Stormwater Management Report and Servicing Brief

New 3 Storey Residential Building
10 McArthur Avenue
Vanier Ontario, K1L 6R2

Prepared for:

Moe Sleiman
2544 Bank Street
Ottawa, Ontario
K1N 1M9

Attention: Mr. Mo Sleiman

LRL File No.: 190109

July 29th, 2019

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1 INTRODUCTION AND SITE DESCRIPTION

LRL Associates Ltd. was retained by Mr. Moe Sleiman to complete a Stormwater Management Analysis and Servicing Brief for a proposed three (3) story development located at 10 McArthure Avenue in Ottawa, Ontario. The property is legally described as LOT 62. The location of the proposed development can be viewed in **Figure 1** below.

Figure 1: Ariel View of Proposed Development

The new three (3) storey residential building will have a roof area of approximately 205 m^2 and consist of ten (10) units. The site will also encompass a paved parking area at the rear (south side) of the lot. The proposed development will have one vehicular entrance with a depressed sidewalk at McCartthur Ave. and one pedestrian entrance via a pathway to McArthur Ave. at the north east corner of the site.

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 EXISTING SITE AND DRAINAGE DESCRIPTION

The portion of land to be developed has a rectangular shape with a frontage of approximately 14.6 m along McArthur Avenue and a depth of approximately 27.8m. With these dimensions, the property has a surface area of approximately 0.041ha. The property is surrounded with residential buildings to the south and east, primarily commercial and office buildings to the north of McArthur, and by a park and the Rideau River on the west side of Norther River Road.

Currently, the land is developed with a building, which was originally used as a restaurant with an upstairs apartment, which will be demolished prior to development. The remainder of the site is covered with impervious asphalt pavement and drains overland to an existing 600 mm dia storm sewer along McArthur Avenue. The site sanitary sewer outlets to the existing 450 mm dia. pipe along McArthur Avenue, and the water service connects to the 150 mm dia. watermain also running along McArthur Avenue.

3 SCOPE OF WORK

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

Stormwater management

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

Water services

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

Sanitary services

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

4 STORMWATER MANAGEMENT

4.1 Existing Stormwater Infrastructure

As previously discussed, there is an existing 600 mm dia. storm sewer running east along McArthur Avenue in which the entire existing property drains towards. 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.

4.2 Design Criteria

Stormwater quantity controls are proposed for this site.

4.2.1 Water Quantity

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

4.2.2 Water Quality

No quality is proposed as the City of Ottawa downstream Stormwater Management Facility will provide water quality treatment.

4.3 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.

4.4 Allowable Release Rate

The maximum allowable release rate was calculated from the rational method for 5-year pre-development. Runoff from post-development conditions must be controlled to the pre-development runoff coefficient or a maximum value of C=0.5, for both minor and major storms (5-year up to 100-year storms), using a time of concentration not less than 10 minutes.

The formula used to calculate the release rate is the following.

$$Q_{peak} = 2.78 * C * I * A$$

$$Q_{peak} = 2.78 * 0.5 * 104.2 * 0.041$$

$$\mathbf{Q_{peak} = 5.87\ L/s}$$

4.5 Proposed Stormwater Quantity Controls

The proposed stormwater management quantity control for this development will be accomplished through the use of underground pipe and structure water storage and overland ponding. The proposed site storm sewer and stormwater management system are shown on drawing C-401 and detailed calculations, including the design sheet can be found in Appendix A.

The existing site delineated by catchment WS-01, 0.041ha, currently drains towards the front of the property. Post development conditions will change slightly in the area around the existing structure. A patch of grass will be added in the front of the building, a parking area will be added at the back of the lot and the building roof surface area will increase.

In order to regulate the runoff, stormwater quantity control will be implemented. Water flowing from watershed CA-04 and CA-03, respectively 0.011ha and 0.005ha will be captured by CB03 and CBMH01 through overland flow directed by the site grading. In addition water will be directed from the roof delineated by the watershed CA-04, 0.011ha, through two roof drains connected to CBMH1. From there, water will be conveyed to the city main storm sewer at a rate of **6.00L/s**. As the city of Ottawa recommends flow no less 6L/s, the calculated flow of 5.87 was increased to 6L/s to meet minimum release set by the city.

In order to throttle the 100 year storm flows, the storm water will be controlled by CB01 through the use of a John Meunier Hydrovex 75VHV-1, with the inlet control device (ICD) installed in CB01. This ICD along with underground pipe storage and parking lot ponding will control the storm water runoff quantity during the 100 year storm event. The property is graded to have a high water level of 56.48 and the required storage is of **7.48 L/s**. The storage created by this ICD can be seen on drawing 601, where ponding at CB3 and CBMH1 will account for 4.65 m^3 while pipe storage and structures will accounts for 5.26m^3, thus satisfying the storage requirement.

Watershed CA-01 consists of grass and pavers and will be uncontrolled. The water will be conveyed to the roadway as per the grading and will be captured by the existing storm CB's

Refer to LRL drawings C.301 and C.702 for the grading/drainage plan and stormwater management plan and Appendix G for stormwater management design sheets.

5 WATER SUPPLY AND FIRE PROTECTION

5.1 Existing Water Supply Services

The subject property is located to the south of an existing 150 mm dia. water main running in the east-west direction on the north side of McArthur Avenue. There is currently (2) existing fire hydrant near the property. One is located west of the building, on the north side of McArthur Ave where it meets River Road and the second one is located south west of the building, on River Road. The hydrants are within the 90m radius distance between the fire hydrant and the building, as required by the City of Ottawa. Refer to LRL drawing C.401 for the layout of the proposed water services.

5.2 Water Supply Demand and Fire Flow

As per the City of Ottawa Design Guidelines, the average water demand for Residential developments was calculated using an average water demand per population. The population of the site was found to be 17 people with daily and hourly peak factors of **6.1** and **12.2**, respectively. The average daily domestic water demand for the proposed building is **0.069L/s**, the maximum daily demand is **0.417L/s** and the maximum hourly demand is **0.841L/s**. Refer to Appendix E for the water demand calculation sheet.

The fire flow demand was estimated in accordance with the Fire Underwriters Survey (FUS). This method is based on the floor area of the building to be protected, type and combustibility of the structural frame and the separation distances with adjoining buildings. The fire flow demand was calculated to be **58.3L/s**. Refer to Appendix F for the fire flow calculation sheet.

5.3 Water Supply Servicing Design

The proposed building will be serviced by a new 50mm dia. service. The proposed service will connect to the existing watermain on McArthur to the north-west corner of the building. Refer to LRL drawing C.401 for the layout of the proposed water services.

5.4 Boundary Conditions

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

Minimum HGL = 109.0m

Maximum HGL = 118.2m*; the maximum pressure is estimated to be more than 80 psi*

Available fire flow = 58 L/s assuming a residual pressure of 140 kPa and a ground elevation of 93.0m

Please Refer to Appendix H for city confirmation.

6 SANITARY SERVICE

6.1 Existing Sanitary Sewer Services

Existing infrastructure surrounding the proposed development were reviewed to determine that there is an existing 450 mm dia. sanitary sewer running east along McArthur Avenue.

6.2 Sanitary Sewer Servicing Design

The new building will be serviced with a new 150mm dia. sanitary service which will connect to the existing 450mm dia. sanitary server on McArthur Ave. The new service will be located at the North-West corner of the new building. The new proposed 150mm dia. PVC sanitary service will be installed at a 1.0% minimum gradient, as per the City of Ottawa Sewer Design Guidelines. Refer to LRL drawing C.401 for the proposed sanitary servicing.

The parameters used to calculate the anticipated sanitary flows are: residential average population per unit of 1.4 person for single units and 2.1 persons for double units, a residential peaking factor of 4.0 and an infiltration rate of 0.28 L/s/ha. Based on these parameters and the total site area of 0.041 ha, the total anticipated sanitary flow was estimated to **0.28 L/s**. Refer to Appendix G for the site sanitary sewer design sheet.

7 Erosion and Sediment Control

During construction, erosion and sediment controls will be provided primarily via a sediment control fence to be erected along the perimeter of the site where runoff has the potential of leaving the site. Inlet sediment control devices are also to be provided in any catchbasin and/or manholes in and around the site that may be impacted by the site construction. Construction and maintenance requirements for erosion and sediment controls are to comply with Ontario Provincial Standard Specification OPSS 577. Refer to LRL Associates drawing C.101 for erosion and sediment control details.

8 Conclusion

This Stormwater Management Report for the development proposed at 10 McArthur 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 Management

- The storm water release rates from the proposed development will meet the pre-development allowable release rate of 6.00 L/s onto McArthur Ave.
- Stormwater quantity control objectives will be met through on site storm water ponding and storage.

Water Service

- The anticipated maximum domestic water demand of the site is 0.841L/s.
- The maximum required fire flow was calculated at 58.3 L/s using the FUS method.
- There is (2) existing fire hydrant. One is located west of the building, on the north side of McArthur Ave and the second one is located south west of the building, on River Road. Both are within the 90m radius.
- The new development/expansion will be serviced with a new 50mmø watermain connected to the existing 150mmø watermain on McArthur Ave.

Sanitary Service

- The anticipated sanitary flow from the proposed development is 0.28 L/s.
- The proposed building will be serviced by a new 150mm sanitary service connection to the existing 900mm dia. sanitary sewer on McArthur Ave.

9 Report Conditions and Limitations

The report conclusions are applicable only to this specific project described in the preceding pages. Any changes, modifications or additions will require a subsequent review by LRL

Associates Ltd. to 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.

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July 29/2019
PROVINCE OF ONTARIO

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APPENDIX A

5 and 100 Year SWM Runoff and Storage Requirements

LRL File No.	190109
Project:	Proposed Multi- Unit Development
Location:	10 McArthur Ave, Ottawa
Date:	June 26, 2019
Designed:	D. Mills
Checked:	G. Brunet
Drawing Ref.:	C.401

Stormwater Management
Design Sheet

STORM - 5 YEAR

Runoff Equation

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

Pre-Devlopment Catchments within Development Area

	Total Area =	**0.041**	ha	**∑R=**	**0.50**
Un-Controlled	EWS-01	0.041	ha	R=	0.50
	Total Uncontrolled =	**0.041**	**ha**	**∑R=**	**0.50**

Allowable Release Rate

5 Year Pre-Development Flow Rate

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

C =	0.50	max of 0.5 as per City of Ottawa
I =	104.2	mm/hr
Tc =	10	min
Total =	0.041	ha
Allowable Release Rate=	**5.87**	L/s

Post-development Stormwater Management

					$∑R_5$	$∑R_{100}$
	Total Site Area =	**0.039**	ha	**∑R=**	**0.83**	**1.00**
Controlled	WS-02 (Roof)	0.021	ha	R=	0.90	1.00
	WS-03	0.005	ha	R=	0.77	0.96
	WS-04	0.011	ha	R=	0.77	0.96
	Total Contolled =	**0.037**	**ha**	**∑R=**	**0.84**	**0.98**
Un-controlled	WS-01	0.002	ha	R=	0.53	0.67
	Total Un-Contolled =	**0.002**	**ha**	**∑R=**	**0.53**	**0.67**

Post-development Stormwater Management

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

Time (min)	Intensity (mm/hr)	Controlled Runoff** (L/s)	Storage Volume (m^3)	Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	104.2	8.95	1.77	6.00	0.34	6.34
15	83.6	7.17	1.06	6.00	0.27	6.27
20	70.3	6.03	0.04	6.00	0.23	6.23
25	60.9	5.23	0.00	6.00	0.20	6.20
30	53.9	4.63	0.00	6.00	0.18	6.18
35	48.5	4.17	0.00	6.00	0.16	6.16
40	44.2	3.79	0.00	6.00	0.14	6.14
45	40.6	3.49	0.00	6.00	0.13	6.13
50	37.7	3.23	0.00	6.00	0.12	6.12
60	32.9	2.83	0.00	6.00	0.11	6.11
70	29.4	2.52	0.00	6.00	0.10	6.10
80	26.6	2.28	0.00	6.00	0.09	6.09
90	24.3	2.09	0.00	6.00	0.08	6.08

* Controlled release rate 6 L/s min. as per city of Ottawa

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Stormwater Management
Design Sheet

STORM - 5 YEAR

Onsite Stormwater Retention

Total Storage Required =	**1.77 m^3**	
Pipe Storage =	3.19 m^3	refer to Storm Sewer Design Sheet
CB/MH Storage =	2.07 m^3	refer to Storm Sewer Design Sheet
Surface Storage =	4.65 m^3	refer to LRL Plan C.301
Total Available Storage =	**9.92 m^3**	Excluding Roof top Storage

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Stormwater Management Design Sheet

STORM - 100 YEAR

Runoff Equation

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

Pre-Devlopment Catchments within Development Area

	Total Area =	**0.041**	ha	**∑R=**	**0.90**
Un-Controlled	EWS-01	0.041	ha	R=	0.90
	Total Uncontrolled =	**0.041**	**ha**	**∑R=**	**0.90**

Allowable Release Rate — 5 Year Pre-Development Flow Rate

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

C =	0.50	max of 0.5 as per City of Ottawa
I =	104.2	mm/hr
Tc =	10	min
Total =	0.041	ha
Allowable Release Rate=	**5.87**	L/s

Post-development Stormwater Management

					$\sum R_5$	$\sum R_{100}$
	Total Site Area =	**0.039**	ha	**∑R=**	**0.83**	**1.00**
Controlled	WS-02 (Roof)	0.021	ha	R=	0.90	1.00
	WS-03	0.005	ha	R=	0.77	0.96
	WS-04	0.011	ha	R=	0.77	0.96
	Total Contolled =	**0.037**	**ha**	**∑R=**	**0.84**	**0.98**
Un-controlled	WS-01	0.002	ha	R=	0.53	0.67
	Total Un-Contolled =	**0.002**	**ha**	**∑R=**	**0.53**	**0.67**

Post-development Stormwater Management

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

Time (min)	Intensity (mm/hr)	Controlled Runoff** (L/s)	Storage Volume (m^3)	Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	178.6	17.88	7.13	6.00	0.73	6.73
15	142.9	14.31	7.48	6.00	0.58	6.58
20	120.0	12.01	7.21	6.00	0.49	6.49
25	103.8	10.40	6.60	6.00	0.42	6.42
30	91.9	9.20	5.76	6.00	0.37	6.37
35	82.6	8.27	4.76	6.00	0.34	6.34
40	75.1	7.52	3.66	6.00	0.31	6.31
45	69.1	6.91	2.47	6.00	0.28	6.28
50	64.0	6.40	1.21	6.00	0.26	6.26
60	55.9	5.60	0.00	6.00	0.23	6.23
70	49.8	4.99	0.00	6.00	0.20	6.20
80	45.0	4.51	0.00	6.00	0.18	6.18
90	41.1	4.12	0.00	6.00	0.17	6.17
100	*37.9*	3.80	0.00	6.00	0.15	6.15
110	35.2	3.52	0.00	6.00	0.14	6.14
120	32.9	3.29	0.00	6.00	0.13	6.13

* Controlled release rate 6 L/s min. as per city of Ottawa

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Stormwater Management Design Sheet

STORM - 100 YEAR

Onsite Stormwater Retention

Total Storage Required =	**7.48 m^3**	
Pipe Storage =	3.19 m^3	refer to Storm Sewer Design Sheet
CB/MH Storage =	2.07 m^3	refer to Storm Sewer Design Sheet
Surface Storage =	4.65 m^3	refer to LRL Plan C.301
Total Available Storage =	**9.92 m^3**	

APPENDIX B

Pre and Post Development Watershed Areas

LRL Associates Ltd.
Storm Watershed Summary

LRL File No.	190109
Project:	Proposed Multi- Unit Development
Location:	10 McArthur Ave, Ottawa
Date:	June 26, 2019
Designed:	D. Mills
Checked:	G. Brunet
Drawing Reference:	C.701, C.702

Pre-Devlopment Catchments

WATERSHED	C = 0.20	C = 0.85	C = 0.90	Total Area (ha)	Combined C
EWS-01	0.000	0.000	0.041	0.041	0.90
TOTAL	0.000	0.000	0.041	0.041	0.90

Post-Devlopment Catchments

WATERSHED	C = 0.20	C = 0.8	C = 0.90	Total Area (ha)	Combined C
WS-01	0.002	0.000	0.002	0.004	0.53
WS-02 (Roof)	0.000	0.000	0.021	0.021	0.90
WS-03	0.001	0.000	0.004	0.005	0.77
WS-04	0.002	0.000	0.009	0.011	0.75
TOTAL	0.005	0.000	0.035	0.041	0.81

APPENDIX C

Engineering Drawings

EROSION AND SEDIMENT CONTROL MEASURES:

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

1. PRIOR TO START OF CONSTRUCTION:

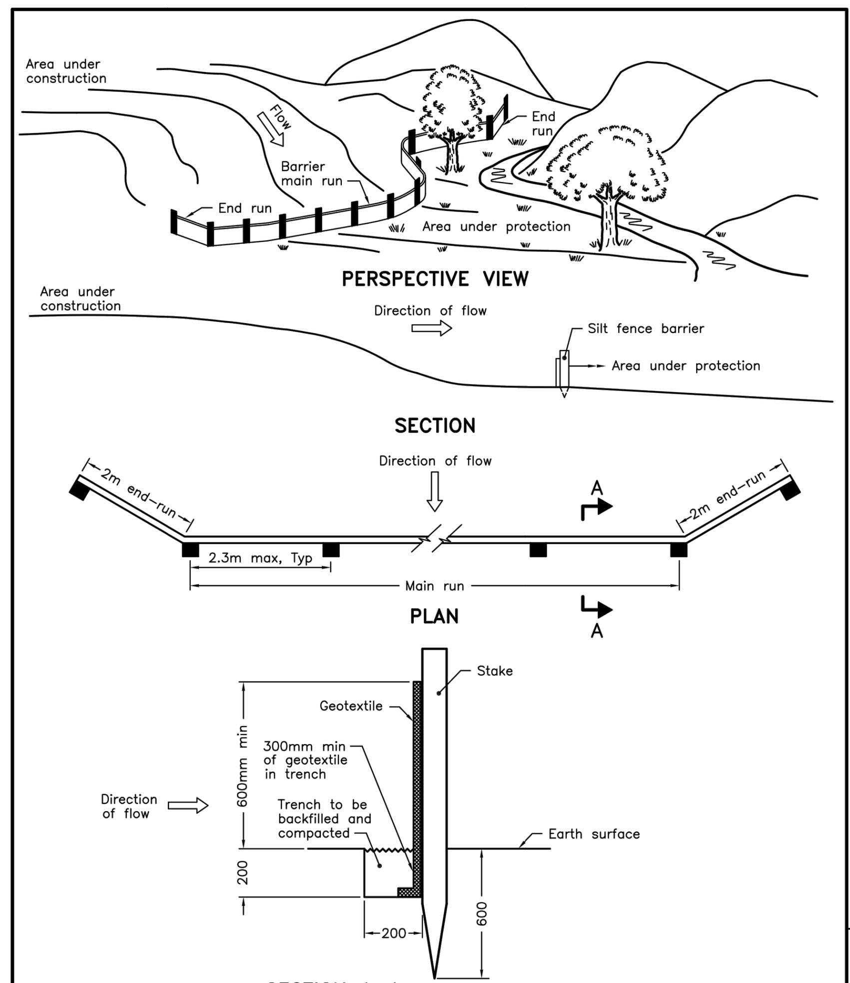
- PRIOR TO THE REMOVAL OF ANY VEGETATIVE COVER, MOVING OF SOIL AND CONSTRUCTION:
- INSTALL SILT FENCE IMMEDIATELY DOWNSTREAM FROM AREAS TO BE DISTURBED (SEE PLAN FOR LOCATION).
- INSTALL GEOSOCK INSERTS WITH AN OVERFLOW IN ALL THE DOWNSTREAM CATCHBASINS AND MANHOLES
- INSTALL SILTSACK FILTERS IN ALL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

2. DURING CONSTRUCTION:

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

3. AFTER CONSTRUCTION:

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

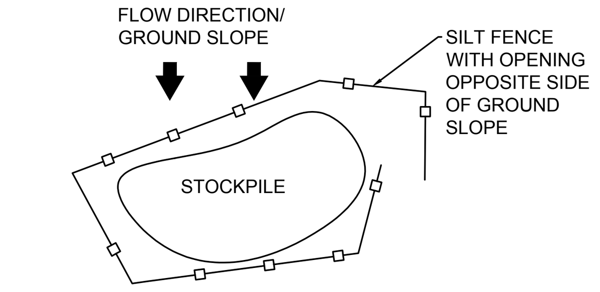


NOTE:
A All dimensions are in millimetres unless otherwise shown.

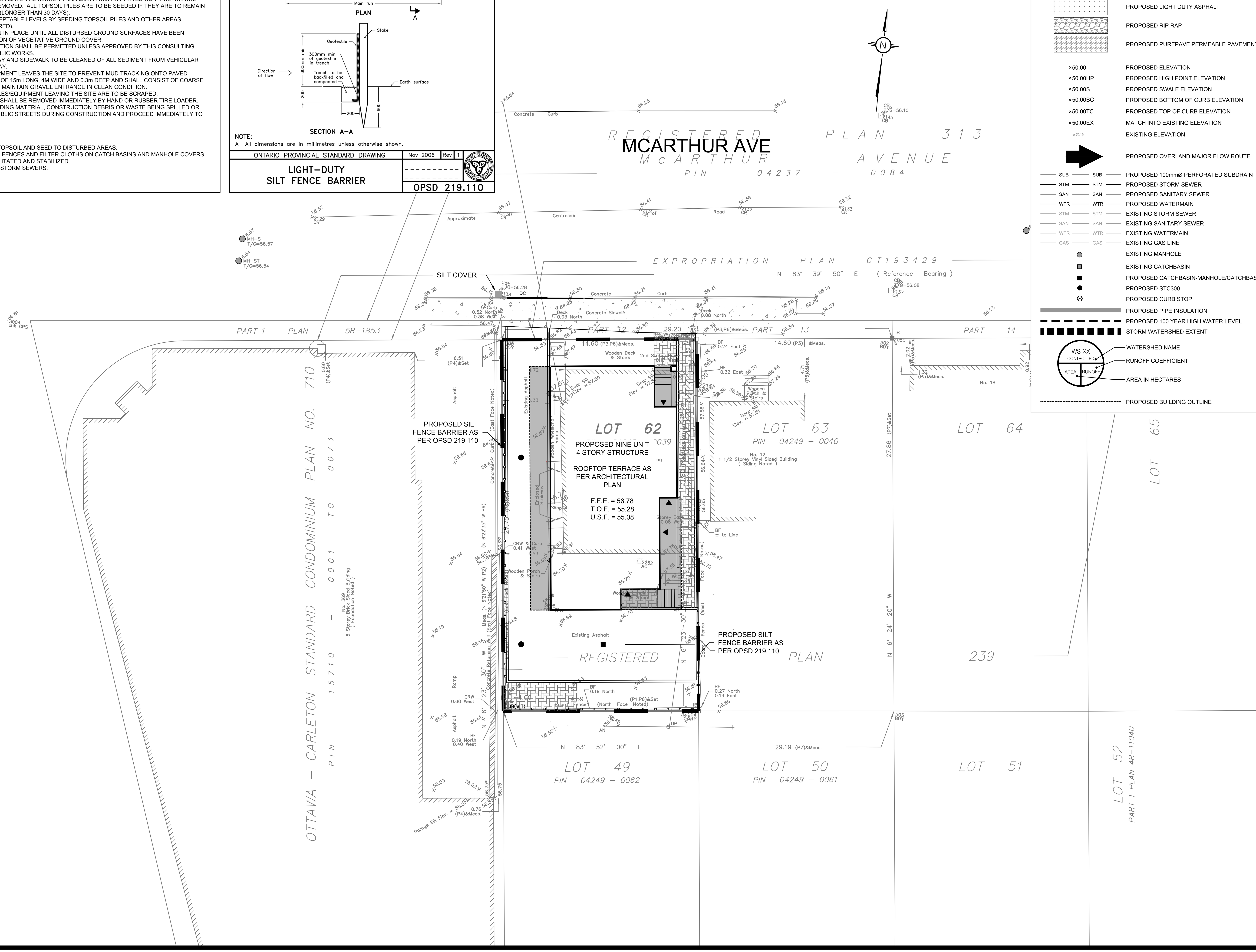
ONTARIO PROVINCIAL STANDARD DRAWING | Nov 2006 | Rev 1

LIGHT–DUTY SILT FENCE BARRIER

OPSD 219.110



STOCKPILE EROSION PROTECTION
N.T.S.



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 HEAVY DUTY ASPHALT
- PROPOSED LIGHT DUTY ASPHALT
- PROPOSED RIP RAP
- PROPOSED PUREPAVE PERMEABLE PAVEMENT
- ×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
- ×50.00EX MATCH INTO EXISTING ELEVATION
- ×70.19 EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- SUB — SUB PROPOSED 100mmØ PERFORATED SUBDRAIN
- STM — STM PROPOSED STORM SEWER
- SAN — SAN PROPOSED SANITARY SEWER
- WTR — WTR PROPOSED WATERMAIN
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DESIGNED BY:	DRAWN BY:	APPROVED BY:
D.M.	D.M.	G.B.

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DRAWING TITLE
EROSION AND SEDIMENT CONTROL PLAN

PROJECT NO.
190109

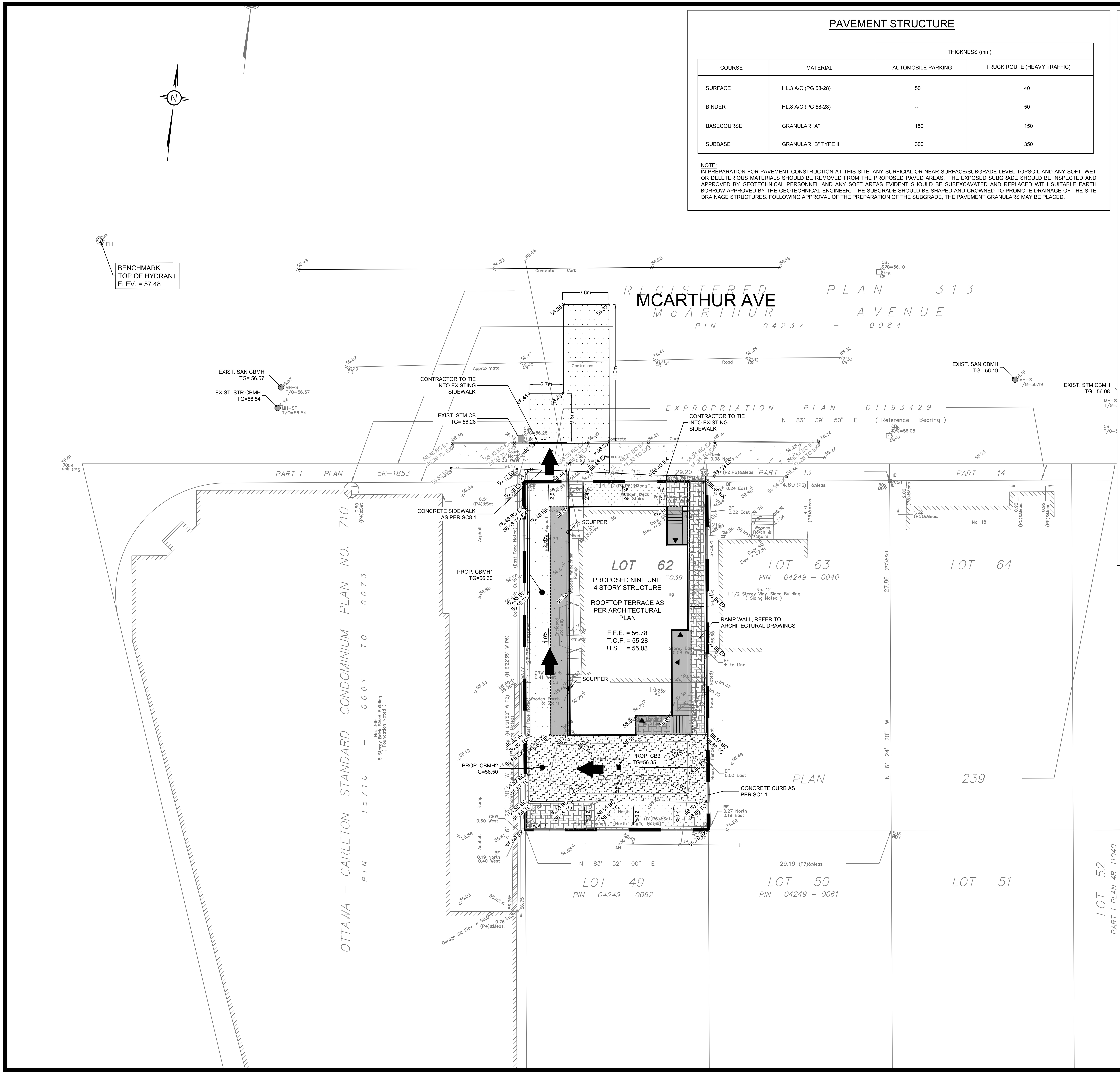
DATE
29/07/2019

C101

PAVEMENT STRUCTURE

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

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



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DRAWING TITLE
GRADING AND DRAINAGE PLAN

PROJECT NO.
190109

DATE
29/07/2019

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

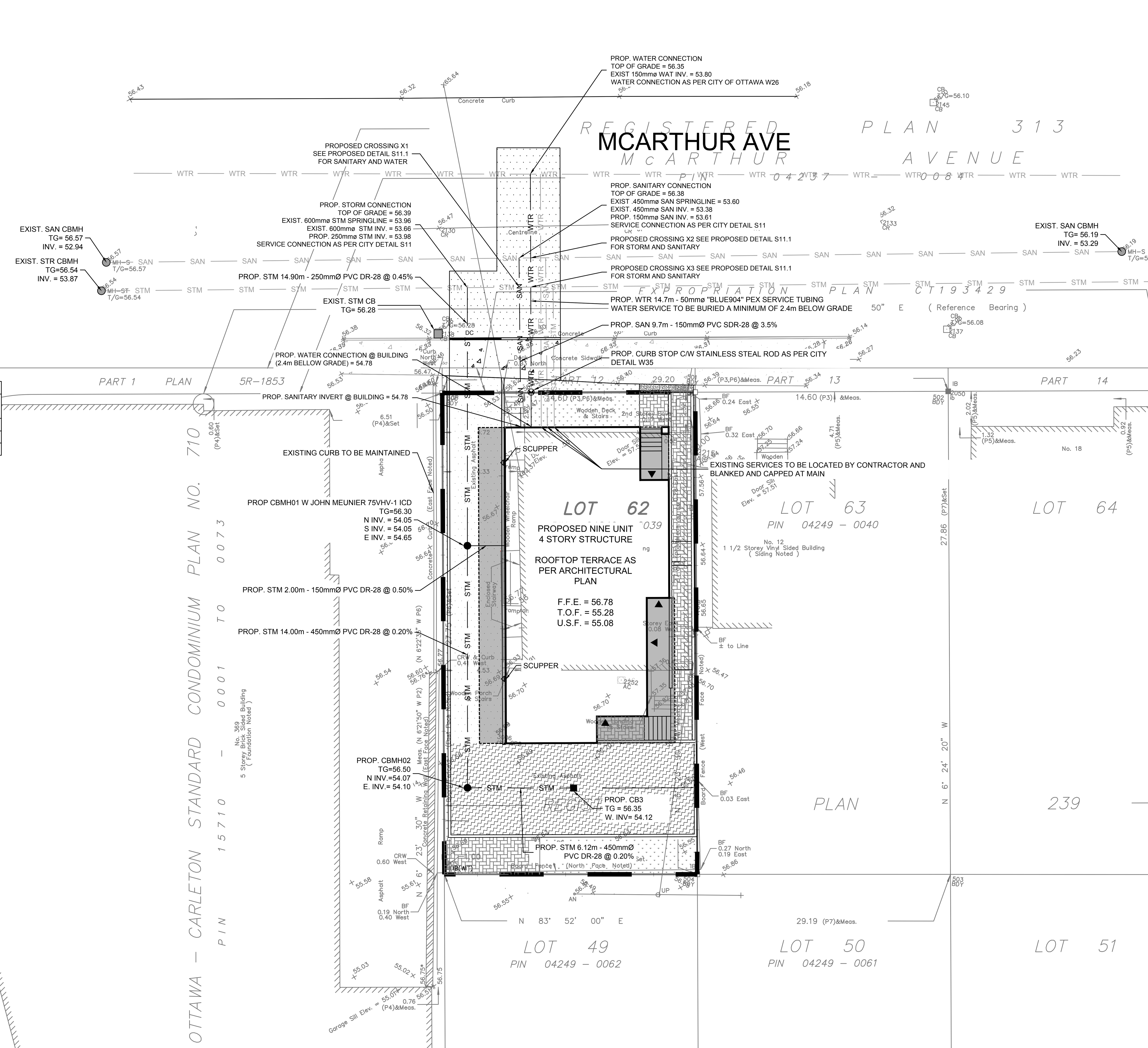
1. SEWER BEDDING AS PER PIPE TRENCH DETAIL WITH GRANULAR 'A' BEDDING COMPACTED TO 95% OF ITS SPMDD.
2. ALL WORK SHALL BE PERFORMED, AS APPLICABLE IN ACCORDANCE WITH OPSS 407, AND 410.
3. CONTRACTOR TO CONFIRM ELEVATION OF EXISTING SEWERS AT PROPOSED CONNECTION POINTS AND REPORT ANY DISCREPANCIES TO THE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

NOTES: WATER SERVICE

1. PROPOSED WATER SERVICE TO BE INSULATED WHEN COVER IS LESS THAN 2.4m

PIPE CROSSING TABLE

CROSSING ID	PROP. 19mm WAT INVERT	PROP. 150mm SAN INVERT	EXIST. 450mm SAN OBVERT	EXIST. 600mm STM OBVERT	GROUND ELEVATION	SEPARATION
X1	N/A	54.54	N/A	54.24	56.39	0.3
X2	54.13	N/A	53.83	N/A	56.42	0.3
X3	54.54	N/A	N/A	54.24	56.39	0.3



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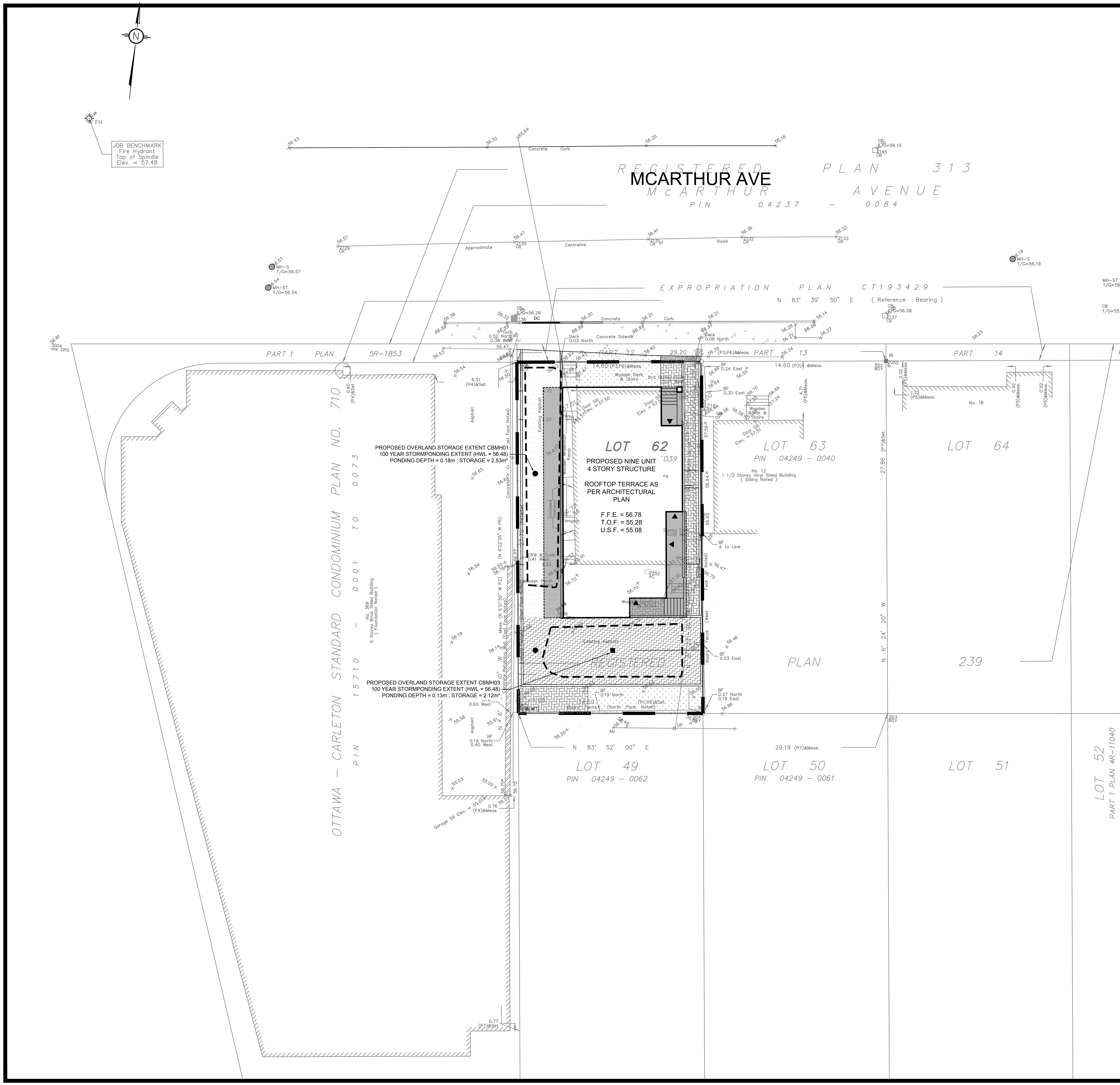

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- PROPOSED TERRACING (3:1 MIN.)
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- WTR EXISTING WATERMAIN
- GAS EXISTING GAS LINE
- EXISTING MANHOLE
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
- PROPOSED STC300
- PROPOSED CURB STOP
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX / CONTROLLED / AREA / RUNOFF: WATERSHED NAME; RUNOFF COEFFICIENT; AREA IN HECTARES
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3.0m 1.5 0 3.0 6.0m

SCALE: 1:150

No.	REVISIONS	BY	DATE
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01	ISSUED FOR CLIENT APPROVAL	D.M.	28 JUNE 2019

LICENSED PROFESSIONAL ENGINEER
V. JOHNSON
100510576
July 29/2019
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
MOE SLEIMAN

DESIGNED BY:	DRAWN BY:	APPROVED BY:
D.M.	D.M.	G.B.

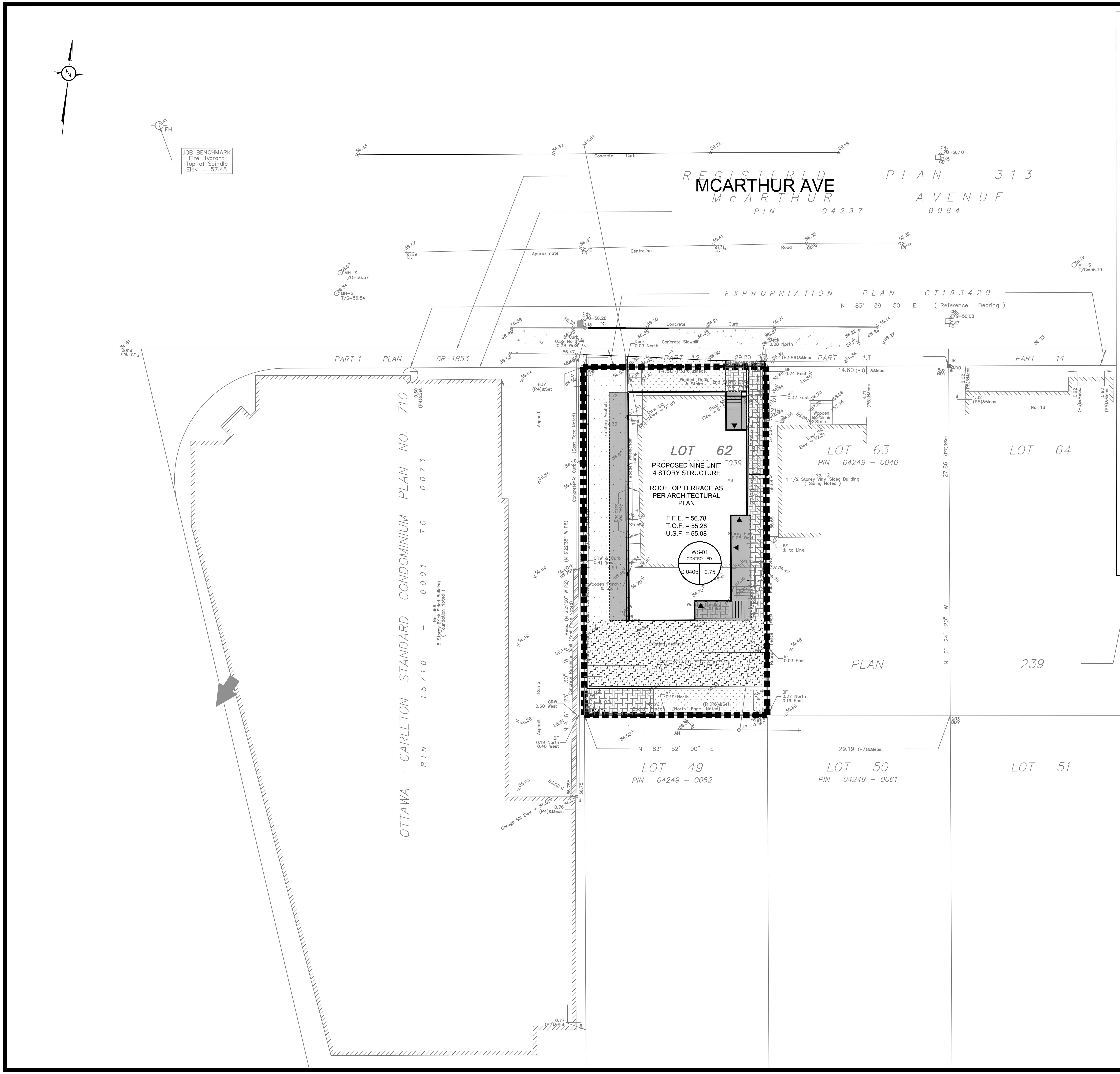
PROJECT
PROPOSED 3 STOREY RESIDENTIAL COMPLEX
10 MCARTHUR AVE., OTTAWA ON

DRAWING TITLE
STORMWATER MANAGEMENT PLAN

PROJECT NO.
190109

DATE
29/07/2019

C601



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CLIENT
MOE SLEIMAN

DESIGNED BY:	DRAWN BY:	APPROVED BY:
D.M.	D.M.	G.B.

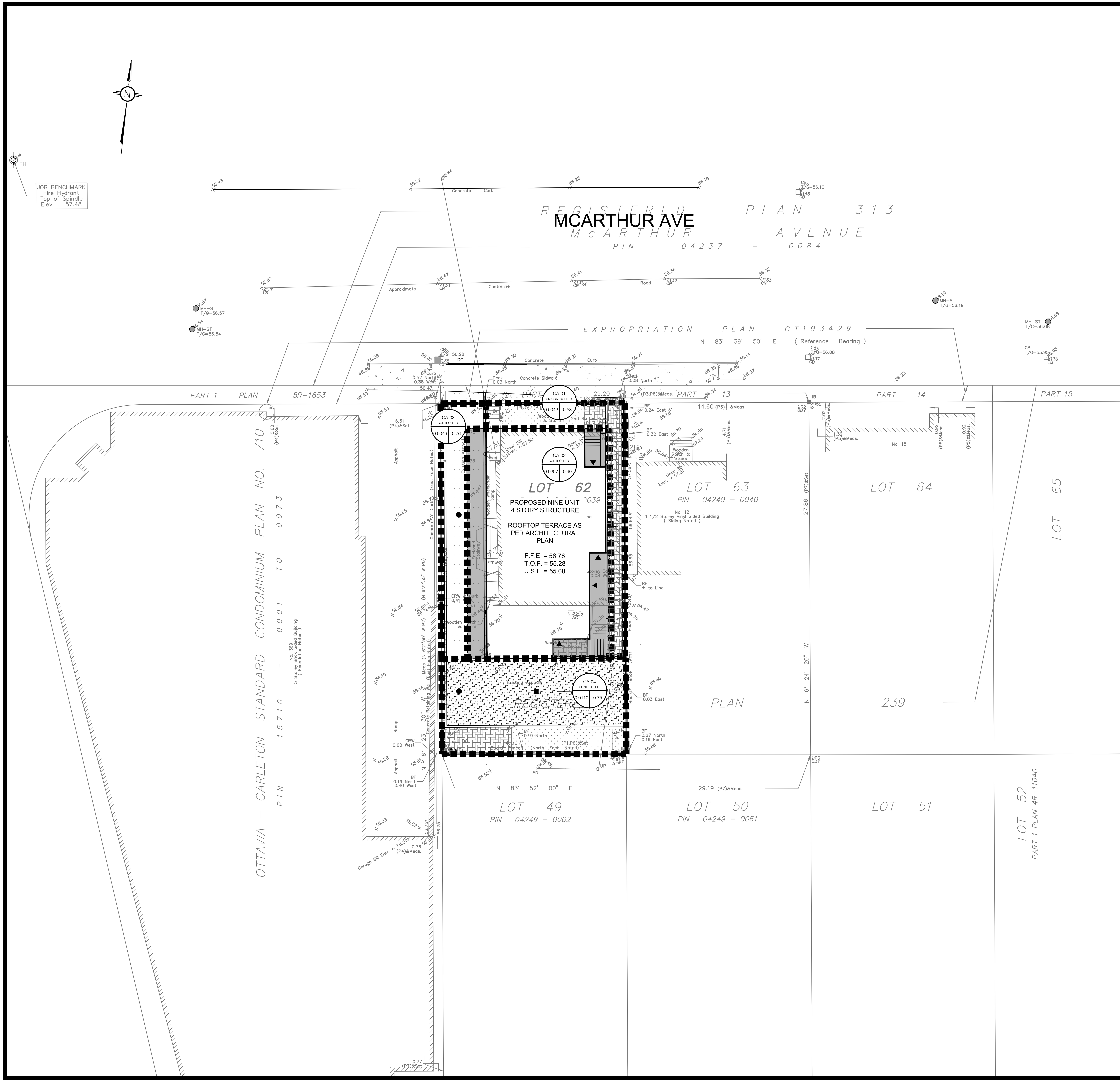
PROJECT
PROPOSED 3 STOREY RESIDENTIAL COMPLEX
10 MCARTHUR AVE., OTTAWA ON

DRAWING TITLE
PRE-DEVELOPMENT
WATERSHED PLAN

PROJECT NO.
190109

DATE
29/07/2019

C701



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DESIGNED BY:	DRAWN BY:	APPROVED BY:
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PROJECT
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DRAWING TITLE
POST-DEVELOPMENT
WATERSHED PLAN

PROJECT NO.
190109

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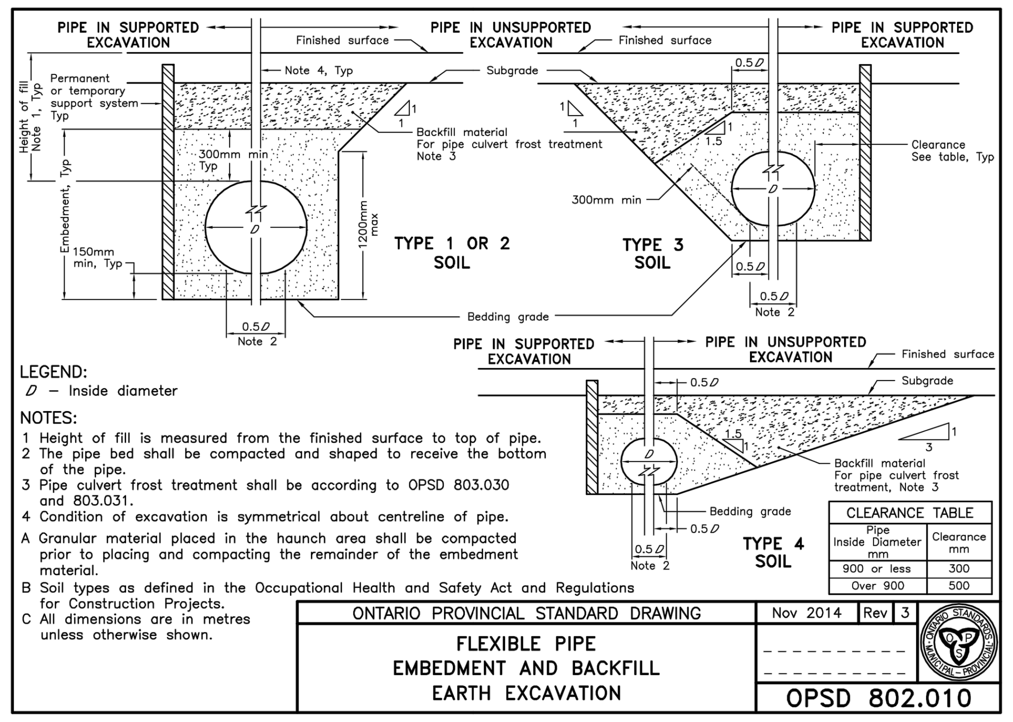
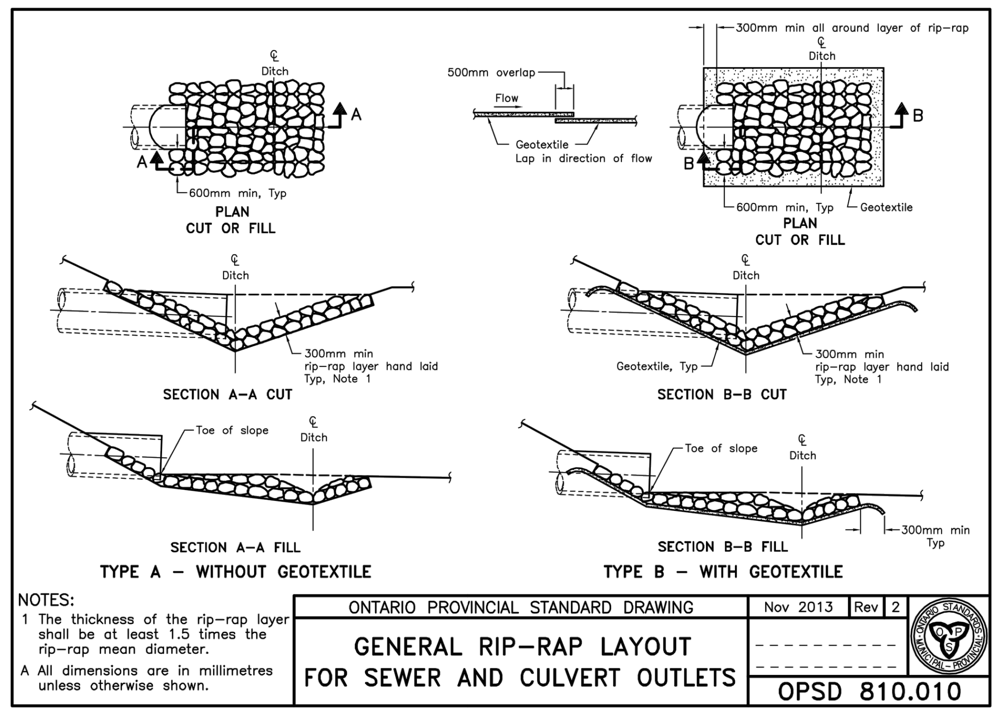
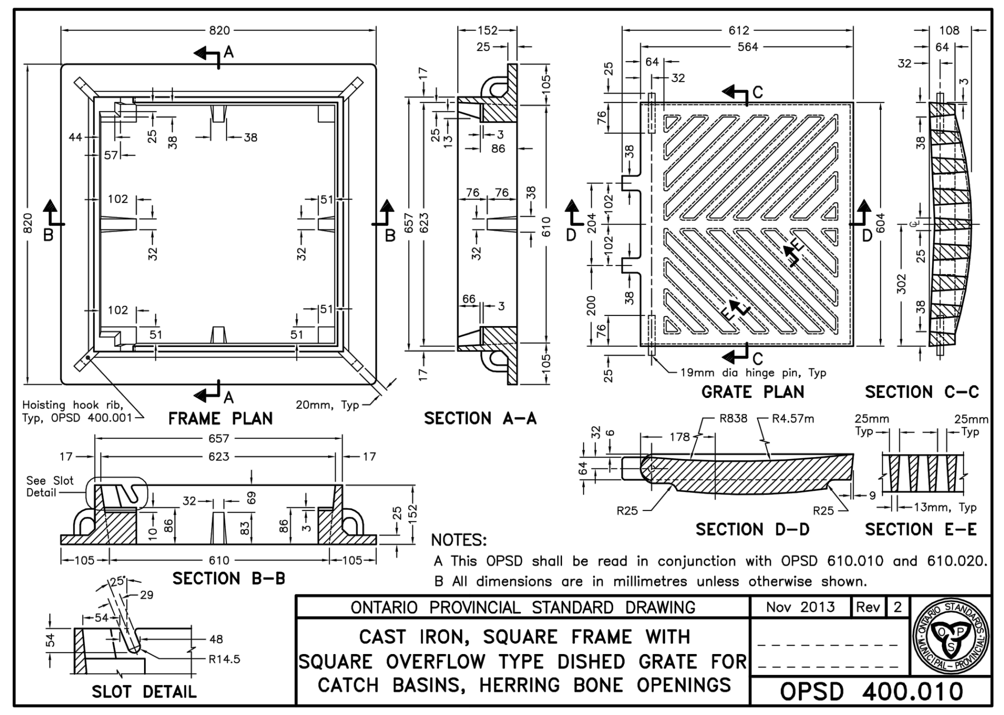
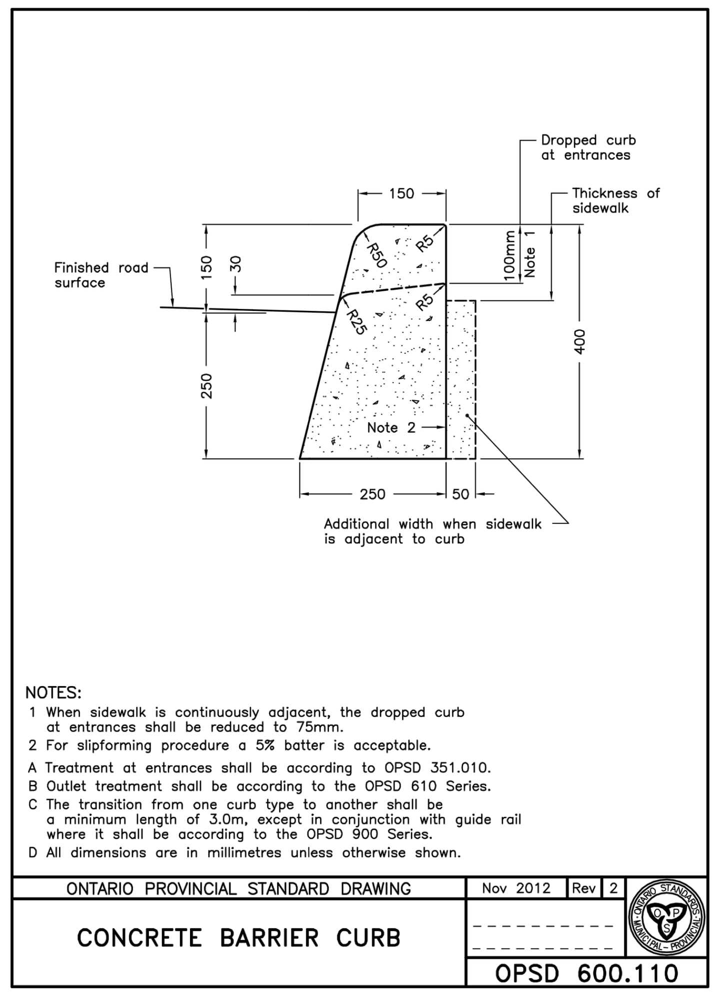
29/07/2019

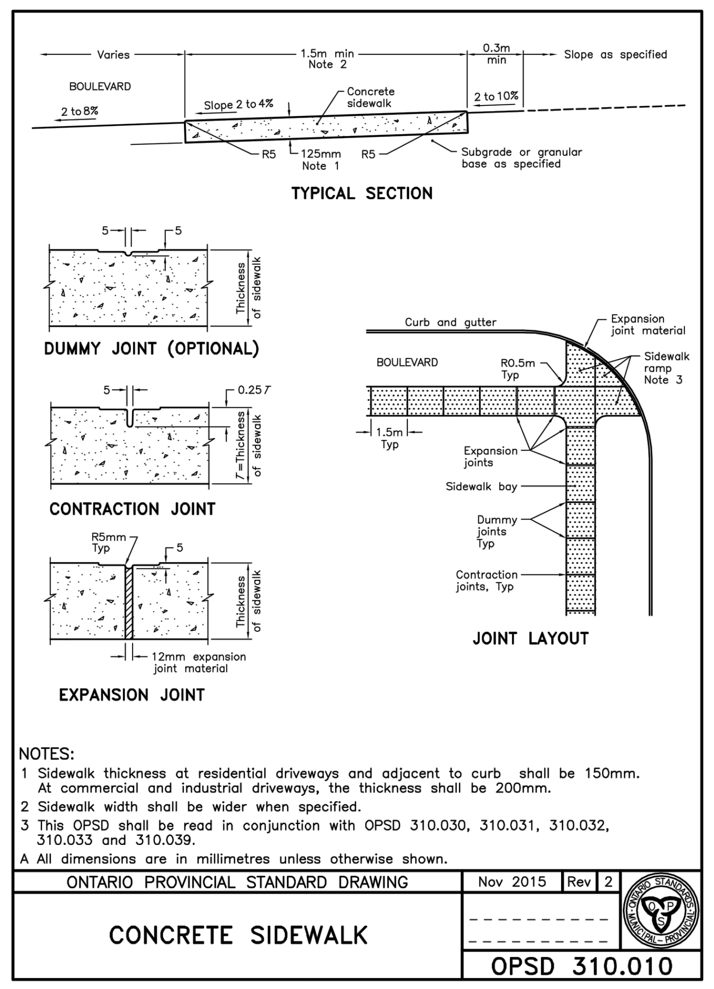
C702

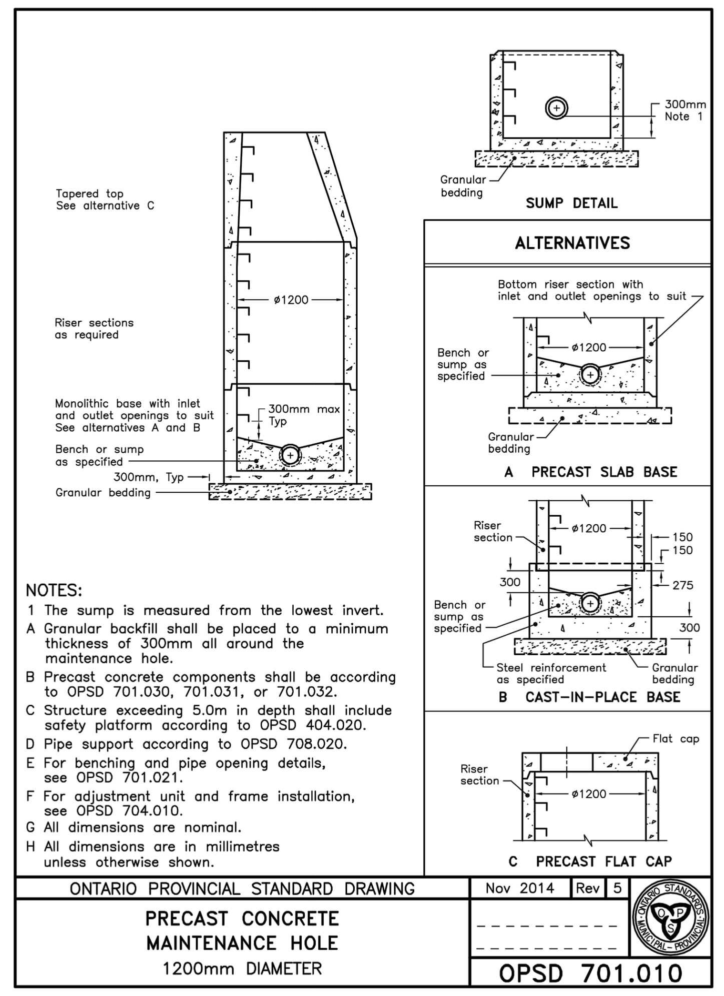


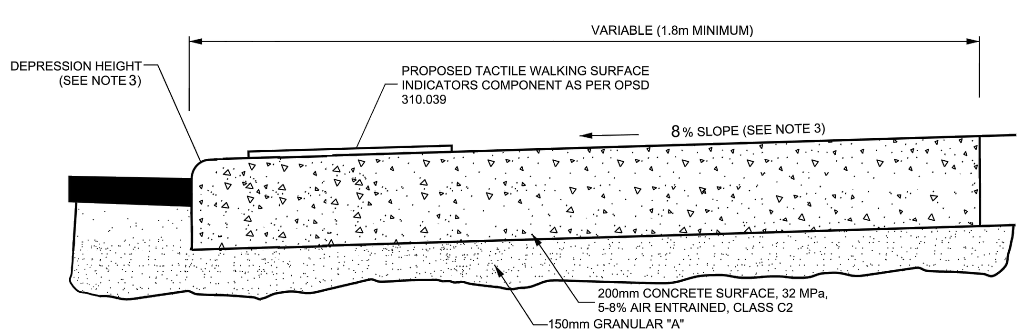






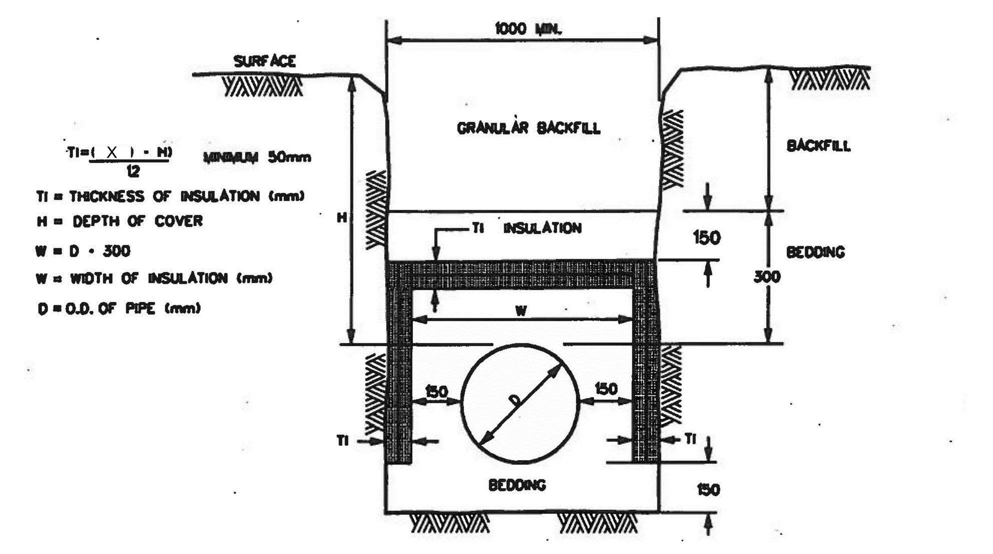






SIDEWALK SECTION AT PRIVATE ENTRANCE AND PEDESTRIAN RAMPS

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
2. FOR CURB RAMPS, SLOPE OF 2% TO 5%, MAXIMUM 8%.
3. DEPRESSION HEIGHT 0 TO 6 mm



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

USE AND INTERPRETATION OF DRAWINGS

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

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

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

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

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

UNAUTHORIZED CHANGES:

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

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

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

GENERAL NOTES:

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

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

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

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

No.	REVISIONS	BY	DATE
02	ISSUED FOR CLIENT APPROVAL	M.S.	29 JULY 2019
01	ISSUED FOR CLIENT APPROVAL	D.M.	28 JUNE 2019

LICENSED PROFESSIONAL ENGINEER
V. JOHNSON
100510576
July 29/2019
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
MOE SLEIMAN

DESIGNED BY:	DRAWN BY:	APPROVED BY:
D.M.	D.M.	G.B.

PROJECT
PROPOSED 3 STOREY RESIDENTIAL COMPLEX
10 MCARTHUR AVE., OTTAWA ON

DRAWING TITLE
CONSTRUCTION DETAIL PLAN

PROJECT NO.
190109

DATE
29/07/2019

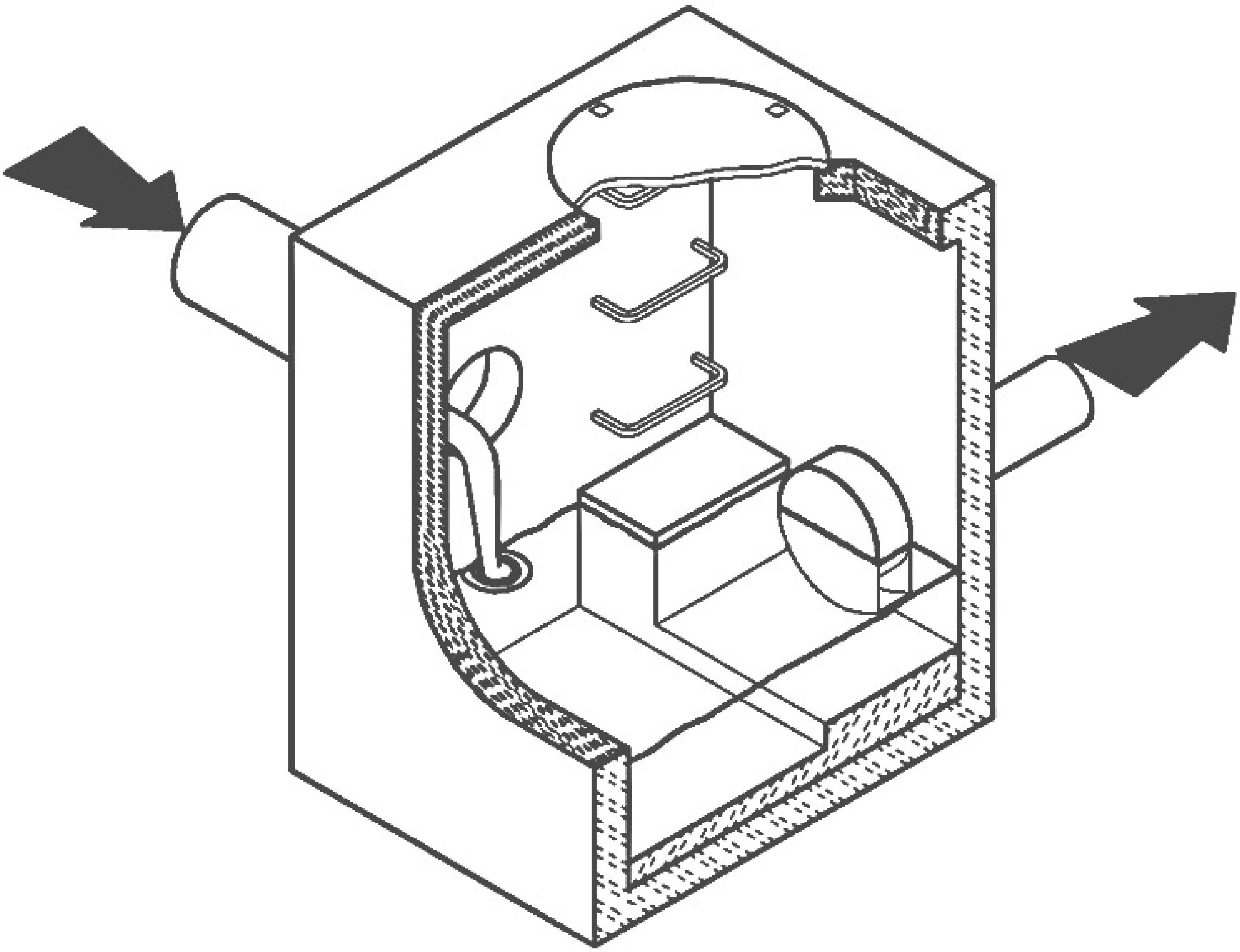
C901

APPENDIX D

SWM Quantity Control Device

CSO/STORMWATER MANAGEMENT

® HYDROVEX® VHV / SVHV
Vertical Vortex Flow Regulator



JOHN MEUNIER

APPLICATIONS

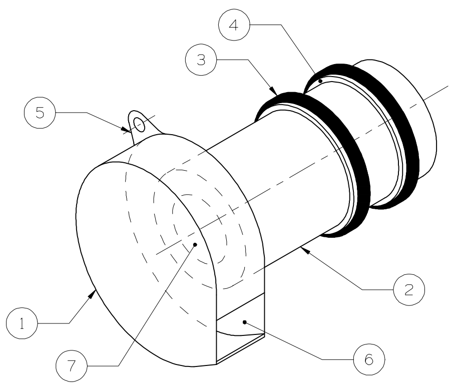
One of the major problems of urban wet weather flow management is the runoff generated after a heavy rainfall. During a storm, uncontrolled flows may overload the drainage system and cause flooding. Due to increased velocities, sewer pipe wear is increased dramatically and results in network deterioration.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

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

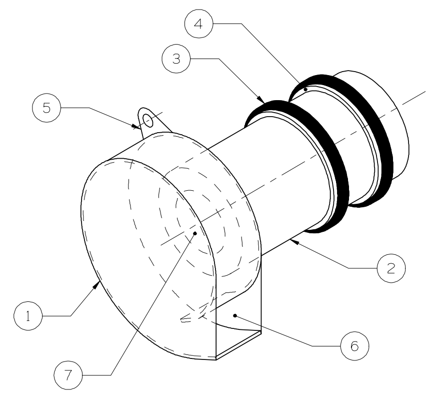
The vortex flow regulator design is based on the fluid mechanics principle of the forced vortex. This grants flow regulation without any moving parts, thus reducing maintenance. The operation of the regulator, depending on the upstream head and discharge, switches between orifice flow (gravity flow)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

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

1. **BODY**
2. **SLEEVE**
3. **O-RING**
4. **RETAINING RINGS (SQUARE BAR)**
5. **ANCHOR PLATE**
6. **INLET**
7. **OUTLET ORIFICE**



VHV



SVHV

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

ADVANTAGES

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

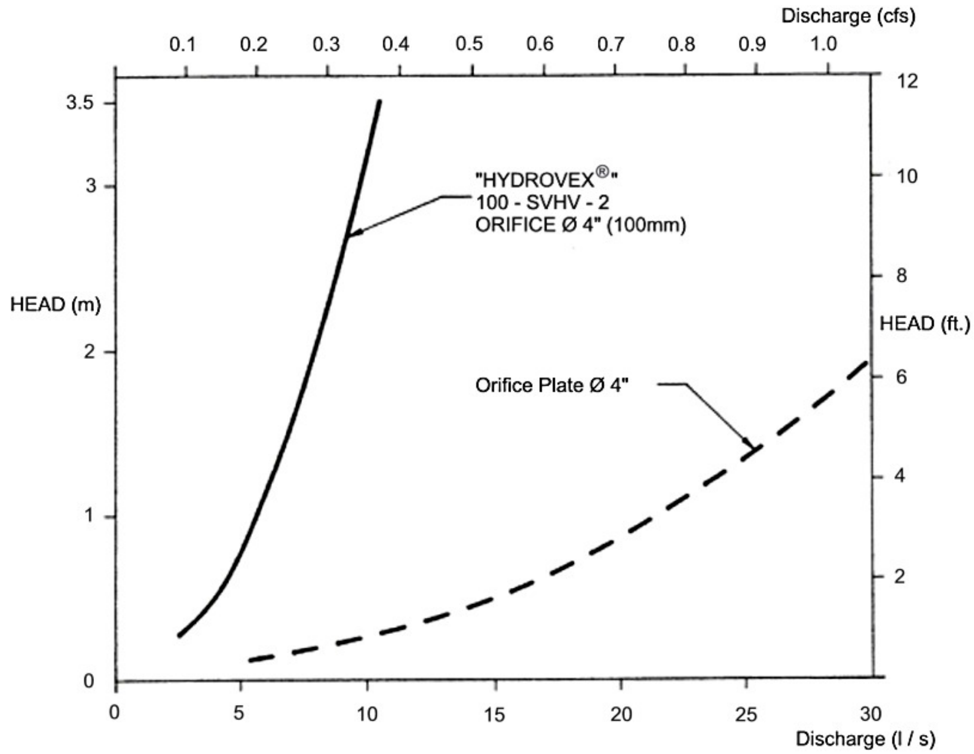


FIGURE 2: DISCHARGE CURVE SHOWING A HYDROVEX® FLOW REGULATOR VS AN ORIFICE PLATE

SELECTION

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

Example:

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

INSTALLATION REQUIREMENTS

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

SPECIFICATIONS

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

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

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

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

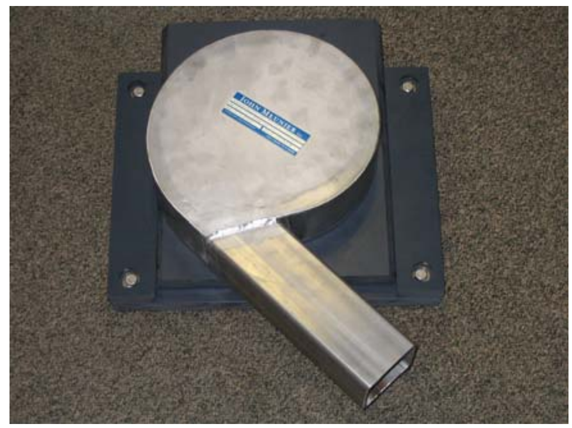
- ***project design flow rate***
- ***pressure head***
- ***chamber's outlet pipe diameter and type***

Typical VHV model in factory

OPTIONS

FV – SVHV (mounted on sliding plate)

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



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

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

VHV with air vent for minimal slopes

HYDROVEX®

VHV Vertical Vortex Flow Regulator

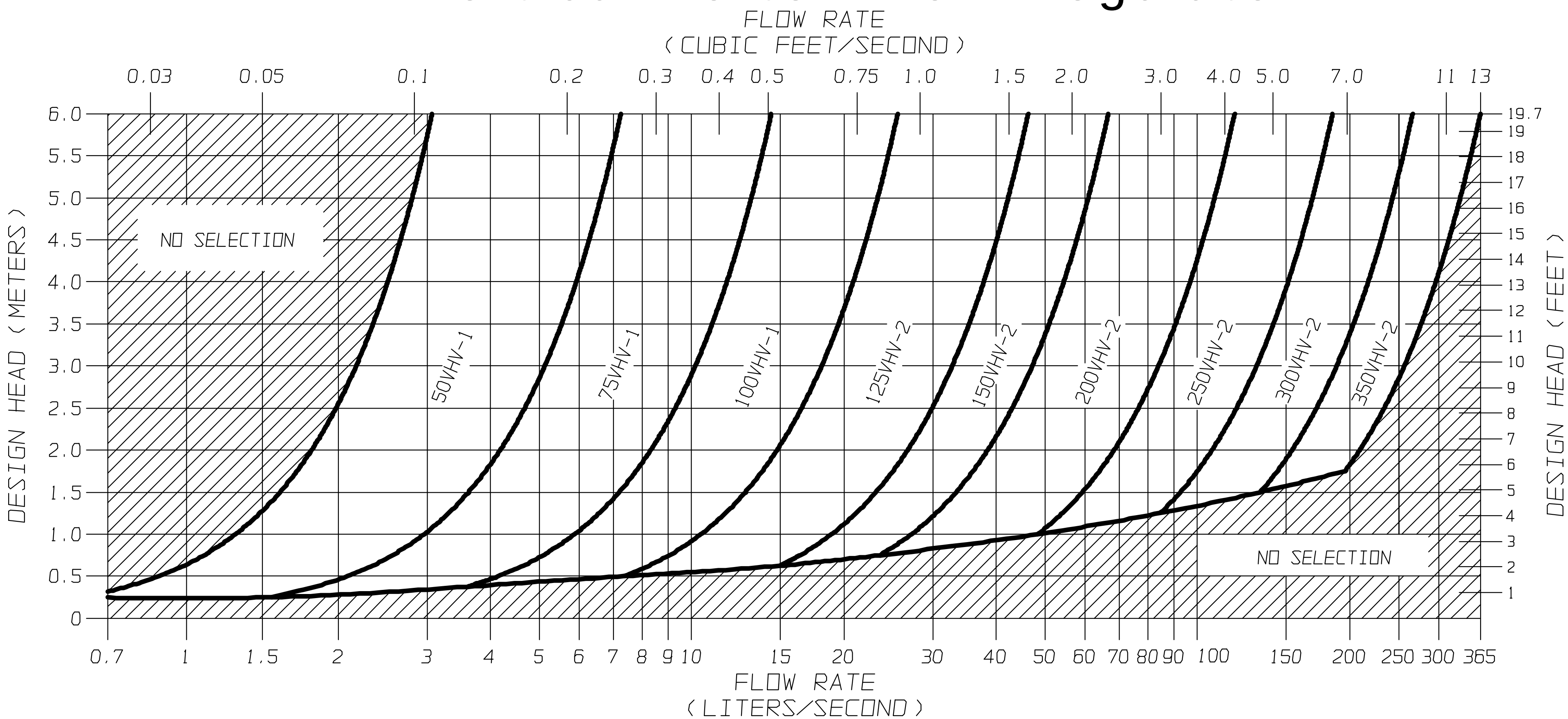


FIGURE 3 - VHV

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SVHV Vertical Vortex Flow Regulator

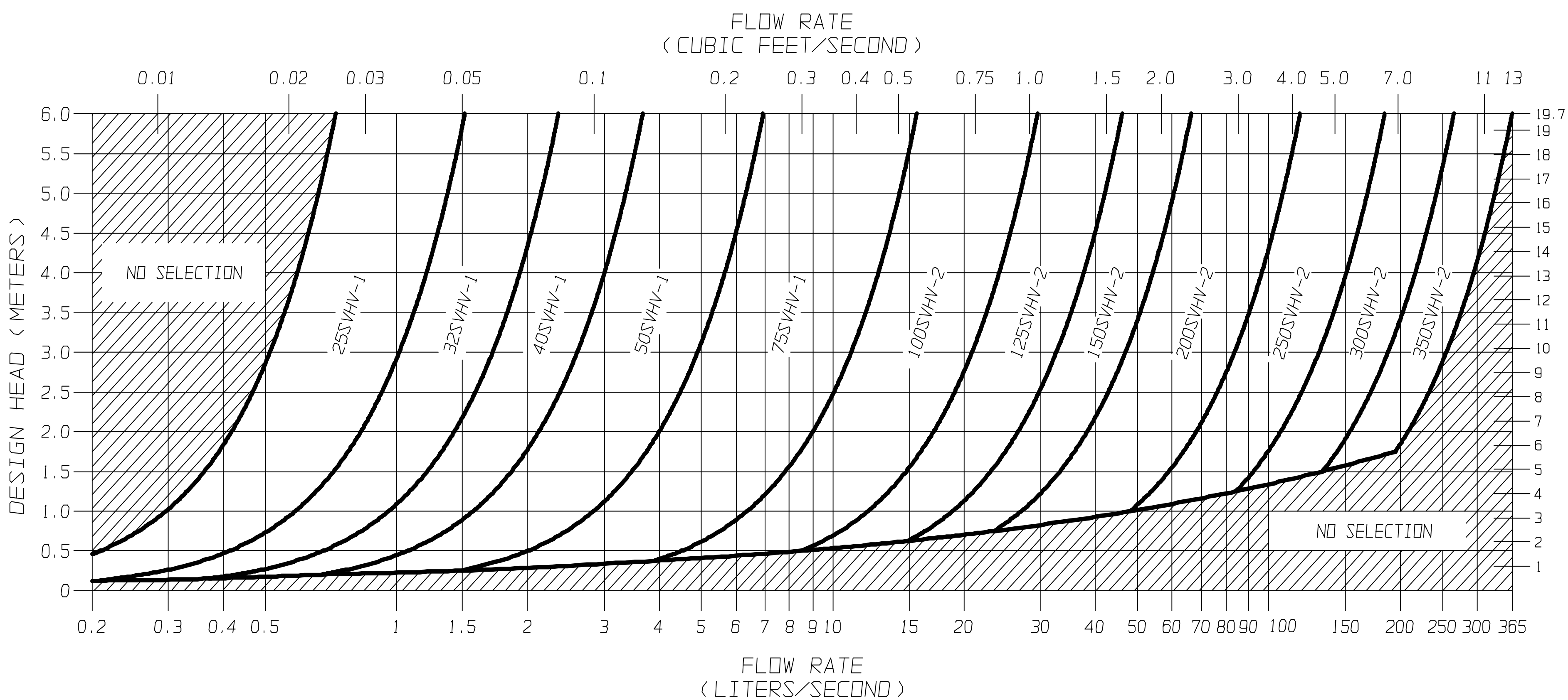

FIGURE 3 - SVHV

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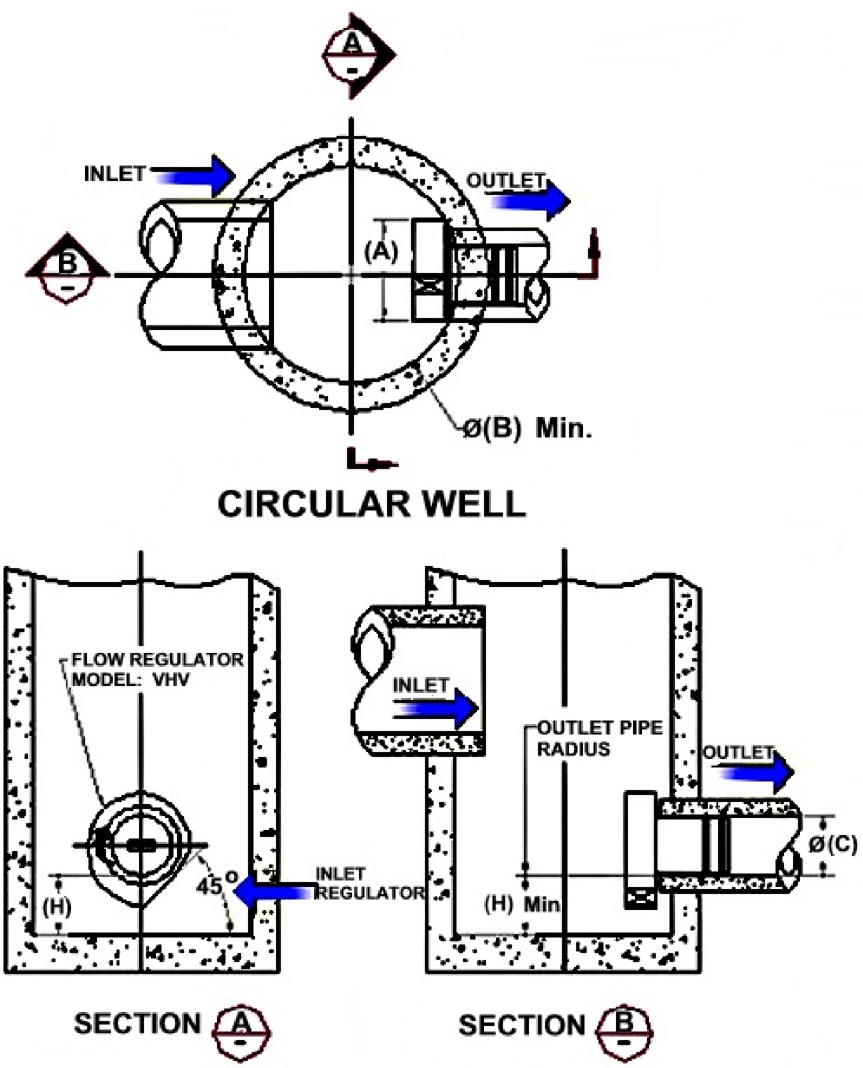
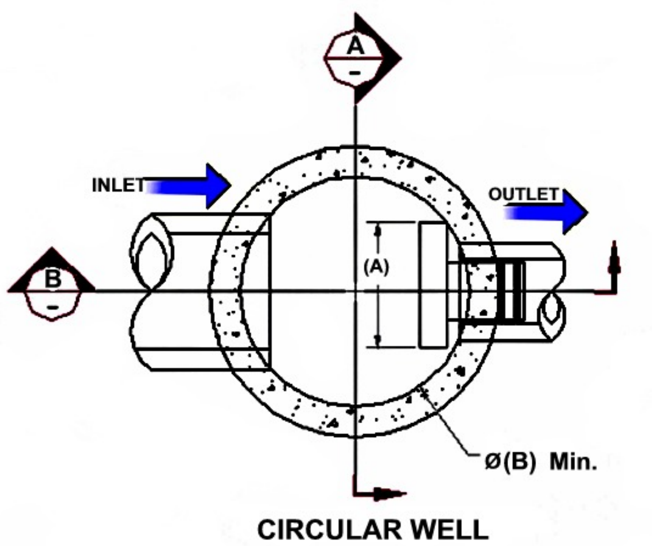
FLOW REGULATOR TYPICAL INSTALLATION IN CIRCULAR MANHOLE
FIGURE 4 (MODEL VHV)

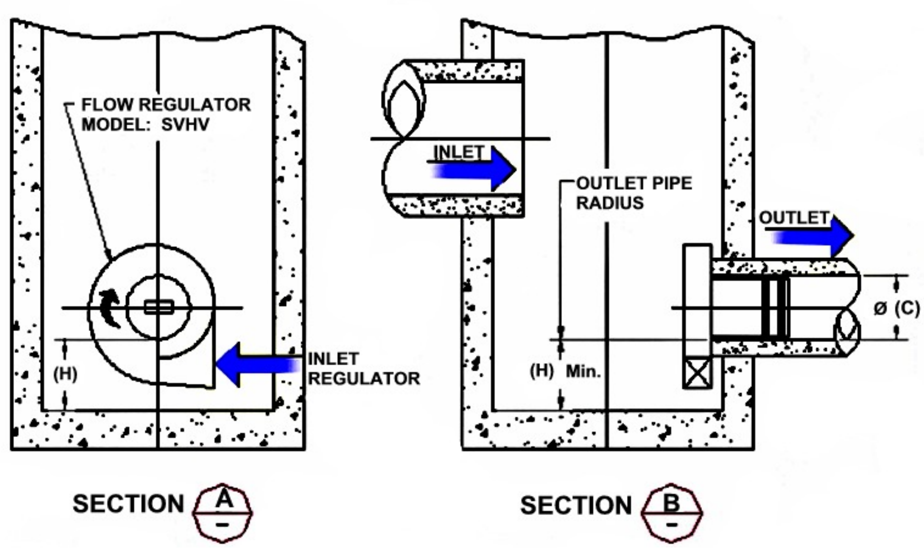
Model Number	Regulator Diameter		Minimum Manhole Diameter		Minimum Outlet Pipe Diameter		Minimum Clearance	
	A (mm)	**A** (in.)	**B** (mm)	**B** (in.)	**C** (mm)	**C** (in.)	**H** (mm)	**H** (in.)
50VHV-1	150	6	600	24	150	6	150	6
75VHV-1	250	10	600	24	150	6	150	6
100VHV-1	325	13	900	36	150	6	200	8
125VHV-2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



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

Model Number	Regulator Diameter		Minimum Manhole Diameter		Minimum Outlet Pipe Diameter		Minimum Clearance	
	A (mm)	**A** (in.)	**B** (mm)	**B** (in.)	**C** (mm)	**C** (in.)	**H** (mm)	**H** (in.)
25 SVHV-1	125	5	600	24	150	6	150	6
32 SVHV-1	150	6	600	24	150	6	150	6
40 SVHV-1	200	8	600	24	150	6	150	6
50 SVHV-1	250	10	600	24	150	6	150	6
75 SVHV-1	375	15	900	36	150	6	275	11
100 SVHV-2	275	11	900	36	150	6	250	10
125 SVHV-2	350	14	900	36	150	6	300	12
150 SVHV-2	425	17	1200	48	150	6	350	14
200 SVHV-2	575	23	1600	64	200	8	450	18
250 SVHV-2	700	28	1800	72	250	10	550	22
300 SVHV-2	850	34	2400	96	250	10	650	26
350 SVHV-2	1000	40	2400	96	250	10	700	28

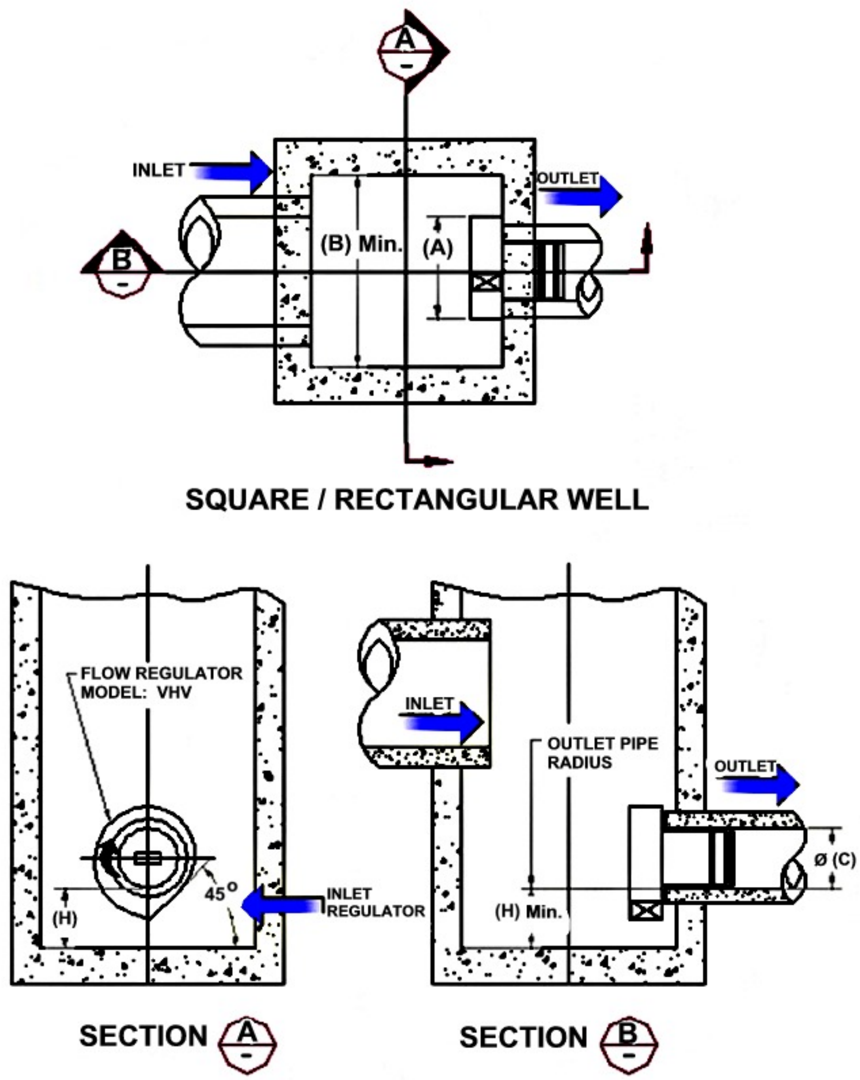




FLOW REGULATOR TYPICAL INSTALLATION IN SQUARE MANHOLE
FIGURE 4 (MODEL VHV)

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

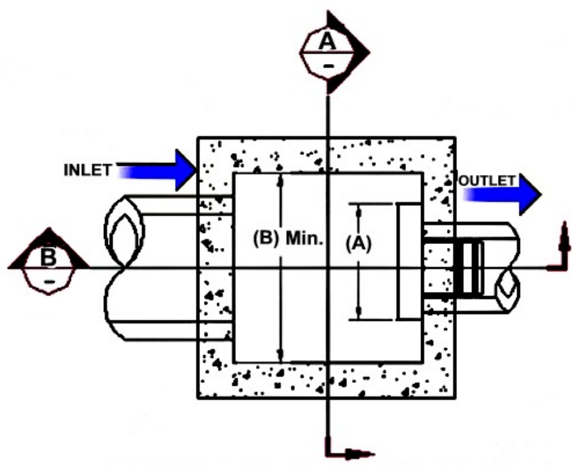
NOTE: ***In the case of a square manhole, the outlet flow pipe must be centered on the wall to ensure enough clearance for the unit.***



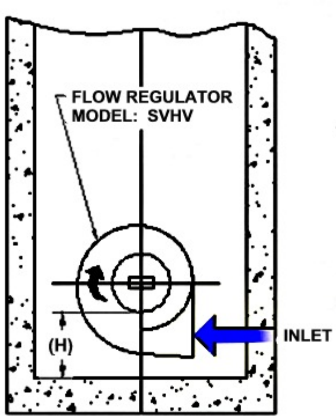
FLOW REGULATOR TYPICAL INSTALLATION IN SQUARE MANHOLE
FIGURE 4 (MODEL SVHV)

Model Number	Regulator Diameter		Minimum Chamber Width		Minimum Outlet Pipe Diameter		Minimum Clearance	
	A (mm)	**A** (in.)	**B** (mm)	**B** (in.)	**C** (mm)	**C** (in.)	**H** (mm)	**H** (in.)
25 SVHV-1	125	5	600	24	150	6	150	6
32 SVHV-1	150	6	600	24	150	6	150	6
40 SVHV-1	200	8	600	24	150	6	150	6
50 SVHV-1	250	10	600	24	150	6	150	6
75 SVHV-1	375	15	600	24	150	6	275	11
100 SVHV-2	275	11	600	24	150	6	250	10
125 SVHV-2	350	14	600	24	150	6	300	12
150 SVHV-2	425	17	600	24	150	6	350	14
200 SVHV-2	575	23	900	36	200	8	450	18
250 SVHV-2	700	28	900	36	250	10	550	22
300 SVHV-2	850	34	1200	48	250	10	650	26
350 SVHV-2	1000	40	1200	48	250	10	700	28

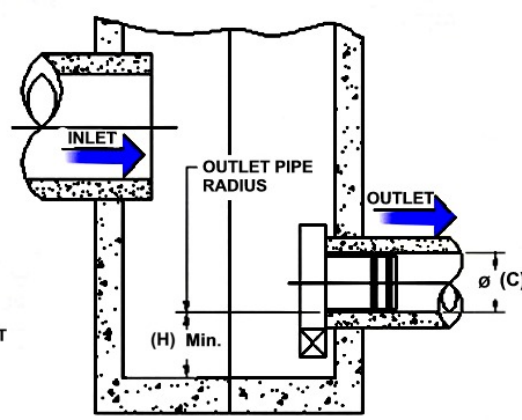
NOTE: *In the case of a square manhole, the outlet flow pipe must be centered on the wall to ensure enough clearance for the unit.*



SQUARE / RECTANGULAR WELL



SECTION A



SECTION B

INSTALLATION

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

MAINTENANCE

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

GUARANTY

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

VHV Vertical Vortex Flow Regulator

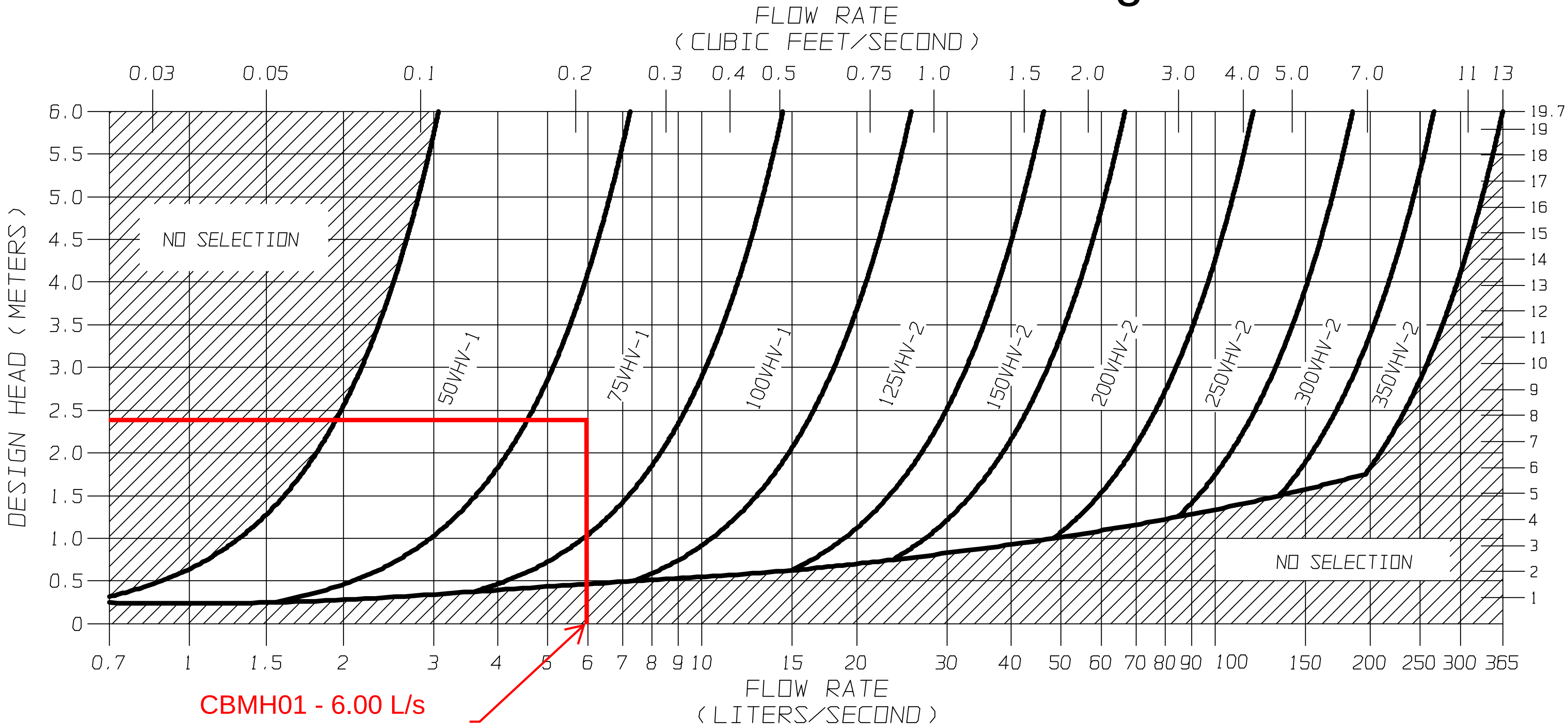


FIGURE 3 - VHV

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APPENDIX E

Proposed Development Water Demands

Water Supply Calculations

LRL File No.	190109
Project	Multi-Units Development
Date	July 29, 2019
Designed:	M. Siddo
Checked:	V. Johnson

Domestic Commercial Flow Demand

Total Building Floor Area =	**202.4**	m^2	(includes existing and proposed building)	
Site Total Area =	**0.0405**	ha		
Total Proposed Fixture Unit =	71	ea.		
Average Demand Per Fixture Unit =	3.33	L/min	As per AWWA Standard	
Average Residential Water Demand =	**236.43**	L/min	3.94	L/s
Maximum Daily Peak Factor =	2.5	* As per City of Ottawa		
Maximum Daily Residential =	**591.08**	L/d	9.85	L/s
Maximum Hourly Peak Factor =	2.2	* As per City of Ottawa		
Maximum Hourly Residential =	**520.15**	L/d	8.67	L/s

Therefore,		
Total Domestic Flow =	**9.85**	**L/s**
Total Fire Flow =	**58.3**	**L/s**

APPENDIX F

FUS Fire Flow Calculation

Fire Flow Calculations - Revision 1

LRL File No. 190109
Project Multi-Unit Development
Date July 29, 2019
Method Fire Underwriters Survey (FUS)
Designed by M. Siddo

Multi-Units Development	202.4	
	202	m^2

Step	Task	Term	Options	Multiplier	Choose:	Value	unit	Fire Flow
				Structural Framing Material				
1	Choose frame used for building	Coefficient C related to the type of construction	Wood Frame	1.5	Non-combustible construction	0.8		
			Ordinary Construction	1.0				
			Non-combustible construction	0.8				
			Fire resistive construction <2 hrs	0.7				
			Fire resistive construction >2 hrs	0.6				
				Floor Space Area				
2	Choose type of housing	Type of housing	Single family dwelling	0	Building - no. of units per floor	3	units	
			Townhouse - no. of units	0				
			Building - no. of units per floor	1				
	Enter no. of storeys	Number of floors/storeys for the building (excluding the basement)				3	floors	
3	Enter area	Enter floor space area		1	202.4	211	sq.m.	
4	Obtain fire flow before reductions	Required fire flow	**Fire Flow = 220 x C x Area^0.5**				L/min	**2,558**
							L/s	42.6
				Reductions or surcharge due to factors affecting burning				
5	Choose combustibility of contents	Occupancy hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15		
			Limited combustible	-0.15				
			Combustible	0				
			Free burning	0.15			L/min	**2,174**
			Rapid burning	0.25			L/s	36.2
6	Choose reduction for sprinklers	Sprinkler reduction	Sprinklers (NFPA13)	-0.30	False	0		
			Water supply is standard for both the system and fire department hose lines	-0.10	False	0	L/min	**2,174**
			Fully supervised system	-0.10	False	0	L/s	36.2
7	Choose separation	Exposure distance between units	North side	30.1 to 45m	0.05			
			East side	0 to 3m	0.25			
			South side	20.1 to 30m	0.1		L/min	**3,479**
			West side	3.1 to 10m	0.2	0.6	L/s	58.0
				Net required fire flow				
8	Obtain fire flow, duration, and volume	Minimum required fire flow rate (rounded to nearest 100)					L/min	**3,500**
		Minimum required fire flow rate					L/s	**58.3**
		Required duration of fire flow					hr	**2**

APPENDIX G

Sanitary & Storm Calculations

LRL File No. 190109
Project: Proposed Multi- Unit Development
Location: 10 McArthur Ave, Ottawa
Date: June 26, 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	TRUNK	0.041	16.8	0.04	16.8	4.0	0.27	0.000	0.000	0.00	0.00	7.0	0.0	0.0	0.00	0.04	0.04	0.01	0.28	9.7	150	3.50%	PVC	28.49	1.61	54.78	53.61
SITE																												

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

Designed: D.M.	PROJECT: Multi-Unit Development		
Checked: G.B.	LOCATION: 10 McArthur Ave.		
Dwg. Reference: C.401	File Ref.: 190109	Date: June 20, 2019	Sheet No. 1 of 1

LRL Associates Ltd.

Storm Design Sheet

LRL File No.	190109
Project:	Proposed Multi- Unit Development
Location:	10 McArthur Ave, Ottawa
Date:	June 26, 2019
Designed:	D. Mills
Checked:	G. Brunet
Drawing Reference:	C.401

Storm Design Parameters

Rational Method Q = 2.78CIA

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

Runoff Coefficient (C)	
Grass	0.2
Gravel	0.85
Asphalt / rooftop	0.90

Ottawa Macdonald-Cartier International Airport IDF curve equation (5 year event, intensity in mm/hr)
$I = 998.071 / (T_c + 6.053)^{0.814}$
Min. velocity = 0.80 m/s
Manning's "n" = 0.013

LOCATION			AREA (ha)			FLOW					STORM SEWER							
WATERSHED / STREET	From MH	To MH	C = 0.20	C = 0.80	C = 0.90	Indiv. 2.78AC	Accum. 2.78AC	Time of Conc. (min.)	Rainfall Intensity (mm/hr)	Peak Flow Q (l/s)	Pipe Diameter (mm)	Type	Slope (%)	Length (m)	Capacity Full (L/s)	Velocity Full (m/s)	Time of Flow (min.)	Ratio (Q/Q_{FULL})
WS-04	CB03	CB02	0.002	0.000	0.009	0.02	0.02	10.00	104.19	2.39	450	PVC	0.20%	6.1	127.50	0.80	0.13	**0.02**
WS-03	CB02	CB01	0.001	0.000	0.004	0.01	0.03	10.13	103.53	3.46	450	PVC	0.20%	14.0	127.50	0.80	0.29	**0.03**
WS-02	CB01	TRUNK	0.000	0.000	0.021	0.05	0.09	10.42	102.04	10.21	250	PVC	0.45%	14.9	39.89	0.81	0.31	**0.26**

	MANHOLE							AVAILABLE STORAGE								
WATERSHED / STREET	Up Invert (m)	Down Invert (m)	T/G Up Stream (m)	T/G Down Stream	Up Depth obv (m)	Down Depth obv (m)	Up Depth inv (m)	Pipe Storage 5 Year (m^3)	Pipe Storage 100 year (m^3)	Upstream CB/MH Size (m)	Water Depth 5 year (m)	Water Depth 100 year (m)	CB/MH Storage 5 year (m^3)	CB/MH Storage 100 year (m^3)	Insulation
WS-04	54.12	54.10	56.35	56.50	1.78	1.95	1.78	0.97	0.97	0.60	1.78	1.78	0.64	0.64	
WS-03	54.07	54.05	56.50	56.30	1.98	1.80	1.98	2.22	2.22	0.60	1.98	1.98	0.71	0.71	
WS-02	54.05	53.98	56.30	56.39			2.00			0.60	2.00	2.00	0.72	0.72	
								3.19	**3.19**				**2.07**	**2.07**	

Note: The Peak flow controlled by the orifice plates are shown in this design sheet.

Invert as per city as built

HWL (5 Year)	56.48
HWL (100 Year)	56.48
Storage (5 Year)	5.27
Storage(100 year)	5.27

APPENDIX H

Additional Documentation

From: Wu, John <John.Wu@ottawa.ca>
Sent: June 26, 2019 1:36 PM
To: Desmond Mills
Subject: RE: 10 McArthur - Boundary Conditions
Attachments: 10 Mcarthur June 2019.pdf

Here is the result:

The following are boundary conditions, HGL, for hydraulic analysis at 10 Mcarthur (zone 1E) assumed to be connected to the 152mm on Mcarthur (see attached PDF for location).

Minimum HGL = 109.0m

Maximum HGL = 118.2m. The maximum pressure is estimated to be close to 80 psi. A pressure check at completion of construction is recommended to determine if pressure control is required.

MaxDay + Fireflow (58L/s) = 93.0m

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.

Thanks.

John

From: Desmond Mills <DMills@lrl.ca>
Sent: June 24, 2019 5:13 PM
To: Wu, John <John.Wu@ottawa.ca>
Cc: Guillaume Brunet <gbrunet@lrl.ca>
Subject: RE: 10 McArthur - Boundary Conditions

Hello John,

I have attached a new PDF of the water demand calculations based on population instead of on fixture count.

Hopefully this proves more successful.

Regards

Desmond Mills, EIT.
Jr. Engineer

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We care deeply, so let us know how we did by completing our Customer Satisfaction Survey.

Nous nous soucions profondément de votre opinion, nous vous invitons donc à nous faire savoir si nous avons satisfait vos attentes en remplissant notre sondage sur la satisfaction de la clientèle

From: Wu, John [mailto:John.Wu@ottawa.ca]
Sent: June 24, 2019 11:02 AM
To: Desmond Mills
Subject: RE: 10 McArthur - Boundary Conditions

HI, Mr. Mills:
I looked at your residential water demand calculation. You are using total fixtures to do the calculation is not right.
It will not being used at the same time. Please use Ottawa water design guideline to re-do the demand calculations. As per person usage. Or you can use water datacard to do the calculation.

John

From: Desmond Mills <DMills@lrl.ca>
Sent: June 21, 2019 3:35 PM
To: Wu, John <John.Wu@ottawa.ca>
Cc: Guillaume Brunet <gbrunet@lrl.ca>
Subject: 10 McArthur - Boundary Conditions

CAUTION: This email originated from an External Sender. Please do not click links or open attachments unless you recognize the source.

ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

Hi John,

Would you be able to provide the boundary conditions for the proposed residential project located at 10 McArthur Ave. in Ottawa, ON?

Please see requested information below:

Location of service: 10 McArthur Ave.
Type of development: Residential
Amount of fire flow required (as per FUS, 1999): 58.3 L/s
Average daily demand: 3.94L/s
Maximum daily demand: 9.85 L/s
Maximum hourly demand: 8.67/s
Hydrant location and spacing to meet City's Water Design guidelines

Thank you

Desmond Mills, EIT.
Jr. Engineer

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