Stormwater Management Report and Servicing Brief

Block 121
Residential Development
Ottawa, Ontario

Prepared for:

Richcraft Homes Ltd
2280 St-Laurent Blvd, Suite 201,
Ottawa, ON
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Attention: Jaafar Oleiche

LRL File No.: 240347

June 2025

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1 INTRODUCTION AND SITE DESCRIPTION

LRL Engineering (LRL) was retained by Richcraft Homes Ltd (Richcraft) to complete a Stormwater Management Analysis and Servicing Brief for the development of a proposed seven (7) buildings for a total of 76 townhouse units, located at Renaud Road in Navan, Ottawa.

The subject property consists of four (4) actual lots as shown on Legal Survey plan included in **Appendix E**. The subject lots are zoned DR (Development Reserve) and I1A (Minor Institutional).

Figure 1: Aerial View of Proposed Development

The subject property is located on Renaud Road between Compass Street and De la Melodie Street in Navan, Ottawa. The approximate site dimensions are as follow:

- 200 m frontage on Renaud Road
- 70 m frontage on Compass Street
- 43 m frontage on de la Mélodie Street

- Maximum depth of 100 m

The total site area is approximately **1.30 ha**.

The proposed development will occupy the entire property and be constructed in a single phase. Refer to ***Site Plan*** included in ***Appendix E*** 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 should be advised to review the report recommendations.

2 Existing Site and Drainage Description

The site is currently divided into four lots, three of which contain single-family homes, while one is covered with a gravel surface. Trees are located in the northwest corner of the site, as well as between the gravel area and the residences. Overall, the site is relatively flat. Existing elevations range between 86.15 m and 88.0 m. The existing houses, which are slightly elevated compared to the surrounding terrain, are located at the high points of the site

Sewers and watermain mapping, along with as-built information collected from the City of Ottawa indicate the following existing infrastructure around the site.

Renaud Road:

- 300 mm Φ watermain
- 200 mm Φ sanitary sewer
- 525 mm Φ stormwater sewer

Compass Street

- 200 mm Φ PVC watermain stub
- 200 mm Φ sanitary sewer stub
- 450 mm Φ stormwater sewer stub

De la Melodie Street

- 200 mm Φ PVC watermain
- 200 mm Φ sanitary sewer
- 375 mm Φ stormwater sewer

3 Scope of Work

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

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.

- 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 development.
- Calculate peak flow rates from the development.
- Describe the proposed sanitary sewer system.
- Review impact of increased sanitary flow on downstream sanitary sewer.

Stormwater management

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

4 WATER SUPPLY AND FIRE PROTECTION

4.1 Existing Water Supply Services and Fire Hydrant Coverage

The subject property lies within the City of Ottawa (Navan) water distribution network. There is an existing stub of 200 mm Φ that deserve the site within Compass Street. Existing 300 mm Φ and 200 mm Φ watermains are also located within Renaud Road and De la Melodie Street respectively.

The closest existing fire hydrants that can be used to deserve a part of the site are located on Renaud Road, Compass Street and de la Melodie Street.

4.2 Water Supply Servicing Design

Seven (7) buildings of eight (8) and twelve (12) units are planned on the site for a total of approximately 205.8 people. This population will require a maximum hourly consumption flow rate of 4.21 L/s.

As discussed with the city, the watermain servicing the project must be looped, therefore connected to the existing network in two places. The proposed locations for connections are the existing stub on Compass Street and the watermain on Renaud Road (under pressure connection).

Considering the above, a **150 mm** watermain, a **50mm** water line and **19 mm** service per unit are planned to serve the project. Refer to *Site Servicing Plan* C401 in ***Appendix D*** for servicing layout and connection points.

Table 1 below summarizes the design parameters employed in the preparation of the water demand estimate.

Table 1: Water | City of Ottawa Design Guidelines Parameters

Design Parameter	Value
Residential / Townhouse	2.7 per/unit
Average Daily Demand	280 L/per/d
Minimum Depth of Cover	2.4 m from top of watermain to finished grade
Desired operating pressure range during normal operating conditions	350 kPa and 480 kPa
During normal operating conditions pressure must not drop below	275 kPa
During normal operating conditions pressure shall not exceed	552 kPa
During fire flow operating conditions pressure must not drop below	140 kPa
**Table updated to reflect technical Bulletin ISDTB-2018-02*	

It was determined that the 2-storey buildings will house ***76*** townhouse units. Based on the City of Ottawa Design Guidelines for population projection, this translates to approximately **205.2** residents. Table 2 below summarizes the proposed development as interpreted using Table 4.1 of the City of Ottawa Design Guidelines, and Appendix 4-A of the Sewer Design Guidelines.

Table 2: Water | Development Residential Population Estimate

Proposed Unit type	Persons Per Unit	Number of Units	Population
Townhouse	2.7	76	205.2
		Total Residential Population	205.2

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

$$\boldsymbol{Q} = (\boldsymbol{q} \times \boldsymbol{P} \times \boldsymbol{M})$$

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 MOECP Guidelines;

- Maximum Daily Demand Residential Factor = **4.23**
- Peak Hour Demand Residential Factor = **6.33**

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

- Average daily domestic water demand is **0.67** L/s,
- Maximum daily demand is **2.81** L/s, and
- Maximum hourly is **4.21** L/s.

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

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

Table 3: Water | Summary of Anticipated Demands and Boundary Conditions

Design Parameter	Anticipated Demand (L/s)	Boundary Conditions	
		Compass Street * (m H_2O / kPa)	Renaud Street ** (m H_2O / kPa)
Maximum Daily Demand	2.81	130.5 / 426	130.5 / 427
Max Day + Fire Flow (per FUS)	2.81 + 166.7	127.1 / 393	126.4 / 387
Peak Hour	4.21	127.9 / 401	127.9 / 401
**Assumed Ground elevation at Compass street connection = 82.0 m*			
***Assumed Ground elevation at Renaud Road connection = 87.0 m*			
Water demand calculation per City of Ottawa Water Design guidelines. ***See Appendix B*** *for details.*			

As indicated in Table 3, pressures in all scenarios should meet the required pressure range stated in Table 1 as per City of Ottawa Design Guidelines.

The estimated fire flow for the proposed buildings was calculated in accordance with *ISTB-2018-02*. The following parameters were provided by Richcraft:

- Type of construction – Ordinary Construction
- Occupancy type – Limited Combustibility
- Sprinkler Protection – No Sprinkler System

The estimated fire flow demand was estimated to be **10,000 L/min** (166.7 L/s) for a duration of 2 hours, see ***Appendix A*** for details.

The city fire department requires that fire hydrants be spaced no more than 90 m apart to ensure adequate coverage of the site. There are six (6) new fire hydrants that will deserve the site. Refer to ***Appendix D*** for fire hydrant locations.

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

5 SANITARY SERVICE

5.1 Existing Sanitary Sewer

As mentioned ahead, three (3) sanitary sewers are located near the land to be served. However, the City has indicated that the connection located on Compass Street must be used to service the project. In addition, authorization has been granted to connect the units fronting de la Mélodie Street to the sanitary sewer on that street. The following table details the characteristics of these two networks at the possible connection points.

Table 4: Sanitary | Summary of boundary conditions

Localisation	Pipe Φ	Existing invert at connection
Compass Street	200 mm	80.43 m
De la Mélodie Street	200 mm	± 83.00 m

5.2 Sanitary Sewer Servicing Design

As requested by the City, the project will have to be served by the 200 mm Φ sanitary sewer (manhole MH206A) located on Compass Street. Each townhouse unit will be served by a **135 mm Φ** connection connected to a **200 mm Φ** sewer. The townhouse units located on de la Mélodie Street will also be individually connected to the 200 mm Φ existing sewer on that street

Refer to LRL drawing C401, included in **Appendix D,** for the proposed sanitary servicing.

The parameters used to calculate the anticipated sanitary flows are residential average population per unit of 2.7 person per townhouse unit, a residential daily demand of 280 L/p/day, a residential peaking factor of 4.0 and a total infiltration rate of 0.33 L/s/ha. Based on these parameters and the developed site area of 1.30 ha, the total anticipated wastewater flow to be conveyed along Compass Street was estimated **2.88 L/s**. Refer to ***Appendix B*** for the site sanitary sewer design sheet.

Six townhouse units will also be directly connected to the sanitary sewer on de la Mélodie Street. This will result in an additional peak sanitary flow of ± **0.21 L/s** in this sewer.

As requested in the pre-consultation with City staff, the calculated sanitary demands for the proposed development were coordinated with the City to confirm there is sufficient capacity in the downstream municipal sewers.

6 STORMWATER MANAGEMENT

6.1 Existing Stormwater Infrastructure

As mentioned ahead, three (3) stormwater sewers are located near the land to be served. However, the City has indicated that the connection located on Compass Street must be used to service the project.

In pre-development conditions, drainage from property is depicted by existing watershed ECA-01 (1.30 ha.), drains uncontrolled overland towards surrounding streets and the Creek to the north of the site. The storm sewers beneath Renaud Road and Compass Street also discharge into the creek along Compass Street. Refer to plan C701 included in ***Appendix D*** for pre-development drainage characteristics.

6.2 Design Criteria

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

6.2.1 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 'enhanced' treatment (80% TSS Removal) is required for stormwater runoff from the proposed development.

6.2.2 Water Quantity

Based on pre-consultation with the City, the following stormwater management requirements were identified for the subject site:

- Meet an allowable release rate of 85 liters per second per hectare (L/s/ha).
- Attenuate all storms up to 100-year storm event on post-development site.

The total allowable storm release rate was calculated to be **110.57 L/s**. Refer to ***Appendix C*** for calculations.

6.3 Method of Analysis

The Modified Rational Method has been used to calculate the runoff rate from the site to quantify the detention storage required for quantity control of the development. Refer to ***Appendix C*** for storage calculations.

6.4 Proposed Stormwater Quantity Controls

The proposed stormwater management quantity control for this development will be accomplished through the use of street sags, grading depressions, and eleven flow restrictors (ICD).

The site will be serviced by a main storm sewer with an outlet located on Compass Street. This sewer will collect runoff from building drains as well as catch basins. To prevent surcharge in the section of the sewer collecting the building drains, ICDs have been strategically placed. These ICDs have been sized to ensure that the allowable discharge rate for the site is not exceeded.

During heavier rainfall events, a significant portion of the site runoff will flow overland toward the depression located north of the parking area. For the western portion of the site, the storm network has been designed to allow surcharging and overflow into the depression located at the northwest end of the site.

A treatment unit allowing the removal of 80% of suspended particles as been provided at the site outlet.

The building drains from the units fronting de la Mélodie Street will be connected to the storm sewer on that street.

The proposed servicing layout and connection points are shown on drawing C401 in ***Appendix D***, and detailed calculations can be found in ***Appendix C***.

The site has been analyzed and thirty-two (32) post-development watersheds have been allocated. Refer to post-development watershed plan C702 in ***Appendix D*** for reference.

The site will be serviced via a free-flowing network of 200 mm to 525 mm Φ storm pipes within the proposed private street. The buildings will be serviced via 150 mm Φ storm service laterals.

Stormceptor EF05 Oil-Grit Separator (*OGS*) is proposed downstream of existing STM MH409 which will treat captured flows from the development. The OGS finally discharges flows to the existing storm sewer within Compass Street via a 450 mm Φ storm pipe. Refer to C401 in ***Appendix D*** for servicing layout and connection points.

Table 5 below summarizes post-development drainage areas. Calculations can be seen in ***Appendix C.***

Table 5: SWM | Drainage Areas

	Drainage Area Name	Area (ha)	Weighted Runoff Coefficient (C)	100 Year Weighted Runoff Coefficient (C_{100})
CONTROLLED	CA-01A	0.047	0.76	0.85
	CA-01B	0.011	0.70	0.79
	CA-01C	0.022	0.80	0.90
	CA-01D	0.015	0.76	0.85
	CA-02	0.115	0.80	0.90
	CA-03	0.066	0.29	0.36
	CA-04	0.058	0.85	0.95

	CA-05	0.097	0.73	0.82
	CA-06	0.027	0.70	0.79
	CA-07	0.122	0.81	0.90
	CA-09	0.021	0.89	0.99
	CA-10	0.021	0.89	0.99
	CA-11	0.010	0.26	0.33
	CA-12	0.066	0.62	0.70
	CA-13	0.101	0.74	0.84
	CA-14	0.047	0.57	0.66
	CA-15	0.159	0.81	0.91
	CA-16	0.054	0.30	0.38
	CA-17	0.018	0.80	0.89
	CA-18	0.037	0.43	0.50
UNCONTROLLED	CA-19	0.017	0.65	0.74
	CA-20	0.007	0.63	0.71
	CA-21	0.015	0.64	0.73
	CA-22	0.004	0.90	1.00
	CA-23	0.011	0.75	0.84
	CA-24	0.004	0.90	1.00
	CA-25	0.014	0.63	0.71
	CA-26	0.010	0.33	0.39
	CA-27	0.005	0.90	1.00
	CA-28	0.011	0.78	0.87
	CA-29	0.022	0.20	0.25
	CA-30	0.017	0.20	0.25

Table 6 below summarizes the release rates and storage volumes required to meet the allowable release rate of 110.57 L/s for 100-year flow rates.

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

Catchment Area (CA)	Drainage Area (ha)	100-year Release Rate (L/s)	100-Year Required Storage (m^3)	Total Available Storage (m^3)
CA-14	0.047	5	5.54	5.57
CA-17	0.018	5	1.45	1.65
CA-18	0.037	5	2.11	35.60
Other CA	1.063	61	223.81	235.67
Controlled areas (all)	1.165	76	232.91	278.49
Uncontrolled areas	0.125	33.67	N/A	N/A
TOTAL	**1.29**	**110.57**	**232.91**	**278.49**

To attenuate flows to the allowable release rate of **110.57 L/s**, it is calculated that a total of **232.91 m^3** of storage will be required for 100-year storm event. The required storage is proposed to be met via street sags, grading depression and pipe storage. The total required storage and allowable release rate was divided as per the following.

- ***232.91*** **m^3** is required retention storage corresponding to maximum restricted flow of **76*.89 L/s.*** Eleven (11) Hydrovex-type flow regulators will be installed within the structures in order to achieve a discharge rate of 76 L/s at the network outlet.
- Runoff flow of ***33.67 L/s*** is not controlled.

The 100-year maximum ponding extent can be found on drawing C601 of ***Appendix D***.

6.5 Proposed Stormwater Quality Control

To meet stormwater quality control, a **Stormceptor EF05** Oil/Grit Separator is proposed to provide enhanced (80% TSS removal) treatment. Refer to drawing C401 for location of OGS and ***Appendix C*** for sizing report and specs.

7 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 577. Refer to drawing C101 for erosion and sediment control details.

8 CONCLUSION

This Stormwater Management and Servicing Report for the development proposed 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 **10,000 L/min** using the FUS method.
- There will be three (3) new fire hydrants to service the proposed development.
- The new development will be serviced with a dual 150 mm Φ water service connections to be connected to the existing 200 mm Φ stub within Compass Street and 300 mm Φ watermain within Renaud Road.
- Each unit will be independently serviced by a unique 19 mm Φ pipe.

Sanitary Service

- The total calculated wet wastewater flow from the proposed development is **2.88 L/s.**
- The proposed development will discharge to the existing manhole MH409 on Compass Street via a proposed 200 mm Φ sanitary sewer.
- Each unit will be independently serviced by a unique 135 mm Φ pipe with a minimum slope of 2 %.

Stormwater Management

- The stormwater release rates from the proposed development will meet calculated allowable release rate of **110.57 L/s** (85 L/s/ha).
- Stormwater quantity control objectives will be achieved using street sags, grading depressions, flow restrictors (ICD) and pipe oversizing.
- Each building will be independently serviced by two 150 mm Φ pipe with a minimum slope of 1 %.
- An OGS is proposed to meet the required 80% TSS Removal.

9 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 Engineering

Virginia Johnson, P.Eng.
Civil Engineer

APPENDIX A

Water Supply Calculations

Water Supply Calculations

LRL File No. : 240347
Project: Block 121, Richcraft
Location: Chemin Renaud, Navan, Ottawa
Date: 2025-05-05
Designed: S.Godin, P.Eng

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

Domestic Demand

Unit Type	Persons Per Unit	Number of Units	Population
Townhouse	2,7	76	205,2
	Total	**76**	**205,2**

verage Water Consumption Rate =	280	L/c/d		
Average Day Demand =	**57 456**	**L/d**	**0,67**	**L/s**
Maximum Day Factor =	4,23		(Table 3-3 MOE Peaking Factors)	
Maximum Daily Demand =	**243 147**	**L/d**	**2,81**	**L/s**
Peak Hour Factor =	6,33		(Table 3-3 MOE Peaking Factors)	
Maximum Hour Demand =	**363 791**	**L/d**	**4,21**	**L/s**

Institutional / Commercial / Industrial Demand

Property Type	Unit Rate (L/ha/d)	Area (ha)	Demand (L/d)
Commercial			**0**

Average Day Demand	**-**	**L/d**	**0,000**	**L/s**
Maximum Day Factor	1,5		(Design Guidelines-Water Distribution Table 4.2)	
Maximum Daily Demand	**-**	**L/d**	**0,000**	**L/s**
Peak Hour Factor	1,8		(Design Guidelines-Water Distribution Table 4.2)	
Maximum Hour Demand	**-**	**L/d**	**0,000**	**L/s**

TOTAL DEMAND				
Average Day Demand	**57 456**	**L/d**	**0,67**	**L/s**
Maximum Daily Demand	**243 147**	**L/d**	**2,81**	**L/s**
Maximum Hour Demand	**363 791**	**L/d**	**4,21**	**L/s**

Water Service Pipe Sizing

Q = VA

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

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

Minimum pipe diameter (d) =	$(4Q/\pi V)^{1/2}$		
=	0,055	m	
=	55	mm	
Proposed pipe diameter (d) =	**200**	mm	(to be confirmed with hydraulic pressure analysis)
=	**8**	Inches	

Fire Flow Calculations

LRL File No. 240347
Project: Block 121, Richcraft
Location: Chemin Renaud, Navan, Ottawa
Date: 2025-02-10
Method: Fire Underwriter's Survey (FUS)
Prepared by: S.Godin, P.Eng.

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	Ordinary Construction	**1**		
			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					**1 283**	m^2	
3	Obtain fire flow before reductions	Required fire flow (rounded to nearest 1000)	Fire Flow = 220 x C x $A^{0.5}$				L/min	**8 000**
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	**6 800**
			Limited combustible	-15%				
			Combustible	0%				
			Free burning	15%				
			Rapid burning	25%				
5	Choose reduction for sprinklers	Sprinkler reduction	Full automatic sprinklers	-30%	False	**0%**	L/min	**6 800**
			Water supply is standard for both the system and fire department hose lines	-10%	False	**0%**		
			Fully supervised system	-10%	False	**0%**		
6	Choose separation	Exposure distance between units	North side	10.1 to 20m	15%		L/min	**10 200**
			East side	10.1 to 20m	15%			
			South side	30.1 to 45m	0%			
			West side	3.1 to 10m	20%	**50%**		
Net required fire flow								
7	Obtain fire flow, duration, and volume	Minimum required fire flow rate (rounded to nearest 1000)					L/min	**10 000**
		Minimum required fire flow rate					L/s	**170,0**
		Required duration of fire flow					hr	**2**

Stephane Godin

De: Polyak, Alex <alex.polyak@ottawa.ca>
Envoyé: 13 mai 2025 08:32
À: Stephane Godin
Objet: 6273 Renaud Road | Trailsedge Block 121 | Boundary conditions (PC2025-0018)
Pièces jointes: TrailsedgeBlock121Boundary Condition(08May2025).docx

Hello Stephane,

Please find the boundary conditions for the above file attached.

We also looked at the proposed sanitary flows and based on the existing model, we don't see any concerns with the proposed flows.

Regards,

Oleksandr (Alex) Polyak, B.Eng., C.E.T., P.Eng.
Project Manager, Infrastructure Approvals, Development Review East Branch | Gestionnaire de projet, Direction de l'examen des projets d'aménagement – Est.
Planning, Development and Building Services Department (PDBS) | Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)

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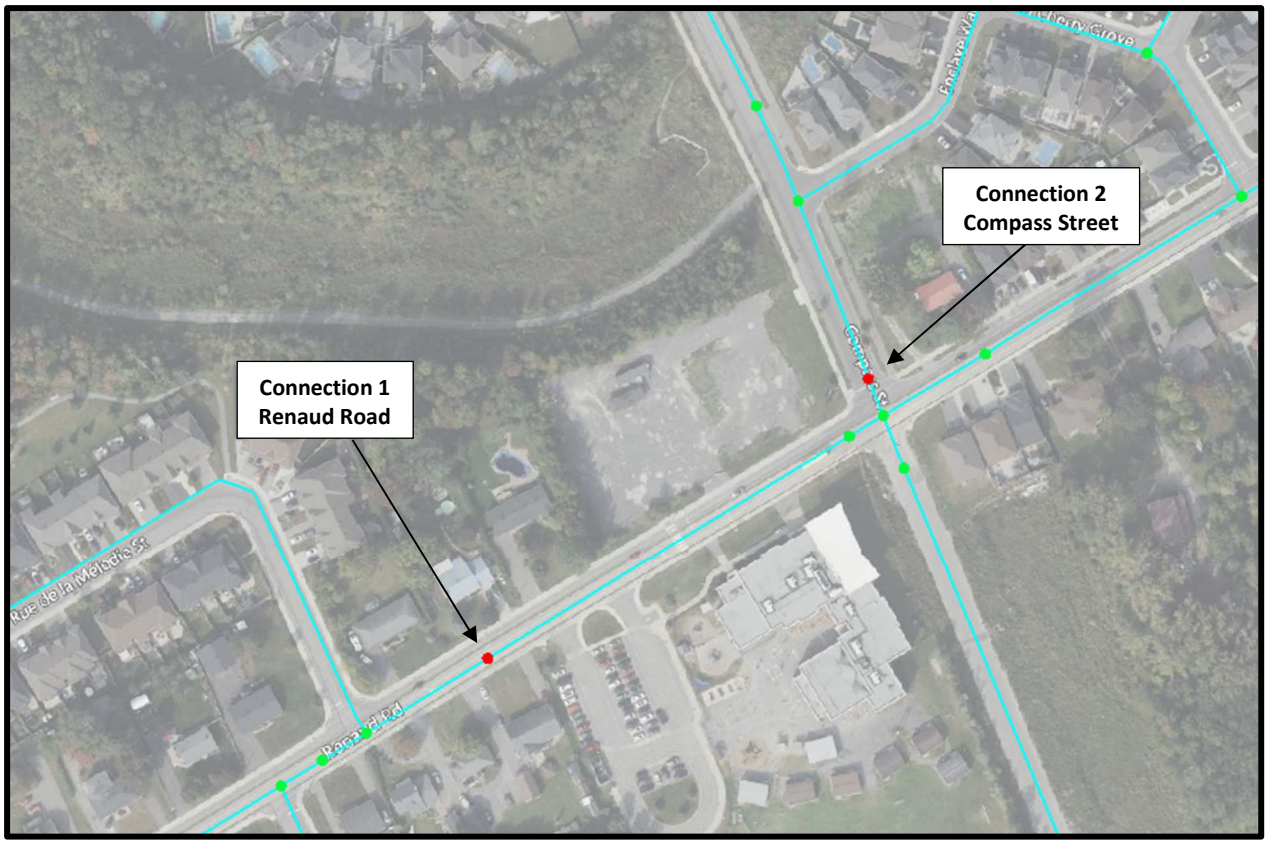
Boundary Conditions
Trailsedge – Block 121

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	40	0.67
Maximum Daily Demand	169	2.81
Peak Hour	253	4.21
Fire Flow Demand #1	10,000	166.67

Location



Results

Connection 1 – Renaud

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.5	61.9
Peak Hour	127.9	58.2
Max Day plus Fire Flow #1	126.4	56.1

[1] Ground Elevation = 87.0 m

Connection 2 – Compass

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.5	61.8
Peak Hour	127.9	58.2
Max Day plus Fire Flow #1	127.1	57.0

[1] Ground Elevation = 82.0 m

Notes

1. The IWSD has recently updated their water modelling software. Any significant difference between previously received BC results and newly received BC results could be attributed to this update.

Disclaimer

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

APPENDIX B

Wastewater Collection Calculations

LRL Associates Ltd.

Sanitary Sewer Design Sheet

LRL File No.: 240347
Project: Block 121, Richcraft
Location: Chemin Renaud, Navan, Ottawa
Designed: S.Godin, P.Eng.
Checked: -
Date: 2025-05-20
DWG. Reference: C401

Sanitary Design Parameters

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

Pipe Design Parameters

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

LOCATION			RESIDENTIAL						COMMERCIAL		INDUSTRIAL			INSTITUTIONAL		C+I+I	INFILTRATION			TOTAL FLOW, Q	PIPE						
STREET	FROM	TO	AREA	POP.	ACCU. AREA	ACCU. POP.	PEAK FACT.	PEAK FLOW	AREA	ACCU. AREA	AREA	ACCU. AREA	PEAK FACT.	AREA	ACCU. AREA	PEAK FLOW	TOTAL AREA	ACCU. AREA	INFILT. FLOW		LENGTH	DIA.	SLOPE	MATERIAL	CAP. Q(FULL)	VEL. V(FULL)	RATIO Q /QFULL
			(Ha)		(Ha)			(L/s)	(Ha)	(Ha)		(Ha)		(Ha)	(Ha)	(L/s)	(Ha)	(Ha)	(L/s)	(L/s)	(m)	(mm)	(%)		(L/s)	(m/s)	
	SAN MH10	SAN MH01	0,08	27,0	0,08	27,0	4,0	0,35									0,08	0,08	0,03	0,38	74,6	200	1,0%	PVC	32,80	1,04	1%
	SAN MH01	SAN MH02	0,08	10,8	0,16	37,8	4,0	0,49									0,08	0,16	0,05	0,54	23,3	200	0,6%	PVC	25,62	0,82	2%
	SAN MH02	SAN MH05	0,08	5,4	0,24	43,2	4,0	0,56									0,08	0,24	0,08	0,64	10,1	200	0,6%	PVC	25,41	0,81	3%
	SAN MH03	SAN MH05	0,08	16,2	0,08	16,2	4,0	0,21									0,08	0,08	0,03	0,24	40,8	200	1,0%	PVC	32,80	1,04	1%
	SAN MH05	SAN MH07	0,08	10,8	0,41	70,2	4,0	0,91									0,08	0,41	0,13	1,04	33,4	200	0,6%	PVC	25,41	0,81	4%
	SAN MH06	SAN MH07	0,08	27,0	0,08	27,0	4,0	0,35									0,08	0,08	0,03	0,38	40,7	200	1,0%	PVC	32,80	1,04	1%
	SAN MH07	SAN MH09	0,08	16,2	0,57	113,4	4,0	1,47									0,08	0,57	0,19	1,66	35,0	200	0,6%	PVC	25,41	0,81	7%
	SAN MH08	SAN MH09	0,08	10,8	0,08	10,8	4,0	0,14									0,08	0,08	0,03	0,17	28,4	200	1,0%	PVC	32,80	1,04	1%
	SAN MH09	SAN MH14	0,08	16,2	0,73	140,4	4,0	1,82									0,08	0,73	0,24	2,06	60,1	200	0,6%	PVC	25,41	0,81	8%
	SAN MH11	SAN MH13	0,08	16,2	0,08	16,2	4,0	0,21									0,08	0,08	0,03	0,24	47,3	200	1,5%	PVC	40,17	1,28	1%
	SAN MH12	SAN MH13	0,08	2,7	0,08	2,7	4,0	0,04									0,08	0,08	0,03	0,06	21,0	200	1,0%	PVC	31,97	1,02	0%
	SAN MH13	SAN MH14	0,08	10,8	0,24	29,7	4,0	0,39									0,08	0,24	0,08	0,47	29,8	200	1,5%	PVC	40,30	1,28	1%
	SAN MH14	SAN MH15	0,08	5,4	1,06	175,5	4,0	2,28									0,08	1,06	0,35	2,62	18,0	200	2,0%	PVC	46,38	1,48	6%
	SAN MH15	SAN MH17	0,08	0,0	1,14	175,5	4,0	2,28									0,08	1,14	0,38	2,65	28,4	200	2,0%	PVC	46,38	1,48	6%
	SAN MH16	SAN MH17	0,08	13,5	0,08	13,5	4,0	0,18									0,08	0,08	0,03	0,20	31,9	200	3,9%	PVC	64,44	2,05	0%
	SAN MH17	EXIST.	0,08	0,0	1,30	189,0	4,0	2,45									0,08	1,30	0,43	2,88	12,0	200	2,0%	PVC	45,92	1,46	6%

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

APPENDIX C

Stormwater Management Calculations
Stormceptor OGS

LRL Engineering
Storm Watershed Summary

LRL File No. 240347
Project: Block 121, Richcraft
Location: Renaud Road, Navan, Ottawa
Date: 2025-05-20
Designed: S.Godin, P. Eng.
Dwg Reference: C701, C702

Pre-Development Catchments

Watershed	C = 0.20	C = 0.80	C = 0.90	Total Area (ha)	Combined C	Combined C
N/A						
Total						

Post-Development Catchments

Watershed	C = 0.20	C = 0.8	C = 0.90	Total Area (ha)	Combined C 2&5 yr	Combined C 100 yr
CA-01A (Controlled)	0,010	0,000	0,037	0,047	0,76	0,85
CA-01B (Controlled)	0,003	0,000	0,008	0,011	0,70	0,79
CA-01C (Controlled)	0,003	0,000	0,019	0,022	0,80	0,90
CA-01D (Controlled)	0,003	0,000	0,012	0,015	0,76	0,85
CA-02 (Controlled)	0,016	0,000	0,099	0,115	0,80	0,90
CA-03 (Controlled)	0,056	0,010	0,000	0,066	0,29	0,36
CA-04 (Controlled)	0,004	0,000	0,054	0,058	0,85	0,95
CA-05 (Controlled)	0,024	0,000	0,074	0,097	0,73	0,82
CA-06 (Controlled)	0,008	0,000	0,019	0,027	0,70	0,79
CA-07 (Controlled)	0,016	0,000	0,106	0,122	0,81	0,90
CA-09 (Controlled)	0,000	0,000	0,021	0,021	0,89	0,99
CA-10 (Controlled)	0,000	0,000	0,021	0,021	0,89	0,99
CA-11 (Controlled)	0,009	0,001	0,000	0,010	0,26	0,33
CA-12 (Controlled)	0,026	0,004	0,037	0,066	0,62	0,70
CA-13 (Controlled)	0,036	0,001	0,117	0,153	0,74	0,83
CA-14 (Controlled)	0,021	0,006	0,019	0,047	0,57	0,66
CA-15 (Controlled)	0,019	0,000	0,139	0,159	0,81	0,91
CA-16 (Controlled)	0,045	0,009	0,000	0,054	0,30	0,38
CA-17 (Controlled)	0,003	0,000	0,015	0,018	0,80	0,89
CA-18 (Controlled)	0,025	0,000	0,012	0,037	0,43	0,50
CA-19 (Un-Controlled)	0,006	0,000	0,011	0,017	0,65	0,74
CA-20 (Un-Controlled)	0,003	0,000	0,005	0,007	0,63	0,71
CA-21 (Un-Controlled)	0,005	0,000	0,009	0,015	0,64	0,73
CA-22 (Un-Controlled)	0,000	0,000	0,004	0,004	0,90	1,00
CA-23 (Un-Controlled)	0,002	0,000	0,008	0,011	0,75	0,84
CA-24 (Un-Controlled)	0,000	0,000	0,004	0,004	0,90	1,00
CA-25 (Un-Controlled)	0,005	0,000	0,009	0,014	0,63	0,71
CA-26 (Un-Controlled)	0,008	0,000	0,002	0,010	0,33	0,39
CA-27 (Un-Controlled)	0,000	0,000	0,005	0,005	0,90	1,00
CA-28 (Un-Controlled)	0,002	0,000	0,009	0,011	0,78	0,87
CA-29 (Un-Controlled)	0,022	0,000	0,000	0,022	0,20	0,25
CA-30 (Un-Controlled)	0,017	0,000	0,000	0,017	0,20	0,25
Total	**0,397**	**0,031**	**0,873**	**1,301**	**0,68**	**0,77**

LRL File No. 240347
Project: Block 121, Richcraft
Location: Renaud Road, Navan, Ottawa
Date: 2025-05-20
Designed: S.Godin, P. Eng.

Stormwater Management Design Sheet

STORM - 100 YEAR

Runoff Equation

Q = 2.78CIA (L/s)

C = Runoff coefficient

I = Rainfall intensity (mm/hr) = A x T_d^B (Ref.: Environment and Climate Change Canada, 2022)

A = Area (ha)

T_d = Time of duration (min)

Pre-Development Release Rate

IDF Curve Equations (Ottawa Macdonald-Cartier Airport)

$I_{100} = 48,4 \times Td^{-0,688}$ A = 48,4 B = -0,688

C =	0,50	(max of 0,5 as per City Guidelines)	
I_{100} =	125,6	mm/hr	
T_d =	15	min	
A =	1,30	ha	
100 Year Release Rate =	227,14	L/s	
Allowable Release Rate =	**110,57**	L/s	**(85 L/s/ha)**

Post-development Stormwater Management

					$\sum R_{2\&5}$	$\sum R_{100}$
	Total Site Area =	**Area**	**ha**	**$\sum R$ =**	**0,68**	**0,85**
	CA-01A (Controlled)	0,047	ha	R =	0,76	0,85
	CA-01B (Controlled)	0,011	ha	R =	0,70	0,79
	CA-01C (Controlled)	0,022	ha	R =	0,80	0,90
	CA-01D (Controlled)	0,015	ha	R =	0,76	0,85
	CA-02 (Controlled)	0,115	ha	R =	0,80	0,90
	CA-03 (Controlled)	0,066	ha	R =	0,29	0,36
	CA-04 (Controlled)	0,058	ha	R =	0,85	0,95
	CA-05 (Controlled)	0,097	ha	R =	0,73	0,82
	CA-06 (Controlled)	0,027	ha	R =	0,70	0,79
	CA-07 (Controlled)	0,122	ha	R =	0,81	0,90
	CA-09 (Controlled)	0,021	ha	R =	0,89	0,99
	CA-10 (Controlled)	0,021	ha	R =	0,89	0,99
	CA-11 (Controlled)	0,010	ha	R =	0,26	0,33
	CA-12 (Controlled)	0,066	ha	R =	0,62	0,70
	CA-13 (Controlled)	0,153	ha	R =	0,74	0,83
	CA-14 (Controlled)	0,047	ha	R =	0,57	0,66
	CA-15 (Controlled)	0,159	ha	R =	0,81	0,91
	CA-16 (Controlled)	0,054	ha	R =	0,30	0,38
	CA-17 (Controlled)	0,018	ha	R =	0,80	0,89
	CA-18 (Controlled)	0,037	ha	R =	0,43	0,50
	Total (controlled)	**1,165**	**ha**	**R =**	**0,70**	**0,79**
	CA-19 (Un-Controlled)	0,017	ha	R =	0,65	0,74
	CA-20 (Un-Controlled)	0,007	ha	R =	0,63	0,71
	CA-21 (Un-Controlled)	0,015	ha	R =	0,64	0,73
	CA-22 (Un-Controlled)	0,004	ha	R =	0,90	1,00
	CA-23 (Un-Controlled)	0,011	ha	R =	0,75	0,84

LRL File No. 240347
Project: Block 121, Richcraft
Location: Renaud Road, Navan, Ottawa
Date: 2025-05-20
Designed: S.Godin, P. Eng.

Stormwater Management Design Sheet

	CA-24 (Un-Controlled)	0,004	ha	R =	0,90	1,00
	CA-25 (Un-Controlled)	0,014	ha	R =	0,63	0,71
	CA-26 (Un-Controlled)	0,010	ha	R =	0,33	0,39
	CA-27 (Un-Controlled)	0,005	ha	R =	0,90	1,00
	CA-29 (Un-Controlled)	0,022	ha	R =	0,20	0,25
	CA-30 (Un-Controlled)	0,017	ha	R =	0,20	0,25
	Total (uncontrolled)	**0,125**	**ha**	**R =**	**0,51**	**0,59**
	Total	**1,289**	**ha**	**R =**	**0,68**	**0,77**

100 Year Post-development Stormwater Management

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	166,04	424,83	208,76	76,89	33,67	**110,57**
15	125,62	321,41	220,06	76,89	25,48	102,37
20	103,06	263,70	224,16	76,89	20,90	97,80
25	88,40	226,17	223,91	76,89	17,93	94,82
30	77,97	199,50	220,70	76,89	15,81	92,71
35	70,13	179,43	215,32	76,89	14,22	91,12
40	63,97	163,68	208,28	76,89	12,97	89,87
45	58,99	150,94	199,92	76,89	11,96	88,86
50	54,87	140,38	190,47	76,89	11,13	88,02
55	51,39	131,47	180,11	76,89	10,42	87,32
60	48,40	123,83	168,98	76,89	9,82	86,71
65	45,81	117,20	157,19	76,89	9,29	86,18
70	43,53	111,37	144,81	76,89	8,83	85,72
75	41,51	106,21	131,92	76,89	8,42	85,31
80	39,71	101,60	118,58	76,89	8,05	84,95
85	38,09	97,45	104,82	76,89	7,72	84,62
90	36,62	93,69	90,69	76,89	7,43	84,32
95	35,28	90,27	76,23	76,89	7,16	84,05
100	34,06	87,14	61,46	76,89	6,91	83,80
105	32,93	84,26	46,41	76,89	6,68	83,57
110	31,90	81,61	31,11	76,89	6,47	83,36
115	30,94	79,15	15,56	76,89	6,27	83,17
120	30,04	76,87	0,00	76,89	6,09	82,99
125	29,21	74,74	0,00	76,89	5,92	82,82
130	28,43	72,75	0,00	76,89	5,77	82,66
135	27,70	70,88	0,00	76,89	5,62	82,51
140	27,02	69,13	0,00	76,89	5,48	82,37
145	26,37	67,48	0,00	76,89	5,35	82,24
150	25,77	65,93	0,00	76,89	5,23	82,12
155	25,19	64,46	0,00	76,89	5,11	82,00
160	24,65	63,06	0,00	76,89	5,00	81,89
165	24,13	61,74	0,00	76,89	4,89	81,79
170	23,64	60,49	0,00	76,89	4,79	81,69
175	23,17	59,29	0,00	76,89	4,70	81,59

On-site stormwater detention

Storage required = 224,16 m^3
Storage provided = 258,38 m^3 (Refer to DWG C601)

LRL File No. 240347
Project: Block 121, Richcraft
Location: Renaud Road, Navan, Ottawa
Date: 2025-05-20
Designed: S.Godin, P. Eng.

Stormwater Management Design Sheet

STORM - 100 YEAR

Runoff Equation

Q = 2.78CIA (L/s)

C = Runoff coefficient

I = Rainfall intensity (mm/hr) = A x T_d^B (Ref.: Environment and Climate Change Canada, 2022)

A = Area (ha)

T_d = Time of duration (min)

Pre-Development Release Rate

IDF Curve Equations (Ottawa Macdonald-Cartier Airport)

I_{100} = 48,4 x $Td^{-0,688}$ A = 48,4 B = -0,688

C =	0,50	(max of 0,5 as per City Guidelines)	
I_{100} =	125,6	mm/hr	
T_d =	15	min	
A =	1,30	ha	
100 Year Release Rate =	227,14	L/s	
Allowable Release Rate =	**110,57**	L/s	**(85 L/s/ha)**

Post-development Stormwater Management

					$\sum R_{2\&5}$	$\sum R_{100}$
	Total Site Area =	**Area**	**ha**	**$\sum$R =**	**0,68**	**0,85**
	CA-01A (Controlled)	0,047	ha	R =	0,76	0,85
	CA-01B (Controlled)	0,011	ha	R =	0,70	0,79
	CA-01C (Controlled)	0,022	ha	R =	0,80	0,90
	CA-01D (Controlled)	0,015	ha	R =	0,76	0,85
	CA-02 (Controlled)	0,115	ha	R =	0,80	0,90
	CA-03 (Controlled)	0,066	ha	R =	0,29	0,36
	CA-04 (Controlled)	0,058	ha	R =	0,85	0,95
	CA-05 (Controlled)	0,097	ha	R =	0,73	0,82
	CA-06 (Controlled)	0,027	ha	R =	0,70	0,79
	CA-07 (Controlled)	0,122	ha	R =	0,81	0,90
	CA-09 (Controlled)	0,021	ha	R =	0,89	0,99
	CA-10 (Controlled)	0,021	ha	R =	0,89	0,99
	CA-11 (Controlled)	0,010	ha	R =	0,26	0,33
	CA-12 (Controlled)	0,066	ha	R =	0,62	0,70
	CA-13 (Controlled)	0,153	ha	R =	0,74	0,83
	CA-14 (Controlled)	0,047	ha	R =	0,57	0,66
	CA-15 (Controlled)	0,159	ha	R =	0,81	0,91
	CA-16 (Controlled)	0,054	ha	R =	0,30	0,38
	CA-17 (Controlled)	0,018	ha	R =	0,80	0,89
	CA-18 (Controlled)	0,037	ha	R =	0,43	0,50
	Total (controlled)	**1,165**	**ha**	**R =**	**0,70**	**0,79**

LRL File No. 240347
Project: Block 121, Richcraft
Location: Renaud Road, Navan, Ottawa
Date: 2025-05-20
Designed: S.Godin, P. Eng.

Stormwater Management Design Sheet

	CA-19 (Un-Controlled)	0,017	ha	R =	0,65	0,74
	CA-20 (Un-Controlled)	0,007	ha	R =	0,63	0,71
	CA-21 (Un-Controlled)	0,015	ha	R =	0,64	0,73
	CA-22 (Un-Controlled)	0,004	ha	R =	0,90	1,00
	CA-23 (Un-Controlled)	0,011	ha	R =	0,75	0,84
	CA-24 (Un-Controlled)	0,004	ha	R =	0,90	1,00
	CA-25 (Un-Controlled)	0,014	ha	R =	0,63	0,71
	CA-26 (Un-Controlled)	0,010	ha	R =	0,33	0,39
	CA-27 (Un-Controlled)	0,005	ha	R =	0,90	1,00
	CA-29 (Un-Controlled)	0,022	ha	R =	0,20	0,25
	CA-30 (Un-Controlled)	0,017	ha	R =	0,20	0,25
	Total (uncontrolled)	**0,125**	**ha**	**R =**	**0,51**	**0,59**
	Total	**1,289**	**ha**	**R =**	**0,68**	**0,77**

100 Year Post-development Stormwater Management

Catchment area 14 (CA-14)

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	166,04	14,24	5,54	5,00	0,00	**5,00**
15	125,62	10,77	5,20	5,00	0,00	5,00
20	103,06	8,84	4,61	5,00	0,00	5,00
25	88,40	7,58	3,87	5,00	0,00	5,00
30	77,97	6,69	3,04	5,00	0,00	5,00

Catchment area 17 (CA-17)

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	166,04	7,41	1,45	5,00	0,00	**5,00**
15	125,62	5,61	0,54	5,00	0,00	5,00
20	103,06	4,60	0,00	5,00	0,00	5,00
25	88,40	3,94	0,00	5,00	0,00	5,00
30	77,97	3,48	0,00	5,00	0,00	5,00

Catchment area 18 (CA-18)

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	166,04	8,52	2,11	5,00	0,00	**5,00**
15	125,62	6,44	1,30	5,00	0,00	5,00
20	103,06	5,29	0,34	5,00	0,00	5,00
25	88,40	4,53	0,00	5,00	0,00	5,00
30	77,97	4,00	0,00	5,00	0,00	5,00

LRL File No. 240347
Project: Block 121, Richcraft
Location: Renaud Road, Navan, Ottawa
Date: 2025-05-20
Designed: S.Godin, P. Eng.

Stormwater Management Design Sheet

Other controlled catchment area

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	166,04	394,66	200,20	61,00	33,67	**110,57**
15	125,62	298,59	213,83	61,00	25,48	86,48
20	103,06	244,97	220,77	61,00	20,90	81,90
25	88,40	210,11	223,66	61,00	17,93	78,93
30	77,97	185,34	223,81	61,00	15,81	76,81
35	70,13	166,69	221,95	61,00	14,22	75,22
40	63,97	152,06	218,54	61,00	12,97	73,97
45	58,99	140,22	213,90	61,00	11,96	72,96
50	54,87	130,42	208,25	61,00	11,13	72,13
55	51,39	122,14	201,76	61,00	10,42	71,42
60	48,40	115,04	194,55	61,00	9,82	70,82

On-site stormwater detention

Storage required = **232,91** m^3

Storage provided = **278,49** m^3 (Including pipes and structures)

(Refer to DWG C601)

Stormceptor®

Rinker MATERIALS® A QUIKRETE® COMPANY

Stormceptor® EF Sizing Report

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

05/14/2025

Province:	Ontario
City:	Ottawa
Nearest Rainfall Station:	OTTAWA CDA RCS
Climate Station Id:	6105978
Years of Rainfall Data:	20

Site Name:	Renaud Road

Drainage Area (ha):	1.165
Runoff Coefficient 'c':	0.79

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	29.70
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	76.00
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	1036
Estimated Average Annual Sediment Volume (L/yr):	842

Project Name:	Richcraft - Block 121
Project Number:	240347
Designer Name:	Jessica Steffler
Designer Company:	Forterra Pipe & Precast
Designer Email:	jessica.steffler@RinkerPipe.com
Designer Phone:	519-239-6958
EOR Name:	Stephane Godin
EOR Company:	LRL Engineering
EOR Email:	sgodin@lrl.ca
EOR Phone:	613-842-3434

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	74
EFO5	80
EFO6	85
EFO8	92
EFO10	95
EFO12	97

Recommended Stormceptor EFO Model: EFO5

Estimated Net Annual Sediment (TSS) Load Reduction (%): 80

Water Quality Runoff Volume Capture (%): > 90

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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.

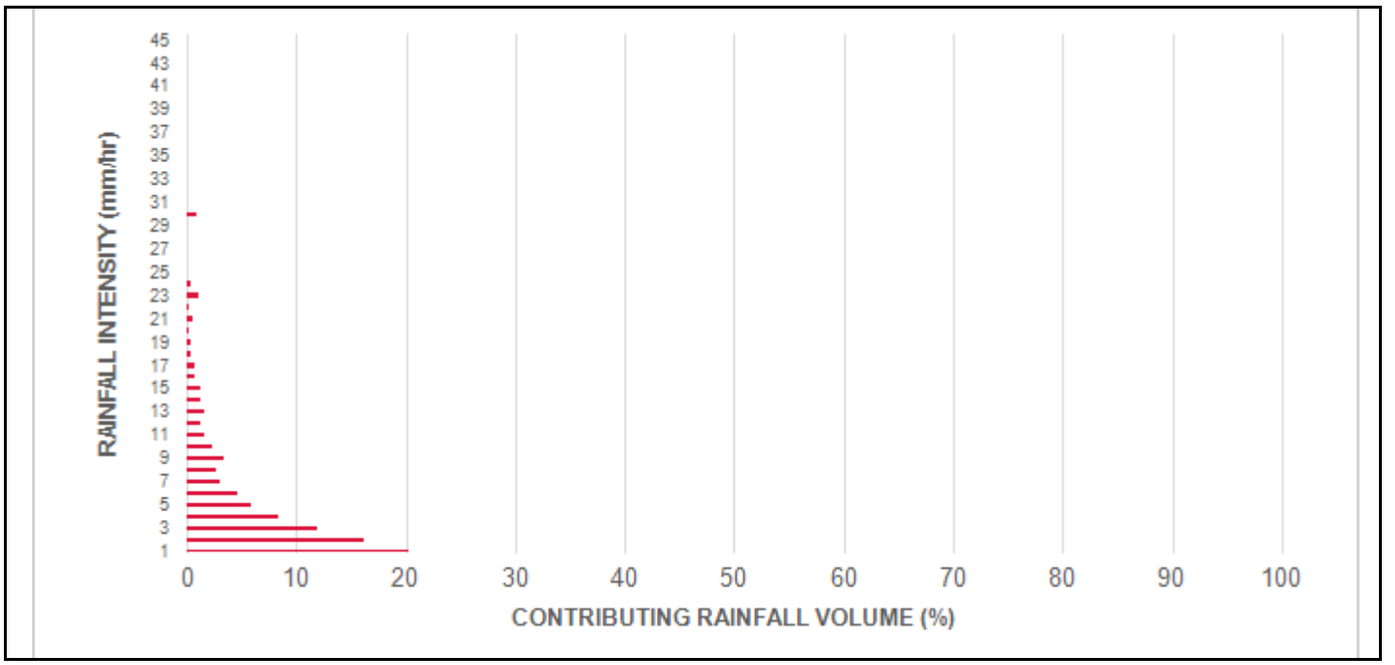
Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Stormceptor® EF Sizing Report

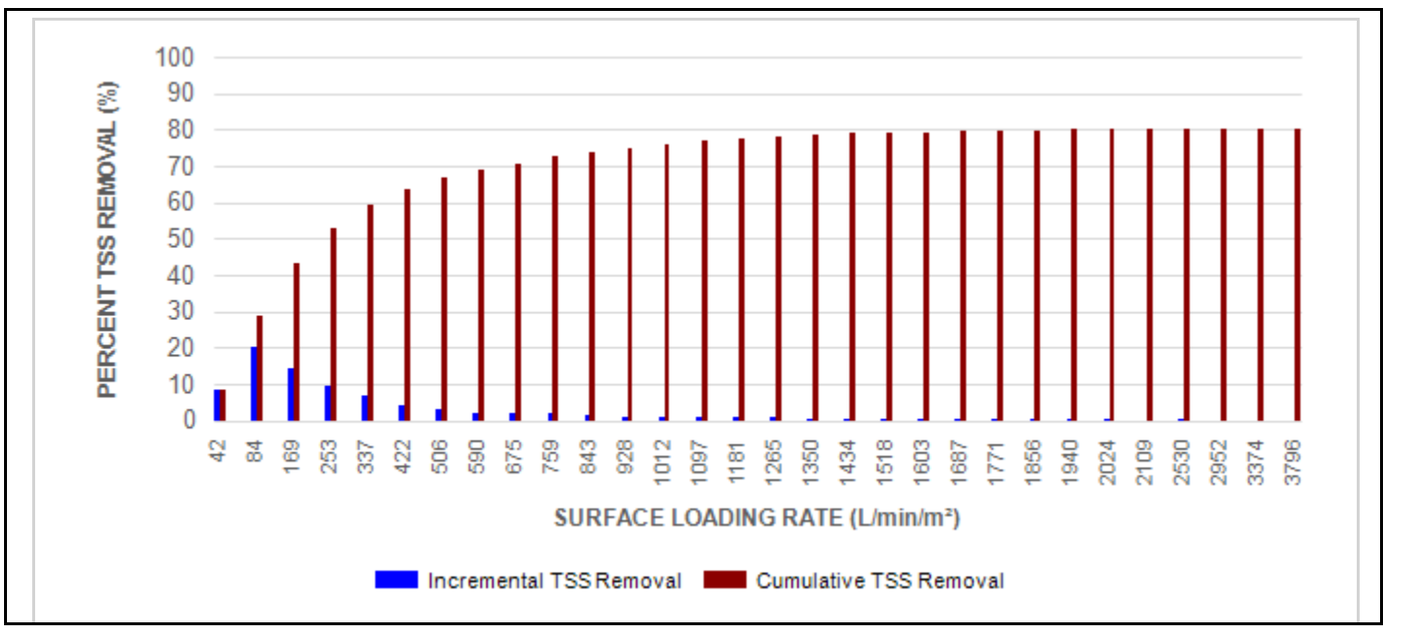
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.6	8.6	1.28	77.0	42.0	100	8.6	8.6
1.00	20.3	29.0	2.56	154.0	84.0	98	20.0	28.6
2.00	16.2	45.2	5.12	307.0	169.0	88	14.3	43.0
3.00	12.0	57.2	7.68	461.0	253.0	81	9.7	52.6
4.00	8.4	65.6	10.23	614.0	337.0	77	6.5	59.2
5.00	5.9	71.6	12.79	768.0	422.0	73	4.3	63.5
6.00	4.6	76.2	15.35	921.0	506.0	69	3.2	66.7
7.00	3.1	79.3	17.91	1075.0	590.0	65	2.0	68.7
8.00	2.7	82.0	20.47	1228.0	675.0	64	1.8	70.4
9.00	3.3	85.3	23.03	1382.0	759.0	63	2.1	72.6
10.00	2.3	87.6	25.59	1535.0	843.0	63	1.4	74.0
11.00	1.6	89.2	28.14	1689.0	928.0	62	1.0	75.0
12.00	1.3	90.5	30.70	1842.0	1012.0	61	0.8	75.8
13.00	1.7	92.2	33.26	1996.0	1097.0	59	1.0	76.8
14.00	1.2	93.5	35.82	2149.0	1181.0	57	0.7	77.5
15.00	1.2	94.6	38.38	2303.0	1265.0	56	0.6	78.1
16.00	0.7	95.3	40.94	2456.0	1350.0	53	0.4	78.5
17.00	0.7	96.1	43.50	2610.0	1434.0	51	0.4	78.9
18.00	0.4	96.5	46.05	2763.0	1518.0	48	0.2	79.1
19.00	0.4	96.9	48.61	2917.0	1603.0	46	0.2	79.3
20.00	0.2	97.1	51.17	3070.0	1687.0	44	0.1	79.4
21.00	0.5	97.5	53.73	3224.0	1771.0	41	0.2	79.6
22.00	0.2	97.8	56.29	3377.0	1856.0	40	0.1	79.7
23.00	1.0	98.8	58.85	3531.0	1940.0	38	0.4	80.0
24.00	0.3	99.1	61.41	3684.0	2024.0	36	0.1	80.1
25.00	0.0	99.1	63.96	3838.0	2109.0	35	0.0	80.1
30.00	0.9	100.0	76.76	4605.0	2530.0	29	0.3	80.4
35.00	0.0	100.0	89.55	5373.0	2952.0	25	0.0	80.4
40.00	0.0	100.0	102.34	6141.0	3374.0	22	0.0	80.4
45.00	0.0	100.0	115.14	6908.0	3796.0	20	0.0	80.4
Estimated Net Annual Sediment (TSS) Load Reduction =								**80 %**

Climate Station ID: 6105978 *Years of Rainfall Data*: 20

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
EF5 / EFO5	1.5	5	90	762	30	762	30	710	25
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

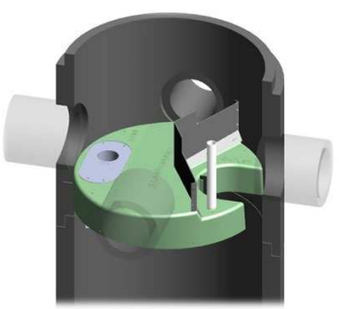
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test 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.

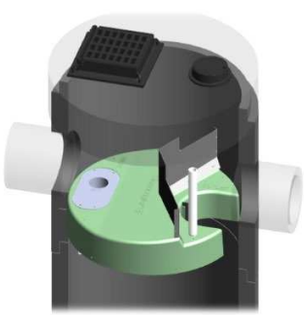
DESIGN FLEXIBILITY

►**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.





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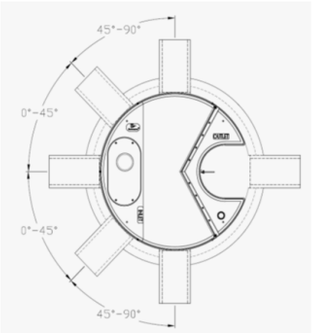

INLET-TO-OUTLET DROP

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)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF5 / EFO5	1.5	5	1.62	5.3	420	111	305	10	2124	75	2612	5758
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/ft^3)

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 TREAMENT 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
	5 ft (1524 mm) Diameter OGS Units:	1.95 m^3 sediment / 420 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

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/m^2 to 1400 L/min/m^2, 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/m^2 and 1400 L/min/m^2 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/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 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/m^2.

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

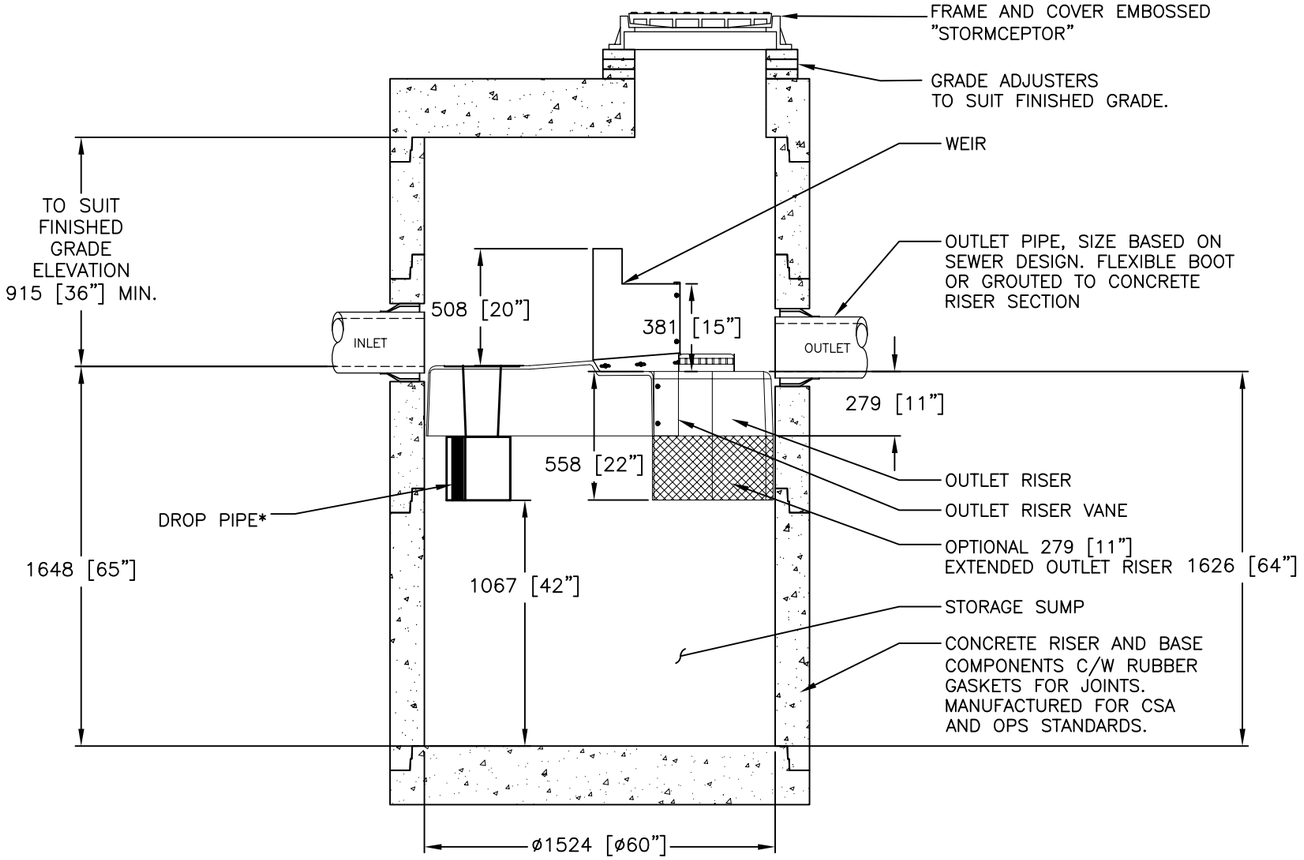
3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

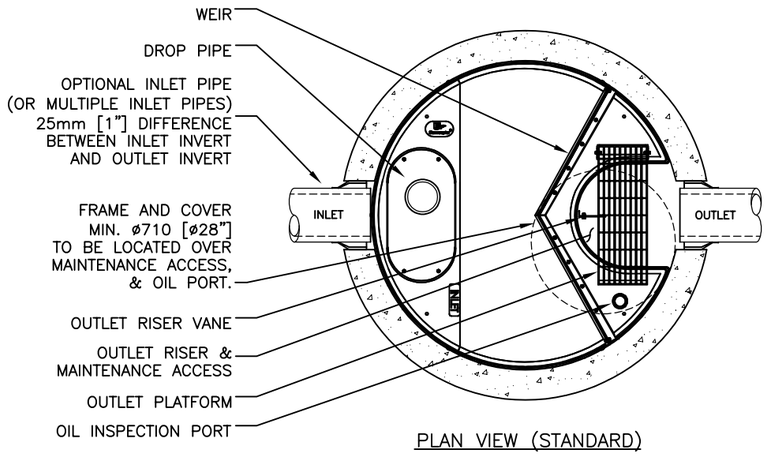
The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 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/m^2 to 2600 L/min/m^2) 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.

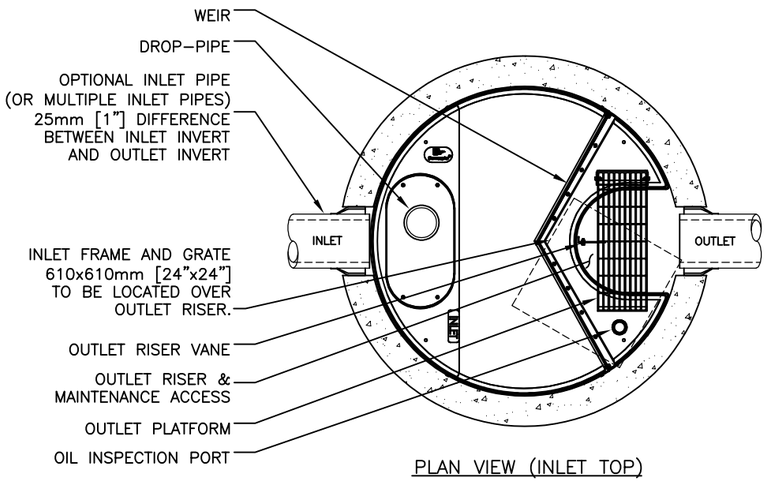
DRAWING NOT TO BE USED FOR CONSTRUCTION



SECTION VIEW



PLAN VIEW (STANDARD)



PLAN VIEW (INLET TOP)

GENERAL NOTES:

* MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m^2 (27.9 gpm/ft^2) FOR STORMCEPTOR EF5 AND 535 L/min/m^2 (13.1 gpm/ft^2) FOR STORMCEPTOR EFO5 (OIL CAPTURE CONFIGURATION).

1. ALL DIMENSIONS INDICATED ARE IN MILLIMETERS (INCHES) UNLESS OTHERWISE SPECIFIED.
2. STORMCEPTOR STRUCTURE INLET AND OUTLET PIPE SIZE AND ORIENTATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.
3. UNLESS OTHERWISE NOTED, BYPASS INFRASTRUCTURE, SUCH AS ALL UPSTREAM DIVERSION STRUCTURES, CONNECTING STRUCTURES, OR PIPE CONDUITS CONNECTING TO COMPLETE THE STORMCEPTOR SYSTEM SHALL BE PROVIDED AND ADDRESSED SEPARATELY.
4. DRAWING FOR INFORMATION PURPOSES ONLY. REFER TO ENGINEER'S SITE/UTILITY PLAN FOR STRUCTURE ORIENTATION.
5. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT THE DEVICE FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. DEVICE ACTIVATION, BY CONTRACTOR, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE STORMCEPTOR UNIT IS CLEAN AND FREE OF DEBRIS.

FOR SITE SPECIFIC DRAWINGS PLEASE CONTACT YOUR LOCAL STORMCEPTOR REPRESENTATIVE. SITE SPECIFIC DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME. SOME FIELD REVISIONS TO THE SYSTEM LOCATION OR CONNECTION PIPING MAY BE NECESSARY BASED ON AVAILABLE SPACE OR SITE CONFIGURATION REVISIONS. ELEVATIONS SHOULD BE MAINTAINED EXCEPT WHERE NOTED ON BYPASS STRUCTURE (IF REQUIRED).

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

STORMCEPTOR MODEL	EFO5
STRUCTURE ID	*
HYDROCARBON STORAGE REQ'D (L)	*
WATER QUALITY FLOW RATE (L/s)	*
PEAK FLOW RATE (L/s)	*
RETURN PERIOD OF PEAK FLOW (yrs)	*
DRAINAGE AREA (HA)	*
DRAINAGE AREA IMPERVIOUSNESS (%)	*

PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*

* PER ENGINEER OF RECORD

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MARK	DATE	REVISION DESCRIPTION	BY
####	####	####	####
0	08/22/24	INITIAL RELEASE	EC
####	####	####	####
####	####	####	####
####	####	####	####

Stormceptor® EF

SCALE = NTS

imbrium
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APPENDIX D

Civil Engineering Drawings

PROPOSED SITE DEVELOPMENT
CORNER OF RENAUD RD & COMPASS ST
ORLEANS, ON

REVISION 01

KEY PLAN (N.T.S.)

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PROPOSED SITE DEVELOPMENT
CORNER OF RENAUD RD & COMPASS ST, ORLEANS, ON
REV.01 - ISSUED FOR APPROVAL - JUNE 26, 2025
LRL PROJECT no: 240347

LICENSED PROFESSIONAL ENGINEER
V. JOHNSON
100510576
06-26-2025
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

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 NOTIFY 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 SERVICING 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 MOMENT'S 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 (WEEKLY), 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 WATERCOURSE AND AVOIDS DAMAGE TO EXISTING SITE FEATURES. 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 IS REQUIRED TO IMPLEMENT SEDIMENT AND EROSION CONTROL MEASURES AT LEAST ONE WEEK BEFORE THE COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES. THESE MEASURES SHOULD BE THOROUGHLY INSTALLED TO EFFECTIVELY MANAGE SOIL EROSION AND SEDIMENT RUNOFF. FOLLOWING INSTALLATION, THE CONTRACTOR MUST CONDUCT INSPECTIONS OF THESE CONTROL MEASURES ON A WEEKLY BASIS TO ENSURE THEIR ONGOING EFFECTIVENESS AND FUNCTIONALITY.

IN ADDITION TO THE REGULAR WEEKLY INSPECTIONS, THE CONTRACTOR MUST ALSO CARRY OUT ADDITIONAL INSPECTIONS IN THE AFTERMATH OF ANY MAJOR RAINFALL EVENTS. THIS WILL HELP ASSESS THE PERFORMANCE OF THE EROSION CONTROL MEASURES UNDER INCREASED WATER FLOW CONDITIONS. ANY DEFICIENCIES OR DAMAGES IDENTIFIED DURING THESE INSPECTIONS MUST BE PROMPTLY REPAIRED TO MAINTAIN COMPLIANCE AND ENSURE THE INTEGRITY OF THE CONSTRUCTION SITE.

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 TAT ALL, THE CONTRACTOR ADMINISTRATOR OR A REGULATORY AGENCY HAS THE RIGHT TO IMMEDIATELY WITHDRAW ITS PERMISSION TO CONTINUE THE WORK BUT MAY RENEW 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, STEAMS, CREEKS, WOODLOTS, AND ANY ENVIRONMENTALLY SENSITIVE AREAS, OR AS OTHERWISE SPECIFIED.
2. THE CONTRACTOR MUST IMPLEMENT ALL NECESSARY MEASURES IN ORDER TO PREVENT 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 ENGINEER'S 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 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 PAINTING 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 & 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

15. ROADWORK TO BE COMPLETED IN ACCORDANCE WITH GEOTECHNICAL REPORT, PREPARED BY LRL ASSOCIATES. DATED NOVEMBER 2020.
16. AL TOPSOIL AND ORGANIC MATERIAL SHALL BE STRIPPED WITHIN THE ROAD ALLOWANCE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND STOCK PILLED ON SITE AS DIRECTED BY NATIONAL MUNICIPALITY.
17. THE SUBGRADE SHALL BE CROWNED AND SLOPED AT LEAST 2% AND PROOF ROLLED WITH HEAVY ROLLERS.
18. SUB-EXCAVATE SOFT AREAS AND FILL WITH GRANULAR 'A', TYPE II COMPACTED IN MAXIMUM 300MM LIFTS.
19. ALL GRANULAR FOR ROADS SHALL BE COMPACTED TO MINIMUM OF 100% STANDARD PROCTOR DENSITY MAXIMUM DRY DENSITY (SPMDD).
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 S8. 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 FROST 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% SPMDD. 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. "MODULOC" 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 SEWER 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

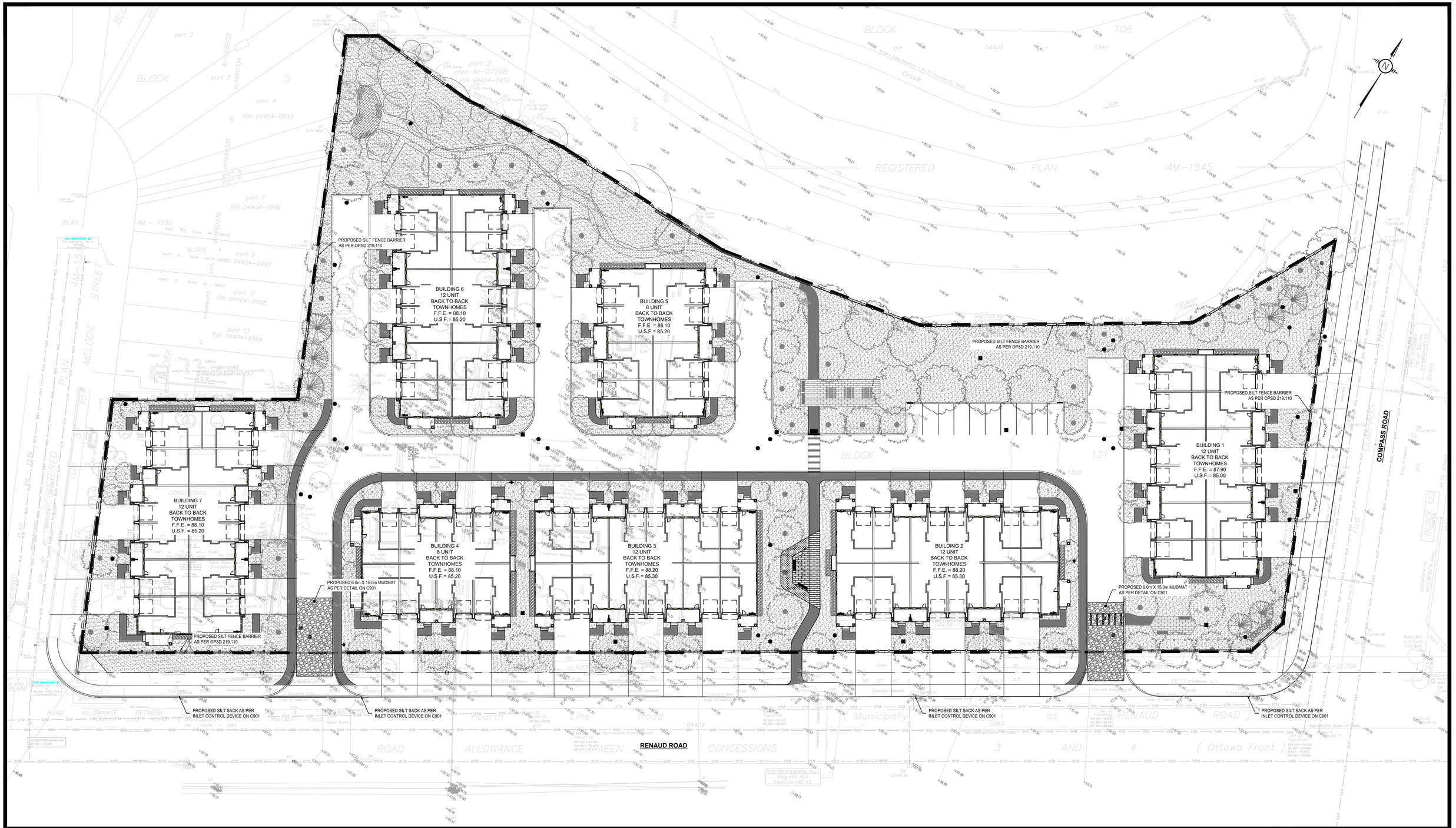
17. ALL REINFORCED CONCRETE STORM SEWER PIPE SHALL BE IN ACCORDANCE WITH CSA A257.2, OR LATEST AMENDMENT. ALL NON-REINFORCED CONCRETE STORM SEWER PIPE SHALL BE IN ACCORDANCE WITH CSA A257.1, OR LATEST AMENDMENT. PIPE SHALL BE JOINED WITH STD. RUBBER GASKETS AS PER CSA A257.3, OR LATEST AMENDMENT.
18. 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-900 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 TWU OR RWU 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 0.5M PER MOE GUIDELINES. FOR CROSSING UNDER SEWERS, ADEQUATE STRUCTURAL SUPPORT FOR THE SEWER IS REQUIRED TO PREVENT EXCESSIVE DEFLECTION OF JOINTS AND SETTLING. 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 HYDRANT LOCATION AS PER STD DWG W18.
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.

LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED CURB
- PROPOSED DEPRESSED CURB
- PROPOSED TERRACING (3:1 MIN.)
- PROPOSED SILT FENCE AS PER OPSD 219.110
- PROPOSED GRASS AREA (100mm TOP SOIL & SOD)
- PROPOSED CONCRETE FEATURES/SLAB
- PROPOSED HEAVY DUTY ASPHALT
- PROPOSED LIGHT DUTY ASPHALT
- ×50.00 PROPOSED ELEVATION
- ×50.00BC PROPOSED BOTTOM OF CURB / ASPHALT ELEVATION
- ×50.00TC PROPOSED TOP OF CURB ELEVATION
- ×50.00BW PROPOSED BOTTOM OF EXPOSED RETAINING WALL
- ×50.00TW PROPOSED TOP OF RETAINING WALL
- ×50.00EX MATCH INTO EXISTING ELEVATION
- ×70.19 EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- STM STM PROPOSED STORM SEWER
- SAN SAN PROPOSED SANITARY SEWER
- WTR WTR PROPOSED WATERMAIN



USE AND INTERPRETATION OF DRAWINGS

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5m 2 0 5 10m

SCALE: 1:300

LICENSED PROFESSIONAL ENGINEER
V. JOHNSON
100510576
06-26-2025
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

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

No.	REVISIONS	BY	DATE
01	ISSUED FOR APPROVAL	M.L.	26 JUNE 2025

CLIENT
RICHCRAFT HOMES LTD.

DESIGNED BY:	DRAWN BY:	APPROVED BY:
M.L.	M.L.	S.G.

PROJECT
SITE DEVELOPMENT
CORNER OF RENAUD RD & COMPASS ST
ORLEANS, ON

DRAWING TITLE
EROSION AND SEDIMENT CONTROL PLAN

PROJECT NO.
240347

DATE
JAN 2025

C101

EXISTING SHEDS TO BE REMOVED

EXISTING SHED TO BE REMOVED

EXISTING SHED TO BE REMOVED

EXISTING SHED TO BE REMOVED

EXISTING BUILDING TO BE REMOVED

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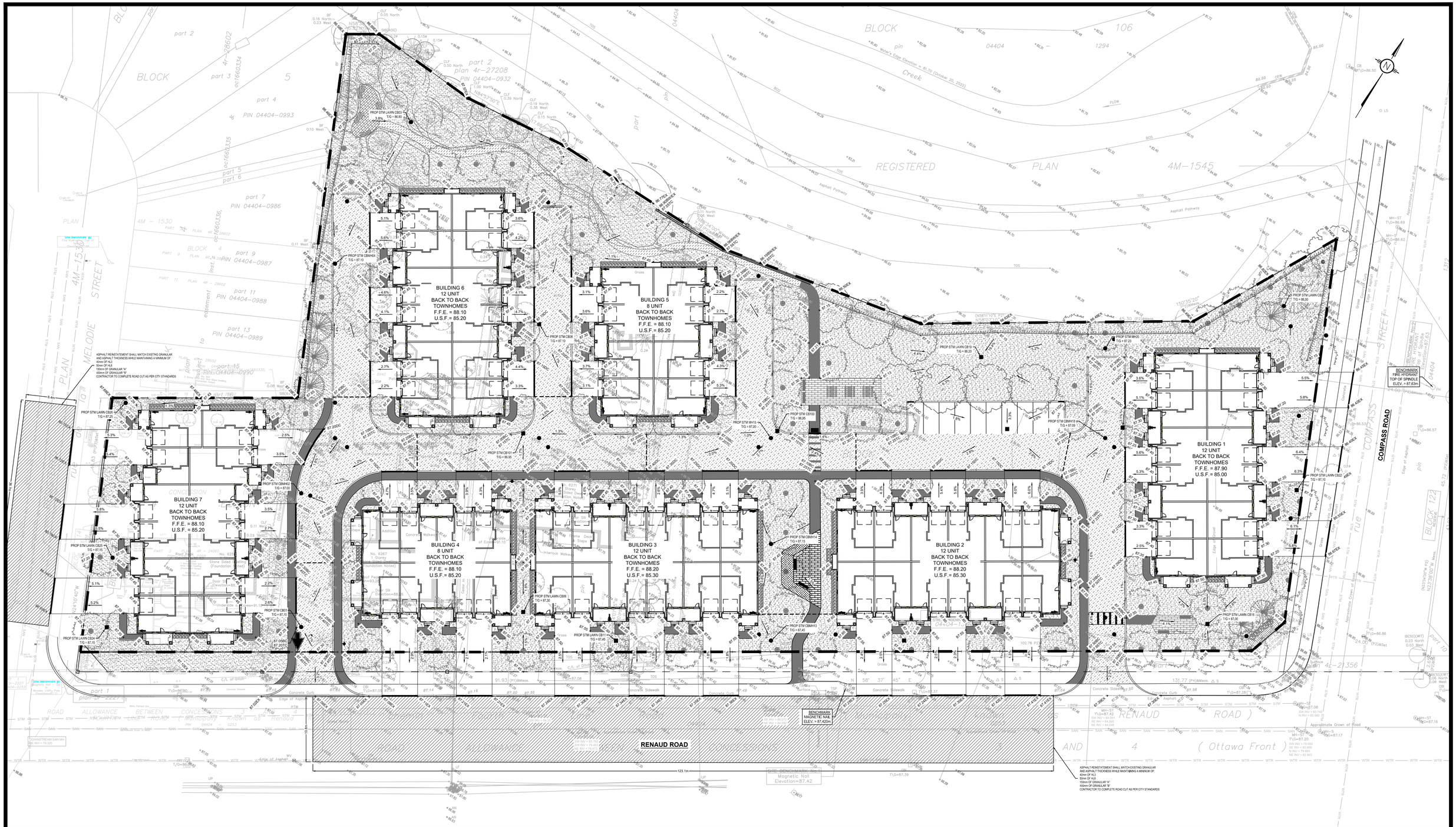
PROJECT
SITE DEVELOPMENT
CORNER OF RENAUD RD & COMPASS ST
ORLEANS, ON

DRAWING TITLE
DEMOLITION PLAN

PROJECT NO.
240347

DATE
JAN 2025

C102

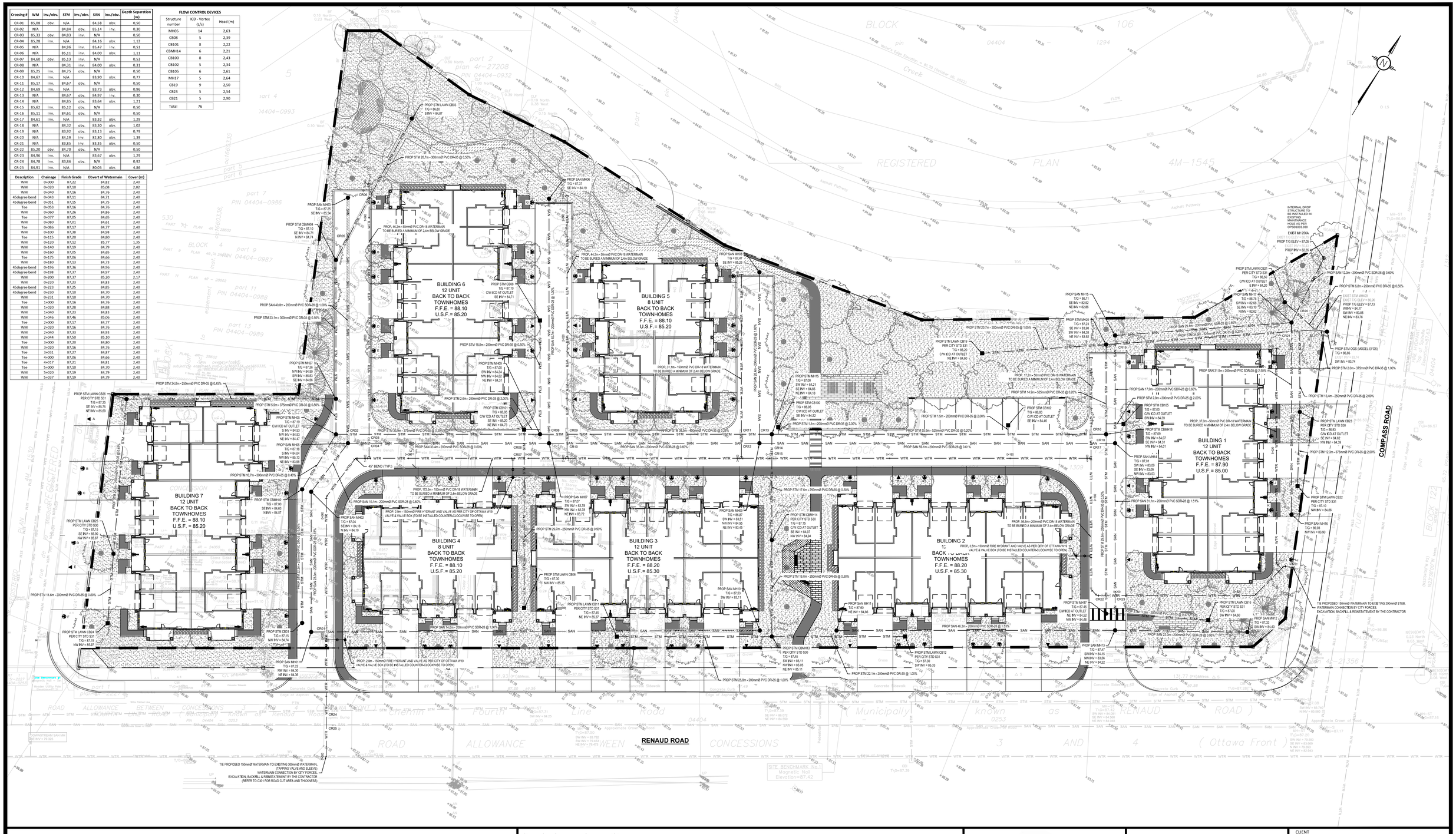

BUILDING 6
12 UNIT
BACK TO BACK
TOWNHOMES
F.F.E. = 88.10
U.S.F. = 85.20
BUILDING 5
8 UNIT
BACK TO BACK
TOWNHOMES
F.F.E. = 88.10
U.S.F. = 85.20
BUILDING 7
12 UNIT
BACK TO BACK
TOWNHOMES
F.F.E. = 88.10
U.S.F. = 85.20
BUILDING 4
8 UNIT
BACK TO BACK
TOWNHOMES
F.F.E. = 88.10
U.S.F. = 85.20
BUILDING 3
12 UNIT
BACK TO BACK
TOWNHOMES
F.F.E. = 88.20
U.S.F. = 85.30
BUILDING 2
12 UNIT
BACK TO BACK
TOWNHOMES
F.F.E. = 88.20
U.S.F. = 85.30
BUILDING 1
12 UNIT
BACK TO BACK
TOWNHOMES
F.F.E. = 87.90
U.S.F. = 85.00
RENAUD ROAD
COMPASS ROAD
BENCHMARK
MAGNETIC NAIL
ELEV. = 87.42m
BENCHMARK
FIRE HYDRANT
TOP OF SPINDLE
ELEV. = 87.63m
ASPHALT REINSTATEMENT SHALL MATCH EXISTING GRANULAR AND ASPHALT THICKNESS WHILE MAINTAINING A MINIMUM OF: 40mm OF HL3 50mm OF HL8 150mm OF GRANULAR 'A' 450mm OF GRANULAR 'B' CONTRACTOR TO COMPLETE ROAD CUT AS PER CITY STANDARDS
PROP STM LAWN CB01
PROP STM LAWN CB02
PROP STM LAWN CB03
PROP STM LAWN CB04
PROP STM LAWN CB05
PROP STM LAWN CB06
PROP STM LAWN CB07
PROP STM LAWN CB08
PROP STM LAWN CB09
PROP STM LAWN CB10
PROP STM LAWN CB11
PROP STM LAWN CB12
PROP STM CB101
PROP STM CB102
PROP STM CBMH1
PROP STM CBMH2
PROP STM CBMH3
PROP STM CBMH4
PROP STM MH15
PROP STM MH20
SITE BENCHMARK #1
Magnetic Nail
Elevation=87.42
SITE BENCHMARK #2
Magnetic Nail
Elevation=87.63
REGISTERED PLAN 4M-1545
REGISTERED PLAN 4M-1530
REGISTERED PLAN 4R-28602
REGISTERED PLAN 4R-27208
REGISTERED PLAN 4R-21356
Creek
Water's Edge Elevation = 81.70 (October 20, 2023)
Asphalt Pathway
Concrete Sidewalk
Edge of Asphalt
Approximate Crown of Road
Concrete Curb
Gross
Grass
Hydro Pole
Guy Wire
Utility Pole
Stone Sided Building (Foundation Noted)
Concrete Block Building (Foundation Noted)
Interlock Walkway
Concrete Walkway
Concrete Steps
Wood Deck
Wood Steps
Wood Fence
Chain Link Fence
Retaining Wall
Sign
Mailbox
Air Conditioner
Gas Meter
Electrical Box
Bell Box
Canada Post Mail Box
Sanitary Manhole
Storm Manhole
Catch Basin
Catch Basin Manhole
Hydro Manhole
Bell Manhole
Gas Valve
Water Valve
Water Meter
Curb Stop
Fire Hydrant
Flow Direction
Existing Contour
Proposed Contour
Proposed Swale
Proposed Grade Break
Proposed Spot Elevation
Proposed Drainage Direction
Proposed Catch Basin
Proposed Catch Basin Manhole
Proposed Storm Manhole
Proposed Storm Sewer
Proposed Lawn Catch Basin
Proposed Curb Cut
Proposed Depressed Curb
Proposed Asphalt
Proposed Concrete
Proposed Granular
Proposed Retaining Wall
Proposed Fence
Proposed Tree
Proposed Shrub
Proposed Sign
Proposed Mailbox
Proposed Bell Box
Proposed Canada Post Mail Box
Proposed Air Conditioner
Proposed Gas Meter
Proposed Electrical Box
Proposed Hydro Pole
Proposed Guy Wire
Proposed Utility Pole
Proposed Light Standard
Proposed Bell Manhole
Proposed Gas Valve
Proposed Water Valve
Proposed Water Meter
Proposed Curb Stop
Proposed Fire Hydrant
Proposed Flow Direction
Proposed Sanitary Manhole
Proposed Sanitary Sewer
Proposed Water Service
Proposed Water Main
Proposed Hydro Manhole
Proposed Hydro Duct
Proposed Bell Duct
Proposed Gas Line
Proposed Street Light
Proposed Traffic Light
Proposed Traffic Light Manhole
Proposed Traffic Light Duct
Proposed Traffic Light Cable
Proposed Traffic Light Pole
Proposed Traffic Light Controller
Proposed Traffic Light Cabinet
Proposed Traffic Light Junction Box
Proposed Traffic Light Pedestal
Proposed Traffic Light Signal
Proposed Traffic Light Camera
Proposed Traffic Light Detector
Proposed Traffic Light Loop
Proposed Traffic Light Wire
Proposed Traffic Light Conduit
Proposed Traffic Light Junction
Proposed Traffic Light Controller Cabinet
Proposed Traffic Light Pedestal Cabinet
Proposed Traffic Light Signal Head
Proposed Traffic Light Camera Head
Proposed Traffic Light Detector Head
Proposed Traffic Light Loop Detector
Proposed Traffic Light Wire Conduit
Proposed Traffic Light Junction Box

Crossing #	WM	Inv./obv.	STM	Inv./obv.	SAN	Inv./obv.	Depth Separation (m)
CR-01	85,08	obv.	N/A		84,58	obv.	0,50
CR-02	N/A		84,84	obv.	85,14	inv.	0,30
CR-03	85,33	obv.	84,83	inv.	N/A		0,50
CR-04	85,28	inv.	N/A		84,16	obv.	1,12
CR-05	N/A		84,96	inv.	85,47	inv.	0,51
CR-06	N/A		85,11	inv.	84,00	obv.	1,11
CR-07	84,60	obv.	85,13	inv.	N/A		0,53
CR-08	N/A		84,31	inv.	84,00	obv.	0,31
CR-09	85,25	inv.	84,75	obv.	N/A		0,50
CR-10	84,67	inv.	N/A		83,90	obv.	0,77
CR-11	85,17	inv.	84,67	obv.	N/A		0,50
CR-12	84,69	inv.	N/A		83,73	obv.	0,96
CR-13	N/A		84,67	obv.	84,97	inv.	0,30
CR-14	N/A		84,85	obv.	83,64	obv.	1,21
CR-15	85,62	inv.	85,12	obv.	N/A		0,50
CR-16	85,11	inv.	84,61	obv.	N/A		0,50
CR-17	84,61	inv.	N/A		83,32	obv.	1,29
CR-18	N/A		84,32	obv.	83,30	obv.	1,02
CR-19	N/A		83,92	obv.	83,13	obv.	0,79
CR-20	N/A		84,19	inv.	82,80	obv.	1,39
CR-21	N/A		83,85	inv.	83,35	obv.	0,50
CR-22	85,20	obv.	84,70	obv.	N/A		0,50
CR-23	84,96	inv.	N/A		83,67	obv.	1,29
CR-24	84,78	inv.	83,86	obv.	N/A		0,92
CR-25	84,91	inv.	N/A		80,05	obv.	4,86

Description	Chainage	Finish Grade	Obvert of Watermain	Cover (m)
WM	0+000	87,22	84,82	2,40
WM	0+020	87,10	85,08	2,02
WM	0+040	87,16	84,76	2,40
45degree bend	0+043	87,11	84,71	2,40
45degree bend	0+051	87,15	84,75	2,40
Tee	0+053	87,16	84,76	2,40
WM	0+060	87,26	84,86	2,40
Tee	0+077	87,05	84,65	2,40
WM	0+080	87,01	84,61	2,40
Tee	0+086	87,17	84,77	2,40
WM	0+100	87,18	84,98	2,40
Tee	0+115	87,20	84,80	2,40
WM	0+120	87,12	85,77	1,35
WM	0+140	87,19	84,79	2,40
WM	0+160	87,05	84,65	2,40
Tee	0+175	87,06	84,66	2,40
WM	0+180	87,13	84,73	2,40
45degree bend	0+196	87,36	84,96	2,40
45degree bend	0+198	87,37	84,97	2,40
WM	0+200	87,37	85,20	2,17
WM	0+220	87,23	84,83	2,40
45degree bend	0+223	87,25	84,85	2,40
45degree bend	0+230	87,10	84,70	2,40
WM	0+231	87,10	84,70	2,40
Tee	1+000	87,16	84,76	2,40
WM	1+020	87,28	84,88	2,40
WM	1+040	87,23	84,83	2,40
WM	1+046	87,46	85,06	2,40
Tee	2+000	87,17	84,77	2,40
WM	2+020	87,16	84,76	2,40
WM	2+040	87,33	84,93	2,40
WM	2+044	87,50	85,10	2,40
Tee	3+000	87,20	84,80	2,40
WM	3+020	87,16	84,76	2,40
Tee	3+031	87,27	84,87	2,40
Tee	4+000	87,06	84,66	2,40
Tee	4+017	87,21	84,81	2,40
Tee	5+000	87,10	84,70	2,40
WM	5+020	87,19	84,79	2,40
WM	5+037	87,19	84,79	2,40

FLOW CONTROL DEVICES

Structure number	ICD - Vortex (L/s)	Head (m)
MH05	14	2,63
CB08	5	2,39
CB101	8	2,22
CBMH14	6	2,21
CB105	8	2,43
CB102	5	2,34
CB105	6	2,61
MH17	5	2,64
CB19	9	2,50
CB23	5	2,54
CB21	5	2,90
Total	76	



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5m 2 0 5 10m

SCALE: 1:300

LICENSED PROFESSIONAL ENGINEER
V. JOHNSON
100510576
06-26-2025
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

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

No.	REVISIONS	BY	DATE
01	ISSUED FOR APPROVAL	M.L.	26 JUNE 2025

CLIENT

RICHCRAFT HOMES LTD.

DESIGNED BY:	DRAWN BY:	APPROVED BY:
M.L.	M.L.	S.G.

PROJECT

SITE DEVELOPMENT
CORNER OF RENAUD RD & COMPASS ST
ORLEANS, ON

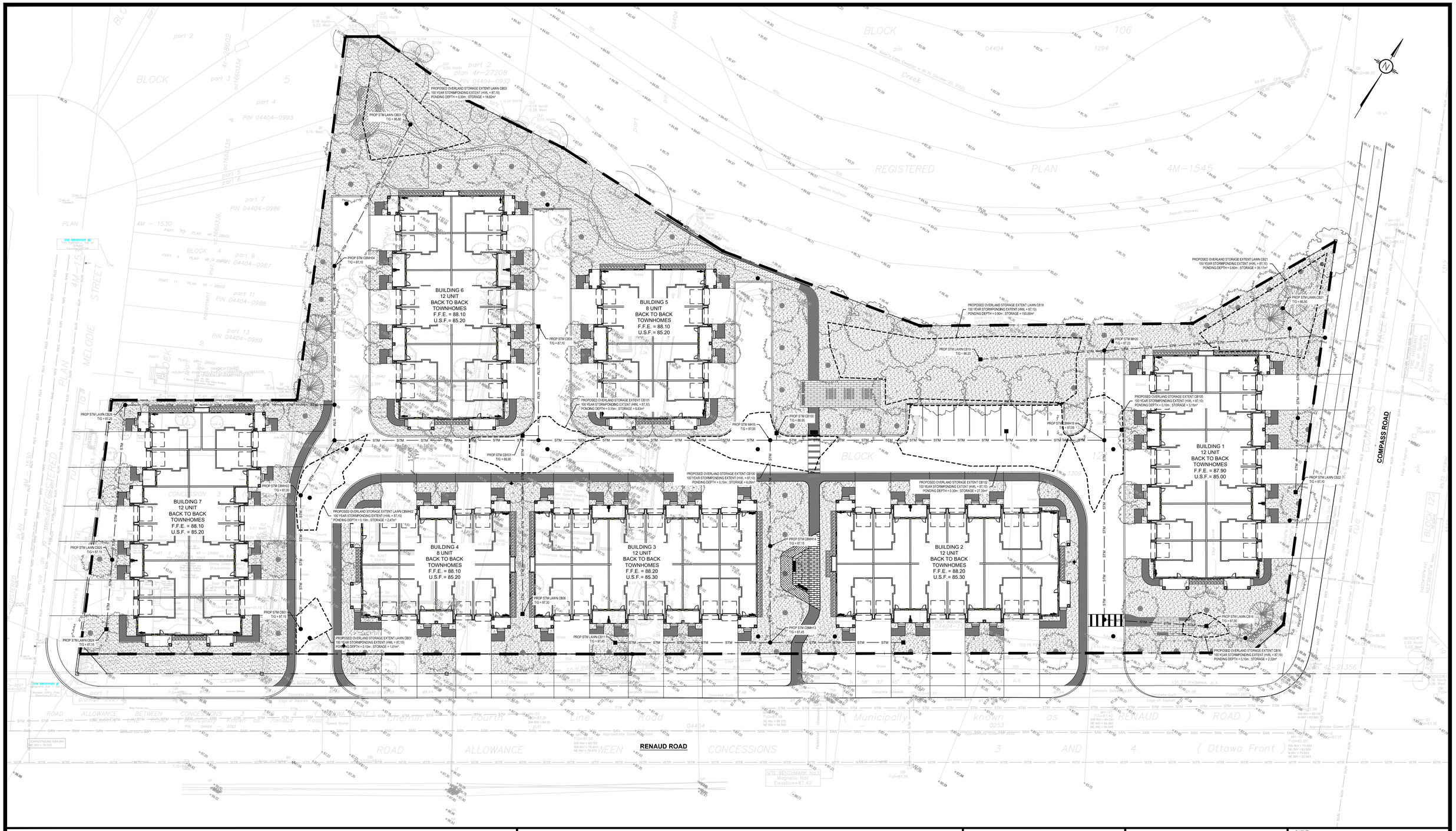
DRAWING TITLE

SERVICING PLAN

PROJECT NO. 240347

DATE JAN 2025

C401



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5m 2 0 5 10m

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M.L.	M.L.	S.G.

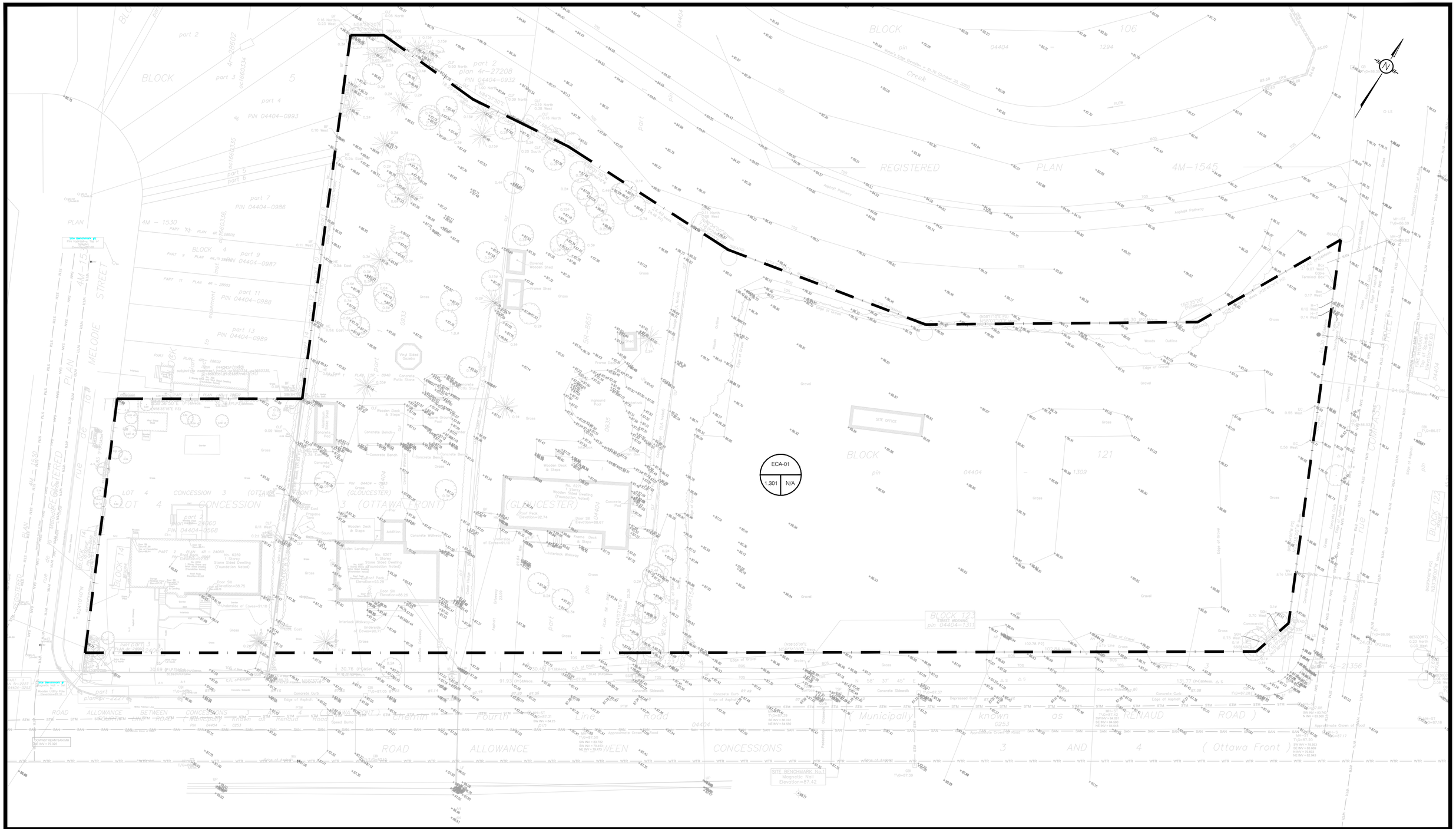
PROJECT
SITE DEVELOPMENT
CORNER OF RENAUD RD & COMPASS ST
ORLEANS, ON

DRAWING TITLE
STORMWATER MANAGEMENT PLAN

PROJECT NO.
240347

DATE
JAN 2025

C601


ECA-01
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N/A
SITE BENCHMARK (SB-1)
Magnetic Nail
Elevation=87.42
SITE OFFICE
BLOCK 106
BLOCK 121
BLOCK 122
BLOCK 123
STREET WIDENING
pin 04404-1311
REGISTERED PLAN 4M-1545
ROAD ALLOWANCE BETWEEN CONCESSIONS 3 AND 4 (Ottawa Front)
(Municipally known as RENAUD ROAD)
LOT 4 CONCESSION 3 (OTTAWA FRONT)
(GLOUCESTER)
Creek
Asphalt Pathway
Gravel
Edge of Gravel
Edge of Asphalt
Concrete Sidewalk
Concrete Curb
Interlock Walkway
Wooden Deck & Steps
Concrete Walkway
Concrete Pad
Vinyl Sided Gazebo
Covered Wooden Shed
Frame Shed
Wooden Shed
Stone Steps
Concrete Patio Stone
Ingrond Pool
Above Ground Pool
Frame Deck & Steps
Concrete Pool
Wooden Deck & Steps
Concrete Bench
Concrete Steps
Concrete Walkway
Addition
Underside of Eaves=91.10
Underside of Eaves=90.71
Underside of Eaves=88.26
Door Sill Elevation=88.75
Door Sill Elevation=88.67
Roof Peak Elevation=92.74
Roof Peak Elevation=93.28
No. 6267 1 Storey Stone Sided Dwelling (Foundation Noted)
No. 6259 1 Storey Stone Sided Dwelling (Foundation Noted)
No. 6251 Stone Wooden Sided Dwelling (Foundation Noted)
No. 6253 Stone Wooden Sided Dwelling (Foundation Noted)
No. 6255 Stone Wooden Sided Dwelling (Foundation Noted)
No. 6257 Stone Wooden Sided Dwelling (Foundation Noted)
No. 6263 Stone Wooden Sided Dwelling (Foundation Noted)
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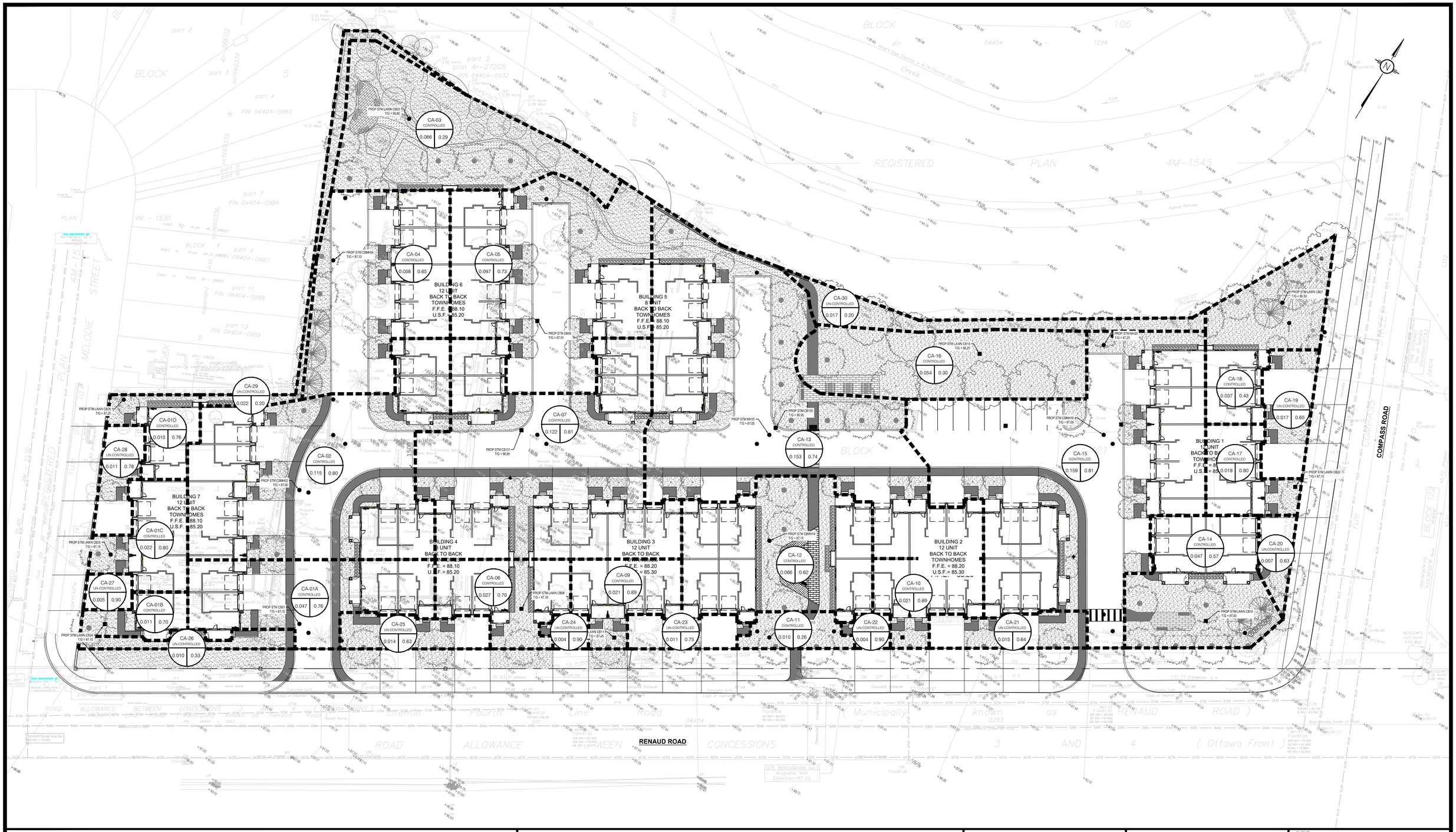

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CLIENT
RICHCRAFT HOMES LTD.

DESIGNED BY:	DRAWN BY:	APPROVED BY:
M.L.	M.L.	S.G.

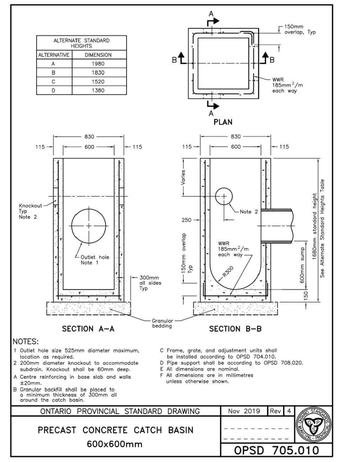
PROJECT
SITE DEVELOPMENT
CORNER OF RENAUD RD & COMPASS ST
ORLEANS, ON

DRAWING TITLE
POST-DEVELOPMENT
WATERSHED PLAN

PROJECT NO.
240347

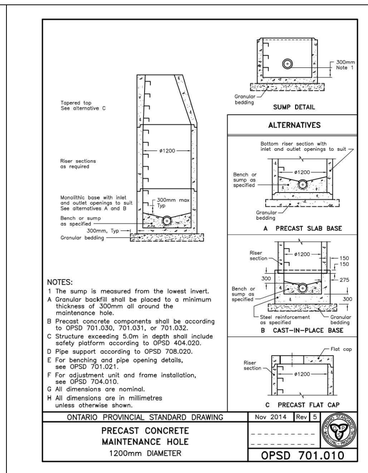
DATE
JAN 2025

C702



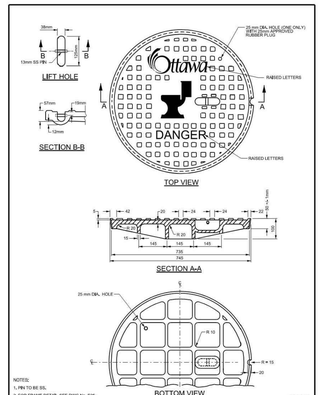
NOTES:
1. Outlet hole size 525mm diameter maximum, location as required.
2. 200mm diameter knockout to accommodate subdrain. Knockout shall be 60mm deep.
A Centre reinforcing in base slab and walls ±20mm.
B Granular backfill shall be placed to 300mm minimum depth 300mm all around the catch basin.
C Frame, grate, and adjustment units shall be installed according to OPSD 704.010.
D Pipe support shall be according to OPSD 708.020.
E All dimensions are nominal.
F All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2019	Rev. 4
PRECAST CONCRETE CATCH BASIN 600x600mm		OPSD 705.010



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

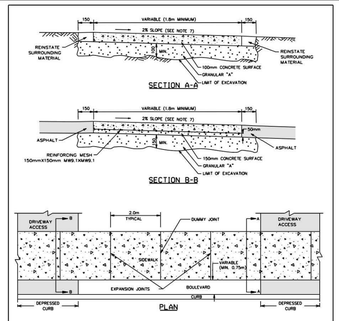
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev. 5
PRECAST CONCRETE MAINTENANCE HOLE 1200mm DIAMETER		OPSD 701.010



NOTES:
1. PIN TO BE SS.
2. FOR FRAME DETAIL SEE DWG No. SC5.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

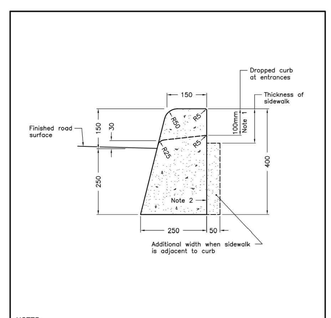
N.T.S.

STANDARD CIRCULAR SANITARY & COMBINED MAINTENANCE HOLE COVER	DATE:	MARCH 2008
	REV. DATE:	MARCH 2017
	DWG. No.:	S24



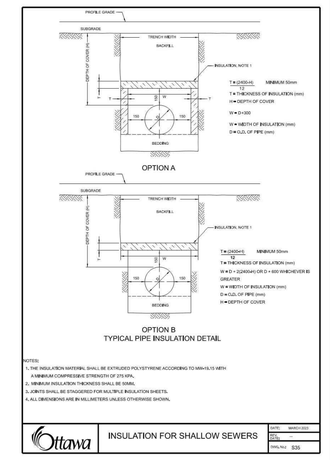
NOTES:
1. CONCRETE AND GRANULAR "A" (G.10) TO BE INCREASED TO 150mm AT THE ENTRANCE AND 150x150mm MW8.1 x MW8.1 REINFORCING MESH (G.10) TO BE PLACED MID DEPTH WITHIN DRIVEWAY ACCESS.
2. TRANSVERSE EXPANSION JOINTS ARE REQUIRED AT THE ENDS, THE MIDPOINT, AT INTERVALS OF 4m MAXIMUM, AND ALSO TO ISOLATE OBSTRUCTIONS FROM SIDEWALK, HYDRANTS, POLES, BUILDINGS, ETC.
3. WHEN THE OVERALL SIDEWALK WIDTH EXCEEDS 2.5m, A LONGITUDINAL CONSTRUCTION JOINT SHALL BE CREATED AT ITS MIDPOINT.
4. EDGES AND JOINTS ARE TO BE FINISHED WITH A 75mm EDGING TOOL.
5. ALL CONCRETE SIDEWALKS ARE TO HAVE A BROOM FINISH UNLESS OTHERWISE SPECIFIED.
6. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
7. THE MAXIMUM SLOPE IS NOT TO EXCEED 2%.
8. INSTALL DUMMY TRANSVERSE JOINTS AS REQUIRED SO THERE IS A MAXIMUM SPACING OF 2m BETWEEN ALL JOINTS.
9. SIDEWALK NOT TO BE DEPRESSED ACROSS DRIVEWAY ACCESSES.
10. EXPANSION AND DUMMY JOINTS AS PER SC5

TYPICAL CONCRETE SIDEWALK IN BOULEVARD	DATE:	MAY 2001
	REV. DATE:	MARCH 2016
	DWG. No.:	SC4



NOTES:
1. When sidewalk is continuously adjacent, the dropped curb at entrances shall be reduced to 75mm.
2. For slipforming procedure a 5% batter is acceptable.
A Treatment at entrances shall be according to OPSD 351.010.
B Outlet treatment shall be according to the OPSD 610 Series.
C The transition from one curb type to another shall be a minimum length of 3.0m, except in conjunction with guide rail where it shall be according to the OPSD 900 Series.
D All dimensions are in millimetres unless otherwise shown.

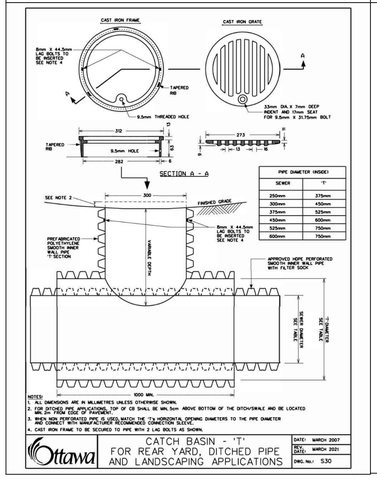
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2012	Rev. 2
CONCRETE BARRIER CURB		OPSD 600.110



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

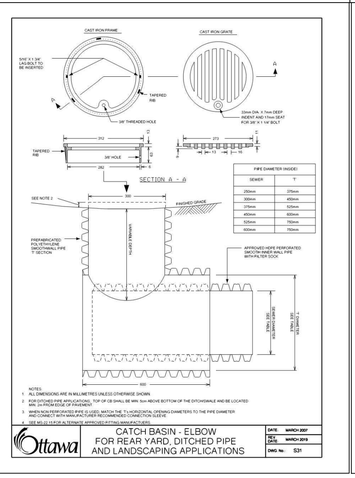
T = (2400-H) MINIMUM 50mm
T = THICKNESS OF INSULATION (mm)
H = DEPTH OF COVER
W = D+200
W = WIDTH OF INSULATION (mm)
D = O.D. OF PIPE (mm)
H = DEPTH OF COVER

INSULATION FOR SHALLOW SEWERS	DATE:	MARCH 2020
	REV. DATE:	
	DWG No.:	S35



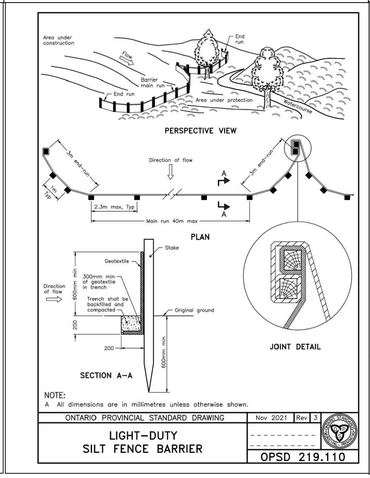
NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.
2. FOR DITCHED PIPE APPLICATIONS, TOP OF CB SHALL BE MIN. 5cm ABOVE BOTTOM OF THE DITCH/SWALE AND BE LOCATED MIN. 2m FROM EDGE OF PAVEMENT.
3. INVERTS NON-PERFORATED PIPE IS USED, MATCH THE 7'S HORIZONTAL OPENING DIAMETERS TO THE PIPE DIAMETER AND CONNECT WITH SAME ACCEPTABLE CONNECTION METHOD.
4. CAST IRON FRAME TO BE SECURED TO PIPE WITH 2 LAG BOLTS AS SHOWN.

CATCH BASIN - 'T' FOR REAR YARD, DITCHED PIPE AND LANDSCAPING APPLICATIONS	DATE:	MARCH 2007
	REV. DATE:	MARCH 2021
	DWG. No.:	S30



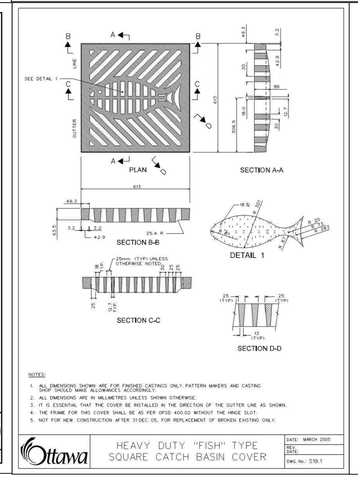
NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.
2. FOR DITCHED PIPE APPLICATIONS, TOP OF CB SHALL BE MIN. 5cm ABOVE BOTTOM OF THE DITCH/SWALE AND BE LOCATED MIN. 2m FROM EDGE OF PAVEMENT.
3. INVERTS NON-PERFORATED PIPE IS USED, MATCH THE 7'S HORIZONTAL OPENING DIAMETERS TO THE PIPE DIAMETER AND CONNECT WITH SAME ACCEPTABLE CONNECTION METHOD (TYP.).
4. SEE AS-22.1 FOR ALTERNATE APPROVED FITTING MANUFACTURERS.

CATCH BASIN - ELBOW FOR REAR YARD, DITCHED PIPE AND LANDSCAPING APPLICATIONS	DATE:	MARCH 2007
	REV. DATE:	MARCH 2019
	DWG No.:	S31



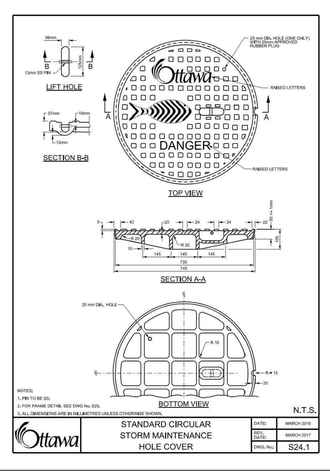
NOTE:
A All dimensions are in millimetres unless otherwise shown.

LIGHT–DUTY SILT FENCE BARRIER	OPSD 219.110



NOTES:
1. ALL DIMENSIONS SHOWN ARE FOR FINISHED CASTINGS ONLY. PATTERN MAKERS AND CASTING SHOP SHOULD MAKE ALLOWANCES ACCORDINGLY.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
3. IT IS ESSENTIAL THAT THE COVER BE INSTALLED IN THE DIRECTION OF THE GUTTER LINE AS SHOWN.
4. THE FRAME FOR THIS COVER SHALL BE AS PER OPSD 400.02 WITHOUT THE HINGE SLOT.
5. NOT FOR NEW CONSTRUCTION AFTER 31-DEC-05, FOR REPLACEMENT OF BROKEN EXISTING ONLY.

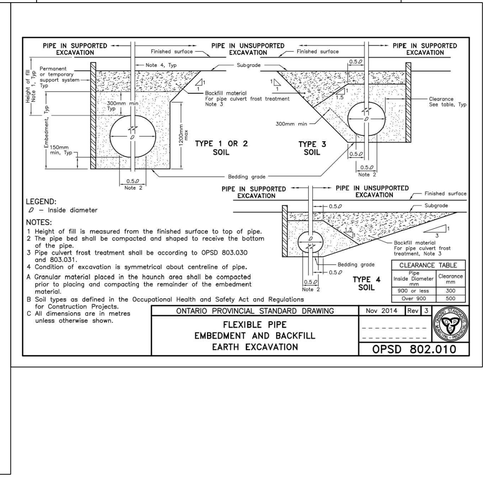
HEAVY DUTY "FISH" TYPE SQUARE CATCH BASIN COVER	DATE:	MARCH 2005
	REV. DATE:	
	DWG. No.:	S19.1



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

N.T.S.

STANDARD CIRCULAR STORM MAINTENANCE HOLE COVER	DATE:	MARCH 2019
	REV. DATE:	MARCH 2017
	DWG No.:	S24.1

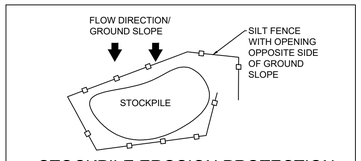


LEGEND:
Ø – Inside diameter

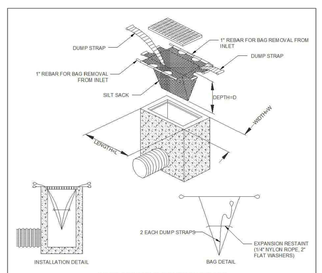
NOTES:
1 Height of fill is measured from the finished surface to top of pipe.
2 The pipe bed shall be compacted and shaped to receive the bottom of the pipe.
3 Pipe culvert frost treatment shall be according to OPSD 803.030 and 803.031.
4 Condition of excavation is symmetrical about centreline of pipe.
A Granular material placed in the haunch area shall be compacted prior to placing and compacting the remainder of the embedment material.
B Soil types as defined in the Occupational Health and Safety Act and Regulations for Construction Projects.
C All dimensions are in metres unless otherwise shown.

CLEARANCE TABLE	
Pipe Inside Diameter mm	Clearance mm
900 or less	300
Over 900	500

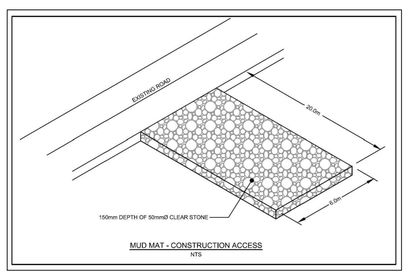
FLEXIBLE PIPE EMBEDMENT AND BACKFILL EARTH EXCAVATION	ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev. 3
			OPSD 802.010



STOCKPILE EROSION PROTECTION
N.T.S.



INLET SEDIMENT CONTROL DEVICE
N.T.S.



MUD MAT - CONSTRUCTION ACCESS
NTS

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 DETAILED 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, CADD 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 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.

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 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 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.

LICENSED PROFESSIONAL ENGINEER
V. JOHNSON
100510576
06-26-2025
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

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

No.	REVISIONS	BY	DATE
01	ISSUED FOR APPROVAL	M.L.	26 JUNE 2025

CLIENT
RICHCRAFT HOMES LTD.

DESIGNED BY:	DRAWN BY:	APPROVED BY:
M.L.	M.L.	S.G.

PROJECT
SITE DEVELOPMENT
CORNER OF RENAUD RD & COMPASS ST
ORLEANS, ON

DRAWING TITLE
CONSTRUCTION DETAIL PLAN

PROJECT NO.
240347

DATE
JAN 2025

C901

APPENDIX E
DRAWINGS/FIGURES

Proposed Site Plan
Legal Survey
As-builts

TOPOGRAPHIC PLAN OF SURVEY OF

BLOCK 121
REGISTERED PLAN 4M-1545
PART OF LOT 4
CONCESSION 3 (OTTAWA FRONT)
Geographic Township of Gloucester
CITY OF OTTAWA

Surveyed by Annis, O'Sullivan, Vollebekk Ltd.

Scale 1 : 250

10 7.5 5.0 2.5 0 5 10 Metres

Metric

DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

Surveyor's Certificate

I CERTIFY THAT :

1. This survey and plan are correct and in accordance with the Surveys Act, the Surveyors Act and the regulations made under them.
2. The survey was completed on the 12th day of April, 2024.

April 16, 2024
Date

T. Harbeck
Ontario Land Surveyor

Notes & Legend

Denotes

—□—	-	Survey Monument Planted
—■—	-	Survey Monument Found
SIB	-	Standard Iron Bar
SSIB	-	Short Standard Iron Bar
IB	-	Iron Bar
CC	-	Cut Cross
CP	-	Concrete Pin
(WIT)	-	Witness
Meas.	-	Measured
(AOG)	-	Annis, O'Sullivan, Vollebekk Ltd.
(P1)	-	Plan 4R-27208
(P2)	-	Registered Plan 4M-1545
(P3)	-	Plan 4R-28602
(P4)	-	Plan 4R-21356
MH-ST	-	Maintenance Hole (Storm Sewer)
MH-S	-	Maintenance Hole (Sanitary)
MH	-	Maintenance Hole (Unidentified)
VC	-	Valve Chamber (Watermain)
WV	-	Water Valve
OHW	-	Overhead Wires
UP	-	Utility Pole
AN	-	Anchor
LS	-	Light Standard
CB	-	Catch Basin
CBI	-	Catch Basin Inlet
FH	-	Fire Hydrant
WV	-	Water Valve
TSP	-	Traffic Signal Post
T/G	-	Top of Grate
GM	-	Gas Meter
HM	-	Hydro Meter
SIGN	-	Sign
CLF	-	Chain Link Fence
BF	-	Board Fence
H-T	-	Hydro Transformer
RWI	-	Interlock Retaining Wall
CRW	-	Concrete Retaining Wall
TOS	-	Top of Slope
BOS	-	Bottom of Slope
PTW	-	White Paint Line
HE	-	Cedar Hedge
TOS	-	Top of Slope
BOS	-	Bottom of Slope
LF	-	Light Fixture
	-	Gate
AC	-	Air Conditioner
Ø	-	Diameter
+ 65.00	-	Location of Elevations
+ 65.00	-	Top of Concrete Curb Elevation
	-	Deciduous Tree
	-	Coniferous Tree
C/L	-	Centreline

Bearings are grid, derived from Can-Net 2016 Real Time Network GPS observations and are referenced to Specified Control Points 01919680184 and 01919843761, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
V-75374

THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR In accordance with Regulation 1026, Section 29 (3).

SITE AREA = 1.191 Ha

ELEVATION NOTES

1. Elevations shown are geodetic, and are derived from site benchmark per archives from Annis O'Sullivan Vollebekk Limited, and are referred to the CGVD28 geodetic datum.
2. It is the responsibility of the user of this information to verify that the job benchmark has not been altered or disturbed and that it's relative elevation and description agrees with the information shown on this drawing.

UTILITY NOTES

1. This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation.
2. Only visible surface utilities were located.
3. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.

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ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
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Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovlld.com

Ontario Land Surveyors

Job No. 2302-22 Rdwork Blk21 4M-1545 PLH C3 O F