Stormwater Management Report and Servicing Brief

New 3.5 Story Residential Building
261-265 Columbus Avenue
Ottawa, Ontario K1K 1P5

Prepared for:

Upscale Homes Inc.
212 Donald Street
Ottawa, ON
K1K 1M8

Attention: Mr. Alfred Abboud

Revised April 29th, 2020
Revised February 21st, 2020
November 6th, 2019

LRL File No.: 190377

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1 INTRODUCTION AND SITE DESCRIPTION

LRL Associates Ltd. was retained by Upscale Homes (c/o Alfred Abboud) to undertake a Stormwater Management Analysis and Servicing Brief for a proposed three and a half (3.5) storey development at 261-265 Columbus Avenue in Ottawa, Ontario. The property is legally described as part of lot 165, lots 166 & 167, of registered plan N. 441 in Ottawa, Ontario. The location of the proposed development can be viewed in Figure 1 below.

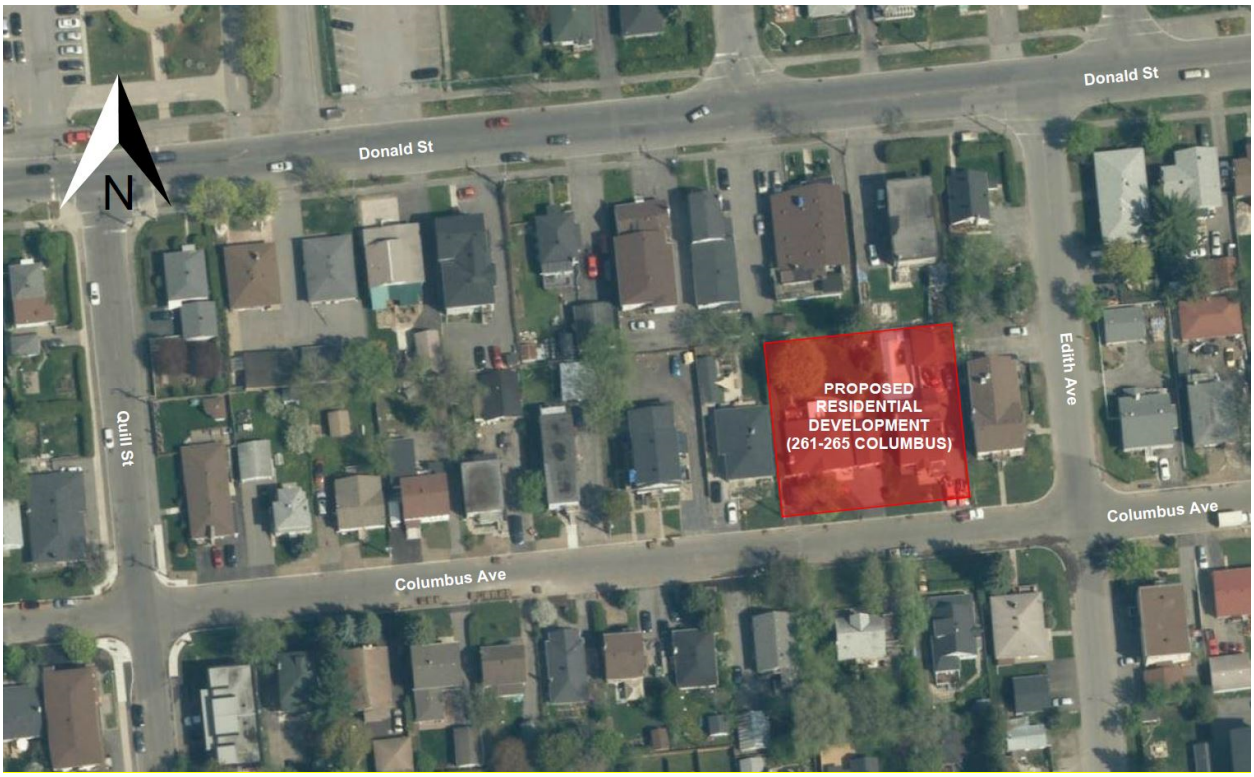


Figure 1: Aerial View of Proposed Residential Development Subdivision Location

The portion of the land to be developed is rectangular in shape, having a frontage of approximately 40m facing Columbus Ave and a depth of approximately 35m. With these dimensions this property has a surface area of approximately 0.140ha.

Currently the land is developed, with residential housing on both 261 and 265 Columbus. Once demolished, a single 3.5 storey residential building with an asphalt parking area will be constructed on site. This new residence building will neighbour the single family residential properties on all sides.

The residential building will have a roof area of approximately 428m^2, along with a 442m^2 parking lot and entranceway along the North face and East face of the building, respectively. The proposed development will have one vehicular entrance with a depressed curb, at Columbus Ave, at the South-East corner of the lot.

Furthermore, to accommodate the development, the property will require a stormwater management network consisting of catch basins, manholes and storm sewers, ultimately to outlet at the South extent of the site into the existing municipal storm sewer system on Columbus Avenue. Sanitary and water services supplying the new building will run from the South of the new building and connect to their respective mains located on Columbus Avenue.

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 considerations, LRL Associates Ltd. should be advised to review the report recommendations.

2 FIELD WORK

The topographic survey work of the property was done on September 5th 2018 by Annis, O`Sullivan, Vollebekk Limited (Ontario Land Surveyors). A site benchmark was established during the survey for future construction use. This benchmark (fire hydrant, top of spindle) is located on the South side of Columbus Avenue, opposite the South-East corner of the property; the benchmark elevation is 61.62m.

3 STORMWATER MANAGEMENT

3.1 Existing Stormwater Infrastructure

As previously discussed, the South end of the subject property is bordered by Columbus Avenue. Hence, the storm service connection will be located at Columbus Avenue. At this location, a dedicated 375mm storm sewer, flowing east, is available along the North side of the street.

The topography of the site in pre development conditions was reviewed to determine the direction of flow from overland runoff. Refer to Appendix B for pre and post development watershed information.

3.2 Design Criteria

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

3.2.1 Water Quality

In order to provide the runoff water quality control for this site, an oil-grit (sediment) separator is proposed to provide enhance (80% minimum) Total Suspended Solids removal and protection from the impervious surfaces such as the building rooftop and asphalt parking area. A Stormceptor, Model EF04 is proposed and will be at the downstream section of the sewer network in the driveway of the proposed development See Appendix C for the selection, the type, and for more information on the treatment unit.

3.2.2 Water Quantity

In pre development conditions, the site was developed as single family home residential lots, with dwellings and garages. With post development conditions introducing an increase in the impervious surfaces, quantity control will be implemented.

Within this section, the allowable release rate to mimic pre development conditions will be calculated using a runoff coefficient of C=0.5 determined based on the pre development land cover. The 100 year and 5 year post development flows will be controlled to the 5 year pre development flow rates of the site using a combination of rooftop drainage control and a control device in the underground infrastructure. Events greater than the 100 year storm are permitted to

flow overland to the Right of Way (ROW). Table 1 below summarizes the target quantity to be released for the 0.140 ha site.

Table 1: Summary of Stormwater Quantity Control Requirements

Quantity Control Parameters	Flow Quantity	
	5 Year Storm Event	100 Year Storm Event
Calculated Pre Development Release Rate (L/s)	20.23	34.67
Controlled Allowable Release Rate for Post Development (L/s)	20.23	20.23

3.3 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 A for allowable release rate as well as storage calculations.

3.4 Allowable Release Rate

The 100 year and 5 year pre development release rates from the site have been calculated to be **34.67 L/s and 20.23 L/S** respectively, which is calculated based on the entire 0.140 ha area which includes the site boundary as well as a small area from the road right-of-way with an assigned runoff coefficient of 0.50 and a 10-minute time of concentration. However, based on the condition of the downstream infrastructure and capacity of the existing sewers along Columbus Avenue, the post development flows will be controlled to release no more than the release taking place in the 5 year pre development conditions equal to 20.23 L/s which assumed a runoff coefficient of 0.5. This is the release rate to which the entire site will be controlled up to and including the 100 year post development storm event.

3.5 Proposed Stormwater Quantity Controls

The proposed stormwater management quantity controls for this development will be accomplished through a flow restrictor in the storm sewer as well a roof drains restricting the flow leaving the rooftop. Ponding required as a result of quantity control will be accomplished through a combination of rooftop storage and parking lot surficial storage.

The site has been analyzed and post development watersheds have been allocated. The landscape, walkway and stairs located at the front (South) entrance of the building will drain off property, uncontrolled, onto Columbus Avenue. The remainder of the site will consist of the parking area & entranceway, the proposed building rooftop, landscape at the North-West corner of the property and a small concrete walkway and stairs along the West face of the building. These areas will be impervious, captured, and routed to the site outlet at Columbus Avenue. Drawings C701 and C 702 in Appendix B summarizes the catchment areas in pre and post development conditions. Refer to Appendix E for engineering drawings applicable to the servicing details for this property. Table 2 below summarizes the drainage areas.

Table 2: Stormwater Drainage Areas

Drainage Area Name	Area (ha)	Runoff Coefficient (C)
WS-01 (controlled)	0.002	0.90
WS-02 (controlled)	0.045	0.55
WS-03 (controlled)	0.058	0.90
WS-04 (controlled)	0.011	0.80
WS-05 (uncontrolled)	0.024	0.57
Total	**0.140**	**0.72**

Table 3 below summarizes the release rate and storage volumes required to meet the allowable release rate.

Table 3: Stormwater Release Rate & Storage Volume Summary

Description	Site Area (ha)	100 Year Release Rate (L/s)	100 Year Total Storage Required (m^3)
Controlled Area	0.115	11.57	29.8
Uncontrolled Area	0.024	8.66	0.00
Total	**0.140**	**20.23**	**29.8**

The project runoff exceeding the allowable release rate will be stored on site via surficial ponding on the paved parking lot and the building rooftop. Dashed lines with shaded areas showing the 100 year maximum ponding elevation and depth (HWL = 61.10m, 0.20m & 0.10m depth) for the parking lot, and ponding depth (0.15m) for the rooftop storage, are indicated on drawing C.601 found in Appendix E– Stormwater Management Plan which represents the maximum above grade storage provided (30.04 m^3).

Table 4 below summarizes the available storage volume which exceeds the minimum required volume. Therefore, the proposed above ground & roof ponding will provide sufficient storage.

Table 4: 100 year Storm Event Required and Available Storage

Location		Drainage Area	Storage Volume Required (m^3)	Storage Volume Provided (m^3)	Maximum Elevation (m)
Surficial Ponding in Parking Area	Ponding – CB01	WS-02	8.40	0.84	61.10
	Ponding – CBMH02	WS-04		7.80	61.10
	Ponding – N/A	WS-01	0.00	0.00	N/A
	Ponding – N/A	WS-05	0.00	0.00	N/A
Surficial Ponding on Roof	Ponding – RD1	WS-03	21.40	10.7	N/A
	Ponding – RD2	WS-03		10.7	N/A
Total			**29.80**	**30.04**	

The total flow leaving the site will be a combination of the uncontrolled portion of the site, flow restricted through the roof drain selection (combined controlled release rate of 3.20 L/s) as well as the flow captured and conveyed in the storm sewers and controlled prior to flowing into the storm sewer along Columbus Avenue.

For the storm sewers, outlet control must be provided at the manhole CBMH02 to restrict the 100 year flow. A proposed flow restrictor, IPEX TEMPEST Inlet Control Device (ICD), model ICD Vortex 81 (see Appendix D) will be installed at CBMH02 manhole outlet controlling the post development flows to 8.37 L/s with a hydraulic head of 2.16 m. See Appendix D for more information about selected ICD.

Rooftop detention of stormwater is also provided with outlet control through two proposed roof drains. The rooftop has been assumed to be low sloping providing two separate ponding areas, each with a single roof drain restricting the discharge rate to 1.6 L/s, resulting in a total release rate from the roof of 3.2 L/s. The roof drain flow control device has been selected to provide a flow rate of 1.6 L/s at a maximum flow depth of 0.15 m. Proposed roof drain to be Murphco Ultra Coppen Drain with one (1) hole moulded control flow dome strainer. See Appendix D for more information about the selected roof drain and flow restrictor. Briefly, the rooftop storage volume was calculated as:

$$V = (A1 + A2) \times h/3$$

$$= (214 + 214)\ m^2 \times 0.150\ m \times 1/3$$

$$= 21.4\ m^3$$

Where:

A1 = A2 = Area of roof surface to be used for stormwater storage

h = Maximum flow depth at the roof drain

Please note that only 74% of total roof surface area (579 m^2) was considered in the roof storage calculations.

Table 5 below summarize the total runoff from site in the 100 year storm event:

Table 5: 100 year Storm Event Allowable Release Rates

	100 year
Location	**Release Rate (L/s)**
Uncontrolled towards Columbus Ave	8.66
Controlled from Roof	3.20
Controlled from parking	8.37
Total Release Rate	**20.23**

4 WATER SUPPLY AND FIRE PROTECTION

4.1 Existing Water Supply Services

The subject property is located in an 1E water distribution network pressure zone. The subject property is fronting Columbus Avenue which has a 203 mm dia. watermain running along the South side of the street.

The fire hydrant which can potentially serve the property is located on the South side of Columbus Avenue, across from the South-East corner of the property, within approximately 27 m of the building. This fire hydrant provides substantial distance coverage for the entire proposed building.

4.2 Boundary Conditions

Boundary conditions of the surrounding water network were requested from the City of Ottawa. The results of the hydraulic analysis are included in Appendix J and summarized below:

Minimum HGL=109.6 m

Maximum HGL=118.5 m

Maximum Day Demand + Fire Flow =100.0 m

These operating pressures have been reviewed to verify that the operating pressures at this location for maximum daily demands, maximum hourly demand and fire flow scenarios are met. The results of the pressure verification are found in Appendix F.

4.3 Water Supply Demand and Fire Flow

According to the City of Ottawa Design Guidelines, the average daily water consumption rate for residential developments is 350 L/c/d.

The interior layout and architectural floor plans have been reviewed, and it was determined that the 3 and a half story building will house a total of 34 units. 15 of the units will be 1-bedroom apartments, and the remaining 19 units will be 2-bedroom units. The proposed floor plans for the building have been included in Appendix I for reference. Based on the city of Ottawa Design guidelines for population projection, this translates to approximately 61 residents. Table 6 below summarizes the population count of the proposed development as interpreted using table 4.1 of the City of Ottawa Design Guidelines.

Table 6: Development Residential Population Estimate

Proposed Unit type	Persons Per Unit	Number of Units	Population
Studio/1 Bedroom	1.4	15	21.0
2 bedroom Apartment	2.1	19	39.9
		Total Residential Population	60.9

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

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

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

Therefore, the average daily domestic water demand is 0.198 L/s, maximum daily is 1.121 L/s, and maximum hourly is 12.765 L/s.

Additionally, there is an area of 40 m^2 allocated for amenities in the main level. According to Ontario Building Code for assembly use (space with non-fixed seats and tables), the occupancy load is to be 0.95 m^2/person, and the average daily water demand is assumed at 70 L/person. The City of Ottawa Guidelines indicates a daily and hourly peak factor for institutional uses of 1.5 and 1.8, respectively. Therefore, the average daily institutional water demand is 0.034 L/s, maximum daily is 0.051 L/s, and maximum hourly is 0.092 L/s. Adding the water demands from domestic and amenity space the required water supply becomes **0.232 L/s** for average daily demand, **1.172 L/s** for maximum daily demand, and **12.857 L/s** for maximum hourly demand as summarized in Appendix F. Pipe Pressure loss calculations to confirm that water supply from Columbus avenue is sufficient are also included in Appendix F.

The fire flow requirements were estimated using the method prescribed by the Fire Underwriters' Survey (FUS). This method is based on the floor area of the building to be protected, the type and combustibility of the structural frame and the separation distances with adjoining building units. In order to determine the critical (maximum) demand of fire protection, the fire flow calculations were conducted for the total area of all storeys.

Table 7 summarizes the input parameters used for the FUS calculations. A minimum required fire flow of **198.3 L/s** was calculated for the water supply. Refer to Appendix G for the fire flow calculation sheet.

Table 7: Input parameters for Fire Flow Calculations

Parameter	Frame used for Building	Combustibility of Contents	Presence of Sprinklers	Separation Distance			
				North	East	South	West
Value according to FUS options	Ordinary Construction	Limited Combustible	Yes	20.1-30m	3.1-10m	20.1-30m	3.1-10m
Surcharge/reduction from base flow	0	-15%	-10%	10%	20%	10%	20%

4.4 Water Supply Servicing Design

The water demand used for watermain size selection should be sufficient to satisfy maximum day demand or the peak hour demand, whichever is greater. For this development, the maximum hour demand is equal to 12.857 L/s which translates to a minimum of 100 mm service required. However, due to the presence of sprinklers and the minimum recommended sizing requirements, it is recommended to upsize this connection to 150 mm. Therefore, the water servicing concept consists of a single (1) 150 mm dia. PVC pipe connected to the 203 mm municipal watermain on Columbus Avenue.

The table below summarizes the design criteria which have been respected during the design of the water service connections at this development.

Table 8: Water Supply Design Criteria

Design Parameter	Value
Minimum watermain diameter	150 mm
Minimum cover	2.4 m
Desired pressure range under maximum daily flow conditions	50 and 80 psi
Minimum pressure under peak hourly flow conditions	40 psi
Minimum pressure under the maximum day plus fire flow condition	20 psi

5 SANITARY SERVICE

5.1 Existing Sanitary Sewer Services

Existing infrastructure surrounding the proposed development were reviewed to determine that a 250mm sanitary sewer currently runs along the South end of Columbus Avenue The most upstream manhole for this sanitary network is roughly 20m West of the South-West extent of the proposed development property line. At this manhole, sanitary flow is conveyed East with an invert of approximately 58.68.

5.2 Sanitary Sewer Servicing Design

According to the Design Guidelines, the peak domestic sewage flow was calculated as follows:

$$Q = (q \times M \times P) + (i \times A)$$

Where:
q = average sanitary flow per capita (L/c/d)
P = Design population (60.9 capita)
M= Peaking factor as per Harmon formula (maximum value of 4 is used)

$$M = 1 + \frac{14}{4 + P^{0.5}}$$

i = Infiltration/inflow rate (0.28 L/s/ha)
A = Total site area (0.14 ha)

Based on the detailed calculations presented in Appendix H, the total peak sewage flow anticipated from the proposed development is **1.03L/s**.

The developments sanitary system will collect sewage through a 150mm PVC sewer, flowing at 2.0% slope, and connecting to the existing 250mm sanitary service running through Columbus Avenue.

6 MAINTENANCE

Maintenance is the key issue for all types of stormwater management practices. It ensures performance efficiency of the facilities and prevents undesirable consequences such as flooding or event contamination to the neighboring properties.

7 CONCLUSION

This Stormwater Management Report for the development proposed at 261-265 Columbus Avenue 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:

Stormwater

- The site will be connected to the Columbus Avenue storm sewer network by adhering to the following quantity controls: Post development flows for the 5 and 100 year storm event must be equal or less than the pre development 5 year release rate, calculated to be 20.23 L/s.
- Stormwater quantity control objectives will be met with the use of flow control devices, overland ponding and roof storage.
- Stormwater quality control objectives will be met with the use of an oil-grit separator (OGS).

Domestic Water

- The anticipated domestic water demand for the site is 0.232 L/s (average daily), 1.172 L/s (maximum daily), and 12.857 L/s (maximum hourly).
- The maximum required fire flow was calculated to be 198.3 L/s using the FUS method.
- One municipal fire hydrants is within 45m of the building exterior, located along Columbus Avenue, and is available to service the proposed development.
- The new building will be serviced with a 150 mm lateral connected to the existing 203 mm watermain on Columbus Avenue.

Sanitary

- The anticipated sanitary flow from the proposed development is 1.03 L/s.
- The developed property will be serviced with a 150 mm dia. sewer which is to be connected to the existing 250 mm dia. sewer along Columbus Avenue.

8 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 insure the compatibility with the recommendations contained in this document.

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

Prepared by:

LRL Associates Ltd.

Maxime Longtin
Civil Technologist

Mohan Basnet, P.Eng.
Civil Engineer

APPENDICES

APPENDIX A

5 and 100 Year SWM Runoff and Storage Requirements

LRL File No. 190377
Project: 3.5 Story Residential Building
Location: 261-265 Columbus Ave
Date: April 24, 2020
Designed: Mohan Basnet
Drawing Ref.: C.601

Stormwater Management Design Sheet

Runoff Equation

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

Allowable Release Rate from total Pre-development

5 Year Pre-Development Flow Rate

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

C =	0.50	max of 0.5 as per City of Ottawa
I =	104.2	mm/hr
Tc =	10	min
EWS-01 Area=	0.140	ha
Allowable Release Rate=	**20.23**	**L/s**

Post-development Stormwater Management

					$\sum R_{2\&5}$	$\sum R_{100}$
	Total Site Area =	**0.140**	ha	**∑R=**	**0.72**	**0.90**
Controlled	WS-01	0.002	ha	R=	0.90	1.00
	WS-02	0.045	ha	R=	0.55	0.69
	WS-03	0.058	ha	R=	0.90	1.00
	WS-04	0.011	ha	R=	0.80	1.00
	Total Contolled =	**0.115**	**ha**	**∑R=**	**0.76**	**0.94**
Un-controlled	WS-05	0.024	ha	R=	0.57	0.72
	Total Un-Contolled =	**0.024**	**ha**	**∑R=**	**0.57**	**0.72**

LRL File No. 190377
Project: 3.5 Story Residential Building
Location: 261-265 Columbus Ave
Date: April 27, 2020
Designed: Mohan Basnet
Drawing Ref.: C.601

Stormwater Management Design Sheet

Runoff Equation

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

Allowable Release Rate from total Pre-development

100 Year Pre-Development Flow Rate

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

C =	0.50	max of 0.5 as per City of Ottawa
I =	178.6	mm/hr
Tc =	10	min
Total Area=	0.140	ha
100 Year Storm Release Rate=	**34.67**	**L/s**
5 Year Storm Allowable Release Rate=	**20.23**	**L/s**

Post-development Stormwater Management

					$\sum R_{2\&5}$	$\sum R_{100}$
	Total Site Area =	**0.140**	ha	**∑R=**	**0.72**	**0.90**
Controlled	WS-01	0.002	ha	R=	0.90	1.00
	WS-02	0.045	ha	R=	0.55	0.69
	WS-03	0.058	ha	R=	0.90	1.00
	WS-04	0.011	ha	R=	0.80	1.00
	Total Contolled =	**0.115**	**ha**	**∑R=**	**0.76**	**0.94**
Un-controlled	WS-05	0.024	ha	R=	0.57	0.72
	Total Un-Contolled =	**0.024**	**ha**	**∑R=**	**0.57**	**0.72**

Post-development Stormwater Management (Total Site)

100 Year Storm Event:

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

		Storage Required				
Time (min)	**Intensity (mm/hr)**	**Controlled Runoff (L/s)**	**Storage Volume (m^3)**	**Controlled Release Rate Constant (L/s)**	**Uncontrolled Runoff (L/s)**	**Total Release Rate (L/s)**
10	178.6	54.07	25.5	11.57	8.66	20.23
15	142.9	43.27	28.5	11.57	6.93	18.50
20	120.0	36.32	29.7	11.57	5.82	17.39
25	103.8	31.45	29.8	11.57	5.04	16.61
30	91.9	27.82	29.2	11.57	4.46	16.03
35	82.6	25.01	28.2	11.57	4.01	15.58
40	75.1	22.75	26.8	11.57	3.65	15.22
45	69.1	20.91	25.2	11.57	3.35	14.92
50	64.0	19.37	23.4	11.57	3.10	14.67
60	55.9	16.93	19.3	11.57	2.71	14.28
70	49.8	15.08	14.7	11.57	2.42	13.99
80	45.0	13.62	9.9	11.57	2.18	13.75
90	41.1	12.45	4.7	11.57	1.99	13.56
100	37.9	11.48	0.0	11.57	1.84	13.41
110	35.2	10.66	0.0	11.57	1.71	13.28
120	32.9	9.96	0.0	11.57	1.60	13.17

LRL File No. 190377
Project: 3.5 Story Residential Building
Location: 261-265 Columbus Ave
Date: April 27, 2020
Designed: Mohan Basnet
Drawing Ref.: C.601

Stormwater Management Design Sheet

Post-development Stormwater Management (On Roof)

100 Year Storm Event:

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

		Storage Required				
Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate Constant (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	178.6	28.74	15.3	3.20	0.00	3.20
15	142.9	23.00	17.8	3.20	0.00	3.20
20	120.0	19.31	19.3	3.20	0.00	3.20
25	103.8	16.72	20.3	3.20	0.00	3.20
30	91.9	14.79	20.9	3.20	0.00	3.20
35	82.6	13.29	21.2	3.20	0.00	3.20
40	75.1	12.10	21.3	3.20	0.00	3.20
45	69.1	11.11	21.4	3.20	0.00	3.20
50	64.0	10.29	21.3	3.20	0.00	3.20
60	55.9	9.00	20.9	3.20	0.00	3.20
70	49.8	8.01	20.2	3.20	0.00	3.20
80	45.0	7.24	19.4	3.20	0.00	3.20
90	41.1	6.62	18.5	3.20	0.00	3.20
100	37.9	6.10	17.4	3.20	0.00	3.20
110	35.2	5.67	16.3	3.20	0.00	3.20
120	32.9	5.29	15.1	3.20	0.00	3.20

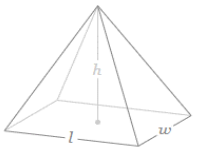
Onsite Stormwater Retention

Total Storage Required =	**29.8**	**m^3**	
Available Roof Storage =	21.4	m^3	
Available Surface Storage =	8.6	m^3	refer to LRL Plan C.601
Total Storage Provided =	**30.0**	**m^3**	

Summary of Roof Storage

Roof Storage Volume (100 Year) =	21.4	m^3		
Number of Roof Drains =	2			
Control Flow/Drain =	1.6	L/s		
Total Flow from Roof Drain =	3.2	L/s		
Available Roof Surface =	0.058	ha		
Effective Roof Surface =	0.043	ha	74	(% of Total Roof Surface)
Max. Depth (100 Year) =	0.150	m		
Roof Drain Model =	Murphco Ultra Roof Drain, see Appendix D			

V = (l*w)*h/3 = Ah/3



APPENDIX B

Pre and Post Development Watershed Areas

LRL Associates Ltd.
Storm Watershed Summary

LRL File No.	190377
Project:	3.5 Story Residential Building
Location:	261-265 Columbus Ave
Date:	October 28, 2019
Designed:	V. Johnson
Drawing Reference:	C.701/C.702

Pre-Development Catchments

WATERSHED	C = 0.3	C = 0.85	C = 0.90	Total Area (ha)	Combined C
EWS-01	0.060	0.000	0.080	0.140	0.64
TOTAL	**0.060**	**0.000**	**0.080**	**0.140**	**0.64**

As per City of Ottawa, Assume Pre development C= 0.5max

Post-Development Catchments

WATERSHED	C = 0.20	C = 0.85	C = 0.90	Total Area (ha)	Combined C
CONTROLLED West Interlocked Portion (WS-01)	0.000	0.000	0.002	0.002	0.90
CONTROLLED North Parking Lot/Site (WS-02)	0.019	0.026	0.000	0.045	0.55
CONTROLLED Building (WS-03)	0.000	0.000	0.058	0.058	0.90
CONTROLLED East Parking Lot (WS-04)	0.000	0.011	0.000	0.011	0.80
UNCONTROLED to Columbus Ave (WS-05)	0.011	0.000	0.013	0.024	0.57
TOTAL	**0.030**	**0.037**	**0.071**	**0.140**	**0.72**

Post-Development Catchments (Roof)

WATERSHED	C = 0.20	C = 0.85	C = 0.90	Total Area (ha)	Combined C
CONTROLLED Building (WS-03)	0.000	0.000	0.058	0.058	0.90
TOTAL	**0.000**	**0.000**	**0.058**	**0.058**	**0.90**

APPENDIX C

SWM Quality Treatment Unit

Stormceptor®

FORTERRA

Stormceptor® EF Sizing Report

ESTIMATED NET ANNNUAL SEDIMENT (TSS) LOAD REDUCTION STORMCEPTOR®

Province :	Ontario
City :	Ottawa
Nearest Rainfall Station :	OTTAWA MACDONALD-CARTIER INT'L AP
NCDC Rainfall Station Id :	6000
Years Of Rainfall Data :	37

Site Name :	261-265 Columbus Ave.

Drainage Area (ha) :	0.056
Runoff Coefficient 'c' :	0.67

Partical Size Distribution :	Fine

Target TSS Removal (%) :	80.0
Required Water Quality Runoff Volume Capture (%) :	90.0

Require Hydrocarbon Spill Capture?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s) :	

Project Name :	261-265 Columbus Ave.
Project Number :	190377
Designer Name :	Brandon O'Leary
Designer Company :	Forterra
Designer Email :	brandon.oleary@forterrabp.com
Designer Phone :	(905) 630-0359
EOR Name :	Maxime Longtin
EOR Company :	LRL Associates Ltd.
EOR Email/Phone :	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	92
EFO6	92
EFO8	93
EFO10	93
EFO12	93

Recommended Stormceptor EFO Model : EFO4

Estimated Net Annual Sediment (TSS) Load Reduction (%) : 92

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 fromthe frequent rainfall events that contribute the vast majority of annualrunoff 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.

PARTICAL 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®

FORTERRA

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 (%)
1	51.3	51.3	0.10	6.0	5.0	93	47.7	47.7
2	8.7	60.0	0.21	13.0	10.0	93	8.1	55.8
3	5.8	65.8	0.31	19.0	16.0	93	5.4	61.2
4	4.6	70.4	0.42	25.0	21.0	93	4.3	65.5
5	4.2	74.6	0.52	31.0	26.0	93	3.9	69.4
6	3.2	77.8	0.63	38.0	31.0	93	3.0	72.4
7	2.6	80.4	0.73	44.0	37.0	93	2.4	74.8
8	2.4	82.8	0.83	50.0	42.0	93	2.2	77.0
9	1.9	84.7	0.94	56.0	47.0	93	1.8	78.8
10	1.6	86.3	1.04	63.0	52.0	92	1.5	80.2
11	1.3	87.6	1.15	69.0	57.0	92	1.2	81.4
12	1.1	88.7	1.25	75.0	63.0	91	1.0	82.4
13	1.3	90.0	1.36	81.0	68.0	91	1.2	83.6
14	1.1	91.1	1.46	88.0	73.0	90	1.0	84.6
15	0.6	91.7	1.56	94.0	78.0	90	0.5	85.2
16	0.8	92.5	1.67	100.0	83.0	89	0.7	85.9
17	0.7	93.2	1.77	106.0	89.0	89	0.6	86.5
18	0.5	93.7	1.88	113.0	94.0	88	0.4	86.9
19	0.6	94.3	1.98	119.0	99.0	87	0.5	87.4
20	0.5	94.8	2.09	125.0	104.0	87	0.4	87.9
21	0.2	95.0	2.19	131.0	110.0	86	0.2	88.1
22	0.4	95.4	2.29	138.0	115.0	86	0.3	88.4
23	0.5	95.9	2.40	144.0	120.0	85	0.4	88.8
24	0.4	96.3	2.50	150.0	125.0	85	0.3	89.2
25	0.1	96.4	2.61	156.0	130.0	84	0.1	89.2

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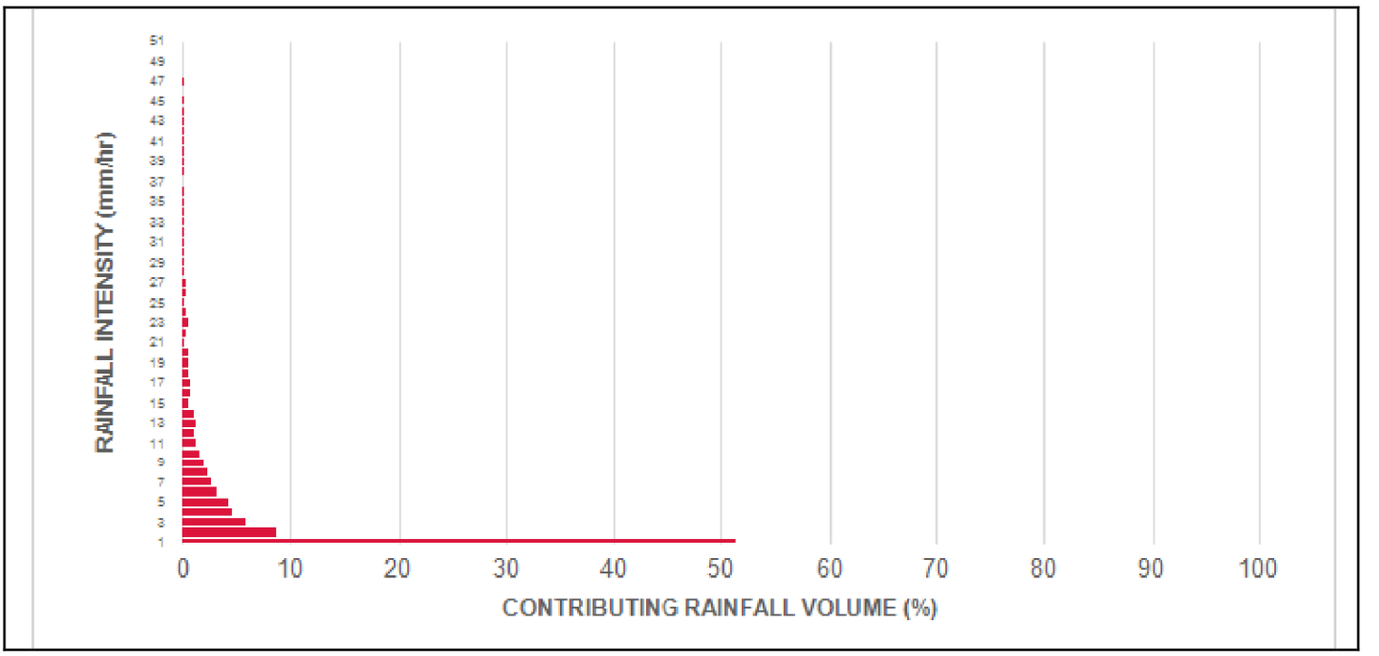
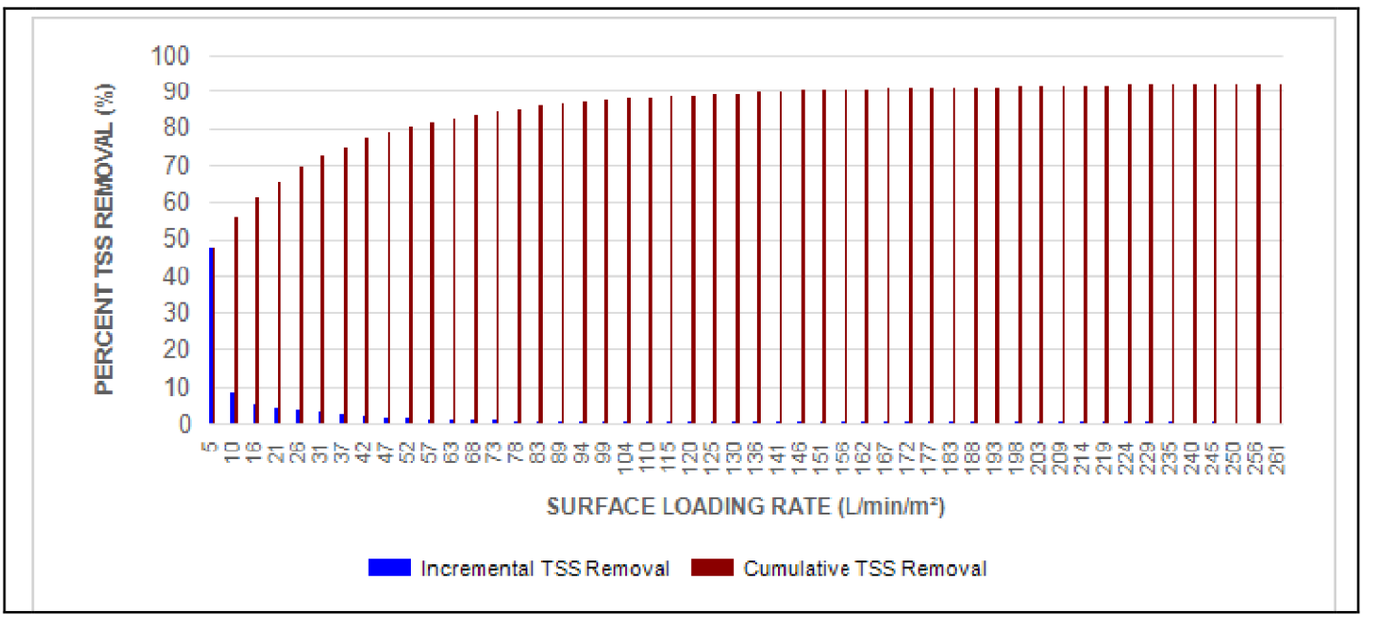
Stormceptor® EF Sizing Report

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 (%)
26	0.3	96.7	2.71	163.0	136.0	84	0.3	89.5
27	0.4	97.1	2.82	169.0	141.0	83	0.3	89.8
28	0.2	97.3	2.92	175.0	146.0	83	0.2	90.0
29	0.2	97.5	3.02	181.0	151.0	81	0.2	90.2
30	0.2	97.7	3.13	188.0	156.0	81	0.2	90.3
31	0.1	97.8	3.23	194.0	162.0	80	0.1	90.4
32	0.2	98.0	3.34	200.0	167.0	80	0.2	90.6
33	0.1	98.1	3.44	207.0	172.0	79	0.1	90.6
34	0.1	98.2	3.55	213.0	177.0	79	0.1	90.7
35	0.1	98.3	3.65	219.0	183.0	78	0.1	90.8
36	0.2	98.5	3.76	225.0	188.0	78	0.2	90.9
37	0.0	98.5	3.86	232.0	193.0	77	0.0	90.9
38	0.1	98.6	3.96	238.0	198.0	77	0.1	91.0
39	0.1	98.7	4.07	244.0	203.0	76	0.1	91.1
40	0.1	98.8	4.17	250.0	209.0	76	0.1	91.2
41	0.1	98.9	4.28	257.0	214.0	75	0.1	91.3
42	0.1	99.0	4.38	263.0	219.0	74	0.1	91.3
43	0.2	99.2	4.49	269.0	224.0	74	0.1	91.5
44	0.1	99.3	4.59	275.0	229.0	73	0.1	91.5
45	0.1	99.4	4.69	282.0	235.0	73	0.1	91.6
46	0.0	99.4	4.80	288.0	240.0	72	0.0	91.6
47	0.1	99.5	4.90	294.0	245.0	72	0.1	91.7
48	0.0	99.5	5.01	300.0	250.0	72	0.0	91.7
49	0.0	99.5	5.11	307.0	256.0	72	0.0	91.7
50	0.0	99.5	5.22	313.0	261.0	71	0.0	91.7
Estimated Net Annual Sediment (TSS) Load Reduction =								**92 %**

RAINFALL DATA FROM OTTAWA MACDONALD-CARTIER INT'L AP RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

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

SCOUR PREVENTION AND ONLINE CONFIGURATION

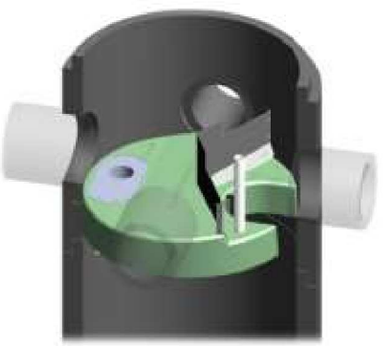
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test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

DESIGN FLEXIBILITY

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

OIL CAPTURE AND RETENTION

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



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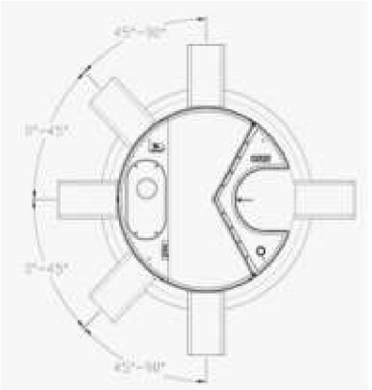

INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.
0(degree)-45(degree):The inlet pipe is 1-inch (25mm) higher than the outlet pipe.
45(degree)-90(degree):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	197	52	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	348	92	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	545	144	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	874	231	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	1219	322	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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Table of TSS Removal vs Surface Loading Rate Based on Third-Party Test Results
Stormceptor® EFO

SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL
1	70	660	46	1320	48	1980	35
30	70	690	46	1350	48	2010	34
60	67	720	45	1380	49	2040	34
90	63	750	45	1410	49	2070	33
120	61	780	45	1440	48	2100	33
150	58	810	45	1470	47	2130	32
180	56	840	45	1500	46	2160	32
210	54	870	45	1530	45	2190	31
240	53	900	45	1560	44	2220	31
270	52	930	44	1590	43	2250	30
300	51	960	44	1620	42	2280	30
330	50	990	44	1650	42	2310	30
360	49	1020	44	1680	41	2340	29
390	48	1050	45	1710	40	2370	29
420	48	1080	45	1740	39	2400	29
450	48	1110	45	1770	39	2430	28
480	47	1140	46	1800	38	2460	28
510	47	1170	46	1830	37	2490	28
540	47	1200	47	1860	37	2520	27
570	46	1230	47	1890	36	2550	27
600	46	1260	47	1920	36	2580	27
630	46	1290	48	1950	35		

APPENDIX D

SWM Quantity Control Devices

TEMPEST Product Submittal Package R1

Date: April 27, 2020

Customer: LRL Associates Ltd.

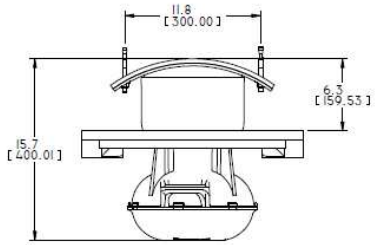
Contact: Mohan Basnet

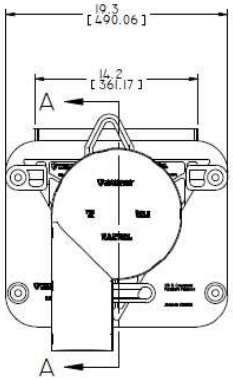
Location: Ottawa

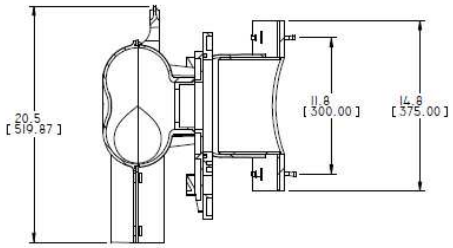
Project Name: Columbus Ave.

IPEX

Tempest LMF ICD Rd Shop Drawing







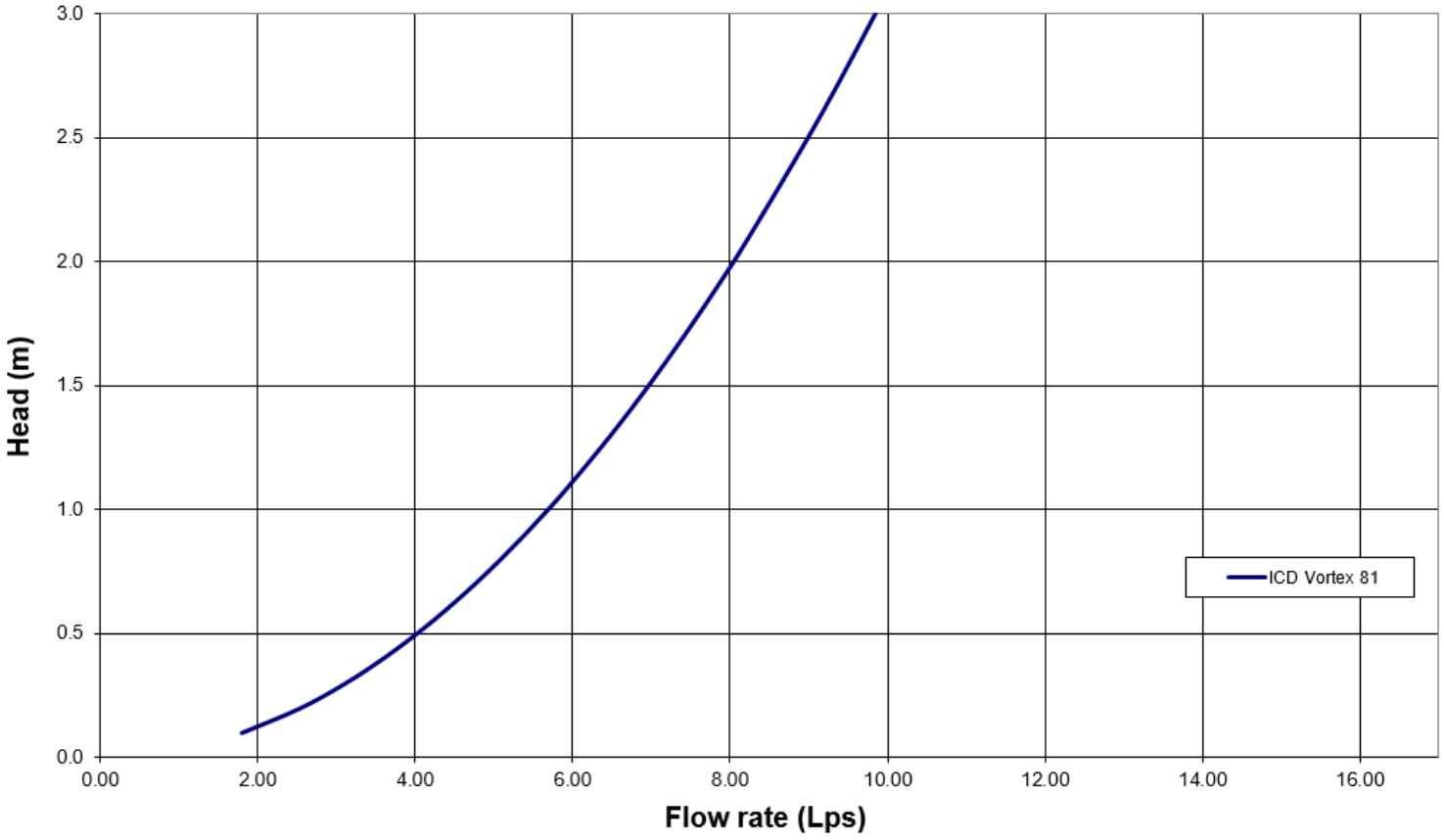
SECTION A-A

IPEX TECHNOLOGIES INC.				
PROJECTION	UNITS: in (mm)	TITLE: LMF ROUND CB ASSEMBLY		
DRAWN BY: H. McMARTIN	DATE: 2011-07-26	SIZE: B	SCALE(S): 1/8	SHEET: 1 OF 1
VERIFIED BY:	DATE: 2011-07-26	DRAWING NUMBER: SGM74_FA002R03		REV: 3

IPEX

Tempest LMF ICD Flow Curve

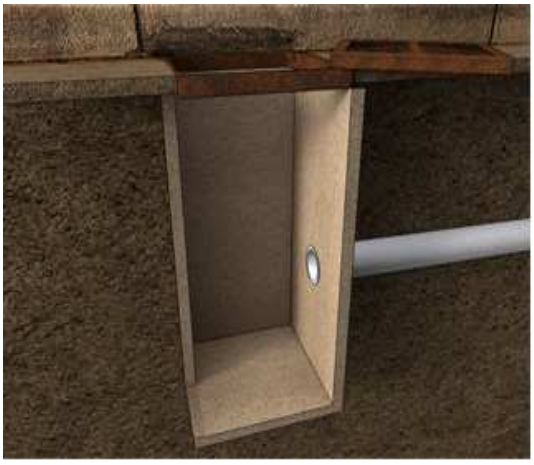
Flow: 8.37 L/s
Head: 2.16 m

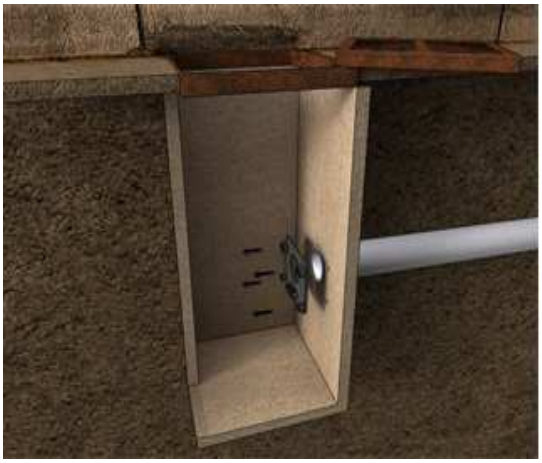


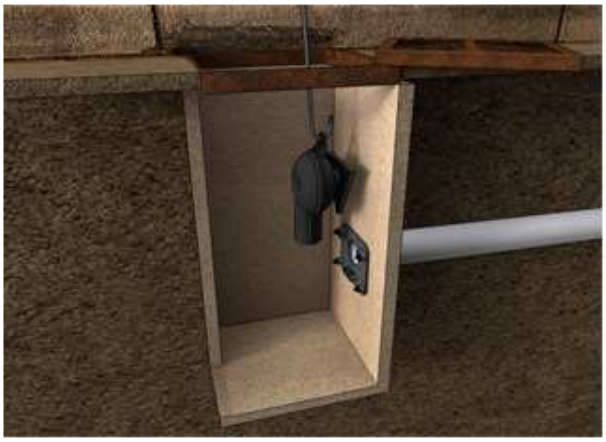
IPEX

Square CB Installation Notes:

1. Materials and tooling verification:
   - Tooling: impact drill, 3/8'' concrete bit, torque wrench for 9/16''nut, hand hammer, level, and marker.
   - Material: (4) concrete anchor 3/8x3-1/2, (4) washers, (4) nuts
2. Use the mounting wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
3. Use an impact drill with a 3/8'' concrete bit to make the four holes at a minimum of 1-1/2'' depth up to 2-1/2''. Clean the concrete dust from the holes.
4. Install the anchors (4) in the holes by using a hammer. Put the nuts on the top of the anchors to protect the threads when you will hit the anchors with the hammer. Remove the nuts on the ends of the anchors
5. Install the wall mounting plate on the anchors and screw the nut in place with a maximum torque of 40 N.m (30 lbf-ft). There should be no gap between the wall mounting plate and the catch basin wall.
6. From ground above using a reach bar, lower the device by hooking the end of the reach bar to the handle of the LMF device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered in to the wall mounting plate and has created a seal.





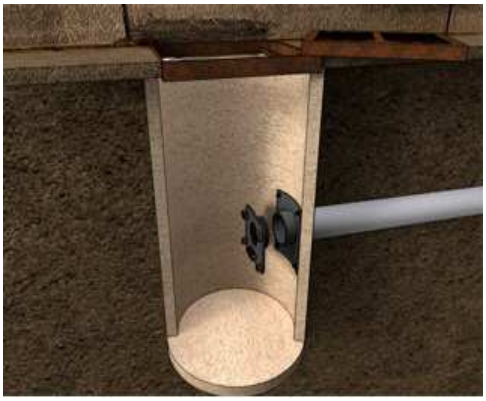


IPEX

Round CB Installation Notes: (Refer to square install notes above for steps 1 , 3, & 4)

2. Use spigot catch basin wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
5. Install the CB spigot wall plate on the anchors and screw the 4 nuts in place with a maximum torque of 40 N.m (30 lb-ft). There should be no gap between the CB spigot wall plate and the catch basin wall.
6. Apply solvent cement on the hub of the universal mounting plate and the spigot of the spigot CB wall plate. Slide the hub over the spigot. Make sure the universal mounting plate is at the horizontal and its hub is completely inserted onto the spigot. Normally, the corners of the universal mounting plate hub adapter should touch the catch basin wall.
7. From ground above using a reach bar, lower the ICD device by hooking the end of the reach bar to the handle of the ICD device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered into the mounting plate and has created a seal.






CAUTION/WARNING/DISCLAIM:

- Verify that the inlet(s) pipe(s) is not protruding into the catch basin. If it is, cut it back so that the inlet pipe is flush with the catch basin wall.
- Any required cement in the installation must be approved for PVC.
- The solvent cement should not be used below 0°C (32°F) or in a high humidity environment. Please refer to the IPEX solvent cement guide to confirm required curing times or attend the IPEX **Online Solvent Cement Training Course**.
- Call your IPEX representative for more information or if you have any questions about our products.

IPEX

IPEX TEMPEST Inlet Control Devices Technical Specification

General

Inlet control devices (ICD's) are designed to provide flow control at a specified rate for a given water head level and also provide odour and floatable control where specified. All ICD's will be IPEX Tempest or approved equal.

All devices shall be removable from a universal mounting plate. An operator from street level using only a T-bar with a hook will be able to retrieve the device while leaving the universal mounting plate secured to the catch basin wall face. The removal of the TEMPEST devices listed above must not require any unbolting or special manipulation or any special tools.

High Flow (HF) Sump devices will consist of a removable threaded cap which can be accessible from street level with out entry into the catchbasin (CB). The removal of the threaded cap shall not require any special tools other than the operator's hand.

ICD's must have no moving parts.

Materials

ICD's are to be manufactured from Polyvinyl Chloride (PVC) or Polyurethane material, designed to be durable enough to withstand multiple freeze-thaw cycles and exposure to harsh elements.

The inner ring seal will be manufactured using a Buna or Nitrile material with hardness between Duro 50 and Duro 70.

The wall seal is to be comprised of a 3/8" thick Neoprene Closed Cell Sponge gasket which is attached to the back of the wall plate.

All hardware will be made from 304 stainless steel.

Dimensioning

The Low Medium Flow (LMF), High Flow (HF) and the High Flow (HF) Sump shall allow for a minimum outlet pipe diameter of 200mm with a 600mm deep Catch Basin sump.

Installation

Contractor shall be responsible for securing, supporting and connecting the ICD's to the existing influent pipe and catchbasin/manhole structure as specified and designed by the Engineer.

Les Produits MURPHCO Ltée

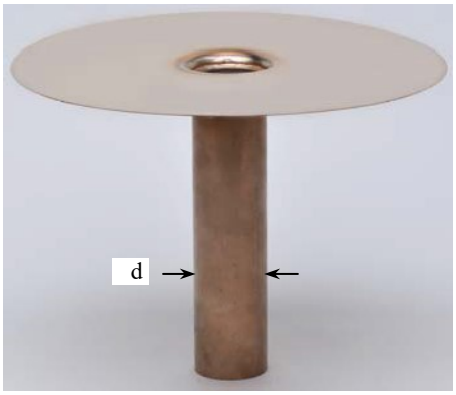
TECHNICAL DATA

MURPHCO ULTRA ROOF DRAINS

DESCRIPTION

ULTRA COPPER DRAIN

d :
2"
2 ⅝"
3"
3 ⅝"
4"
4 ⅝"
5"
5 ⅝"
6"



ULTRA ALUMINUM DRAIN

d :
2 ⅝"
3"
3 ⅝"
4"

The design of the joint between the flange and the sleeve makes it a very distinctive roof drain. The flange is folded down in the sleeve with the patented ***Murphco*** punch. Both pieces are then unified with a continuous ***"MIG"*** bronze solder joint, under the flange. This solder joint cannot be melted when heated by a blowtorch at the time of application of modified bitumen membranes so that the assembly remains permanently watertight. This method avoids any contact of water on the soldered joint, preventing any infiltration on account of solder defect.

Use: recommended for all types of flat roofs: industrial, commercial, and residential.

MATERIALS

	ULTRA COPPER DRAIN	**ULTRA ALUMINUM DRAIN**
FLANGE	32 oz copper, thickness : 0.042" (1.066 mm)	Rigid aluminum 3003-H14, MARINE TYPE; Thickness: 0.090" (2.29 mm)
SLEEVE	Rigid copper sleeve See table of diameters, page 3	Rigid aluminum sleeve, 3003-H14 grade, MARINE TYPE; ALLOY 6061 : 0.090" (2.29 mm) thick for all interior diameter sizes See table of interior diameters, page 3
STANDARDS	Rigid copper sleeve conforming with ASTM-B75	Rigid aluminum sleeve conforming with ASTM-B221.REV.14
GRADE	Commercial, DHP C12200	Marine vessels, pressure tanks
SOLDER	***"MIG"*** process	***"MIG"*** process

DIMENSIONS

	ULTRA COPPER DRAIN	**ULTRA ALUMINUM DRAIN**
FLANGE	CIRCULAR 16" DIA. (400 mm); square flange on request. (delivery delay)	CIRCULAR 16" DIA. (400 mm)
SLEEVE	Standard length: 12" (300 mm) and 18" (452 mm); longer sleeves available on request (delivery delay)	Standard length: 12" (300 mm) and 18" (452 mm); longer sleeves available on request (delivery delay)

Revision 00: july 2016

MURPHCO ULTRA ROOF DRAINS

INSTALLATION – COPPER DRAIN / ALUMINUM DRAIN

At the membrane level:
These types of roof drains are used on flat roofs covered with B.U.R. asphalt felt membranes, modified bitumen or E.P.D.M. roofing and waterproofing membranes.

To seal the drain to the membrane, it is recommended to prime the copper and/or aluminum flange on both sides with a compatible primer. Then, the flange is applied into a continuous layer of compatible and heavy duty bituminous cement, or specified adhesive.

To complete the flashing of the flange to an asphalt felt membrane, apply 2 plies of heavy duty cotton fabric and a top ply no.15 asphalt felt, each one applied into hot bitumen.

For a modified bitumen membrane, apply a reinforcing ply and extend the cap sheet membrane in accordance with the recommendation of the manufacturer.

For an E.P.D.M. membrane, strictly follow the installation procedures recommended by the membrane manufacturer.

Connection to the interior rainwater leader:
The connection of the roof drain sleeve to the interior rainwater leader may be made as per the following procedures:

1. If the rainwater leader is accessible by the interior, cut the roof drain sleeve to an appropriate length in order to install a clamp collar with 3" and 4" drains or a flexible coupling sleeve. This method may be made only with a rigid sleeve roof drain. In such a way. The water flow diameter is not reduced.

2. When using an appropriate interior drain diameter of 2⅝" (67 mm), 3⅝" (92 mm), 4 ⅝" (117 mm) and 5 ⅝" (143 mm), the drain sleeve may also be sealed to the interior pipe with a U-Flow$^{T.M.}$ seal, following the recommendation of U-Flow Inc., manufacturer.

3. The drain sleeve may also be sealed to the interior pipe with a heavy duty elastomeric cement applied on the exterior surface of the sleeve, before the drain installation. This interior pipe connection method is used only if the methods described in items 1 and 2 above are not possible.

FEATURES AND GUARANTY

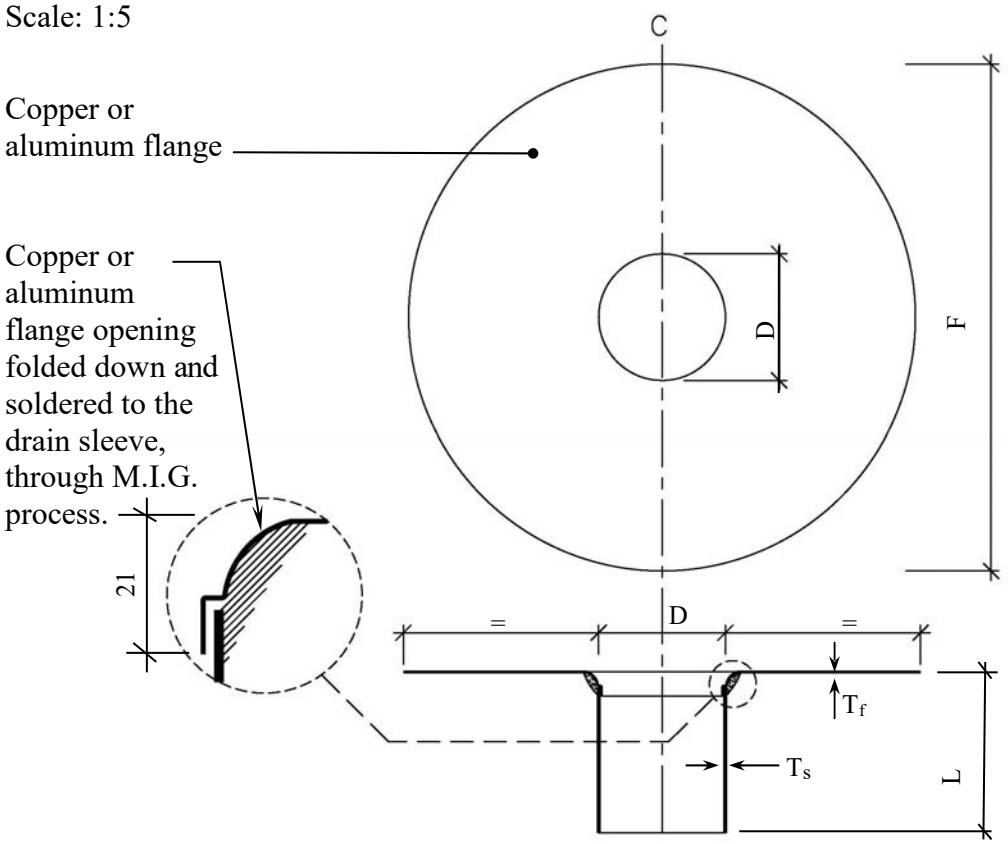
- Rigid copper or aluminum sleeve without joint, clip or vertical solder
- 32 oz copper flange or 0.090" (2.29 mm) aluminum flange folded down in the sleeve with the patented ***Murphco*** punch
- No joint or solder exposed to surface water
- Compatible with U-FLOW$^{T.M.}$ seal, clamp collar or flexible coupling sleeve for a maximum flow
- Durability, quality and commercial grade
- Guaranteed against corrosion and manufacturing defects (see note)

Note: Avoid any contact between the aluminum drain and pressure treated wood. Such contact shall invalidate the drain guaranty.

MURPHCO ULTRA ROOF DRAINS

DRAIN SECTION – COPPER DRAIN / ALUMINUM DRAIN

Scale: 1:5



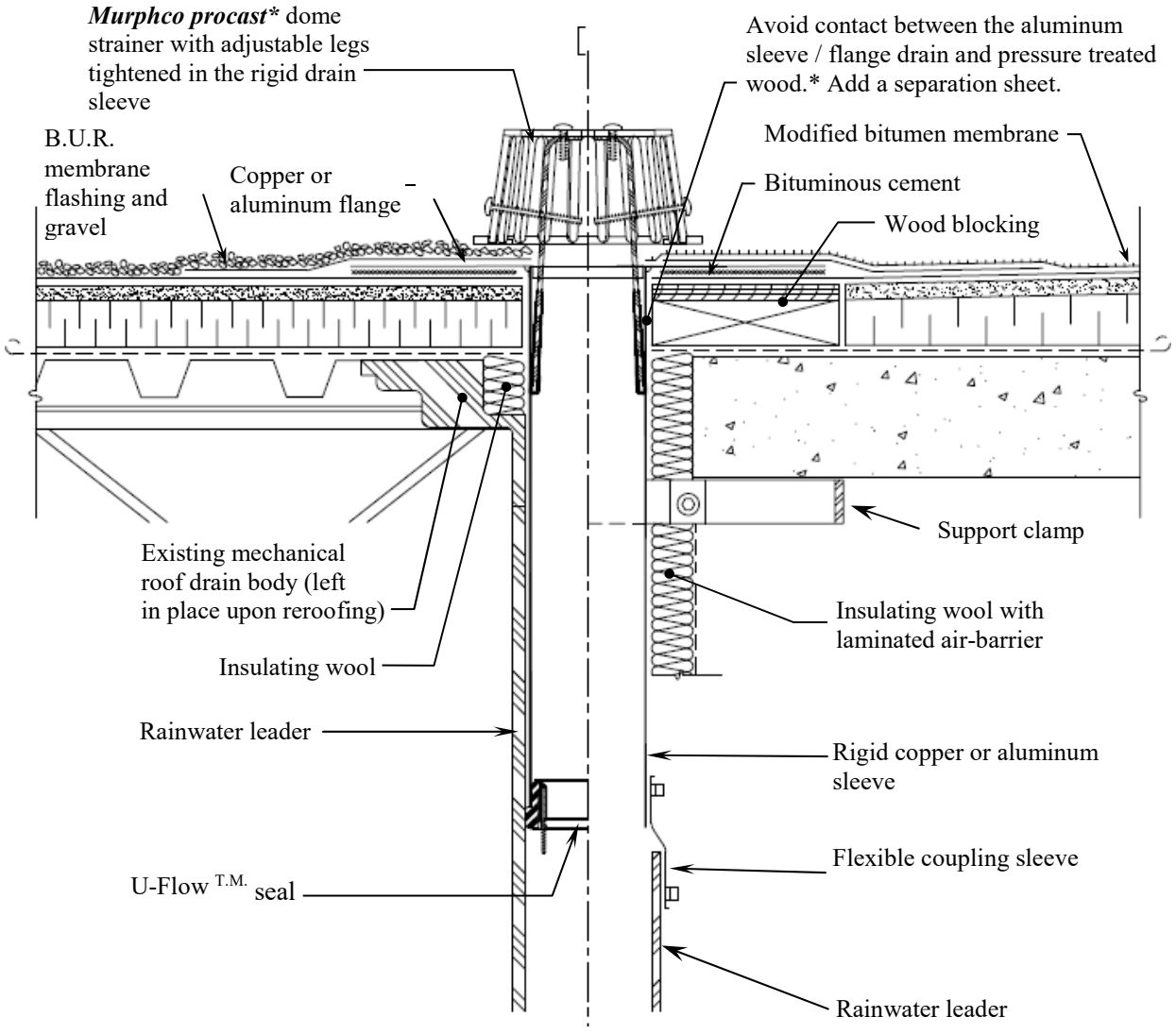
ULTRA COPPER DRAIN				
STANDARDS DIMENSIONS				
D (interior)	Ts	Tf	F	L
2" (51 mm)	0.050" (1.27 mm)	32 onces	Round 16" (400 mm)	12" & 18" (300 & 452 mm)
2 ⅝" (67 mm)	0.050" (1.27 mm)	32 onces		
3" (76 mm)	0.045" (1.14 mm)	32 onces		
3 ⅝" (92 mm)	0.078" (1.83 mm)	32 onces		
4" (102 mm)	0.058" (1.47 mm)	32 onces		
4 ⅝" (117 mm)	0.090" (2.29 mm)	32 onces		
5" (127 mm)	0.090" (2.29 mm)	32 onces		
5 ⅝" (143 mm)	0.090" (2.29 mm)	32 onces		
6" (152 mm)	0.090" (2.29 mm)	32 onces		

ULTRA ALUMINUM DRAIN				
STANDARDS DIMENSIONS				
D (interior)	Ts	Tf	F	L
2 ⅝" (67 mm)	0.090" (2.29 mm)	0.090" (2.29 mm)	Round 16" (400 mm)	12" & 18" (300 & 452 mm)
3" (76 mm)	0.090" (2.29 mm)	0.090" (2.29 mm)		
3 ⅝" (92 mm)	0.090" (2.29 mm)	0.090" (2.29 mm)		
4" (102 mm)	0.090" (2.29 mm)	0.090" (2.29 mm)		

MURPHCO ULTRA ROOF DRAINS

TYPICAL DETAIL – COPPER DRAIN / ALUMINUM DRAIN

Scale: 1:5



Notice to plumbing / roofing contractor: When a copper drain sleeve must be cut for adjustment to appropriate length, avoid the use of vibrating tools that could generate fissures in the copper flange or sleeve along the solder. Rather utilize a circular cutter.

*Note: Avoid any contact between the aluminum drain and pressure treated wood. Such contact shall invalidate the drain guaranty.

MURPHCO ULTRA ROOF DRAINS

DESIGNED AND MANUFACTURED BY LES PRODUITS MURPHCO LTÉE

Technical assistance or further information may be obtained from:

LES PRODUITS MURPHCO

Manufacturier et spécialiste de drains de toiture

Boutique de Métal en feuille

4955 Brock st, Montreal (Qc) H4E 1B5
Tel.: (514) 937-3275 • Fax: (514) 937-6797
Web: www.produitsmurphco.com • E-mail: nancy@produitsmurphco.com

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info@englobecorp.com

NOTICE

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MOULDED CONTROL FLOW DOME STRAINER

DESCRIPTION

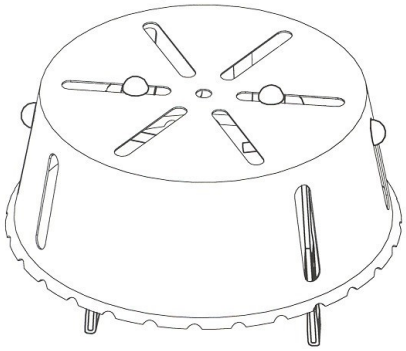
The control flow dome strainer is made of shop moulded aluminum and conceived for flat roof drains where hydraulic loads of the interior rainwater leaders must be restricted in order to meet the requirements of the current codes, the standards of certain municipalities and the drainage system capacity limits.

According to these requirements, the strainer may be modified to limit the water flow by reducing the number of openings, see tables on following pages.

The strainer is available in 2 sizes, small and medium, which are compatible with ***Murphco**** copper roof drains, being inserted inside the sleeves. Moreover, such strainers may adapt to all types of existing drains as their adjustable legs, coated with gripping rubber, are tightly adjusted inside the sleeve or body of the drain.

TECHNICAL DESCRIPTION OF FINISHED PRODUCT

Color : Aluminum (metallic grey)
Dome : Moulded aluminum
Series: 1100
Legs : Extruded aluminum
6063 T5 solid
Rounded end
Coating : Red plastic color Guard
No. 17545
Screws : Stainless steel
2 screws of ¼" x 3"
2 screws of ¼" x ¾"



Moulded control-flow dome strainer

SIZES		SMALL		MEDIUM	
Height		3½"	90 mm	3½"	90 mm
Maximum Width		6¾"	173 mm	9⅛"	232 mm
Legs height		6¾"	170 mm	6¾"	170 mm
Distance between the legs	min.	1"	25 mm	3⅜"	85 mm
	max.	6¾"	173 mm	9⅛"	232 mm

* Trade mark of Les Produits Murphco Ltée, see appropriate data sheet

MOULDED CONTROL FLOW DOME STRAINER

TABLE: WATER FLOW CORRESPONDING TO THE NUMBER OF OPENINGS FOR A MAXIMUM WATER DEPTH OF 3½"

Number of holes	Water flow (l/s) *	Water flow (gal/min)	Evacuation time **
1	0,9	11,9	24,0
2	1,3	17,2	17,3
3	1,7	22,5	13,2
4	2,1	27,7	10,7
5	2,5	33,0	9,0
6	2,9	38,3	7,8
7	3,3	43,6	6,8
8	3,7	48,9	6,1
9	4,1	54,2	5,5
10	4,5	59,5	5,0
11	4,9	64,7	4,6
12	5,3	70,0	4,2
13	5,7	75,3	3,9
14	6,1	80,6	3,7
15	6,5	85,9	3,5
16	6,9	91,2	3,3
17	7,3	96,5	3,1
18	7,7	101,8	2,9
19	8,1	107,0	2,8
20	8,5	112,3	2,6
21	8,9	117,6	2,5
22	9,3	122,9	2,4

Notes:

*: The water flow is calculated with a maximum water level of 90 mm (3½") at the drain.

**: Maximum evacuation time in hours for a maximum drainage area of 900 m^2 per drain so that the water depth does not exceed 90 mm (3½"). The complete drainage of water should not last more than 24 hours [article 4.10.4.2) of the 1995 National Plumbing Code of Canada].

MOULDED CONTROL FLOW DOME STRAINER

TABLE: WATER FLOW CORRESPONDING TO THE NUMBER OF OPENINGS FOR A MAXIMUM WATER DEPTH OF 6"

Number of holes	Water flow (l/s) *	Water flow (gal/min)	Evacuation time **
1	1,6	21,6	11,5
2	2,0	26,9	9,2
3	2,4	32,2	7,7
4	2,8	37,5	6,6
5	3,2	42,8	5,8
6	3,6	48,0	5,2
7	4,0	53,3	4,6
8	4,4	58,6	4,2
9	4,8	63,9	3,9
10	5,2	69,2	3,6
11	5,6	74,5	3,3
12	6,0	79,8	3,1
13	6,4	85,1	2,9
14	6,8	90,3	2,7
15	7,2	95,6	2,6
16	7,6	100,9	2,5
17	8,0	106,2	2,3
18	8,4	111,5	2,2
19	8,8	116,8	2,1
20	9,2	122,1	2,0
21	9,6	127,3	1,9
22	10,0	132,6	1,9

Notes:

*: The water flow is calculated with a maximum water level of 150 mm (6") at the drain.

**: Maximum evacuation time in hours for a maximum drainage area of 900 m^2 per drain so that the water depth does not exceed 150 mm (6"). The complete drainage of water should not last more than 24 hours [article 4.10.4.2) of the 1995 National Plumbing Code of Canada].

Example:

To drain an area of 900 m^2, with a maximum water flow of 2 l/s imposed by the mechanical engineer and a maximum water depth of 150 mm, it is necessary to install 2 drains, each one equipped with two openings in each dome strainer.

MOULDED CONTROL FLOW DOME STRAINER

DESIGNED AND MANUFACTURED BY LES PRODUITS MURPHCO LTÉE

Technical assistance or further information may be obtained from:

LES PRODUITS MURPHCO

Manufacturier et spécialiste de drains de toiture

Boutique de Métal en feuille

4955, rue Brock Montréal, Qc, H4E 1B5

Tél : (514) 937-3275 Fax : (514) 937-6797

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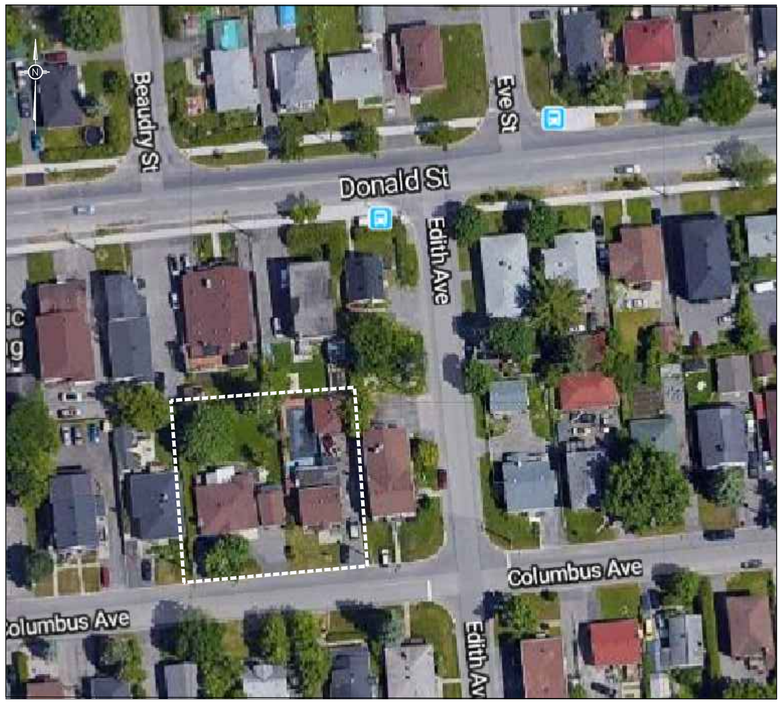
APPENDIX E

Civil Engineering Drawings

3.5 STORY APARTMENT
261-265 COLUMBUS AVE, ON

REVISION 04



KEY PLAN (N.T.S.)

DRAWING INDEX	
TITLE PAGE	
SEDIMENT AND EROSION CONTROL PLAN	C101
GRADING AND DRAINAGE PLAN	C301
SERVICING PLAN	C401
STORMWATER MANAGEMENT PLAN	C601
PRE-DEVELOPMENT WATERSHED PLAN	C701
POST-DEVELOPMENT WATERSHED PLAN	C702
CONSTRUCTION DETAIL PLAN	C901

LRL

ENGINEERING | INGÉNIERIE

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

3.5 STORY APARTMENT
261-265 COLUMBUS AVE, OTTAWA
REV.04 - RE-ISSUED FOR APPROVAL - APRIL 2020
LRL PROJECT no: 190377

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2020-04-29
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

EROSION AND SEDIMENT CONTROL MEASURES:

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

1. PRIOR TO START OF CONSTRUCTION:

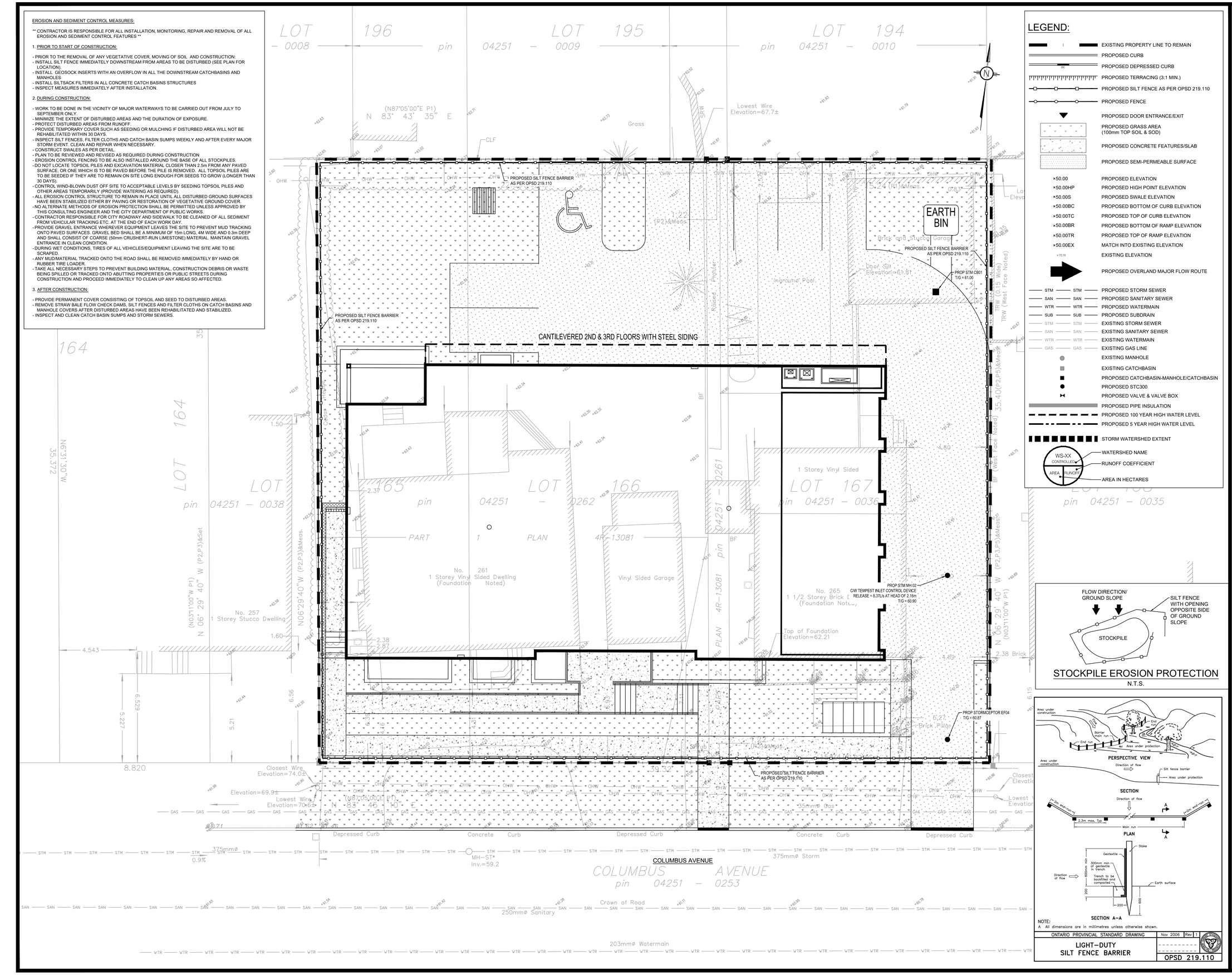
- PRIOR TO THE REMOVAL OF ANY VEGETATIVE COVER, MOVING OF SOIL AND CONSTRUCTION:
- INSTALL SILT FENCE IMMEDIATELY DOWNSTREAM FROM AREAS TO BE DISTURBED (SEE PLAN FOR LOCATION).
- INSTALL GEOSOCK INSERTS WITH AN OVERFLOW IN ALL THE DOWNSTREAM CATCHBASINS AND MANHOLES
- INSTALL SILTSACK FILTERS IN ALL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

2. DURING CONSTRUCTION:

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

3. AFTER CONSTRUCTION:

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



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 FENCE
- PROPOSED DOOR ENTRANCE/EXIT
- PROPOSED GRASS AREA (100mm TOP SOIL & SOD)
- PROPOSED CONCRETE FEATURES/SLAB
- PROPOSED SEMI-PERMEABLE SURFACE
- ×50.00 PROPOSED ELEVATION
- ×50.00HP PROPOSED HIGH POINT ELEVATION
- ×50.00S PROPOSED SWALE ELEVATION
- ×50.00BC PROPOSED BOTTOM OF CURB ELEVATION
- ×50.00TC PROPOSED TOP OF CURB ELEVATION
- ×50.00BR PROPOSED BOTTOM OF RAMP ELEVATION
- ×50.00TR PROPOSED TOP OF RAMP ELEVATION
- ×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
- SUB SUB PROPOSED SUBDRAIN
- STM STM EXISTING STORM SEWER
- SAN SAN EXISTING SANITARY SEWER
- WTR WTR EXISTING WATERMAIN
- GAS GAS EXISTING GAS LINE
- EXISTING MANHOLE
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
- PROPOSED STC300
- PROPOSED VALVE & VALVE BOX
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- PROPOSED 5 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX CONTROLLED AREA RUNOFF — WATERSHED NAME, RUNOFF COEFFICIENT, AREA IN HECTARES

USE AND INTERPRETATION OF DRAWINGS

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION ARE PART OF THE CONTRACT DOCUMENTS AND DESCRIBE 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 AVAILABE 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.

2m 0.5 0 2 4m
SCALE: 1:100

STOCKPILE EROSION PROTECTION
N.T.S.

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

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

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04	RE-ISSUED FOR APPROVAL	M.L.	29 APR 2020
03	RE-ISSUED FOR APPROVAL	M.L.	21 FEB 2020
02	ISSUED FOR APPROVAL	M.L.	05 NOV 2019
01	ISSUED FOR COORDINATION	M.L.	01 NOV 2019

LICENSED PROFESSIONAL ENGINEER M. BASNET 100501996 2020-04-29 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

CLIENT
UPSCALE HOMES INC.

DESIGNED BY:	DRAWN BY:	APPROVED BY:
M.L.	M.L.	V.J.

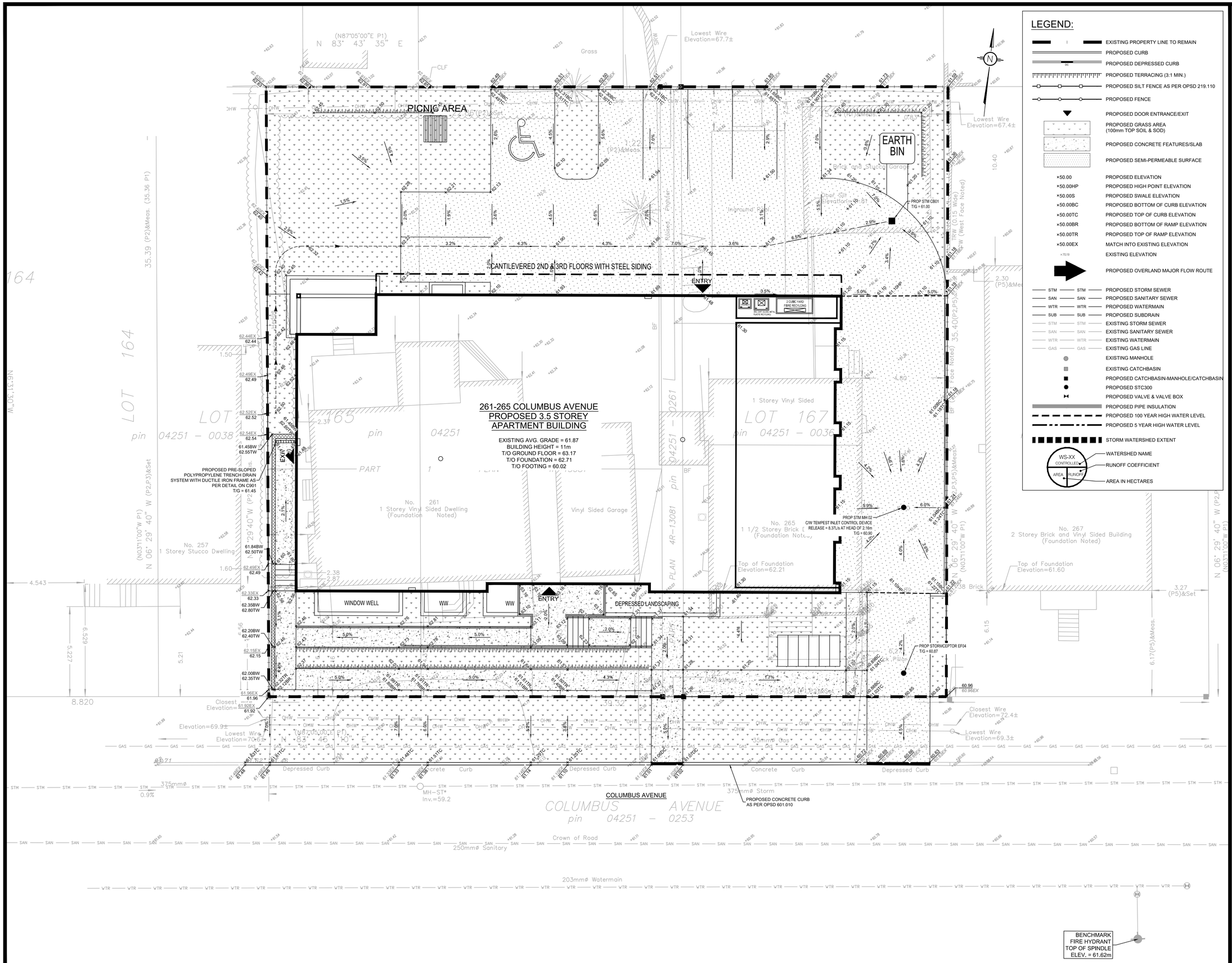
PROJECT
3.5 STORY RESIDENTIAL BUILDING
261-265 COLUMBUS AVE
OTTAWA, ON

DRAWING TITLE
EROSION AND SEDIMENT CONTROL PLAN

PROJECT NO.
190377

DATE
07/08/2019

C101



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- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
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- PROPOSED VALVE & VALVE BOX
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- STORM WATERSHED EXTENT
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PROJECT

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261-265 COLUMBUS AVE
OTTAWA, ON

DRAWING TITLE

GRADING AND DRAINAGE PLAN

PROJECT NO. 190377

DATE 07/08/2019

C301

NOTES: GENERAL

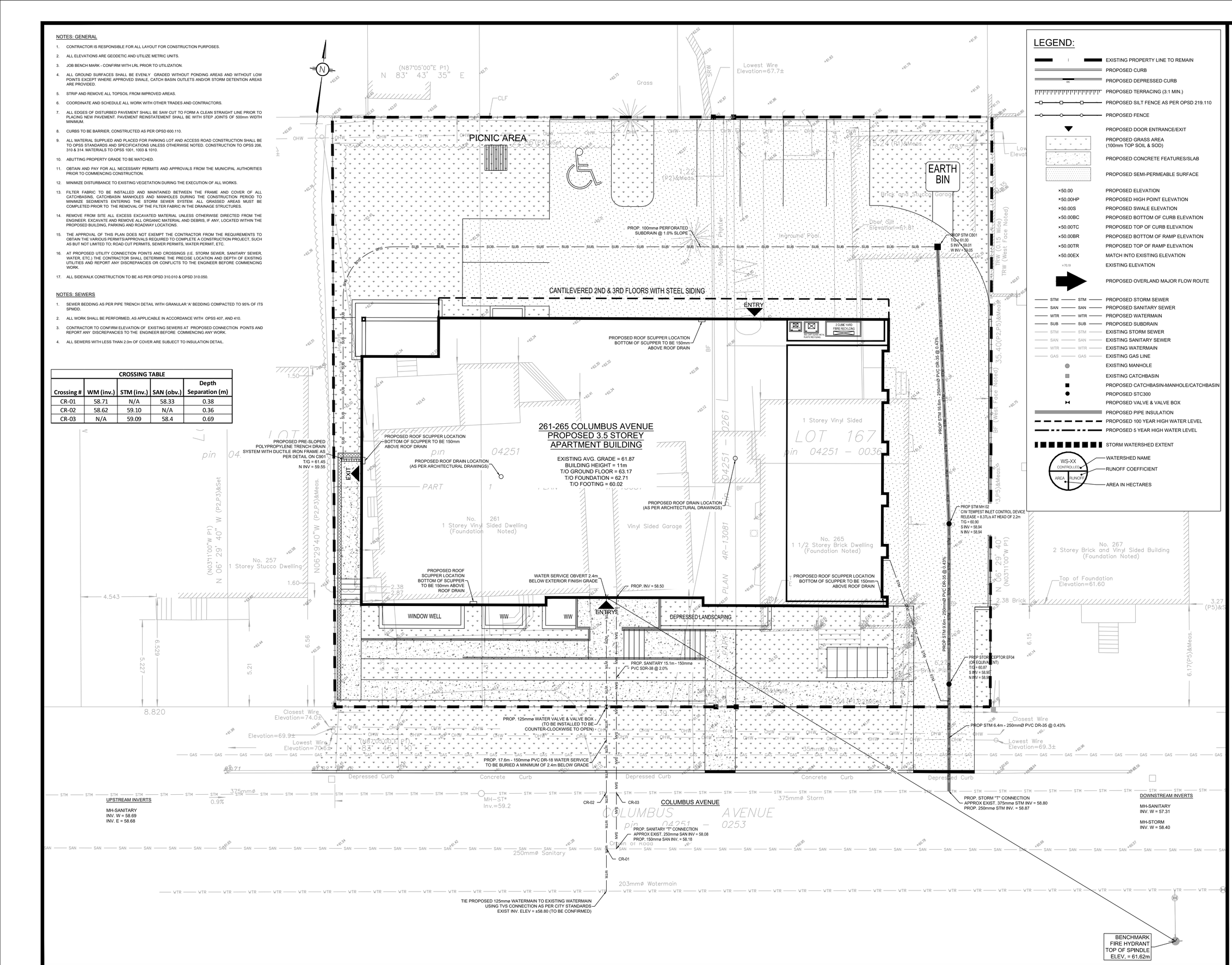
1. CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT FOR CONSTRUCTION PURPOSES.
2. ALL ELEVATIONS ARE GEODETIC AND UTILIZE METRIC UNITS.
3. JOB BENCH MARK - CONFIRM WITH LRL PRIOR TO UTILIZATION.
4. ALL GROUND SURFACES SHALL BE EVENLY GRADED WITHOUT PONDING AREAS AND WITHOUT LOW POINTS EXCEPT WHERE APPROVED SWALE,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

NOTES: SEWERS

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

CROSSING TABLE

Crossing #	WM (inv.)	STM (inv.)	SAN (obv.)	Depth Separation (m)
CR-01	58.71	N/A	58.33	0.38
CR-02	58.62	59.10	N/A	0.36
CR-03	N/A	59.09	58.4	0.69



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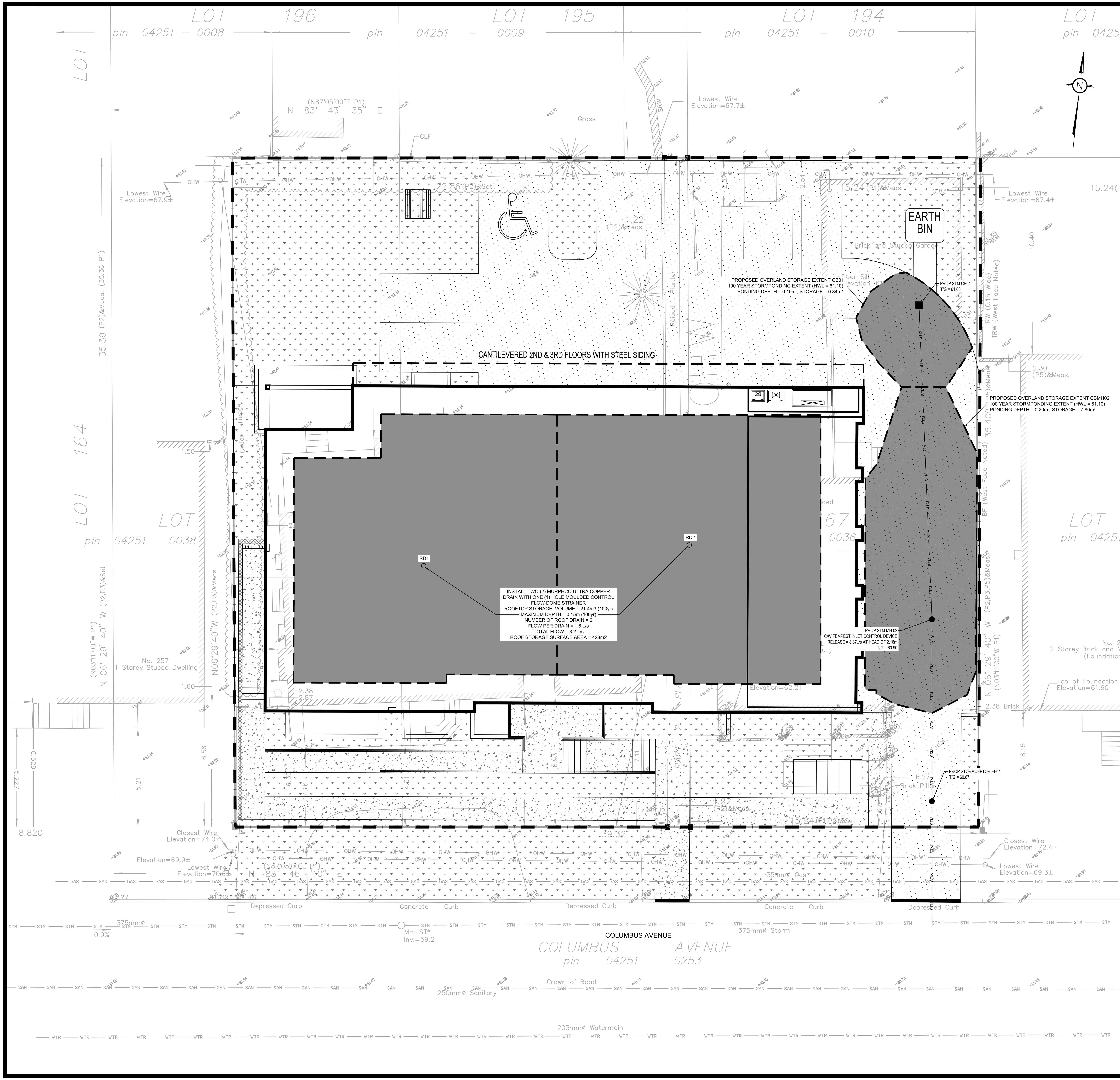

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2m 0.5 0 2 4m

SCALE: 1:100

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04	RE-ISSUED FOR APPROVAL	M.L.	29 APR 2020
03	RE-ISSUED FOR APPROVAL	M.L.	21 FEB 2020
02	ISSUED FOR APPROVAL	M.L.	05 NOV 2019
01	ISSUED FOR COORDINATION	M.L.	01 NOV 2019

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2020-04-29
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

CLIENT
UPSCALE HOMES INC.

DESIGNED BY:	DRAWN BY:	APPROVED BY:
M.L.	M.L.	V.J.

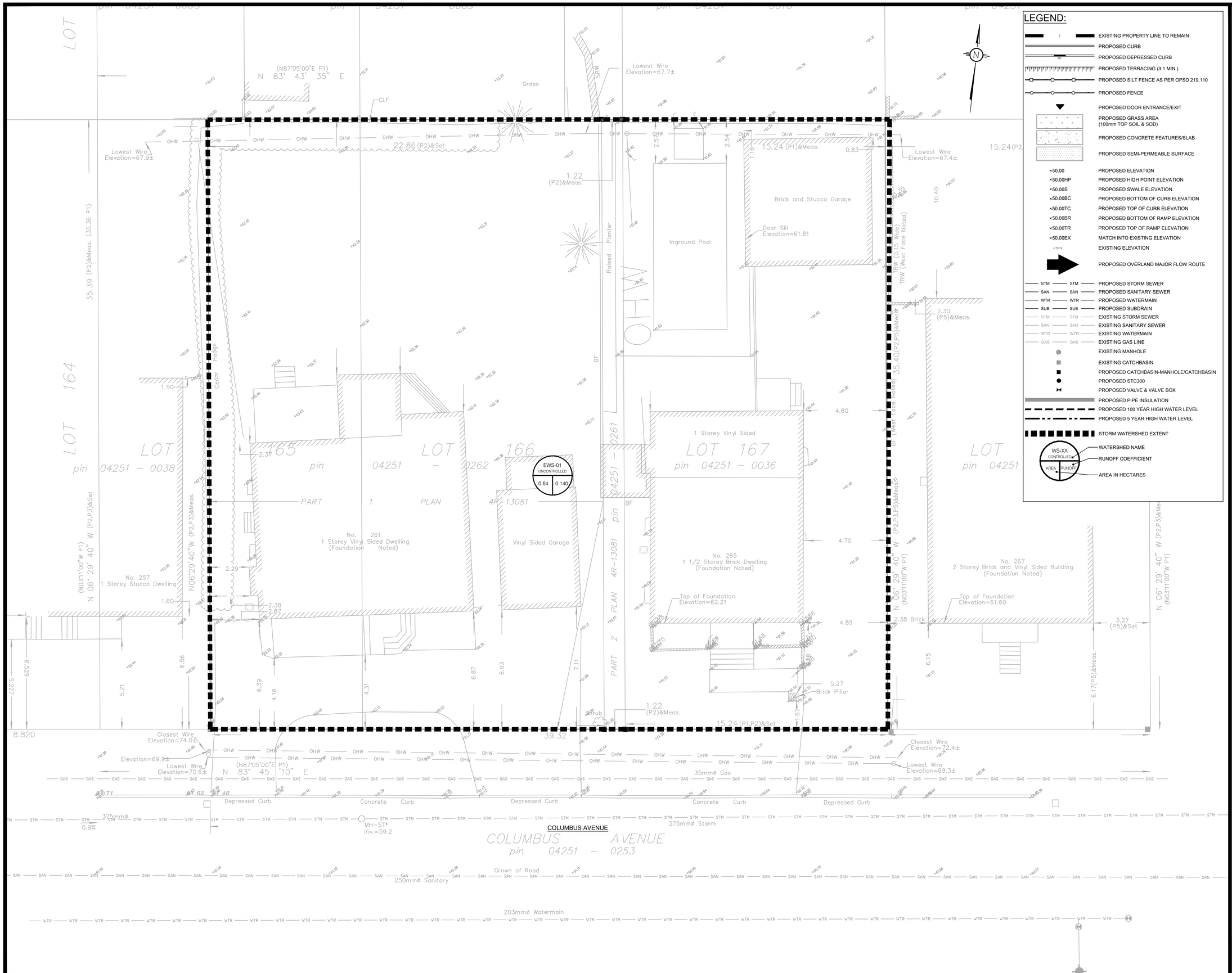
PROJECT
3.5 STORY RESIDENTIAL BUILDING
261-265 COLUMBUS AVE
OTTAWA, ON

DRAWING TITLE
STORMWATER MANAGEMENT PLAN

PROJECT NO.
190377

DATE
07/08/2019

C601



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PROJECT

3.5 STORY RESIDENTIAL BUILDING
261-265 COLUMBUS AVE
OTTAWA, ON

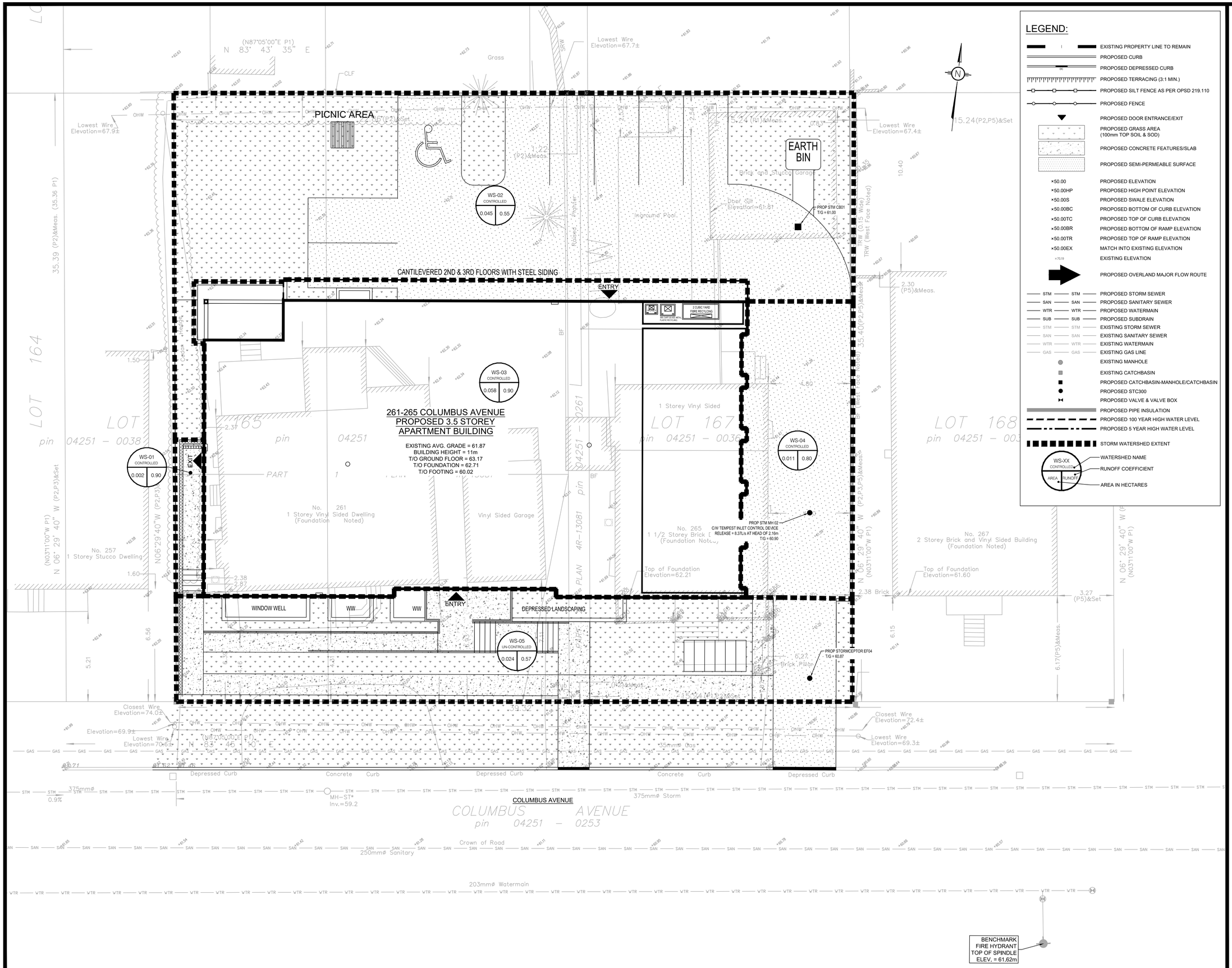
DRAWING TITLE

PRE-DEVELOPMENT
WATERSHED PLAN

PROJECT NO. 190377

DATE 07/08/2019

C701



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 FENCE
- PROPOSED DOOR ENTRANCE/EXIT
- PROPOSED GRASS AREA (100mm TOP SOIL & SOD)
- PROPOSED CONCRETE FEATURES/SLAB
- PROPOSED SEMI-PERMEABLE SURFACE
- ×50.00 PROPOSED ELEVATION
- ×50.00HP PROPOSED HIGH POINT ELEVATION
- ×50.00S PROPOSED SWALE ELEVATION
- ×50.00BC PROPOSED BOTTOM OF CURB ELEVATION
- ×50.00TC PROPOSED TOP OF CURB ELEVATION
- ×50.00BR PROPOSED BOTTOM OF RAMP ELEVATION
- ×50.00TR PROPOSED TOP OF RAMP ELEVATION
- ×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
- SUB / SUB PROPOSED SUBDRAIN
- STM / STM EXISTING STORM SEWER
- SAN / SAN EXISTING SANITARY SEWER
- WTR / WTR EXISTING WATERMAIN
- GAS / GAS EXISTING GAS LINE
- EXISTING MANHOLE
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
- PROPOSED STC300
- PROPOSED VALVE & VALVE BOX
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- PROPOSED 5 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX CONTROLLED / AREA / RUNOFF — WATERSHED NAME, RUNOFF COEFFICIENT, AREA IN HECTARES

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PROJECT

3.5 STORY RESIDENTIAL BUILDING
261-265 COLUMBUS AVE
OTTAWA, ON

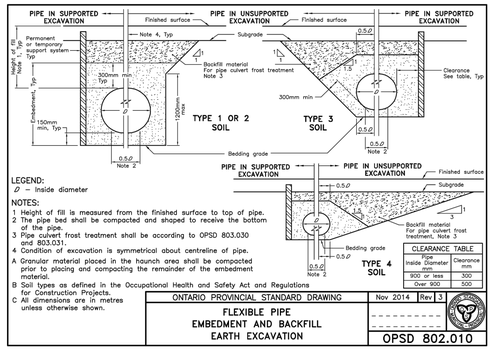
DRAWING TITLE

POST-DEVELOPMENT
WATERSHED PLAN

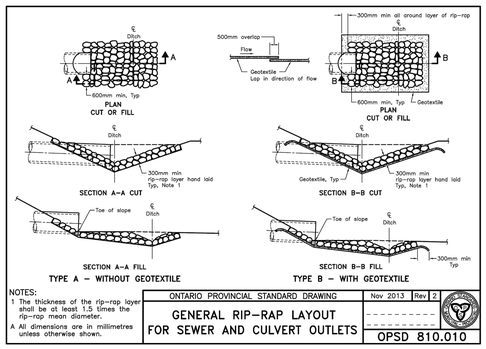
PROJECT NO. 190377

DATE 07/08/2019

C702

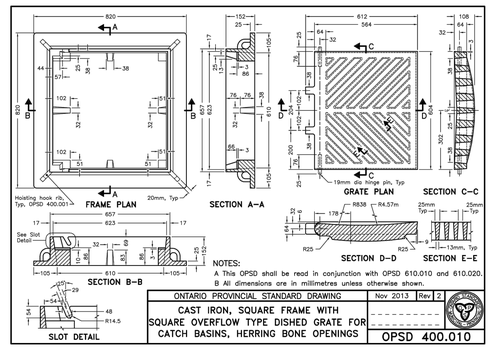


ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 3
FLEXIBLE PIPE EMBEDMENT AND BACKFILL EARTH EXCAVATION		OPSD 802.010



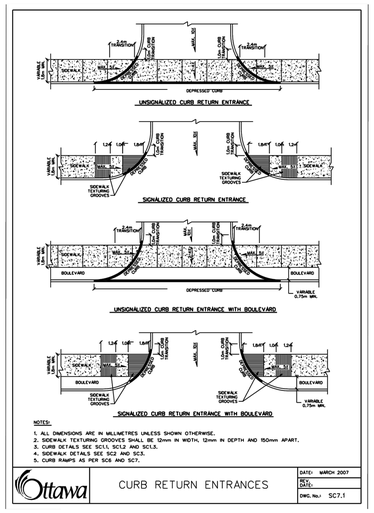
NOTES:
1 The thickness of the rip-rap layer shall be at least 1.5 times the rip-rap mean diameter.
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2013	Rev 2
GENERAL RIP-RAP LAYOUT FOR SEWER AND CULVERT OUTLETS		OPSD 810.010



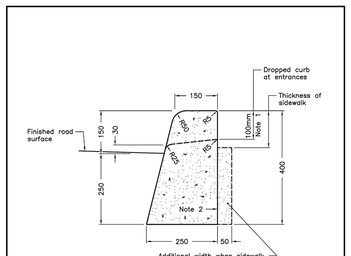
NOTES:
A This OPSD shall be read in conjunction with OPSD 610.010 and 610.020.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2013	Rev 2
CAST IRON, SQUARE FRAME WITH SQUARE OVERFLOW TYPE DISHED GRATE FOR CATCH BASINS, HERRING BONE OPENINGS		OPSD 400.010



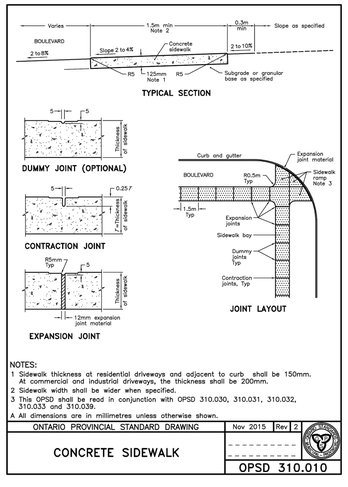
Ottawa — CURB RETURN ENTRANCES

DATE: MARCH 2007
No.
DWG. No.: SC7.1



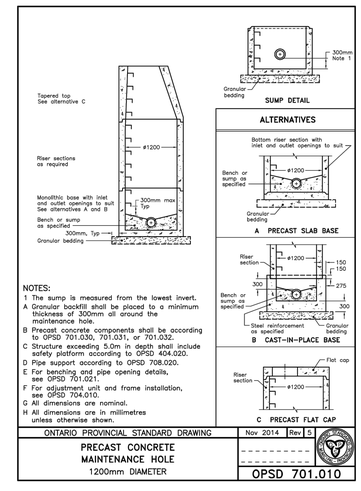
NOTES:
1 When sidewalk is continuously adjacent, the dropped curb at entrances shall be reduced to 75mm.
2 For slipforming procedure a 5% batter is acceptable.
A Treatment at entrances shall be according to OPSD 351.010.
B Outlet treatment shall be according to the OPSD 610 Series.
C The transition from 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



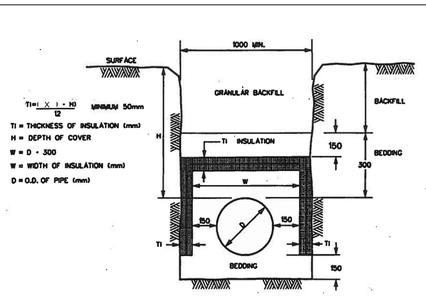
NOTES:
1 Sidewalk thickness at residential driveways and adjacent to curb shall be 150mm. At commercial and industrial driveways, the thickness shall be 200mm.
2 Sidewalk width shall be wider when specified.
3 This OPSD shall be read in conjunction with OPSD 310.030, 310.031, 310.032, 310.033 and 310.039.
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev 2
CONCRETE SIDEWALK		OPSD 310.010



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 701.021.
F For adjustment unit and frame installation, see OPSD 704.010.
G All dimensions are nominal.
H All dimensions are in millimetres unless otherwise shown.

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



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

TYPICAL STORM AND SANITARYSEWER AND WATERMAIN INSULATION DETAIL

(N.T.S.)

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

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

No.	REVISIONS	BY	DATE
04	RE-ISSUED FOR APPROVAL	M.L.	29 APR 2020
03	RE-ISSUED FOR APPROVAL	M.L.	21 FEB 2020
02	ISSUED FOR APPROVAL	M.L.	05 NOV 2019
01	ISSUED FOR COORDINATION	M.L.	01 NOV 2019

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2020-04-29
PROVINCE OF ONTARIO

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

CLIENT
UPSCALE HOMES INC.

DESIGNED BY:	DRAWN BY:	APPROVED BY:
M.L.	M.L.	V.J.

PROJECT
3.5 STORY RESIDENTIAL BUILDING
261-265 COLUMBUS AVE
OTTAWA, ON

DRAWING TITLE
CONSTRUCTION DETAIL PLAN

PROJECT NO.
190377

DATE
07/08/2019

C901

APPENDIX F

Proposed Development Water Demands

Water Supply Calculations

LRL File No. 190377
Date October 8, 2019
Prepared by Virginia Johnson

Residential Demand

Unit Type	Persons Per Unit	Number of Units	Population
Studio/1 Bedroom Apartment	1.4	15	21
2 Bedroom Apartment	2.1	19	39.9
			60.9

Population	61	Capita		
Average Water Consumption Rate	280	L/c/d		
Maximum Daily Peak Factor	5.7	*due to low population (MOE table 3-3		
Maximum Hourly Peak Factor	11.4			
Average Domestic Water Demand	17,080	L/d	0.198	L/s
Maximum Daily Domestic Water Demand	96,866	L/d	1.121	L/s
Maximum Hourly Water Demand	1,102,926	L/d	12.765	L/s

Commercial Demand

Commercial Area	0	m^2		
Office Area	0	m^2		
Average Daily Demand	2500	L/(1000m^2/d)		
Maximum Daily Peak Factor	1.5			
Maximum Hourly Peak Factor	2.7			
Average Commercial Water Demand	-	L/d	0.000	L/s
Maximum Daily Commercial Water Demand	-	L/d	0.000	L/s
Maximum Hourly Commercial Water Demand	-	L/d	0.000	L/s

Institutional Demand

Ammenity Area	40	m^2		
Occupancy Load	0.95	m2/person		
Occupancy	42	person		
Average Daily Demand	70	L/person/d		
Maximum Daily Peak Factor	1.5			
Maximum Hourly Peak Factor	1.8			
Average Institutional Water Demand	2,947	L/d	0.034	L/s
Maximum Daily Institutional Water Demand	4,421.05	L/d	0.051	L/s
Maximum Hourly Institutional Water Demand	7,958	L/d	0.092	L/s

Total Water Demand

Average Total Water Demand	**20,027**	**L/d**	**0.232**	**L/s**
Maximum Daily Total Water Demand	**101,287**	**L/d**	**1.172**	**L/s**
Maximum Hourly Total Water Demand	**1,110,884**	**L/d**	**12.857**	**L/s**

Pipe Pressure Losses Calculations

LRL File No.	190377
Project	261-265 Columbus Ave
Date	November 1, 2019
Designed:	Maxime Longtin

Piezometric Head Equation (Derived from Bernoulli's Equation)

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

Where:

h = HGL (m)

p = Pressure (Pa)

γ = Specific weight (N/m3) = 9810

z = Elevation of centreline of pipe (m) = **58.5**

Water Pressure at Jamie Avenue Connection			
HGL (m)		Pressure	
		kPa	psi
Minimum =	**109.6**	501.3	73
Maximum =	**118.5**	588.6	85
Max. Day + Fire =	**100**	407.1	59

Hazen Williams Equation

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

Where:

h_f = Head loss over the length of pipe (m)

Q = Volumetric flow rate (m^3/s)

L = Length of pipe (m)

C = Pipe roughness coefficient

d = Pipe diameter (m)

Scenario 1: maximum daily demand		
Q (L/s)	**1.172**	
C	**110**	
L (m.)	**17.6**	
d (mm)	**150**	
V (m/s)	0.07	
hf (m)	0.00	
Head Loss (psi)	0.00	
Pressure (psi)	72.7	(must be between 50 and 80psi)

Scenario 2: maximum hourly demand		
Q (L/s)	**12.857**	
C	**110**	
L (m.)	**17.6**	
d (mm)	**150**	
V (m/s)	0.73	
hf (m)	0.10	
Head Loss (psi)	0.15	
Pressure (psi)	72.6	(must not be less than 40psi)

Scenario 3: maximum daily demand + fire flow		
Q (L/s)	**242.87**	
C	**110**	
L (m.)	**17.6**	
d (mm)	**150**	
V (m/s)	13.74	
hf (m)	23.58	
Head Loss (psi)	33.53	
Pressure (psi)	25.5	(must not be less than 20psi)

APPENDIX G

FUS Fire Flow Calculations

Fire Flow Calculations

LRL File No. 190377
Date April 23, 2020
Method Fire Underwriters Survey (FUS)
Prepared by Mohan Basnet

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								
2	Total area					**1,969**		
3	Obtain fire flow before reductions	Required fire flow	Fire Flow = 220 x C x Area$^{0.5}$				L/min	**9,762**
							L/s	162.7
Reductions or surcharge due to factors affecting burning								
4	Choose combustibility of contents	Occupancy hazard reduction or surcharge	Non-combustible	-25%	Limited Combustible	**-15%**		
			Limited combustible	-15%				
			Combustible	0%				
			Free burning	15%			L/min	**8,298**
			Rapid burning	25%			L/s	138.3
5	Choose reduction for sprinklers	Sprinkler reduction	Full automatic sprinklers	-30%	False	**0%**		
			Water supply is standard for both the system and fire department hose lines	-10%	True	-0.1	L/min	**7,468**
			Fully supervised system	-10%	False	0	L/s	124.5
6	Choose separation	Exposure distance between units	North side	20.1 to 30m	10%			
			East side	3.1 to 10m	20%			
			South side	20.1 to 30m	10%		L/min	**11,949**
			West side	3.1 to 10m	20%	**60%**	L/s	1.0
Net required fire flow								
7	Obtain fire flow, duration, and volume				Minimum required fire flow rate (rounded to nearest 100)		L/min	**11,900**
					Minimum required fire flow rate		L/s	**198.3**
					Required duration of fire flow		hr	**2**

APPENDIX H

Sanitary Calculations

LRL File No. 190377
Project: 261-265 Columbus
Location: Ottawa, ON
Date: October 28, 2019

Sanitary Design Parameters

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

Pipe Design Parameters

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

LOCATION			RESIDENTIAL AREA AND POPULATION						COMMERCIAL		INDUSTRIAL			INSTITUTIONAL		C+I+I	INFILTRATION			TOTAL FLOW (l/s)	PIPE						MANHOLE	
STREET	FROM MH	TO MH	AREA (Ha)	POP.	CUMMULATIVE AREA (Ha)	CUMMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (Ha)	ACCU. AREA (Ha)	AREA (Ha)	ACCU. AREA (Ha)	PEAK FACT.	AREA (Ha)	ACCU. AREA (Ha)	PEAK FLOW (l/s)	TOTAL AREA (Ha)	ACCU. AREA (Ha)	INFILT. FLOW (l/s)		LENGTH (m)	DIA. (mm)	SLOPE (%)	MATERAIL	CAP. (FULL) (l/s)	VEL. (FULL) (m/s)	UP INVERT (m)	DOWN INVERT (m)
SITE	PROP. BLDG	Existing Sewer - Columbus Ave	0.140	60.9	0.14	60.9	4.0	0.99	0.000	0.000	0.00	0.00	7.0	0.0	0.0	0.00	0.14	0.14	0.04	1.03	15.1	135	2.00%	PVC	16.26	1.14	142.53	142.35

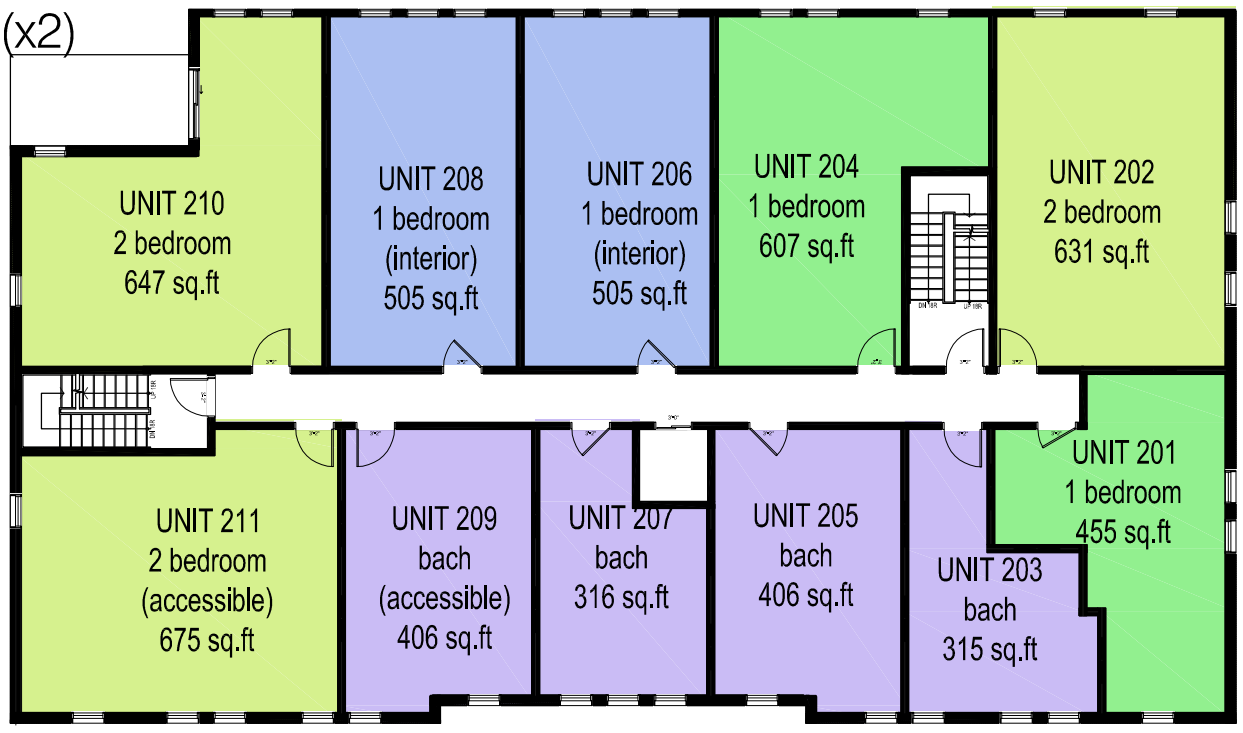
NOTES
Existing inverts and slopes are estimated. They are to be confirmed on-site.

Designed: ML	PROJECT: 3.5 Storey Residential Site Plan Control		
Checked:	LOCATION: 261-265 Columbus Ave, Ottawa		
Dwg. Reference: C.401	File Ref.: 190377	Date: October 2019	Sheet No. 1 of 1

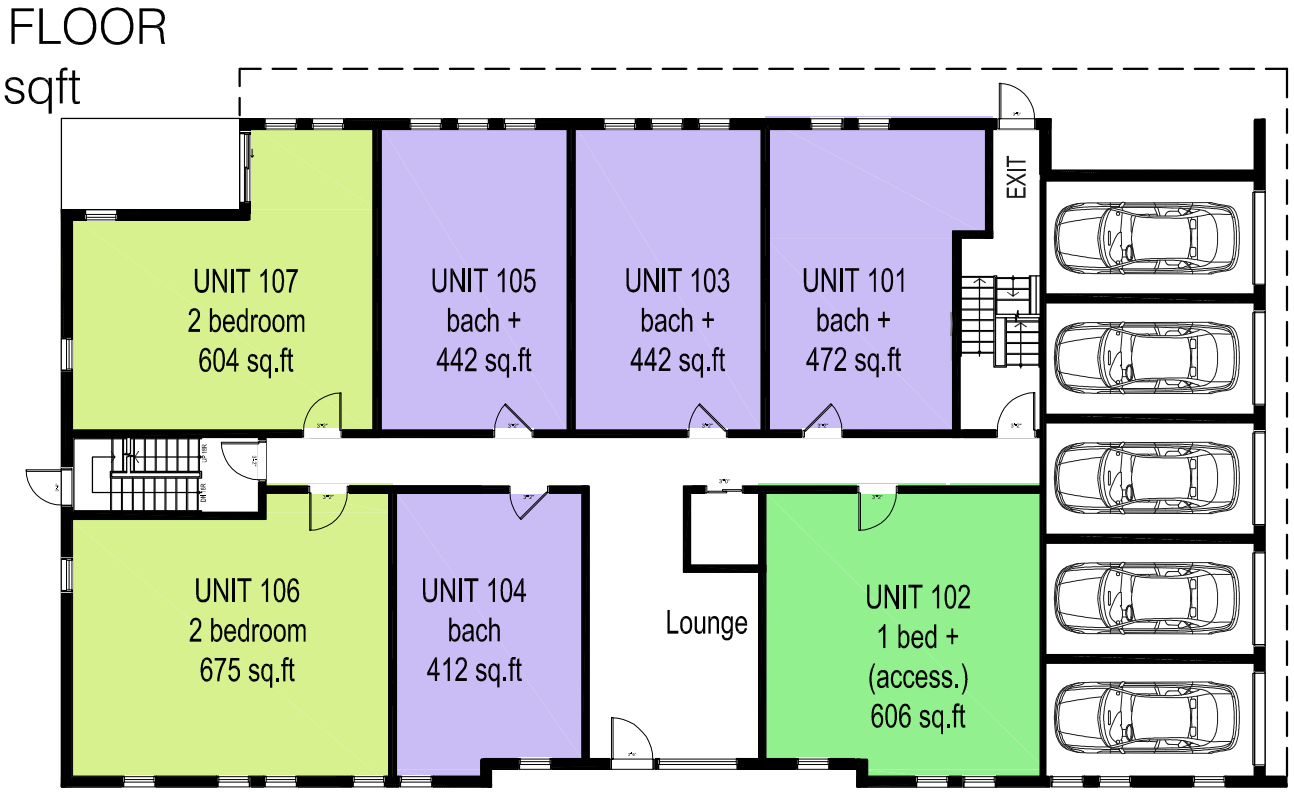
APPENDIX I

Floor Plans

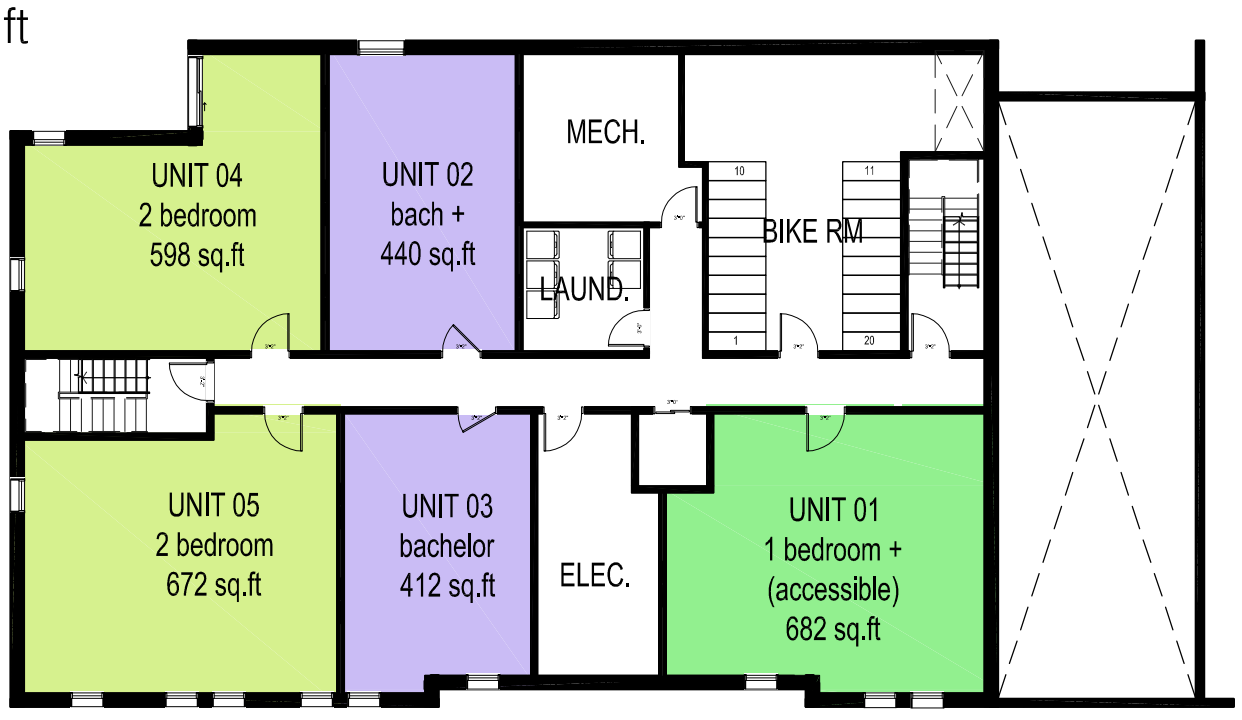
SECOND & THIRD FLOORS
6,040 sqft (x2)



GROUND FLOOR
4,570 sqft



BASEMENT
4,540 sqft



2 BEDROOM
1 BEDROOM
1 BED INT.
BACH

TOTAL FLOOR AREA: 21,190 sqft

Rosaline J. Hill Architect Inc.
414 Churchill Ave. N, Ottawa, ON, K1Z 5C6 • 613-853-2822
www.rjhill.ca • rosaline@rjhill.ca

Columbus Apartments

261-265 Columbus Avenue, Ottawa, Ontario

October 02, 2019 SCALE: 1/16" = 1'-0"

SCHEMATIC PLANS

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COLUMBUS APARTMENTS

261-265 Columbus Avenue, Ottawa, Ontario

October 02, 2019 SCALE: 1/8" = 1'-0"

BASEMENT FLOOR

Drawing name: Z:\1902 Columbus\1902 dwgs\1902 AutoCAD\1902 Design Layouts.dwg

PLOTTED Wed, 02 Oct 2019

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www.rjhill.ca • rosaline@rjhill.ca

COLUMBUS APARTMENTS

261-265 Columbus Avenue, Ottawa, Ontario

October 02, 2019 SCALE: 1/8" = 1'-0"

GROUND FLOOR

Drawing name: Z:\1902 Columbus\1902 dwgs\1902 AutoCAD\1902 Design Layouts.dwg
PLOTTED Wed, 02 Oct 2019

Rosaline J. Hill Architect Inc.
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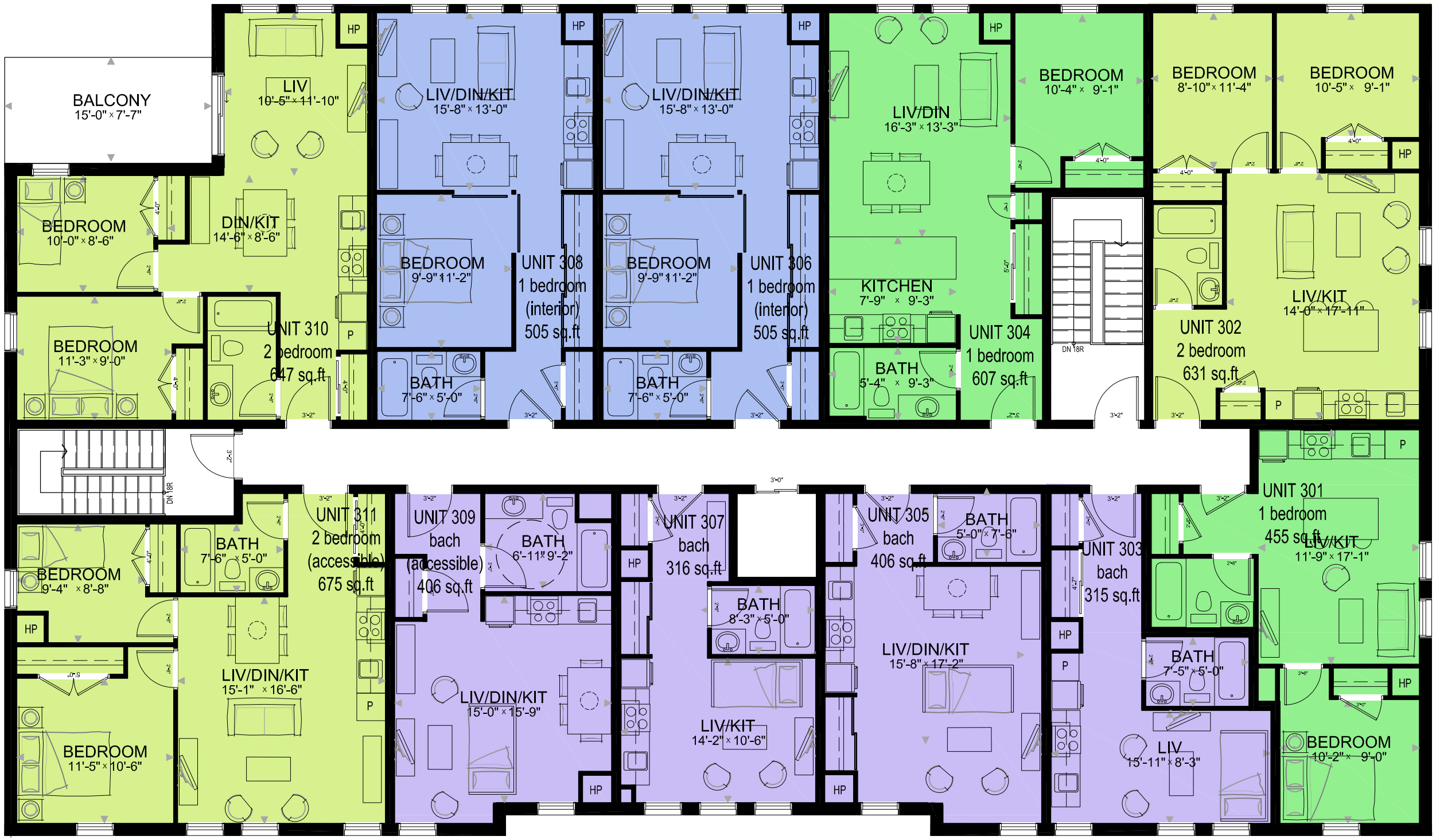
COLUMBUS APARTMENTS

261-265 Columbus Avenue, Ottawa, Ontario

October 02, 2019 SCALE: 1/8" = 1'-0"

SECOND FLOOR

Drawing name: Z:\1902 Columbus\1902 dwgs\1902 AutoCAD\1902 Design Layouts.dwg
PLOTTED Wed, 02 Oct 2019



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COLUMBUS APARTMENTS

261-265 Columbus Avenue, Ottawa, Ontario

October 02, 2019 SCALE: 1/8" = 1'-0"

THIRD FLOOR

Drawing name: Z:\1902 Columbus\1902 dwgs\1902 AutoCAD\1902 Design Layouts.dwg

PLOTTED Wed, 02 Oct 2019

APPENDIX J

Water Boundary Conditions

Maxime Longtin

From: Wu, John <John.Wu@ottawa.ca>
Sent: Friday, October 18, 2019 9:52 AM
To: Maxime Longtin
Subject: RE: 261-265 Columbus Rd
Attachments: 261 Columbus Oct 2019.pdf

Here is the result:

The following are boundary conditions, HGL, for hydraulic analysis at 261 Columbus (zone 1E) assumed to be connected to the 203mm on Columbus (see attached PDF for location).

Minimum HGL = 109.6m

Maximum HGL = 118.5m; the maximum pressure is estimated to be above 80 psi. A pressure check at completion of construction is recommended to determine if pressure control is required

MAxDay + FireFlow (240 L/s) = 100.0m

These are for current conditions and are based on computer model simulation.

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

John

From: Maxime Longtin <mlongtin@lrl.ca>
Sent: October 16, 2019 3:21 PM
To: Wu, John <John.Wu@ottawa.ca>
Subject: FW: 261-265 Columbus Rd

Hi John,

Any news on this email below?

Thanks

Maxime Longtin
Civil Engineering Technologist

LRL Associates Ltd.
5430 Canotek Road
Ottawa, Ontario K1J 9G2
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F (613) 842-4338
E mlongtin@lrl.ca
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From: Maxime Longtin
Sent: Wednesday, October 9, 2019 2:43 PM
To: Wu, John <John.Wu@ottawa.ca>
Cc: Virginia Johnson <vjohnson@lrl.ca>
Subject: 261-265 Columbus Rd

Good Afternoon John,

For your information, I have attached a site location figure showing the proposed location(s) for the water connection.

Please use the following data to provide the required boundary conditions:

- Average total Daily Demand= 0.232 L/s
- Maximum Daily Demand= 1.172 L/s
- Maximum hourly demand= 12.857 L/s
- Required fire flow= 241.7 L/s

Please do not hesitate to reach out if you require any additional information.

Maxime Longtin
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W www.lrl.ca

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'

'


Boundary Condition for 261 Columbus
DONALD ST
406mm
152mm
QUILL ST
EDITH AVE
EVE ST
COLUMBUS AVE
GLYNN AVE
203mm
N
261
Legend
Pipe Ownership
Private
Public