Site Servicing & Stormwater Management Report
Konson Warehouse – 1485 Upper Canada Street, Ottawa, ON.

Client:
Dolyn Construction Ltd.

Project Number:
OTT-22023462-A0

Application Stage:
Site Plan Control

Prepared By: Aaditya Jariwala, M.Eng, P.Eng.

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100-2650 Queensview Drive
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Date Submitted:
April 11, 2023
Revised: September 12, 2023
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Legal Notification

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1 Introduction

EXP Services Inc. (EXP) was retained by Dolyn Construction Ltd. to provide Site Servicing and Stormwater Management report for Konson Warehouse in the Kanata West Business Park located in Ottawa, ON.

The site is 1.84 hectares and located within the Kanata West Business Park (KWBP) – Phase 5. The site is bound by Upper Canada Street along the north and west property line, Campeau Drive along the south property line and commercial lots along the east property line. Refer to Figure A1 in Appendix A for the site location.

This servicing design report will address the Servicing requirements for the proposed development including the domestic and fire water, sanitary and storm servicing. The report will also cover the storm water management requirements and proposed methods to meet those requirements.

2 Existing Conditions

The subject property is currently vacant, with some vegetation and construction debris on it. The topography of the site is fairly flat, gradually sloping to the northeast towards the neighboring properties.

The existing municipal infrastructure present within the City ROW were installed during Phase 4 and Phase 5 construction of the Kanata West Business Park as part of the plan of subdivision. There are no known services or infrastructure within the property. The existing municipal infrastructure near the property within Upper Canada Street and Campeau Drive are noted below:

- Upper Canada Street:
  - Storm:
    - 975mm Ø Concrete Storm Sewer
    - 1050mm Ø Concrete Storm Sewer
    - 1650mm Ø Concrete Storm Sewer
  - Sanitary:
    - 250mm Ø PVC Sanitary Sewer
  - Water:
    - 200mm Ø PVC Watermain
    - 250mm Ø PVC Watermain
- Campeau Drive:
  - Storm:
    - 825mm Ø Concrete Storm Sewer
    - 900mm Ø Concrete Storm Sewer
  - Sanitary:
    - 250mm Ø PVC Sanitary Sewer
  - Water:
    - 300mm Ø PVC Watermain

3 References

Various documents were referred to in preparing the current report including:

- Sewer Design Guidelines, Second Edition, Document SDG002, October 2012, City of Ottawa (Guidelines) including:
  - Technical Bulletin ISDTB-2012-4 (20 June 2012)
  - Technical Bulletin ISDTB-2014-01 (05 February 2014)
  - Technical Bulletin PIEDTB-2016-01 (September 6, 2016)
  - Technical Bulletin ISDTB-2018-01 (21 March 2018)
  - Technical Bulletin ISDTB-2018-04 (27 June 2018)
  - Technical Bulletin ISDTB-2019-02 (08 July 2019)
- Ottawa Design Guidelines – Water Distribution, July 2010 (WDG001), including:
  - Technical Bulletin ISDTB-2014-02 (May 27, 2014)
  - Technical Bulletin ISTB-2018-02 (21 March 2018)
  - Technical Bulletin ISTB-2021-03 (18 August, 2021)
- Ontario Ministry of Transportation (MTO) Drainage Manual, 1995-1997
- Stormwater Management Planning and Design Manual, Ontario Ministry of the Environment and Climate Change, March 2003 (SMPDM).
- Chapter 7 – National Engineering Handbook, United States Department of Agriculture (USDA), January 2009)
- Design Guidelines for Drinking-Water Systems, Ontario Ministry of the Environment and Climate Change, 2008 (GDWS).
- Fire Underwriters Survey, Water Supply for Public Fire Protection (FUS), 2020
- Ontario Building Code 2012, Ministry of Municipal Affairs and Housing
- Design Brief – Kanata West Business Park – Phase 5 prepared by IBI Group, dated October 2019.
- Geotechnical Investigation Report – 1485 Upper Canada Street prepared by Paterson Group, dated January 2023.

4 Watermain Design

4.1 Required Fire Flow

The fire flow demand calculations were prepared based on the Fire Underwriters Survey (FUS, 2020) criteria. The construction type for the proposed warehouse building is classified as non-combustible. The building will have a fully supervised sprinkler system and combustible contents. The required fire flow was determined to be 183.3 L/s (11,000 L/min). Refer to Appendix B for detailed fire flow demand calculations.

4.2 Watermain Design

The domestic water demands for the proposed building were calculated as per the City of Ottawa Water Design Guidelines (July 2010). The proposed development is considered as light-industrial building. Therefore, an average demand of 35,000 L/gross ha/day was used. The peaking factors were considered as 1.5 and 1.8 for the max. day and peak hour demands, respectively. Refer to Appendix B for detailed calculations. The proposed building's domestic demands were as follows:

Light Industrial Water Demands:

Average daily demand = 0.74 L/s

Maximum daily demand = 1.12 L/s

Maximum hourly daily demand = 2.01 L/s

There is an existing 250mm diameter municipal watermain on Upper Canada Street. The estimated average daily demand of the proposed development is greater than 50 m^3/day. Therefore, two water services of 150mm and 200mm diameter separated by an isolation valve are proposed to service the proposed development for domestic and sprinkler demands. The proposed water services are to be connected to the 250mm diameter municipal watermain on Upper Canada Street. A fire hydrant is also proposed to feed from the 200mm diameter water service within the property. This hydrant is location within 45m distance from the proposed fire department hose connection.

4.3 Pressure Check

The City of Ottawa provided boundary conditions based on the above noted domestic and fire flow demands at the connection point to the municipal water main on Upper Canada Street. These boundary conditions indicate that the minimum and maximum pressure in the existing municipal 250mm diameter watermain at the connection point on Upper Canada Street are 72.1 psi (497.37 kPa) and 78.1 psi (538.57 kPa), respectively. In addition, the residual pressure of 41.1 psi (283.51 kPa) was indicated by the city during max day + fire flow demand of 184.5 L/s. Based on this, a 150mm diameter water service connection would supply the average day, max day and peak hour demand of 0.74 L/sec, 1.12 L/sec and 2.01 L/sec at 78.0 psi, 72.0 psi and 72.0 psi residual pressures at the building finished floor elevation, respectively. The residual water pressures in the proposed water service are greater than the minimum requirement of 20psi (140kPa) and less than the maximum allowable limit of 80 psi.

Moreover, the proposed 150mm and 200mm dia. water services would supply total ±45 L/sec flow at ±1 psi head loss. A typical sprinkler system for the building of this size and magnitude requires 65 psi residual pressure at the building FFE. Based on the boundary conditions received form the City, it is assumed that flows greater than 45 L/sec would be available in 250mm municipal watermain on Upper Canada Street at ±66 psi residual pressure. Therefore, a sprinkler designer would have to confirm if the flow and pressure noted above are sufficient for the sprinkler system and suggest a booster pump accordingly.

Based on the above noted analysis, the existing water supply system and the proposed services will have adequate capacity to meet the domestic and fire demands for the proposed building. Refer to Appendix B for detailed calculations.

4.4 Review of Hydrant Spacing

A review of the hydrant spacing was completed to ensure compliance with Appendix I of Technical Bulletin ISTB-2018-02. As per Section 3 of Appendix I all hydrants within 150 meters were reviewed to assess the total possible contribution of flow from these contributing hydrants. For each hydrant, the distance to the proposed building was determined to arrive at the contribution of fire flow. A review of the available fire hydrant within 150m distance along the fire route from the building was carried out which is summarized in the table below.

Table 4-1: Summary of Nearby Municipal Hydrants

Hydrant #	Location	City / Private	Color Code	Distance from the Building (m)	Fire Flow Contribution for Class AA Hydrant (L/min)
348017H119	UPPER CANADA STREET	CITY	BLUE	139	3,800
348017H120	UPPER CANADA STREET	CITY	BLUE	53	5,700
348017H121	UPPER CANADA STREET	CITY	BLUE	77	3,800
348017H122	UPPER CANADA STREET	CITY	BLUE	118	3,800
348017H083	UPPER CANADA STREET	CITY	BLUE	63	5,700
348017H082	CAMPEAU DRIVE	CITY	BLUE	84	3,800
348017H081	CAMPEAU DRIVE	CITY	BLUE	57	5,700
348017H080	CAMPEAU DRIVE	CITY	BLUE	70	5,700
348017H092	-	CITY	BLUE	73	5,700
				Total:	43,700

As noted in the table above, there are total nine (9) accessible fire hydrants within 150m distance along a fire route which equates to a total accessible fire flow of 43,700 L/min. This is well above the required fire flow of 11.000 L/min.

Based on the boundary conditions received from the city and review of the available municipal hydrants as noted above, the proposed development can be serviced for the required fire flow without any issues.

5 Sanitary Sewer Design

5.1 Peak Design Flow

There is an existing municipal 250mm diameter sanitary sewer on Upper Canada Street flowing towards Campeau Drive from north to south. The anticipated peak sanitary flows from the proposed industrial site have been calculated as per the City of Ottawa Sewer Design Guidelines (October 2012). The anticipated peak sanitary flows are calculated as follows:

Design Flows

Institutional Design Flow:	35,000 L/gross ha/day
Development Area:	1.84 hectares
Peak Factor:	1.5
Extraneous Flow:	0.33 L/s/ha
Peak Design Flow:	=(35,000L/ha/day)(1.84 ha)(1.5)(1/86400)+(1.84ha)(0.33L/s/ha)
	=**1.72 L/s**

The proposed building at 1485 Upper Canada Street will be serviced by a new 200mm diameter sanitary service installed at a minimum slope of 2.0%. At this slope, the 200mm diameter sanitary services will have a capacity of 47.1 L/s and a full flow velocity of 1.72 m/s, which will be sufficient to service proposed development. Refer to the sanitary sewer design sheet in Appendix C and the Site Servicing plan (dwg #C101 and #C102) in Appendix F for further details.

6 Stormwater Management

6.1 Storm Design Criteria

The storm sewer system was designed in conformance with the City of Ottawa Sewer Design Guidelines (October 2012). The stormwater servicing design criteria for the proposed development are as follows:

- The proposed on-site storm sewer network / minor system is designed using Rational Method and Manning's Equation to convey runoff under free flow conditions for the 5-year return period.
- Post-development peak run-ff during 100-year storm event to be controlled to 408 L/sec and during 5-year storm to be controlled to 388 L/sec as identified in the Kanata West Business Park Design Brief prepared by IBI Group, dated October 2019.
- Maximum allowable ponding depth is 300 mm for surface ponding and 150mm for roof ponding.
- Flows from storm events greater than 100-year return period to be directed overland, away from the building towards the Upper Canada Street and Campeau Drive.
- Minimum freeboard of 300mm between the 100-year overland spill elevation and finished floor elevation. Minimum freeboard of 150mm between the 100-year overland spill elevation and lowest grades against the building foundation.
- Annual infiltration target of 73 mm for groundwater recharge as noted by MVCA in the pre-consultation meeting notes.
- Quality control criteria of 80% TSS removal as noted by MVCA in the pre-consultation meeting notes. Thermal mitigation is required as Feedmill Creek is a coolwater watercourse.

6.2 Pre-Development Conditions

The 1.84-hectare site at 1485 Upper Canada Street is currently a vacant land covered with minor vegetations and some construction debris. Surface runoff from the property flows towards the neighboring property to the east. The city ROW along the Upper Canada Street and Campeau Drive were developed as part of the plan of subdivision for the Kanata West Business Park Phase 4 and 5.

6.3 Allowable Release Rate

The allowable release rate for the site was identified in the Kanata West Business Park Phase 5 Design Brief prepared by IBI Group, dated October 2019. The City had noted in the pre-consultation meeting notes that the proposed development is part of the Kanata West Business Park and shall comply with the stormwater management criteria identified in the above-mentioned design brief. Therefore, the allowable release rate for up-to 100-year storm for the proposed development is considered as 408 L/sec.

6.4 Post-Development Conditions

Stormwater from the 1.84 ha drainage area will be controlled and released at a rate less than the allowable release rate for storms up to and including the 100-year storm event. An overland flow route is provided for storms greater than the 100-year event. In the post-development conditions, the stormwater run-off coefficients for the hard surfaces (concrete, asphalt, roof etc.) and soft surfaces (grass) are considered as 0.9 and 0.2, respectively. The estimated post-development average run-off coefficient is 0.83.

6.4.1 Storage Requirements and Allocation

Post development runoff will be detained on-site for storms up to and including the 100-year storm. The required SWM storage volumes will be achieved using the surface ponding in the landscaped areas, parking areas and ponding on the roof of the new building for up to 100-year storm event.

Surface ponding volumes over catch basins and roof drains were determined by applying the pyramid volume equation of one-third of the depth multiplied by the surface area of the pond. Ponding depths for the subject site must be equal to or less than 300 mm for the landscape and parking surfaces and 150mm for the roof during a 100-year storm event.

Refer to Stormwater Management Plan drawing #C400 in Appendix F for the drainage areas, associated ponding limits, ponding depth and control methods and refer to Appendix D for the detailed stormwater management calculations. The following table 6-1 summarizes the release rates and storage requirements for the proposed drainage areas within the subject site.

The proposed 100-year controlled release rate is 407.4 L/s and 5-year controlled release rate is 272.1 L/sec, which are compliant with the quantity control criteria noted in section 6.1 above. The available storage volume of 447.9 m^3 is more than the required volume of 347.5 m^3.

6.4.2 Flow Control Device Sizing

Stormwater runoff from the proposed development will be detained using inlet control devices (ICDs) and flow control roof drains. The proposed ICD manufacturer and models are summarized in Table 6-1 below. The required flow control from the roof will be achieved by mounting Watts Accutrol flow weirs on the roof drains. Further details regarding the ICDs and roof drains are provided in Appendix D. The 5-year and 100-year ponding limits, total ponding depth and location of the flow control measures are provided on drawing #C400 in Appendix F.

Table 6-1: Summary of SWM Storage Requirements

Area ID	Outlet Location	Area (ha)	C_{AVG}	100 Year Release (L/s)	100 Year storage required (m^3)	100 Year surface storage provided (m3)	Control Method	Storage Method
A1	CB11	0.079	0.82	**30.0**	6.9	9.5	**Hydrovex 150 VHV-2**	Surface Ponding
A1-1	Trench Drain	0.023	0.90	11.5	-	-	Uncontrolled	-
A2	CB10	0.078	0.79	**33.0**	5.7	5.7	**Hydrovex 150 VHV-2**	Surface Ponding
A3-1	CB09	0.046	0.79	**15.0**	4.7	7.25	**Hydrovex 100 VHV-1**	Surface Ponding
A3-2	CB08	0.043	0.74	19.7	-	-	Uncontrolled	-
A4	CB07	0.078	0.79	**30.0**	6.5	8.4	**Hydrovex 125 VHV-2**	Surface Ponding
A5-1	DCB06	0.152	0.81	**50.0**	15.8	15.8	**Hydrovex 200 VHV-2**	Surface Ponding
A5-2	CB04	0.076	0.88	**30.0**	6.5	18.5	**Hydrovex 125 VHV-2**	Surface Ponding
A6-1	DCB05	0.160	0.90	**70.0**	11.4	14.8	**Hydrovex 200 VHV-2**	Surface Ponding
A6-2	CB03	0.052	0.90	**15.0**	6.5	15.8	**Hydrovex 100 VHV-1**	Surface Ponding
A7-1	CBE02, CBT03, CBT04	0.039	0.41	**43.0**	22.5	31.7	**Hydrovex 150 VHV-2**	Underground pipe + Surface Ponding
A7	CB01, CB02	0.120	0.86					
A8	CBT01, CBMH300	0.046	0.24					
A9	Trench Drain	0.015	0.90	7.4	-	-	Uncontrolled	-
A10-1	East Property Line	0.011	0.20	1.3	-	-	Uncontrolled	-
A10-2	South-West Property Line	0.017	0.20	2.1	-	-	Uncontrolled	-
A10-3	Campeau Drive	0.011	0.23	1.5	-	-	Uncontrolled	-
A11	Roof Drains	0.799	0.90	47.8	259.1	319.8	**WATTS Roof Drains**	Surface Ponding
	TOTAL	**1.844**		**407.4**	**347.5**	**447.9**		
	Total Allowable Release L/s:			**408.0**	(*From Kanata West Business Park - Phase 5 Design Brief prepared by IBI Group, dated October 2019*)			

***Bold** flows are controlled.

6.4.3 Quality Control

Mississippi Valley Conservation Authority (MVCA) had noted quality control criteria as summarized in section 6.1 above (Also noted in the pre-consultation meeting noted included in Appendix E). In the KWBP-Phase 5 Design Brief (IBI, October 2019), it is noted that the West Pond 6 is designed to provide quality control criteria for the existing and proposed development within the Kanata West Business Park. The subject site is a tributary to Pond 6 West. The proposed stormwater management strategy is compliant with the criteria assigned to the subject site in the design brief. Therefore, the proposed development shall be successfully accommodated by Pond 6 West for the quality control. Hence, no additional quality control measures are proposed.

6.4.4 Infiltration

As noted in section 6.1 above, MVCA has assigned an annual infiltration target of 73 mm/year for the subject site for the groundwater recharge. With the subject site area of 1.84 ha, a 73 mm/year infiltration target equates to a total volume of 1343.2 m^3. To meet this target, onsite infiltration system consisting of four underground Stormtech chambers with 0.5m thick drainage layer at the bottom is proposed. This system will receive stormwater from the roof drains only, to maintain the groundwater quality.

The proposed building will have fourteen roof drains, out of which four roof drains will be directed to four separate Stormtech MC-3500 chambers. Rest of the roof drains will discharge to storm stub, ultimately making its way to the municipal storm sewer. Each roof drain will be equipped with a Watts Accutrol weir, set at full-open position. Refer to Table D4 in Appendix D for detailed roof drain calculations. The four roof drains for infiltration will be equipped with a Watts Accutrol Weir with two notch set at full open position. With this setup, each of these four roof drains will discharge maximum of 3.78 L/sec flow towards the underground Stormtech chambers. Total roof area draining to these four roof drains is 2626.4 m^2. Annual rainfall in Ottawa area based on the historical data is ±943.4 mm/year. Therefore, the volume of stormwater directed towards underground Stormtech chambers for infiltration purpose equates to 2477.75 m^3 which is more than the target infiltration volume of 1343.2 m^3 as noted above.

Memo from the Geotech engineer (included in Appendix E), dated 6th September 2023 noted that the design infiltration rate of 43 mm/hr for the subsurface soil below Stormtech chambers is reasonable given the soil type. To ensure that the stormwater routed from the designated roof drains would be infiltrated, Stormtech chambers are proposed to be dispersed across the site to avoid concentrating infiltration at one location. Additionally, proposed 0.5m thick drainage layer below Stormtech chambers will ensure initial high infiltration rates and provide storage when the subsurface soil reaches saturation. The chambers will provide additional buffer volume to ensure infiltration. Additionally, as per MECP's stormwater management guidelines the bottom of the drainage layer will be placed at least 1.0m above the ground water elevation of ~102.46m noted in the Geo-investigation report. In the extreme weather conditions, the chambers will overflow into the nearby storm sewers. Refer to drawings #C101, C102 and C400 for the proposed Stormtech chamber locations and typical details. Refer to Appendix E for Stormtech chamber product details from the manufacturer.

With the above noted reasonings, the annual infiltration target of 73 mm/year can be achieved with the proposed infiltration system.

7 Erosion and Sediment Control

During all construction activities, erosion and sedimentation shall be controlled by the following techniques:

- Extent of exposed soils shall be limited at any given time;
- Exposed areas shall be re-vegetated as soon as possible;

- Minimize the area to be cleared and disruption of adjacent areas;
- Siltsack or approved equivalent shall be installed inside all catch basins, catch basin manholes, and storm manholes as identified on the erosion and sediment control plan;
- Visual inspection shall be completed daily on sediment control barriers and any damage will be repaired immediately. Care will be taken to prevent damage during construction operations;
- In some cases, barriers may be removed temporarily to accommodate the construction operations. The affected barriers will be reinstated at night when construction is completed;
- Sediment control devices will be cleaned of accumulated silt as required. The deposits will be disposed of as per the requirements of the contract;
- During construction, if the engineer believes that additional prevention methods are required to control erosion and sedimentation, the contractor will install additional silt fences or other methods as required to the satisfaction of the engineer; and,
- Construction and maintenance requirements for erosion and sediment controls are to comply with Ontario Provincial Standard Specification (OPSS) 805.

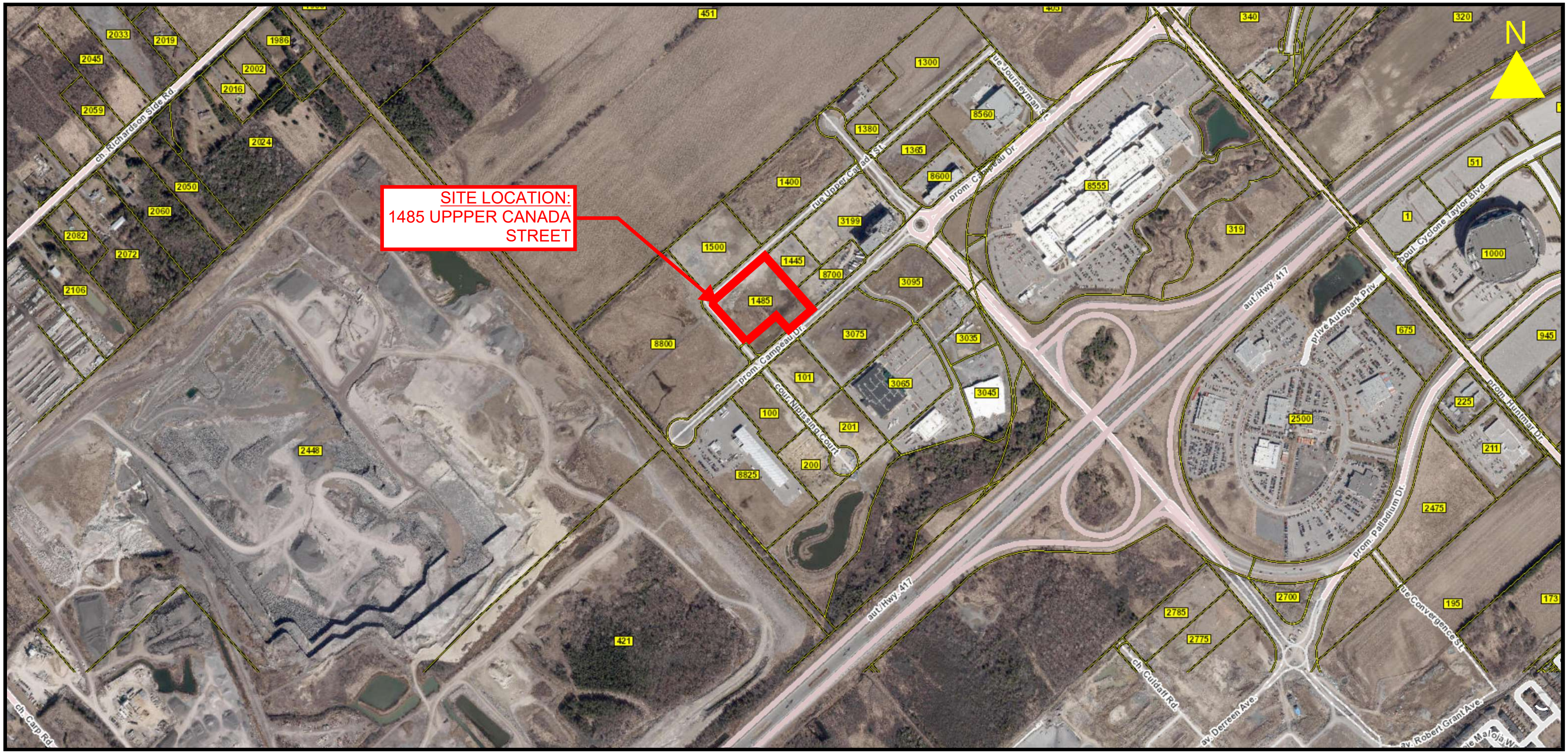
8 Conclusions

This report addresses the site servicing and stormwater management requirements for the site plan control application for the proposed development. Based on the analysis provided in this report, the conclusions are as follows:

- The proposed warehouse building will be serviced by 150mm and 200mm diameter dual watermains, which will adequately service the proposed development for the domestic and fire flow demands.
- The proposed building will be serviced by a 200mm diameter sanitary sewer, which will have adequate capacity to service the new building for the sanitary flows.
- Stormwater Management criteria for the proposed development will be achieved by restricting the post-development stormwater discharge rates up to and including the 100-year to the allowable release rates.
- Required on-site SWM storage volumes will be achieved using the surface storage in the landscaped areas and parking areas and roof storage using the flow control measures like ICDs and flow control roof drains.
- The annual infiltration target will be achieved by directing a portion of the stormwater form the building roof to the underground Stormtech chambers.
- The stormwater quality control for the proposed site is provided by the existing Pond 6 West. Therefore, no additional quality control measures are proposed.
- Temporary erosion and sediment control measures for the subject site have been identified.

Appendix A – Figures

FIGURE A1: SITE LOCATION PLAN



Appendix B – Water Servicing

TABLE B1: Water Demand Chart

Location: Konson Warehouse - Kanata West Business Park
Project No: OTT-22023462-A0
Designed by: K.Hinds
Checked By: A. Ansari
Date Revised: February 2023

exp.

Water Consumption
Industrial - Light = **35,000** L/gross ha/day

Proposed	No. of Residential Units										Total Persons (pop)	Industrial						Total Demands (L/sec)		
	Singles/Semis/Towns				Apartments									Peaking Factors (x Avg Day)						
	Single Famility	Semi-Detached	Duplexz	Townhome	Bachelor	1 Bedroom	2 Bedroom	3 Bedroom	4 Bedroom	Avg Apt.		Area (m^2)	Avg Demand (L/day)	Max Day	Peak Hour	Max Day Demand (L/day)	Peak Hour Demand (L/day)	Avg Day (L/s)	Max Day (L/s)	Max Hour (L/s)
Konson Development												18,383	64,341	1.50	1.80	96,511	173,719	*0.74*	*1.12*	*2.01*

TABLE B2: FIRE FLOW REQURIEMENTS BASED ON FIRE UNDERWRITERS SURVEY(FUS) 2020
PROJECT: OTT-22023462
Building: **Konson Development**

An estimate of the Fire Flow required for a given fire area may be estimated by:

F = 220 * C * SQRT(A)

where: F = required fire flow in litres per minute
A = total floor area in m^2 (including all storeys, but excluding basements at least 50% below grade)
C = coefficient related to the type of construction

Task	Options	Multiplier	Input	Value Used	Fire Flow Total (L/min)
Choose Building Frame (C)	Wood Frame	1.5	Non-combustible Construction	0.8	
	Ordinary Construction	1			
	Non-combustible Construction	0.8			
	Fire Resistive Construction	0.6			
	Second Floor		8142	16284.0 m²	
	First Floor		8142		
	Basement (At least 50% below grade, not included)		0		
Fire Flow (F)	F = 220 * C * SQRT(A)				22,459
Fire Flow (F)	Rounded to nearest 1,000				**22,000**

Reductions/Increases Due to Factors Effecting Burning

Task	Options	Multiplier	Input	Value Used	Fire Flow Change (L/min)	Fire Flow Total (L/min)
Choose Combustibility of Building Contents	Non-combustible	-25%	Combustible	0%	0	22,000
	Limited Combustible	-15%				
	Combustible	0%				
	Free Burning	15%				
	Rapid Burning	25%				
Choose Reduction Due to Sprinkler System	**Adequate** Sprinkler Conforms to NFPA13	-30%	Adequate Sprinkler Conforms to NFPA13	-30%	-6,600	15,400
	No Sprinkler	0%				
	Standard Water Supply for Fire Department Hose Line and for Sprinkler System	-10%	Standard Water Supply for Fire Department Hose Line and for Sprinkler System	-10%	-2,200	13,200
	Not Standard Water Supply or Unavailable	0%				
	Fully Supervised Sprinkler System	-10%	Fully Supervised Sprinkler System	-10%	-2,200	11,000
	Not Fully Supervised or N/A	0%				

Choose Structure Exposure Distance

Exposures	Separ-ation Dist (m)	Cond	Separation Conditon	Exposed Wall type	Exposed Wall Length: Length (m)	No of Storeys	Length-Height Factor	Sub-Conditon	Charge (%)	Total Charge (%)	Total Exposure Charge (L/min)	Fire Flow Total (L/min)
West	150	5	30.1 to 45	Type V	18	2	36	6	0%	0%	0	11,000
East	200	5	30.1 to 45	Type V	94	0	0	6	0%			
South	54	5	30.1 to 45	Type V	52	4	208	6	0%			
North	43	5	30.1 to 45	Type V	105	8	840	6	0%			

Obtain Required Fire Flow		
	Total Required Fire Flow, Rounded to the Nearest 1,000 L/min =	**11,000**
	Total Required Fire Flow, L/s =	**183.3**

Exposure Charges for Exposing Walls of Wood Frame Construciton (from Table G5)

Type V	Wood Frame
Type IV-III (U)	Mass Timber or Ordinary with Unprotected Openings
Type IV-III (P)	Mass Timber or Ordinary with Protected Openings
Type II-I (U)	Noncombustible or Fire Resistive with Unprotected Openings
Type II-I (P)	Noncombustible or Fire Resistive with Protected Openings

Conditons for Separation

Separation Dist	Condition
0m to 3m	1
3.1m to 10m	2
10.1m to 20m	3
20.1m to 30m	4
> 30.1m	5

TABLE B3

ESTIMATED WATER PRESSURE AT PROPOSED BUILDING FFE

Description	From	To	Demand (L/sec)	Pipe Length (m)	Pipe Dia (mm)	Dia (m)	Q (m3/sec)	Area (m2)	C	Vel (m/s)	Slope of HGL (m/m)	Head Loss (m)	Elev From (m)	Elev To (m)	*Elev Diff (m)	Pressure From kPa	(psi)	Pressure To kPa	(psi)	Pressure Drop (psi)
Avg Day Conditons																				
Single 150mm water service	Main	Building	0.74	97 m	150	0.150	0.0007	0.017671	110	0.0421	2.9E-05	0.0029	105.80	105.90	-0.1	538.6	(78.1)	537.6	(78.0)	0.1
Max Day Conditons																				
Single 150mm watermain	Main	Building	1.12	97 m	150	0.150	0.0011	0.017671	110	0.0632	6.2E-05	0.006	105.80	105.90	-0.1	497.4	(72.1)	496.3	(72.0)	0.2
Peak Hour Conditons																				
Single 150mm watermain	Main	Building	2.01	97 m	150	0.150	0.0020	0.017671	110	0.1138	0.00018	0.018	105.80	105.90	-0.1	497.4	(72.1)	496.2	(72.0)	0.2
Flow @65 psi for sprinkler system																				
Single 150mm watermain	Main	Building	15.00	97 m	150	0.150	0.0150	0.017671	110	0.8488	0.00762	0.7423	105.80	105.90	-0.1	0.0	(0.0)	-8.3	-(1.2)	1.2
Single 200mm watermain	Main	Building	30.00	97 m	200	0.200	0.0300	0.031416	110	0.9549	0.00678	0.6601	105.80	105.90	-0.1	0.0	(0.0)	-7.5	-(1.1)	1.1

Water Demand Info

Average Demand =	0.74	L/sec
Max Day Demand =	1.12	L/sec
Peak Hr Deamand =	2.01	L/sec
Fireflow Requriement =	183.3	L/sec
Max Day Plus FF Demand =	184.5	L/sec

Pipe Lengths

From watermain to building = 97 m

Hazen Williams C Factor for Friction Loss in Pipe, C= 110

Boundary Conditon

	Min HGL	Max HGL	Max Day + Fireflow	
HGL (m)	156.5	160.7	134.7	(From City of Ottawa)
Approx Ground Elev (m) =	105.80	105.80	105.80	
Approx Bldg FF Elev (m) =	105.90	105.90	105.90	
Pressure (m) =	50.7	54.9	28.9	
Pressure (Pa) =	497,367	538,569	283,509	
Pressure (psi) =	72.1	78.1	41.1	

TABLE B4
AVAILABLE FIRE FLOWS BASED ON HYDRANT SPACING

Hydrant #	Location	City / Private	Color Code	Accessible (yes/no)	Konson Warehouse	
					[1]Dist (m)	[2]Fire Flow Contrib (L/min)
348017H119	UPPER CANADA STREET	CITY	BLUE	Yes	139	3,800
348017H120	UPPER CANADA STREET	CITY	BLUE	Yes	53	5,700
348017H121	UPPER CANADA STREET	CITY	BLUE	Yes	77	3,800
348017H122	UPPER CANADA STREET	CITY	BLUE	Yes	118	3,800
348017H083	UPPER CANADA STREET	CITY	BLUE	Yes	63	5,700
348017H082	CAMPEAU DRIVE	CITY	BLUE	Yes	84	3,800
348017H081	CAMPEAU DRIVE	CITY	BLUE	Yes	57	5,700
348017H080	CAMPEAU DRIVE	CITY	BLUE	Yes	70	5,700
348017H092	-	CITY	BLUE	Yes	73	5,700
Total (L/min)						43,700
Total (L/sec)						728
FUS RFF in L/min						183
Meets Requreiment (Yes/No)						Yes

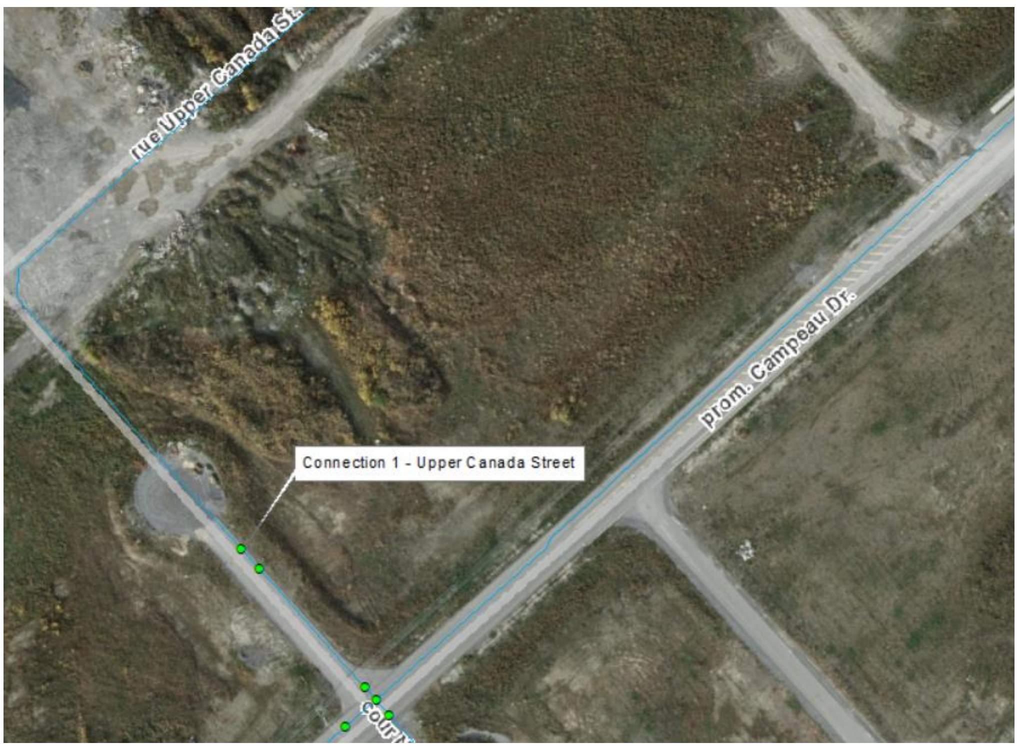
Notes:
1) Distance is measured along a road or fire route.
2) Fire Flow Contribution for Class AA Hydrant from Table 1 of Appendix I, ISTB-2018-02

Boundary Conditions
1485 Upper Canada Street (Konson Development)

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	44	0.74
Maximum Daily Demand	67	1.12
Peak Hour	121	2.01
Fire Flow Demand #1	16,980	283.00
Fire Flow Demand #2	15,000	250.00
Fire Flow Demand #3	11,100	185.00
Fire Flow Demand #4	10,000	166.67

Location



Future Condition: Location of future 305 mm watermain

Results

Existing Condition

Connection 1 - Upper Canada Street

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	160.7	79.2
Peak Hour	156.5	73.2
Max Day plus Fire Flow #1	108.5	5.1
Max Day plus Fire Flow #2	118.3	19.0
Max Day plus Fire Flow #3	134.7	42.2
Max Day plus Fire Flow #4	138.5	47.7
[1] Ground Elevation =	105.0	m

Future Condition

Connection 1 - Upper Canada Street

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	160.7	79.2
Peak Hour	156.5	73.2
Max Day plus Fire Flow #1	117.3	17.5
Max Day plus Fire Flow #2	125.3	28.9
Max Day plus Fire Flow #4	141.8	52.4
[1] Ground Elevation =	105.0	m

Disclaimer

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

Appendix C – Sanitary Sewer Design Sheet

TABLE C1 - SANITARY SEWER CALCULATION SHEET

LOCATION				RESEDENTIAL AREAS AND POPULAITONS												COMMERCIAL			INDUSTRIAL			INSTITUTIONAL			INFILTRATION				SEWER DATA						
					NUMBER OF UNITS							POPULATION				AREA (ha)			AREA (ha)						AREA (ha)										
Street	U/S MH	D/S MH	Desc	Area (ha)	Singles	Semis	Towns	1-Bed Apt.	2-Bed Apt.	3-Bed Apt.	4-Bed Apt.	INDIV	ACCU	Peak Factor	Peak Flow (L/sec)	INDIV	ACCU	Peak Flow (L/sec)	INDIV	ACCU	Peak Flow (L/sec)	AREA (Ha)	ACCU AREA (Ha)	Peak Flow (L/sec)	INDIV	ACCU	INFILT FLOW (L/s)	TOTAL FLOW (L/s)	Nom Dia (mm)	Actual Dia (mm)	Slope (%)	Length (m)	Capacity (L/sec)	Q/Q_{CAP} (%)	Full Velocity (m/s)
Site	BLDG	SANMH 01																	1.84	1.84	1.12				1.84	1.84	0.61	1.72	200	201.16	2.00	89.730	47.1	4%	1.72
Upper Canada Street	SANMH 01	SANMH 02																		1.84	1.12					1.84	0.61	1.72	200	201.16	2.00	10.780	47.1	4%	1.72
																									1.838										

Residential Avg. Daily Flow, q (L/p/day) = 280
Commercial Avg. Daily Flow (L/gross ha/day) = 28,000
or L/gross ha/sec = 0.324
Institutianal Avg. Daily Flow (L/s/ha) = 28,000
or L/gross ha/sec = 0.324
Light Industrial Flow (L/gross ha/day) = 35,000
or L/gross ha/sec = 0.40509
Heavy Industrial Flow (L/gross ha/day) = 55,000
or L/gross ha/sec = 0.637

Commercial Peak Factor = 1.5 (when area >20%)
1.0 (when area <20%)
Institutional Peak Factor = 1.5 (when area >20%)
1.0 (when area <20%)
Residential Correction Factor, K = 0.80
Manning N = 0.013
Peak extraneous flow, I (L/s/ha) = 0.33 (Total I/I)

Peak Population Flow, (L/sec) = P*q*M/86.4
Peak Extraneous Flow, (L/sec) = I*Ac
Residential Peaking Factor, M = 1 + (14/(4+P^0.5)) * K
A_c = Cumulative Area (hectares)
P = Population (thousands)
Sewer Capacity, Qcap (L/sec) = $1/N \; S^{1/2} \; R^{2/3} \; A_c$
(Manning's Equation)

Unti Type	Persons/Unit
Singles	3.0
Semi-Detached	2.7
Townhomes	2.7
Single Apt. Unit	1.4
2-bed Apt. Unit	2.1
3-bed Apt. Unit	3.1
4-bed Apt. Unit	3.8

Designed:	Project:
A. Jariwala, M.Eng, EIT.	Konson Warehouse
Checked:	Location:
A. Ansari, M.Sc., P.Eng.	1485 Upper Canada Street, Ottawa, ON
File Reference:	Page No:
22023462 Water - Hydrant Spacing Chart.xlsx	**1 of 1**

Appendix D – Stormwater Management Design Sheet

Table D1
Stormwater Management Summary

Area ID	Outlet Location	Area (ha)	Runoff Coefficient 'C'	100 Year Release (L/s)	100 Year storage required (m^3)	100 Year surface storage provided (m3)	Control Method	Storage Method
A1	CB11	0.079	0.82	**30.0**	6.9	9.5	**Hydrovex 150 VHV-2**	Surface Ponding
A1-1	Trench Drain	0.023	0.90	11.5	-	-	Uncontrolled	-
A2	CB10	0.078	0.79	**33.0**	5.7	5.7	**Hydrovex 150 VHV-2**	Surface Ponding
A3-1	CB08	0.046	0.79	**15.0**	4.7	7.9	**Hydrovex 100 VHV-1**	Surface Ponding
A4	CB07	0.078	0.79	**30.0**	6.5	8.4	**Hydrovex 125 VHV-2**	Surface Ponding
A5-1	DCB06	0.152	0.81	**50.0**	15.8	15.8	**Hydrovex 200 VHV-2**	Surface Ponding
A5-2	CB04	0.076	0.88	**30.0**	6.5	18.5	**Hydrovex 125 VHV-2**	Surface Ponding
A6-1	DCB05	0.160	0.90	**70.0**	11.4	14.8	**Hydrovex 200 VHV-2**	Surface Ponding
A6-2	CB03	0.052	0.90	**15.0**	6.5	15.8	**Hydrovex 100 VHV-1**	Surface Ponding
A7-1	CBE02, CBT03, CBT04	0.039	0.41					
A7	CB01, CB02	0.120	0.86	**43.0**	22.5	31.7	**Hydrovex 150 VHV-2**	Underground pipe + Surface Ponding
A8	CBT01, CBMH300	0.046	0.24					
A9	Trench Drain	0.015	0.90	7.4	-	-	Uncontrolled	-
A10-1	East Property Line	0.011	0.20	1.3	-	-	Uncontrolled	-
A10-2	South-West Property Line	0.017	0.20	2.1	-	-	Uncontrolled	-
A10-3	Campeau Drive	0.011	0.23	1.5	-	-	Uncontrolled	-
A11	Roof Drains	0.799	0.90	47.8	259.1	319.8	**WATTS Roof Drains**	Surface Ponding
	TOTAL	**1.802**		**387.7**	**345.6**	**447.9**		

Total Allowable Release L/s: **408.0** (*From Kanata West Business Park - Phase 5 Design Brief prepared by IBI Group, dated October 2019*)

Table D2 - CALCULATION OF AVERAGE RUNOFF COEFFICIENTS (POST-DEVELOPMENT)

Area No.	Outlet Location	Asphalt/Concrete Areas		Roof Areas		Pavers/Gravel Areas		Grassed Areas		Sum AC	Total Area (m^2)	C_{AVG}
		Area (m^2)	A * C	Area (m^2)	A * C	Area (m^2)	A * C	Area (m^2)	A * C			
		C=0.90		C=0.90		C=0.90		C=0.20				
A1	CB11	702.48	632.2		0.0		0.0	84.40	16.88	649.1	786.88	0.82
A1-1	Trench Drain	230.89	207.8		0.0		0.0		0.00	207.8	230.89	0.90
A2	CB10	658.15	592.3		0.0		0.0	124.20	24.84	617.2	782.35	0.79
A3-1	CB08	389.80	350.8		0.0		0.0	73.20	14.64	365.5	463.00	0.79
A3-2	CB09	331.06	298.0		0.0		0.0	94.94	18.99	316.9	426.00	0.74
A4	CB07	652.00	586.8		0.0		0.0	127.16	25.43	612.2	779.16	0.79
A5-1	DCB06	1323.70	1191.3		0.0		0.0	195.76	39.15	1230.5	1519.46	0.81
A5-2	CB04	739.80	665.8		0.0		0.0	24.00	4.80	670.6	763.80	0.88
A6-1	DCB05	1599.81	1439.8		0.0		0.0		0.00	1439.8	1599.81	0.90
A6-2	CB03	521.39	469.3		0.0		0.0		0.00	469.3	521.39	0.90
A7-1	CBE02, CBT03, CBT04	118.50	106.7		0.0		0.0	273.82	54.76	161.4	392.32	0.41
A7	CB01, CB02	1121.13	1009.0		0.0		0.0	76.00	15.20	1024.2	1197.13	0.86
A8	CBT01, CBMH300	28.60	25.7		0.0		0.0	429.47	85.89	111.6	458.07	0.24
A9	Trench Drain	149.73	134.8		0.0		0.0		0.00	134.8	149.73	0.90
A10-1	East Property Line		0.0		0.0		0.0	107.11	21.42	21.4	107.11	0.20
A10-2	South-West Property Line		0.0		0.0		0.0	170.15	34.03	34.0	170.15	0.20
A10-3	Campeau Drive	5.20	4.7		0.0		0.0	99.80	19.96	24.6	105.00	0.23
A11	Roof Drains		0.0	7992.47	7193.2		0.0		0.00	7193.2	7992.47	0.90
								Average Runoff Coeff =		C_{AVG} =	15,284 / 18,445	= 0.83

Table D3

SWM POST-DEVELOPMENT RUNOFF (UNCONTROLLED AND CONTROLLED)

Area No	Outlet Location	Area (ha)	Time of Conc. T_c (min)	Storm = 2-year				Storm = 5-year				Storm = 100-year			
				C_{AVG}	I_2 (mm/hr)	Q (L/sec)	Q_{CAP} (L/sec)	C_{AVG}		Q (L/sec)	Q_{CAP} (L/sec)	$C_{AVG-100Yr}$	I_{100} (mm/hr)	Q (L/sec)	Q_{CAP} (L/sec)
A1	CB11	0.079	10	0.82	76.81	13.9	**13.9**	0.82	104.19	18.8	**18.8**	1.00	178.56	39.1	**30.0**
A1-1	Trench Drain	0.023	10	0.90	76.81	4.4	4.4	0.90	104.19	6.0	6.0	1.00	178.56	11.5	11.5
A2	CB10	0.078	10	0.79	76.81	13.2	**13.2**	0.79	104.19	17.9	**17.9**	0.99	178.56	38.3	**33.0**
A3-1	CB08	0.046	10	0.79	76.81	7.8	**7.8**	0.79	104.19	10.6	**10.6**	0.99	178.56	22.7	**15.0**
A3-2	CB09	0.043	10	0.74	76.81	6.8	**6.8**	0.74	104.19	9.2	**9.2**	0.93	178.56	19.7	19.7
A4	CB07	0.078	10	0.79	76.81	13.1	**13.1**	0.79	104.19	17.7	**17.7**	0.98	178.56	38.0	**30.0**
A5-1	DCB06	0.152	10	0.81	76.81	26.3	**26.3**	0.81	104.19	35.6	**35.6**	1.00	178.56	75.4	**50.0**
A5-2	CB04	0.076	10	0.88	76.81	14.3	**14.3**	0.88	104.19	19.4	**19.4**	1.00	178.56	37.9	**30.0**
A6-1	DCB05	0.160	10	0.90	76.81	30.7	**30.7**	0.90	104.19	41.7	**41.7**	1.00	178.56	79.4	**70.0**
A6-2	CB03	0.052	10	0.90	76.81	10.0	**10.0**	0.90	104.19	13.6	**13.6**	1.00	178.56	25.9	**15.0**
A7-1	CBE02, CBT03, CBT04	0.039	10	0.41	76.81	3.4		0.41	104.19	4.7		0.51	178.56	10.0	
A7	CB01, CB02	0.120	10	0.86	76.81	21.9	**27.7**	0.86	104.19	29.7	**37.6**	1.00	178.56	59.4	**43.0**
A8	CBT01, CBMH300	0.046	10	0.24	76.81	2.4		0.24	104.19	3.2		0.30	178.56	6.9	
A9	Trench Drain	0.015	10	0.90	76.81	2.9	2.9	0.90	104.19	3.9	3.9	1.00	178.56	7.4	7.4
A10-1	East Property Line	0.011	10	0.20	76.81	0.5	0.5	0.20	104.19	0.6	0.6	0.25	178.56	1.3	1.3
A10-2	South-West Property Line	0.017	10	0.20	76.81	0.7	0.7	0.20	104.19	1.0	1.0	0.25	178.56	2.1	2.1
A10-3	Campeau Drive	0.011	10	0.23	76.81	0.5	0.5	0.23	104.19	0.7	0.7	0.29	178.56	1.5	1.5
A11	Roof Drains	0.799	10	0.90	76.81	153.6	**31.6**	0.90	104.19	208.4	**37.9**	1.00	178.56	396.7	**47.8**
Total		1.844				326.3	**204.4**			442.7	**272.2**			873.3	**407.4**

Notes

1) Intensity, $I_2 = 732.951/(Tc+6.199)^{0.810}$ (2-year, City of Ottawa)

2) Intensity, $I_5 = 998.071/(Tc+6.035)^{0.814}$ (5-year, City of Ottawa)

3) Intensity, $I_{100} = 1735.688/(Tc+6.014)^{0.820}$ (100-year, City of Ottawa)

4) Time of Concentration: T_c=10min

4) Flows under column Q_{CAP} which are **bold**, denotes flows that are controlled.

Table D4: 2-year, 5-year & 100-year Roof Drains Design Sheet - Using Flow Controlled Roof Drains

Project: 1485 UPPER CANADA STREET
Location: City of Ottawa
Date: SEPTEMBER 2023

Area #	Roof Drain Type	No Drains per Area	No of Weirs per Drain	Weir Position	Runoff Coeff (Cavg)		Drainage Area		2-year Event						5-year Event						100-year Event						Storage Required *(MRM)*			Maximium Storage Provided at Spill Elevation					
					2-year & 5-year	100-year	m^2	ha	Runoff Rate (L/sec)	2yr Ponding Depth (mm)	Roof Drain Capacity Per Weir (gpm)	Roof Drain Capacity Per Drain per weir (gpm)	Roof Drain Capacity Per Drain (L/sec)	Total Flow From Roof Drains (L/sec)	Runoff Rate (L/sec)	5yr Ponding Depth (mm)	Roof Drain Capacity Per Weir (gpm)	Roof Drain Capacity Per Drain per weir (gpm)	Roof Drain Capacity Per Drain (L/sec)	Total Flow From Roof Drains (L/sec)	Runoff Rate (L/sec)	100yr Ponding Depth (mm)	Roof Drain Capacity Per Weir (gpm)	Roof Drain Capacity Per Drain per weir (gpm)	Roof Drain Capacity Per Drain (L/sec)	Total Flow From Roof Drains (L/sec)	2-year (m^3)	5-year (m^3)	100-year (m^3)	Area Available for Storage (m^2)	Max Prism Depth (mm)	Max Prisim Volume (m^3)	% Volume Used for Ponding		
																																	2-year	5-year	100-year
A11-1	RD2	1	2	6-Full	0.90	1.00	656.60	0.0657	12.618	98	19.6	39.2	2.473	2.473	17.117	117	23.4	46.8	2.953	2.953	32.593	146	29.2	58.4	3.684	3.684	7.42	12.40	24.08	525.3	150	26.3	28%	47%	92%
A11-2	RD2	1	2	6-Full	0.90	1.00	656.60	0.0657	12.618	98	19.6	39.2	2.473	2.473	17.117	117	23.4	46.8	2.953	2.953	32.593	146	29.2	58.4	3.684	3.684	7.42	12.40	24.08	525.3	150	26.3	28%	47%	92%
A11-3	RD2	1	2	6-Full	0.90	1.00	656.60	0.0657	12.618	98	19.6	39.2	2.473	2.473	17.117	117	23.4	46.8	2.953	2.953	32.593	146	29.2	58.4	3.684	3.684	7.42	12.40	24.08	525.3	150	26.3	28%	47%	92%
A11-4	RD2	1	2	6-Full	0.90	1.00	656.60	0.0657	12.618	98	19.6	39.2	2.473	2.473	17.117	117	23.4	46.8	2.953	2.953	32.593	146	29.2	58.4	3.684	3.684	7.42	12.40	24.08	525.3	150	26.3	28%	47%	92%
A11-5	RD3	1	3	6-Full	0.90	1.00	594.63	0.0595	11.428	90	18.0	54.0	3.407	3.407	15.501	109	21.8	65.4	4.126	4.126	29.517	137	27.4	82.2	5.186	5.186	5.20	8.98	18.00	475.7	150	23.8	22%	38%	76%
A11-6	RD3	1	3	6-Full	0.90	1.00	869.53	0.0870	16.711	97	19.4	58.2	3.672	3.672	22.668	115	23.0	69.0	4.353	4.353	43.163	144	28.8	86.4	5.451	5.451	9.23	15.63	30.51	695.6	150	34.8	27%	45%	88%
A11-7	RD3	1	3	6-Full	0.90	1.00	470.30	0.0470	9.038	87	17.4	52.2	3.293	3.293	12.260	104	20.8	62.4	3.937	3.937	23.345	132	26.4	79.2	4.997	4.997	3.58	6.30	12.87	376.2	150	18.8	19%	33%	68%
A11-8	RD3	1	3	6-Full	0.90	1.00	470.30	0.0470	9.038	87	17.4	52.2	3.293	3.293	12.260	104	20.8	62.4	3.937	3.937	23.345	132	26.4	79.2	4.997	4.997	3.58	6.30	12.87	376.2	150	18.8	19%	33%	68%
A11-9	RD3	1	3	6-Full	0.90	1.00	470.30	0.0470	9.038	87	17.4	52.2	3.293	3.293	12.260	104	20.8	62.4	3.937	3.937	23.345	132	26.4	79.2	4.997	4.997	3.58	6.30	12.87	376.2	150	18.8	19%	33%	68%
A11-10	RD3	1	3	6-Full	0.90	1.00	470.30	0.0470	9.038	87	17.4	52.2	3.293	3.293	12.260	104	20.8	62.4	3.937	3.937	23.345	132	26.4	79.2	4.997	4.997	3.58	6.30	12.87	376.2	150	18.8	19%	33%	68%
A11-11	RD3	1	3	6-Full	0.90	1.00	470.30	0.0470	9.038	87	17.4	52.2	3.293	3.293	12.260	104	20.8	62.4	3.937	3.937	23.345	132	26.4	79.2	4.997	4.997	3.58	6.30	12.87	376.2	150	18.8	19%	33%	68%
A11-12	RD3	1	3	6-Full	0.90	1.00	470.30	0.0470	9.038	87	17.4	52.2	3.293	3.293	12.260	104	20.8	62.4	3.937	3.937	23.345	132	26.4	79.2	4.997	4.997	3.58	6.30	12.87	376.2	150	18.8	19%	33%	68%
A11-13	RD2	1	2	6-Full	0.90	1.00	541.26	0.0541	10.402	95	19.0	38.0	2.397	2.397	14.110	114	22.8	45.6	2.877	2.877	26.868	143	28.6	57.2	3.609	3.609	5.58	9.43	18.52	433.0	150	21.7	26%	44%	86%
A11-14	RD2	1	2	6-Full	0.90	1.00	541.26	0.0541	10.402	95	19.0	38.0	2.397	2.397	14.110	114	22.8	45.6	2.877	2.877	26.868	143	28.6	57.2	3.609	3.609	5.58	9.43	18.52	433.0	150	21.7	26%	44%	86%
Totals					0.9	0.9	**7,994.9**	**0.7995**	**153.64**		**258.20**		**41.53**	**41.53**	**208.42**		**308.80**		**49.66**	**49.66**	**396.86**		**388.60**		**62.57**	**62.57**	**76.74**	**130.87**	**259.10**	**6396**		**319.8**			
Total to City Sewer														**31.63**						**37.85**						**47.83**									
Min										**90**				`		**109**				`		**137**													
Max										**98**						**117**						**146**													

To Stormtech Chambers for Infiltration

Runoff Based on the Following:

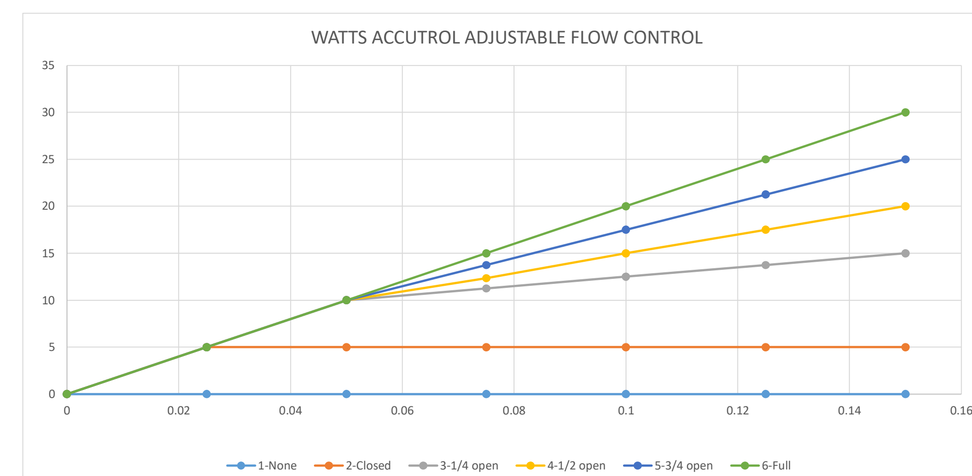
Storm Frequency (years) =	2	5	100
Time of Conc (mins) =	10	10	10
Storm Intensity (mm/hr) =	76.8	104.2	178.6

Roof Drain Types

Drain Type =	RD1	RD2	RD3
Max Overflow Depth (mm)	150 mm	150 mm	150 mm
Flow Controlled (Yes/No)	Yes	Yes	Yes
Ponding	Yes	Yes	Yes
Weir Desc	Accutrol	Accutrol	Accutrol
No. Weirs	1	2	3

Roof Drains have Following Flow Rates per weir: WATTS Flow Controlled Drain

Weir Position	Flow (gpm) per depth							Max Flow Rate per Weir @150mm (L/s)
	0	25	50	75	100	125	150	
	0	0.025	0.05	0.075	0.1	0.125	0.15	
1-None	0	0	0	0	0	0	0	0.000
2-Closed	0	5	5	5	5	5	5	0.315
3-1/4 open	0	5	10	11	13	14	15	0.946
4-1/2 open	0	5	10	12	15	18	20	1.262
5-3/4 open	0	5	10	14	18	21	25	1.577
6-Full	0	5	10	15	20	25	30	1.890



Storage Volumes Roof Area #A11-1 to A11-4(2 Year, 5 Year and 100 Year Storms)

C_{AVG} = 0.90 (dimmensionless)
C_{AVG} = 1.00
Time Interval = 5 (mins)
Drainage Area = 0.06566 (hectares)

	2 Year					5 Year					100 Year				
	Release Rate = 2.473 (L/sec)					Release Rate = 2.9526 (L/sec)					Release Rate = 3.6845 (L/sec)				
	Return Period = 2 (years)					Return Period = 5 (years)					Return Period = 100 (years)				
	IDF Parameters, A = 732.951			, B = 0.810		IDF Parameters, A = 998.071			, B = 0.814		IDF Parameters, A = 1735.69			, B = 0.820	
	($I = A/(T_c+C)$)			, C = 6.199		($I = A/(T_c+C)$)			, C = 6.053		($I = A/(T_c+C)$)			, C = 6.014	
Duration (min)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
0	167.2	27.5	2.47	25.0	0.00	230.5	42.1	2.953	39.1	0.00	398.6	72.8	3.7	69.1	0.00
5	103.6	17.0	2.47	14.5	4.36	141.2	25.8	2.953	22.8	6.85	242.7	44.3	3.7	40.6	12.19
10	76.8	12.6	2.47	10.1	6.09	104.2	19.0	2.953	16.1	9.64	178.6	32.6	3.7	28.9	17.35
15	61.8	10.1	2.47	7.7	6.91	83.6	15.3	2.953	12.3	11.07	142.9	26.1	3.7	22.4	20.16
20	52.0	8.5	2.47	6.1	7.29	70.3	12.8	2.953	9.9	11.84	120.0	21.9	3.7	18.2	21.85
25	45.2	7.4	2.47	4.9	7.42	60.9	11.1	2.953	8.2	12.24	103.8	19.0	3.7	15.3	22.91
30	40.0	6.6	2.47	4.1	7.39	53.9	9.8	2.953	6.9	12.40	91.9	16.8	3.7	13.1	23.55
35	36.1	5.9	2.47	3.5	7.25	48.5	8.9	2.953	5.9	12.40	82.6	15.1	3.7	11.4	23.92
40	32.9	5.4	2.47	2.9	7.02	44.2	8.1	2.953	5.1	12.27	75.1	13.7	3.7	10.0	24.08
45	30.2	5.0	2.47	2.5	6.74	40.6	7.4	2.953	4.5	12.05	69.1	12.6	3.7	8.9	24.08
50	28.0	4.6	2.47	2.1	6.40	37.7	6.9	2.953	3.9	11.76	64.0	11.7	3.7	8.0	23.97
55	26.2	4.3	2.47	1.8	6.03	35.1	6.4	2.953	3.5	11.41	59.6	10.9	3.7	7.2	23.76
60	24.6	4.0	2.47	1.6	5.62	32.9	6.0	2.953	3.1	11.02	55.9	10.2	3.7	6.5	23.47
65	23.2	3.8	2.47	1.3	5.19	31.0	5.7	2.953	2.7	10.58	52.6	9.6	3.7	5.9	23.11
70	21.9	3.6	2.47	1.1	4.73	29.4	5.4	2.953	2.4	10.12	49.8	9.1	3.7	5.4	22.70
75	20.8	3.4	2.47	0.9	4.26	27.9	5.1	2.953	2.1	9.62	47.3	8.6	3.7	4.9	22.24
80	19.8	3.3	2.47	0.8	3.77	26.6	4.8	2.953	1.9	9.10	45.0	8.2	3.7	4.5	21.73
85	18.9	3.1	2.47	0.6	3.26	25.4	4.6	2.953	1.7	8.56	43.0	7.8	3.7	4.2	21.20
90	18.1	3.0	2.47	0.5	2.74	24.3	4.4	2.953	1.5	8.00	41.1	7.5	3.7	3.8	20.63
95	17.4	2.9	2.47	0.4	2.21	23.3	4.3	2.953	1.3	7.42	39.4	7.2	3.7	3.5	20.03
100	16.7	2.8	2.47	0.3	1.67	22.4	4.1	2.953	1.1	6.82	37.9	6.9	3.7	3.2	19.40
105	16.1	2.7	2.47	0.2	1.12	21.6	3.9	2.953	1.0	6.22	36.5	6.7	3.7	3.0	18.76
110	15.6	2.6	2.47	0.1	0.56	20.8	3.8	2.953	0.8	5.60	35.2	6.4	3.7	2.7	18.09
115	15.0	2.5	2.47	0.0	-0.01	20.1	3.7	2.953	0.7	4.97	34.0	6.2	3.7	2.5	17.41
120	14.6	2.4	2.47	-0.1	-0.58	19.5	3.6	2.953	0.6	4.33	32.9	6.0	3.7	2.3	16.70
Max =					**7.42**					**12.40**					**24.08**

Notes

1) Peak flow is equal to the product of 2.78 x C x I x A

2) Rainfall Intensity, $I = A/(Tc+C)^B$

3) Release Rate = Min (Release Rate, Peak Flow)

4) Storage Rate = Peak Flow - Release Rate

5) Storage = Duration x Storage Rate

6) Maximium Storage = Max Storage Over Duration

Storage Volumes Roof Area #A11-5 (2 Year, 5 Year and 100 Year Storms)

C_{AVG} =	0.90	(dimmensionless)
C_{AVG} =	1.00	
Time Interval =	5	(mins)
Drainage Area =	0.05946	(hectares)

	2 Year					5 Year					100 Year				
	Release Rate = **3.407** (L/sec)					Release Rate = **4.1261** (L/sec)					Release Rate = **5.1860** (L/sec)				
	Return Period = 2 (years)					Return Period = 5 (years)					Return Period = 100 (years)				
	IDF Parameters, A = 732.951			, B = 0.810		IDF Parameters, A = 998.071			, B = 0.814		IDF Parameters, A = 1735.688			, B = 0.820	
	(I = A/(T_c+C)			, C = 6.199		(I = A/(T_c+C)			, C = 6.053		(I = A/(T_c+C)			, C = 6.014	
Duration (min)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
0	167.2	24.9	3.41	21.5	0.00	230.5	38.1	4.126	34.0	0.00	398.6	65.9	5.2	60.7	0.00
5	103.6	15.4	3.41	12.0	3.60	141.2	23.3	4.126	19.2	5.76	242.7	40.1	5.2	34.9	10.48
10	76.8	11.4	3.41	8.0	4.81	104.2	17.2	4.126	13.1	7.86	178.6	29.5	5.2	24.3	14.60
15	61.8	9.2	3.41	5.8	5.20	83.6	13.8	4.126	9.7	8.72	142.9	23.6	5.2	18.4	16.59
20	52.0	7.7	3.41	4.3	5.20	70.3	11.6	4.126	7.5	8.98	120.0	19.8	5.2	14.6	17.57
25	45.2	6.7	3.41	3.3	4.97	60.9	10.1	4.126	5.9	8.91	103.8	17.2	5.2	12.0	17.97
30	40.0	6.0	3.41	2.6	4.59	53.9	8.9	4.126	4.8	8.62	91.9	15.2	5.2	10.0	18.00
35	36.1	5.4	3.41	2.0	4.11	48.5	8.0	4.126	3.9	8.18	82.6	13.7	5.2	8.5	17.78
40	32.9	4.9	3.41	1.5	3.56	44.2	7.3	4.126	3.2	7.63	75.1	12.4	5.2	7.2	17.37
45	30.2	4.5	3.41	1.1	2.95	40.6	6.7	4.126	2.6	6.99	69.1	11.4	5.2	6.2	16.82
50	28.0	4.2	3.41	0.8	2.29	37.7	6.2	4.126	2.1	6.29	64.0	10.6	5.2	5.4	16.16
55	26.2	3.9	3.41	0.5	1.61	35.1	5.8	4.126	1.7	5.54	59.6	9.9	5.2	4.7	15.41
60	24.6	3.7	3.41	0.2	0.89	32.9	5.4	4.126	1.3	4.75	55.9	9.2	5.2	4.1	14.59
65	23.2	3.4	3.41	0.0	0.15	31.0	5.1	4.126	1.0	3.92	52.6	8.7	5.2	3.5	13.72
70	21.9	3.3	3.41	-0.1	-0.62	29.4	4.9	4.126	0.7	3.06	49.8	8.2	5.2	3.0	12.79
75	20.8	3.1	3.41	-0.3	-1.40	27.9	4.6	4.126	0.5	2.18	47.3	7.8	5.2	2.6	11.82
80	19.8	3.0	3.41	-0.5	-2.19	26.6	4.4	4.126	0.3	1.27	45.0	7.4	5.2	2.3	10.81
85	18.9	2.8	3.41	-0.6	-3.00	25.4	4.2	4.126	0.1	0.34	43.0	7.1	5.2	1.9	9.76
90	18.1	2.7	3.41	-0.7	-3.82	24.3	4.0	4.126	-0.1	-0.60	41.1	6.8	5.2	1.6	8.69
95	17.4	2.6	3.41	-0.8	-4.65	23.3	3.9	4.126	-0.3	-1.56	39.4	6.5	5.2	1.3	7.60
100	16.7	2.5	3.41	-0.9	-5.49	22.4	3.7	4.126	-0.4	-2.53	37.9	6.3	5.2	1.1	6.48
105	16.1	2.4	3.41	-1.0	-6.34	21.6	3.6	4.126	-0.6	-3.52	36.5	6.0	5.2	0.8	5.34
110	15.6	2.3	3.41	-1.1	-7.20	20.8	3.4	4.126	-0.7	-4.51	35.2	5.8	5.2	0.6	4.18
115	15.0	2.2	3.41	-1.2	-8.06	20.1	3.3	4.126	-0.8	-5.52	34.0	5.6	5.2	0.4	3.00
120	14.6	2.2	3.41	-1.2	-8.93	19.5	3.2	4.126	-0.9	-6.54	32.9	5.4	5.2	0.3	1.81
Max =					**5.20**					**8.98**					**18.00**

Notes

1) Peak flow is equal to the product of 2.78 x C x I x A

2) Rainfall Intensity, I = $A/(Tc+C)^B$

3) Release Rate = Min (Release Rate, Peak Flow)

4) Storage Rate = Peak Flow - Release Rate

5) Storage = Duration x Storage Rate

6) Maximium Storage = Max Storage Over Duration

Storage Volumes Roof Area #A11-6 (2 Year, 5 Year and 100 Year Storms)

C_{AVG} = 0.90 (dimmensionless)

C_{AVG} = 1.00

Time Interval = 5 (mins)

Drainage Area = 0.08695 (hectares)

	Release Rate = 3.672 (L/sec)					Release Rate = 4.3532 (L/sec)					Release Rate = 5.4510 (L/sec)				
	Return Period = 2 (years)					Return Period = 5 (years)					Return Period = 100 (years)				
	IDF Parameters, A = 732.951			, B = 0.810		IDF Parameters, A = 998.071			, B = 0.814		IDF Parameters, A = 1735.69			, B = 0.820	
	($I = A/(T_c+C)$)			, C = 6.199		($I = A/(T_c+C)$)			, C = 6.053		($I = A/(T_c+C)$)			, C = 6.014	
Duration (min)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
0	167.2	36.4	3.67	32.7	0.00	230.5	55.7	4.353	51.4	0.00	398.6	96.4	5.5	90.9	0.00
5	103.6	22.5	3.67	18.9	5.66	141.2	34.1	4.353	29.8	8.93	242.7	58.7	5.5	53.2	15.97
10	76.8	16.7	3.67	13.0	7.82	104.2	25.2	4.353	20.8	12.50	178.6	43.2	5.5	37.7	22.63
15	61.8	13.4	3.67	9.8	8.79	83.6	20.2	4.353	15.8	14.26	142.9	34.5	5.5	29.1	26.18
20	52.0	11.3	3.67	7.6	9.18	70.3	17.0	4.353	12.6	15.15	120.0	29.0	5.5	23.5	28.25
25	45.2	9.8	3.67	6.2	9.23	60.9	14.7	4.353	10.4	15.55	103.8	25.1	5.5	19.7	29.48
30	40.0	8.7	3.67	5.0	9.07	53.9	13.0	4.353	8.7	15.63	91.9	22.2	5.5	16.8	30.16
35	36.1	7.8	3.67	4.2	8.76	48.5	11.7	4.353	7.4	15.49	82.6	20.0	5.5	14.5	30.47
40	32.9	7.1	3.67	3.5	8.35	44.2	10.7	4.353	6.3	15.19	75.1	18.2	5.5	12.7	30.51
45	30.2	6.6	3.67	2.9	7.85	40.6	9.8	4.353	5.5	14.76	69.1	16.7	5.5	11.2	30.35
50	28.0	6.1	3.67	2.4	7.29	37.7	9.1	4.353	4.7	14.25	64.0	15.5	5.5	10.0	30.03
55	26.2	5.7	3.67	2.0	6.67	35.1	8.5	4.353	4.1	13.65	59.6	14.4	5.5	9.0	29.57
60	24.6	5.3	3.67	1.7	6.01	32.9	8.0	4.353	3.6	13.00	55.9	13.5	5.5	8.1	29.02
65	23.2	5.0	3.67	1.4	5.32	31.0	7.5	4.353	3.2	12.29	52.6	12.7	5.5	7.3	28.37
70	21.9	4.8	3.67	1.1	4.60	29.4	7.1	4.353	2.7	11.54	49.8	12.0	5.5	6.6	27.66
75	20.8	4.5	3.67	0.9	3.85	27.9	6.7	4.353	2.4	10.75	47.3	11.4	5.5	6.0	26.87
80	19.8	4.3	3.67	0.6	3.08	26.6	6.4	4.353	2.1	9.92	45.0	10.9	5.5	5.4	26.04
85	18.9	4.1	3.67	0.4	2.29	25.4	6.1	4.353	1.8	9.07	43.0	10.4	5.5	4.9	25.15
90	18.1	3.9	3.67	0.3	1.49	24.3	5.9	4.353	1.5	8.20	41.1	9.9	5.5	4.5	24.23
95	17.4	3.8	3.67	0.1	0.66	23.3	5.6	4.353	1.3	7.30	39.4	9.5	5.5	4.1	23.26
100	16.7	3.6	3.67	0.0	-0.17	22.4	5.4	4.353	1.1	6.38	37.9	9.2	5.5	3.7	22.27
105	16.1	3.5	3.67	-0.2	-1.02	21.6	5.2	4.353	0.9	5.44	36.5	8.8	5.5	3.4	21.24
110	15.6	3.4	3.67	-0.3	-1.88	20.8	5.0	4.353	0.7	4.49	35.2	8.5	5.5	3.1	20.19
115	15.0	3.3	3.67	-0.4	-2.75	20.1	4.9	4.353	0.5	3.52	34.0	8.2	5.5	2.8	19.11
120	14.6	3.2	3.67	-0.5	-3.63	19.5	4.7	4.353	0.4	2.54	32.9	8.0	5.5	2.5	18.00
Max =					**9.23**					**15.63**					**30.51**

Notes

1) Peak flow is equal to the product of 2.78 x C x I x A

2) Rainfall Intensity, $I = A/(Tc+C)^B$

3) Release Rate = Min (Release Rate, Peak Flow)

4) Storage Rate = Peak Flow - Release Rate

5) Storage = Duration x Storage Rate

6) Maximium Storage = Max Storage Over Duration

Storage Volumes Roof Area #A11-7 to A11-12 (2 Year, 5 Year and 100 Year Storms)

C_{AVG} = 0.90 (dimmensionless)

C_{AVG} = 1.00

Time Interval = 5 (mins)

Drainage Area = 0.04703 (hectares)

	2 Year					5 Year					100 Year				
	Release Rate = 3.293 (L/sec)					Release Rate = 3.9368 (L/sec)					Release Rate = 4.9967 (L/sec)				
	Return Period = 2 (years)					Return Period = 5 (years)					Return Period = 100 (years)				
	IDF Parameters, A = 732.951			, B =	0.810	IDF Parameters, A = 998.071			, B =	0.814	IDF Parameters, A = 1735.688			, B =	0.820
	(I = A/(T_c+C)			, C =	6.199	(I = A/(T_c+C)			, C =	6.053	(I = A/(T_c+C)			, C =	6.014
Duration (min)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
0	167.2	19.7	3.29	16.4	0.00	230.5	30.1	3.937	26.2	0.00	398.6	52.1	5.0	47.1	0.00
5	103.6	12.2	3.29	8.9	2.67	141.2	18.5	3.937	14.5	4.36	242.7	31.7	5.0	26.7	8.02
10	76.8	9.0	3.29	5.7	3.45	104.2	13.6	3.937	9.7	5.81	178.6	23.3	5.0	18.3	11.01
15	61.8	7.3	3.29	4.0	3.58	83.6	10.9	3.937	7.0	6.29	142.9	18.7	5.0	13.7	12.32
20	52.0	6.1	3.29	2.8	3.39	70.3	9.2	3.937	5.2	6.30	120.0	15.7	5.0	10.7	12.82
25	45.2	5.3	3.29	2.0	3.03	60.9	8.0	3.937	4.0	6.04	103.8	13.6	5.0	8.6	12.87
30	40.0	4.7	3.29	1.4	2.55	53.9	7.1	3.937	3.1	5.60	91.9	12.0	5.0	7.0	12.63
35	36.1	4.2	3.29	0.9	1.99	48.5	6.3	3.937	2.4	5.05	82.6	10.8	5.0	5.8	12.18
40	32.9	3.9	3.29	0.6	1.38	44.2	5.8	3.937	1.8	4.42	75.1	9.8	5.0	4.8	11.59
45	30.2	3.6	3.29	0.3	0.72	40.6	5.3	3.937	1.4	3.71	69.1	9.0	5.0	4.0	10.88
50	28.0	3.3	3.29	0.0	0.02	37.7	4.9	3.937	1.0	2.96	64.0	8.4	5.0	3.4	10.09
55	26.2	3.1	3.29	-0.2	-0.71	35.1	4.6	3.937	0.7	2.16	59.6	7.8	5.0	2.8	9.24
60	24.6	2.9	3.29	-0.4	-1.45	32.9	4.3	3.937	0.4	1.33	55.9	7.3	5.0	2.3	8.32
65	23.2	2.7	3.29	-0.6	-2.22	31.0	4.1	3.937	0.1	0.48	52.6	6.9	5.0	1.9	7.36
70	21.9	2.6	3.29	-0.7	-3.00	29.4	3.8	3.937	-0.1	-0.41	49.8	6.5	5.0	1.5	6.35
75	20.8	2.4	3.29	-0.8	-3.80	27.9	3.6	3.937	-0.3	-1.31	47.3	6.2	5.0	1.2	5.32
80	19.8	2.3	3.29	-1.0	-4.61	26.6	3.5	3.937	-0.5	-2.23	45.0	5.9	5.0	0.9	4.25
85	18.9	2.2	3.29	-1.1	-5.43	25.4	3.3	3.937	-0.6	-3.16	43.0	5.6	5.0	0.6	3.16
90	18.1	2.1	3.29	-1.2	-6.26	24.3	3.2	3.937	-0.8	-4.11	41.1	5.4	5.0	0.4	2.04
95	17.4	2.0	3.29	-1.2	-7.09	23.3	3.0	3.937	-0.9	-5.07	39.4	5.2	5.0	0.2	0.91
100	16.7	2.0	3.29	-1.3	-7.94	22.4	2.9	3.937	-1.0	-6.04	37.9	5.0	5.0	0.0	-0.25
105	16.1	1.9	3.29	-1.4	-8.79	21.6	2.8	3.937	-1.1	-7.02	36.5	4.8	5.0	-0.2	-1.42
110	15.6	1.8	3.29	-1.5	-9.64	20.8	2.7	3.937	-1.2	-8.02	35.2	4.6	5.0	-0.4	-2.60
115	15.0	1.8	3.29	-1.5	-10.51	20.1	2.6	3.937	-1.3	-9.01	34.0	4.4	5.0	-0.6	-3.80
120	14.6	1.7	3.29	-1.6	-11.37	19.5	2.5	3.937	-1.4	-10.02	32.9	4.3	5.0	-0.7	-5.01
Max =					**3.58**					**6.30**					**12.87**

Notes

1) Peak flow is equal to the product of 2.78 x C x I x A

2) Rainfall Intensity, I = $A/(Tc+C)^B$

3) Release Rate = Min (Release Rate, Peak Flow)

4) Storage Rate = Peak Flow - Release Rate

5) Storage = Duration x Storage Rate

6) Maximium Storage = Max Storage Over Duration

Storage Volumes Roof Area #A11-13 & A11-14 (2 Year, 5 Year and 100 Year Storms)

C_{AVG} = 0.90 (dimmensionless)

C_{AVG} = 1.00

Time Interval = 5 (mins)

Drainage Area = 0.05413 (hectares)

	Release Rate = 2.397 (L/sec)					Release Rate = 2.8769 (L/sec)					Release Rate = 3.6088 (L/sec)				
	Return Period = 2 (years)					Return Period = 5 (years)					Return Period = 100 (years)				
	IDF Parameters, A = 732.951		, B = 0.810			IDF Parameters, A = 998.071		, B = 0.814			IDF Parameters, A = 1735.688		, B = 0.820		
	(I = A/(T_c+C)		, C = 6.199			(I = A/(T_c+C)		, C = 6.053			(I = A/(T_c+C)		, C = 6.014		
Duration (min)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
0	167.2	22.6	2.40	20.2	0.00	230.5	34.7	2.877	31.8	0.00	398.6	60.0	3.6	56.4	0.00
5	103.6	14.0	2.40	11.6	3.49	141.2	21.2	2.877	18.4	5.51	242.7	36.5	3.6	32.9	9.87
10	76.8	10.4	2.40	8.0	4.80	104.2	15.7	2.877	12.8	7.68	178.6	26.9	3.6	23.3	13.96
15	61.8	8.4	2.40	6.0	5.37	83.6	12.6	2.877	9.7	8.73	142.9	21.5	3.6	17.9	16.10
20	52.0	7.0	2.40	4.6	5.58	70.3	10.6	2.877	7.7	9.23	120.0	18.0	3.6	14.4	17.33
25	45.2	6.1	2.40	3.7	5.58	60.9	9.2	2.877	6.3	9.43	103.8	15.6	3.6	12.0	18.03
30	40.0	5.4	2.40	3.0	5.45	53.9	8.1	2.877	5.2	9.43	91.9	13.8	3.6	10.2	18.39
35	36.1	4.9	2.40	2.5	5.22	48.5	7.3	2.877	4.4	9.29	82.6	12.4	3.6	8.8	18.52
40	32.9	4.5	2.40	2.1	4.93	44.2	6.6	2.877	3.8	9.05	75.1	11.3	3.6	7.7	18.48
45	30.2	4.1	2.40	1.7	4.58	40.6	6.1	2.877	3.2	8.74	69.1	10.4	3.6	6.8	18.31
50	28.0	3.8	2.40	1.4	4.20	37.7	5.7	2.877	2.8	8.37	64.0	9.6	3.6	6.0	18.04
55	26.2	3.5	2.40	1.1	3.78	35.1	5.3	2.877	2.4	7.95	59.6	9.0	3.6	5.4	17.70
60	24.6	3.3	2.40	0.9	3.34	32.9	5.0	2.877	2.1	7.49	55.9	8.4	3.6	4.8	17.29
65	23.2	3.1	2.40	0.7	2.88	31.0	4.7	2.877	1.8	7.00	52.6	7.9	3.6	4.3	16.82
70	21.9	3.0	2.40	0.6	2.39	29.4	4.4	2.877	1.5	6.48	49.8	7.5	3.6	3.9	16.31
75	20.8	2.8	2.40	0.4	1.90	27.9	4.2	2.877	1.3	5.94	47.3	7.1	3.6	3.5	15.76
80	19.8	2.7	2.40	0.3	1.38	26.6	4.0	2.877	1.1	5.38	45.0	6.8	3.6	3.2	15.17
85	18.9	2.6	2.40	0.2	0.86	25.4	3.8	2.877	0.9	4.80	43.0	6.5	3.6	2.9	14.56
90	18.1	2.5	2.40	0.1	0.32	24.3	3.7	2.877	0.8	4.20	41.1	6.2	3.6	2.6	13.92
95	17.4	2.4	2.40	0.0	-0.22	23.3	3.5	2.877	0.6	3.59	39.4	5.9	3.6	2.3	13.25
100	16.7	2.3	2.40	-0.1	-0.78	22.4	3.4	2.877	0.5	2.97	37.9	5.7	3.6	2.1	12.57
105	16.1	2.2	2.40	-0.2	-1.34	21.6	3.2	2.877	0.4	2.33	36.5	5.5	3.6	1.9	11.86
110	15.6	2.1	2.40	-0.3	-1.91	20.8	3.1	2.877	0.3	1.69	35.2	5.3	3.6	1.7	11.14
115	15.0	2.0	2.40	-0.4	-2.48	20.1	3.0	2.877	0.2	1.04	34.0	5.1	3.6	1.5	10.41
120	14.6	2.0	2.40	-0.4	-3.06	19.5	2.9	2.877	0.1	0.38	32.9	4.9	3.6	1.3	9.65
Max =					**5.58**					**9.43**					**18.52**

Notes

1) Peak flow is equal to the product of 2.78 x C x I x A

2) Rainfall Intensity, I = A/(Tc+C)^B

3) Release Rate = Min (Release Rate, Peak Flow)

4) Storage Rate = Peak Flow - Release Rate

5) Storage = Duration x Storage Rate

6) Maximium Storage = Max Storage Over Duration

Table D5 Storage Volumes for 2-year, 5-Year and 100-Year Storms (MRM)

Area No: A1
C_{AVG} = 0.82 (2-yr)
C_{AVG} = 0.82 (5-yr)
C_{AVG} = 1.00 (100-yr, Max 1.0)
Time Interval = 5.00 (mins)
Drainage Area = 0.0787 (hectares)

Actual Release Rate (L/sec) = 30.00
Percentage of Actual Rate (City of Ottawa requirement) = 100% (Set to 50% when U/G storage used)
Release Rate Used for Estimation of 100-year Storage (L/sec) = 30.00

Duration (mins)	Release Rate = 13.86 (L/sec); Return Period = 2 (years); IDF Parameters, A = 733.0, B = 0.810, C = 6.199 (I = A/(T_c+C))					Release Rate = 18.80 (L/sec); Return Period = 5 (years); IDF Parameters, A = 998.1, B = 0.814, C = 6.053 (I = A/(T_c+C))					Release Rate = 30.00 (L/sec); Return Period = 100 (years); IDF Parameters, A = 1735.7, B = 0.820, C = 6.014 (I = A/(T_c+C))				
	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
0	167.2	30.2	13.9	16.3	0.0	230.5	41.6	18.8	22.8	0.0	398.6	87.2	30.0	57.2	0.0
5	103.6	18.7	13.9	4.8	1.4	141.2	25.5	18.8	6.7	2.0	242.7	53.1	30.0	23.1	6.9
10	76.8	13.9	13.9	0.0	0.0	104.2	18.8	18.8	0.0	0.0	178.6	39.1	30.0	9.1	5.4
15	61.8	11.1	13.9	-2.7	-2.4	83.6	15.1	18.8	-3.7	-3.4	142.9	31.3	30.0	1.3	1.1
20	52.0	9.4	13.9	-4.5	-5.4	70.3	12.7	18.8	-6.1	-7.3	120.0	26.2	30.0	-3.8	-4.5
25	45.2	8.2	13.9	-5.7	-8.6	60.9	11.0	18.8	-7.8	-11.7	103.8	22.7	30.0	-7.3	-10.9
30	40.0	7.2	13.9	-6.6	-11.9	53.9	9.7	18.8	-9.1	-16.3	91.9	20.1	30.0	-9.9	-17.8
35	36.1	6.5	13.9	-7.4	-15.4	48.5	8.8	18.8	-10.0	-21.1	82.6	18.1	30.0	-11.9	-25.1
40	32.9	5.9	13.9	-7.9	-19.0	44.2	8.0	18.8	-10.8	-26.0	75.1	16.4	30.0	-13.6	-32.5
45	30.2	5.5	13.9	-8.4	-22.7	40.6	7.3	18.8	-11.5	-31.0	69.1	15.1	30.0	-14.9	-40.2
50	28.0	5.1	13.9	-8.8	-26.4	37.7	6.8	18.8	-12.0	-36.0	64.0	14.0	30.0	-16.0	-48.0
55	26.2	4.7	13.9	-9.1	-30.2	35.1	6.3	18.8	-12.5	-41.1	59.6	13.0	30.0	-17.0	-56.0
60	24.6	4.4	13.9	-9.4	-33.9	32.9	5.9	18.8	-12.9	-46.3	55.9	12.2	30.0	-17.8	-64.0
65	23.2	4.2	13.9	-9.7	-37.8	31.0	5.6	18.8	-13.2	-51.5	52.6	11.5	30.0	-18.5	-72.1
70	21.9	4.0	13.9	-9.9	-41.6	29.4	5.3	18.8	-13.5	-56.7	49.8	10.9	30.0	-19.1	-80.3
75	20.8	3.8	13.9	-10.1	-45.5	27.9	5.0	18.8	-13.8	-62.0	47.3	10.3	30.0	-19.7	-88.5
80	19.8	3.6	13.9	-10.3	-49.4	26.6	4.8	18.8	-14.0	-67.2	45.0	9.8	30.0	-20.2	-96.8
85	18.9	3.4	13.9	-10.4	-53.2	25.4	4.6	18.8	-14.2	-72.5	43.0	9.4	30.0	-20.6	-105.1
90	18.1	3.3	13.9	-10.6	-57.2	24.3	4.4	18.8	-14.4	-77.9	41.1	9.0	30.0	-21.0	-113.4
95	17.4	3.1	13.9	-10.7	-61.1	23.3	4.2	18.8	-14.6	-83.2	39.4	8.6	30.0	-21.4	-121.8
100	16.7	3.0	13.9	-10.8	-65.0	22.4	4.0	18.8	-14.8	-88.6	37.9	8.3	30.0	-21.7	-130.3
Max =					**1.4**					**2.0**					**6.9**

Notes
1) Peak flow is equal to the product of 2.78 x C x I x A
2) Rainfall Intensity, I = A/(Tc+C)^B
3) Release Rate = Min (Release Rate, Peak Flow)
4) Storage Rate = Peak Flow - Release Rate
5) Storage = Duration x Storage Rate
6) Maximium Storage = Max Storage Over Duration
7) Parameters a,b,c are for City of Ottawa

City of Ottawa IDF Data (from SDG002)

IDF curve equations (Intensity in mm/hr)

100 year Intensity = 1735.688 / (Time in min + 6.014)$^{0.820}$
50 year Intensity = 1569.580 / (Time in min + 6.014)$^{0.820}$
25 year Intensity = 1402.884 / (Time in min + 6.018)$^{0.819}$
10 year Intensity = 1174.184 / (Time in min + 6.014)$^{0.816}$
5 year Intensity = 998.071 / (Time in min + 6.053)$^{0.814}$
2 year Intensity = 732.951 / (Time in min + 6.199)$^{0.810}$

Table D6 Storage Volumes for 2-year, 5-Year and 100-Year Storms (MRM)

Area No: **A2**
C_{AVG} = 0.79 (2-yr)
C_{AVG} = 0.79 (5-yr)
C_{AVG} = 0.99 (100-yr, Max 1.0)
Time Interval = 5.00 (mins)
Drainage Area = 0.0782 (hectares)

Actual Release Rate (L/sec) = 33.00
Percentage of Actual Rate (City of Ottawa requirement) = 100% (Set to 50% when U/G storage used)
Release Rate Used for Estimation of 100-year Storage (L/sec) = 33.00

Duration (mins)	Release Rate = 13.18 (L/sec)					Release Rate = 17.88 (L/sec)					Release Rate = 33.00 (L/sec)				
	Return Period = 2 (years)					Return Period = 5 (years)					Return Period = 100 (years)				
	IDF Parameters, A = 733.0		, B = 0.810			IDF Parameters, A = 998.1		, B = 0.814			IDF Parameters, A = 1735.7		, B = 0.820		
	(I = A/(T_c+C)		, C = 6.199			(I = A/(T_c+C)		, C = 6.053			(I = A/(T_c+C)		, C = 6.014		
	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
0	167.2	28.7	13.2	15.5	0.0	230.5	39.5	17.9	21.7	0.0	398.6	85.5	33.0	52.5	0.0
5	103.6	17.8	13.2	4.6	1.4	141.2	24.2	17.9	6.3	1.9	242.7	52.1	33.0	19.1	5.7
10	76.8	13.2	13.2	0.0	0.0	104.2	17.9	17.9	0.0	0.0	178.6	38.3	33.0	5.3	3.2
15	61.8	10.6	13.2	-2.6	-2.3	83.6	14.3	17.9	-3.5	-3.2	142.9	30.6	33.0	-2.4	-2.1
20	52.0	8.9	13.2	-4.3	-5.1	70.3	12.1	17.9	-5.8	-7.0	120.0	25.7	33.0	-7.3	-8.7
25	45.2	7.7	13.2	-5.4	-8.1	60.9	10.4	17.9	-7.4	-11.1	103.8	22.3	33.0	-10.7	-16.1
30	40.0	6.9	13.2	-6.3	-11.4	53.9	9.3	17.9	-8.6	-15.5	91.9	19.7	33.0	-13.3	-23.9
35	36.1	6.2	13.2	-7.0	-14.7	48.5	8.3	17.9	-9.6	-20.1	82.6	17.7	33.0	-15.3	-32.1
40	32.9	5.6	13.2	-7.5	-18.1	44.2	7.6	17.9	-10.3	-24.7	75.1	16.1	33.0	-16.9	-40.5
45	30.2	5.2	13.2	-8.0	-21.6	40.6	7.0	17.9	-10.9	-29.4	69.1	14.8	33.0	-18.2	-49.1
50	28.0	4.8	13.2	-8.4	-25.1	37.7	6.5	17.9	-11.4	-34.2	64.0	13.7	33.0	-19.3	-57.9
55	26.2	4.5	13.2	-8.7	-28.7	35.1	6.0	17.9	-11.9	-39.1	59.6	12.8	33.0	-20.2	-66.7
60	24.6	4.2	13.2	-9.0	-32.3	32.9	5.7	17.9	-12.2	-44.0	55.9	12.0	33.0	-21.0	-75.6
65	23.2	4.0	13.2	-9.2	-35.9	31.0	5.3	17.9	-12.6	-48.9	52.6	11.3	33.0	-21.7	-84.7
70	21.9	3.8	13.2	-9.4	-39.6	29.4	5.0	17.9	-12.8	-53.9	49.8	10.7	33.0	-22.3	-93.8
75	20.8	3.6	13.2	-9.6	-43.2	27.9	4.8	17.9	-13.1	-58.9	47.3	10.1	33.0	-22.9	-102.9
80	19.8	3.4	13.2	-9.8	-46.9	26.6	4.6	17.9	-13.3	-63.9	45.0	9.6	33.0	-23.4	-112.1
85	18.9	3.3	13.2	-9.9	-50.6	25.4	4.4	17.9	-13.5	-69.0	43.0	9.2	33.0	-23.8	-121.3
90	18.1	3.1	13.2	-10.1	-54.4	24.3	4.2	17.9	-13.7	-74.0	41.1	8.8	33.0	-24.2	-130.6
95	17.4	3.0	13.2	-10.2	-58.1	23.3	4.0	17.9	-13.9	-79.1	39.4	8.5	33.0	-24.5	-139.9
100	16.7	2.9	13.2	-10.3	-61.8	22.4	3.8	17.9	-14.0	-84.2	37.9	8.1	33.0	-24.9	-149.2
Max =					**1.4**					**1.9**					**5.7**

Notes
1) Peak flow is equal to the product of 2.78 x C x I x A
2) Rainfall Intensity, I = $A/(Tc+C)^B$
3) Release Rate = Min (Release Rate, Peak Flow)
4) Storage Rate = Peak Flow - Release Rate
5) Storage = Duration x Storage Rate
6) Maximium Storage = Max Storage Over Duration
7) Parameters a,b,c are for City of Ottawa

City of Ottawa IDF Data (from SDG002)

IDF curve equations (Intensity in mm/hr)

100 year Intensity	$= 1735.688 / (\text{Time in min} + 6.014)^{0.820}$
50 year Intensity	$= 1569.580 / (\text{Time in min} + 6.014)^{0.820}$
25 year Intensity	$= 1402.884 / (\text{Time in min} + 6.018)^{0.819}$
10 year Intensity	$= 1174.184 / (\text{Time in min} + 6.014)^{0.816}$
5 year Intensity	$= 998.071 / (\text{Time in min} + 6.053)^{0.814}$
2 year Intensity	$= 732.951 / (\text{Time in min} + 6.199)^{0.810}$

Table D7 Storage Volumes for 2-year, 5-Year and 100-Year Storms (MRM)

Area No:	A3-1	
C_{AVG} =	0.79	(2-yr)
C_{AVG} =	0.79	(5-yr)
C_{AVG} =	0.99	(100-yr, Max 1.0)
Time Interval =	5.00	(mins)
Drainage Area =	0.0463	(hectares)

Actual Release Rate (L/sec) =	15.00	
Percentage of Actual Rate (City of Ottawa requirement) =	100%	(Set to 50% when U/G storage used)
Release Rate Used for Estimation of 100-year Storage (L/sec) =	15.00	

Duration (mins)	Release Rate = 7.80 (L/sec); Return Period = 2 (years); IDF Parameters, A = 733.0, B = 0.810, C = 6.199 ($I = A/(T_c+C)$)					Release Rate = 10.59 (L/sec); Return Period = 5 (years); IDF Parameters, A = 998.1, B = 0.814, C = 6.053 ($I = A/(T_c+C)$)					Release Rate = 15.00 (L/sec); Return Period = 100 (years); IDF Parameters, A = 1735.7, B = 0.820, C = 6.014 ($I = A/(T_c+C)$)				
	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
0	167.2	17.0	7.8	9.2	0.0	230.5	23.4	10.6	12.8	0.0	398.6	50.6	15.0	35.6	0.0
5	103.6	10.5	7.8	2.7	0.8	141.2	14.3	10.6	3.8	1.1	242.7	30.8	15.0	15.8	4.7
10	76.8	7.8	7.8	0.0	0.0	104.2	10.6	10.6	0.0	0.0	178.6	22.7	15.0	7.7	4.6
15	61.8	6.3	7.8	-1.5	-1.4	83.6	8.5	10.6	-2.1	-1.9	142.9	18.1	15.0	3.1	2.8
20	52.0	5.3	7.8	-2.5	-3.0	70.3	7.1	10.6	-3.4	-4.1	120.0	15.2	15.0	0.2	0.3
25	45.2	4.6	7.8	-3.2	-4.8	60.9	6.2	10.6	-4.4	-6.6	103.8	13.2	15.0	-1.8	-2.7
30	40.0	4.1	7.8	-3.7	-6.7	53.9	5.5	10.6	-5.1	-9.2	91.9	11.7	15.0	-3.3	-6.0
35	36.1	3.7	7.8	-4.1	-8.7	48.5	4.9	10.6	-5.7	-11.9	82.6	10.5	15.0	-4.5	-9.5
40	32.9	3.3	7.8	-4.5	-10.7	44.2	4.5	10.6	-6.1	-14.6	75.1	9.5	15.0	-5.5	-13.1
45	30.2	3.1	7.8	-4.7	-12.8	40.6	4.1	10.6	-6.5	-17.4	69.1	8.8	15.0	-6.2	-16.8
50	28.0	2.8	7.8	-5.0	-14.9	37.7	3.8	10.6	-6.8	-20.3	64.0	8.1	15.0	-6.9	-20.6
55	26.2	2.7	7.8	-5.1	-17.0	35.1	3.6	10.6	-7.0	-23.2	59.6	7.6	15.0	-7.4	-24.5
60	24.6	2.5	7.8	-5.3	-19.1	32.9	3.3	10.6	-7.2	-26.1	55.9	7.1	15.0	-7.9	-28.4
65	23.2	2.4	7.8	-5.5	-21.3	31.0	3.2	10.6	-7.4	-29.0	52.6	6.7	15.0	-8.3	-32.4
70	21.9	2.2	7.8	-5.6	-23.4	29.4	3.0	10.6	-7.6	-31.9	49.8	6.3	15.0	-8.7	-36.4
75	20.8	2.1	7.8	-5.7	-25.6	27.9	2.8	10.6	-7.8	-34.9	47.3	6.0	15.0	-9.0	-40.5
80	19.8	2.0	7.8	-5.8	-27.8	26.6	2.7	10.6	-7.9	-37.9	45.0	5.7	15.0	-9.3	-44.6
85	18.9	1.9	7.8	-5.9	-30.0	25.4	2.6	10.6	-8.0	-40.8	43.0	5.5	15.0	-9.5	-48.7
90	18.1	1.8	7.8	-6.0	-32.2	24.3	2.5	10.6	-8.1	-43.8	41.1	5.2	15.0	-9.8	-52.8
95	17.4	1.8	7.8	-6.0	-34.4	23.3	2.4	10.6	-8.2	-46.8	39.4	5.0	15.0	-10.0	-57.0
100	16.7	1.7	7.8	-6.1	-36.6	22.4	2.3	10.6	-8.3	-49.9	37.9	4.8	15.0	-10.2	-61.1
Max =					**0.8**					**1.1**					**4.7**

Notes

1) Peak flow is equal to the product of 2.78 x C x I x A
2) Rainfall Intensity, $I = A/(Tc+C)^B$
3) Release Rate = Min (Release Rate, Peak Flow)
4) Storage Rate = Peak Flow - Release Rate
5) Storage = Duration x Storage Rate
6) Maximium Storage = Max Storage Over Duration
7) Parameters a,b,c are for City of Ottawa

City of Ottawa IDF Data (from SDG002)

IDF curve equations (Intensity in mm/hr)

100 year Intensity	= 1735.688 / (Time in min + 6.014) $^{0.820}$
50 year Intensity	= 1569.580 / (Time in min + 6.014) $^{0.820}$
25 year Intensity	= 1402.884 / (Time in min + 6.018) $^{0.819}$
10 year Intensity	= 1174.184 / (Time in min + 6.014) $^{0.816}$
5 year Intensity	= 998.071 / (Time in min + 6.053) $^{0.814}$
2 year Intensity	= 732.951 / (Time in min + 6.199) $^{0.810}$

Table D8 Storage Volumes for 2-year, 5-Year and 100-Year Storms (MRM)

Area No: **A3-1**

C_{AVG} = 0.79 (2-yr)

C_{AVG} = 0.79 (5-yr)

C_{AVG} = 0.99 (100-yr, Max 1.0)

Time Interval = 5.00 (mins)

Drainage Area = 0.0463 (hectares)

Actual Release Rate (L/sec) = 15.00

Percentage of Actual Rate (City of Ottawa requirement) = 100% (Set to 50% when U/G storage used)

Release Rate Used for Estimation of 100-year Storage (L/sec) = 15.00

Duration (mins)	2-year: Release Rate = 7.80 (L/sec); Return Period = 2 (years); IDF Parameters, A = 733.0, B = 0.810, C = 6.199 ($I = A/(T_c+C)$)					5-year: Release Rate = 10.59 (L/sec); Return Period = 5 (years); IDF Parameters, A = 998.1, B = 0.814, C = 6.053 ($I = A/(T_c+C)$)					100-year: Release Rate = 15.00 (L/sec); Return Period = 100 (years); IDF Parameters, A = 1735.7, B = 0.820, C = 6.014 ($I = A/(T_c+C)$)				
	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
0	167.2	17.0	7.8	9.2	0.0	230.5	23.4	10.6	12.8	0.0	398.6	50.6	15.0	35.6	0.0
5	103.6	10.5	7.8	2.7	0.8	141.2	14.3	10.6	3.8	1.1	242.7	30.8	15.0	15.8	4.7
10	76.8	7.8	7.8	0.0	0.0	104.2	10.6	10.6	0.0	0.0	178.6	22.7	15.0	7.7	4.6
15	61.8	6.3	7.8	-1.5	-1.4	83.6	8.5	10.6	-2.1	-1.9	142.9	18.1	15.0	3.1	2.8
20	52.0	5.3	7.8	-2.5	-3.0	70.3	7.1	10.6	-3.4	-4.1	120.0	15.2	15.0	0.2	0.3
25	45.2	4.6	7.8	-3.2	-4.8	60.9	6.2	10.6	-4.4	-6.6	103.8	13.2	15.0	-1.8	-2.7
30	40.0	4.1	7.8	-3.7	-6.7	53.9	5.5	10.6	-5.1	-9.2	91.9	11.7	15.0	-3.3	-6.0
35	36.1	3.7	7.8	-4.1	-8.7	48.5	4.9	10.6	-5.7	-11.9	82.6	10.5	15.0	-4.5	-9.5
40	32.9	3.3	7.8	-4.5	-10.7	44.2	4.5	10.6	-6.1	-14.6	75.1	9.5	15.0	-5.5	-13.1
45	30.2	3.1	7.8	-4.7	-12.8	40.6	4.1	10.6	-6.5	-17.4	69.1	8.8	15.0	-6.2	-16.8
50	28.0	2.8	7.8	-5.0	-14.9	37.7	3.8	10.6	-6.8	-20.3	64.0	8.1	15.0	-6.9	-20.6
55	26.2	2.7	7.8	-5.1	-17.0	35.1	3.6	10.6	-7.0	-23.2	59.6	7.6	15.0	-7.4	-24.5
60	24.6	2.5	7.8	-5.3	-19.1	32.9	3.3	10.6	-7.2	-26.1	55.9	7.1	15.0	-7.9	-28.4
65	23.2	2.4	7.8	-5.5	-21.3	31.0	3.2	10.6	-7.4	-29.0	52.6	6.7	15.0	-8.3	-32.4
70	21.9	2.2	7.8	-5.6	-23.4	29.4	3.0	10.6	-7.6	-31.9	49.8	6.3	15.0	-8.7	-36.4
75	20.8	2.1	7.8	-5.7	-25.6	27.9	2.8	10.6	-7.8	-34.9	47.3	6.0	15.0	-9.0	-40.5
80	19.8	2.0	7.8	-5.8	-27.8	26.6	2.7	10.6	-7.9	-37.9	45.0	5.7	15.0	-9.3	-44.6
85	18.9	1.9	7.8	-5.9	-30.0	25.4	2.6	10.6	-8.0	-40.8	43.0	5.5	15.0	-9.5	-48.7
90	18.1	1.8	7.8	-6.0	-32.2	24.3	2.5	10.6	-8.1	-43.8	41.1	5.2	15.0	-9.8	-52.8
95	17.4	1.8	7.8	-6.0	-34.4	23.3	2.4	10.6	-8.2	-46.8	39.4	5.0	15.0	-10.0	-57.0
100	16.7	1.7	7.8	-6.1	-36.6	22.4	2.3	10.6	-8.3	-49.9	37.9	4.8	15.0	-10.2	-61.1
Max =					**0.8**					**1.1**					**4.7**

Notes

1) Peak flow is equal to the product of 2.78 x C x I x A

2) Rainfall Intensity, I = $A/(Tc+C)^B$

3) Release Rate = Min (Release Rate, Peak Flow)

4) Storage Rate = Peak Flow - Release Rate

5) Storage = Duration x Storage Rate

6) Maximium Storage = Max Storage Over Duration

7) Parameters a,b,c are for City of Ottawa

City of Ottawa IDF Data (from SDG002)

IDF curve equations (Intensity in mm/hr)

100 year Intensity	= 1735.688 / (Time in min + 6.014) $^{0.820}$
50 year Intensity	= 1569.580 / (Time in min + 6.014) $^{0.820}$
25 year Intensity	= 1402.884 / (Time in min + 6.018) $^{0.819}$
10 year Intensity	= 1174.184 / (Time in min + 6.014) $^{0.816}$
5 year Intensity	= 998.071 / (Time in min + 6.053) $^{0.814}$
2 year Intensity	= 732.951 / (Time in min + 6.199) $^{0.810}$

Table D9 **Storage Volumes for 2-year, 5-Year and 100-Year Storms (MRM)**

Area No: **A4**

C_{AVG} = 0.79 (2-yr)

C_{AVG} = 0.79 (5-yr)

C_{AVG} = 0.98 (100-yr, Max 1.0)

Time Interval = 5.00 (mins)

Drainage Area = 0.0779 (hectares)

Actual Release Rate (L/sec) = 30.00

Percentage of Actual Rate (City of Ottawa requirement) = 100% (Set to 50% when U/G storage used)

Release Rate Used for Estimation of 100-year Storage (L/sec) = 30.00

Duration (mins)	Release Rate = 13.07 (L/sec); Return Period = 2 (years); IDF Parameters, A = 733.0, B = 0.810, C = 6.199 ($I = A/(T_c+C)$)					Release Rate = 17.73 (L/sec); Return Period = 5 (years); IDF Parameters, A = 998.1, B = 0.814, C = 6.053 ($I = A/(T_c+C)$)					Release Rate = 30.00 (L/sec); Return Period = 100 (years); IDF Parameters, A = 1735.7, B = 0.820, C = 6.014 ($I = A/(T_c+C)$)				
	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
0	167.2	28.5	13.1	15.4	0.0	230.5	39.2	17.7	21.5	0.0	398.6	84.8	30.0	54.8	0.0
5	103.6	17.6	13.1	4.6	1.4	141.2	24.0	17.7	6.3	1.9	242.7	51.6	30.0	21.6	6.5
10	76.8	13.1	13.1	0.0	0.0	104.2	17.7	17.7	0.0	0.0	178.6	38.0	30.0	8.0	4.8
15	61.8	10.5	13.1	-2.6	-2.3	83.6	14.2	17.7	-3.5	-3.2	142.9	30.4	30.0	0.4	0.4
20	52.0	8.9	13.1	-4.2	-5.1	70.3	12.0	17.7	-5.8	-6.9	120.0	25.5	30.0	-4.5	-5.4
25	45.2	7.7	13.1	-5.4	-8.1	60.9	10.4	17.7	-7.4	-11.1	103.8	22.1	30.0	-7.9	-11.9
30	40.0	6.8	13.1	-6.3	-11.3	53.9	9.2	17.7	-8.6	-15.4	91.9	19.5	30.0	-10.5	-18.8
35	36.1	6.1	13.1	-6.9	-14.6	48.5	8.3	17.7	-9.5	-19.9	82.6	17.6	30.0	-12.4	-26.1
40	32.9	5.6	13.1	-7.5	-17.9	44.2	7.5	17.7	-10.2	-24.5	75.1	16.0	30.0	-14.0	-33.6
45	30.2	5.1	13.1	-7.9	-21.4	40.6	6.9	17.7	-10.8	-29.2	69.1	14.7	30.0	-15.3	-41.3
50	28.0	4.8	13.1	-8.3	-24.9	37.7	6.4	17.7	-11.3	-34.0	64.0	13.6	30.0	-16.4	-49.2
55	26.2	4.5	13.1	-8.6	-28.4	35.1	6.0	17.7	-11.8	-38.8	59.6	12.7	30.0	-17.3	-57.1
60	24.6	4.2	13.1	-8.9	-32.0	32.9	5.6	17.7	-12.1	-43.7	55.9	11.9	30.0	-18.1	-65.2
65	23.2	3.9	13.1	-9.1	-35.6	31.0	5.3	17.7	-12.5	-48.6	52.6	11.2	30.0	-18.8	-73.3
70	21.9	3.7	13.1	-9.3	-39.2	29.4	5.0	17.7	-12.7	-53.5	49.8	10.6	30.0	-19.4	-81.5
75	20.8	3.5	13.1	-9.5	-42.9	27.9	4.7	17.7	-13.0	-58.4	47.3	10.1	30.0	-19.9	-89.8
80	19.8	3.4	13.1	-9.7	-46.5	26.6	4.5	17.7	-13.2	-63.4	45.0	9.6	30.0	-20.4	-98.1
85	18.9	3.2	13.1	-9.8	-50.2	25.4	4.3	17.7	-13.4	-68.4	43.0	9.1	30.0	-20.9	-106.4
90	18.1	3.1	13.1	-10.0	-53.9	24.3	4.1	17.7	-13.6	-73.4	41.1	8.7	30.0	-21.3	-114.8
95	17.4	3.0	13.1	-10.1	-57.6	23.3	4.0	17.7	-13.8	-78.5	39.4	8.4	30.0	-21.6	-123.2
100	16.7	2.9	13.1	-10.2	-61.3	22.4	3.8	17.7	-13.9	-83.5	37.9	8.1	30.0	-21.9	-131.6
Max =					**1.4**					**1.9**					**6.5**

Notes

1) Peak flow is equal to the product of 2.78 x C x I x A

2) Rainfall Intensity, $I = A/(Tc+C)^B$

3) Release Rate = Min (Release Rate, Peak Flow)

4) Storage Rate = Peak Flow - Release Rate

5) Storage = Duration x Storage Rate

6) Maximium Storage = Max Storage Over Duration

7) Parameters a,b,c are for City of Ottawa

City of Ottawa IDF Data (from SDG002)

IDF curve equations (Intensity in mm/hr)

100 year Intensity $= 1735.688 / (\text{Time in min} + 6.014)^{0.820}$

50 year Intensity $= 1569.580 / (\text{Time in min} + 6.014)^{0.820}$

25 year Intensity $= 1402.884 / (\text{Time in min} + 6.018)^{0.819}$

10 year Intensity $= 1174.184 / (\text{Time in min} + 6.014)^{0.816}$

5 year Intensity $= 998.071 / (\text{Time in min} + 6.053)^{0.814}$

2 year Intensity $= 732.951 / (\text{Time in min} + 6.199)^{0.810}$

Table D10 Storage Volumes for 2-year, 5-Year and 100-Year Storms (MRM)

Area No: A5-1
C_{AVG} = 0.81 (2-yr)
C_{AVG} = 0.81 (5-yr)
C_{AVG} = 1.00 (100-yr, Max 1.0)
Time Interval = 5.00 (mins)
Drainage Area = 0.1519 (hectares)

Actual Release Rate (L/sec) = 50.00
Percentage of Actual Rate (City of Ottawa requirement) = 100% (Set to 50% when U/G storage used)
Release Rate Used for Estimation of 100-year Storage (L/sec) = 50.00

Duration (mins)	Release Rate = 26.27 (L/sec); Return Period = 2 (years); IDF Parameters, A = 733.0, B = 0.810, C = 6.199 ($I = A/(T_c+C)$)					Release Rate = 35.64 (L/sec); Return Period = 5 (years); IDF Parameters, A = 998.1, B = 0.814, C = 6.053 ($I = A/(T_c+C)$)					Release Rate = 50.00 (L/sec); Return Period = 100 (years); IDF Parameters, A = 1735.7, B = 0.820, C = 6.014 ($I = A/(T_c+C)$)				
	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
0	167.2	57.2	26.3	30.9	0.0	230.5	78.8	35.6	43.2	0.0	398.6	168.4	50.0	118.4	0.0
5	103.6	35.4	26.3	9.2	2.7	141.2	48.3	35.6	12.7	3.8	242.7	102.5	50.0	52.5	15.8
10	76.8	26.3	26.3	0.0	0.0	104.2	35.6	35.6	0.0	0.0	178.6	75.4	50.0	25.4	15.3
15	61.8	21.1	26.3	-5.1	-4.6	83.6	28.6	35.6	-7.1	-6.4	142.9	60.4	50.0	10.4	9.3
20	52.0	17.8	26.3	-8.5	-10.2	70.3	24.0	35.6	-11.6	-13.9	120.0	50.7	50.0	0.7	0.8
25	45.2	15.5	26.3	-10.8	-16.2	60.9	20.8	35.6	-14.8	-22.2	103.8	43.9	50.0	-6.1	-9.2
30	40.0	13.7	26.3	-12.6	-22.6	53.9	18.4	35.6	-17.2	-31.0	91.9	38.8	50.0	-11.2	-20.1
35	36.1	12.3	26.3	-13.9	-29.3	48.5	16.6	35.6	-19.0	-40.0	82.6	34.9	50.0	-15.1	-31.7
40	32.9	11.2	26.3	-15.0	-36.1	44.2	15.1	35.6	-20.5	-49.3	75.1	31.7	50.0	-18.3	-43.8
45	30.2	10.3	26.3	-15.9	-43.0	40.6	13.9	35.6	-21.7	-58.7	69.1	29.2	50.0	-20.8	-56.2
50	28.0	9.6	26.3	-16.7	-50.0	37.7	12.9	35.6	-22.8	-68.3	64.0	27.0	50.0	-23.0	-69.0
55	26.2	9.0	26.3	-17.3	-57.2	35.1	12.0	35.6	-23.6	-78.0	59.6	25.2	50.0	-24.8	-81.9
60	24.6	8.4	26.3	-17.9	-64.3	32.9	11.3	35.6	-24.4	-87.7	55.9	23.6	50.0	-26.4	-95.0
65	23.2	7.9	26.3	-18.4	-71.6	31.0	10.6	35.6	-25.0	-97.6	52.6	22.2	50.0	-27.8	-108.3
70	21.9	7.5	26.3	-18.8	-78.9	29.4	10.0	35.6	-25.6	-107.5	49.8	21.0	50.0	-29.0	-121.7
75	20.8	7.1	26.3	-19.2	-86.2	27.9	9.5	35.6	-26.1	-117.5	47.3	20.0	50.0	-30.0	-135.2
80	19.8	6.8	26.3	-19.5	-93.6	26.6	9.1	35.6	-26.6	-127.5	45.0	19.0	50.0	-31.0	-148.8
85	18.9	6.5	26.3	-19.8	-100.9	25.4	8.7	35.6	-27.0	-137.5	43.0	18.1	50.0	-31.9	-162.5
90	18.1	6.2	26.3	-20.1	-108.4	24.3	8.3	35.6	-27.3	-147.6	41.1	17.4	50.0	-32.6	-176.2
95	17.4	6.0	26.3	-20.3	-115.8	23.3	8.0	35.6	-27.7	-157.7	39.4	16.7	50.0	-33.3	-190.1
100	16.7	5.7	26.3	-20.5	-123.3	22.4	7.7	35.6	-28.0	-167.9	37.9	16.0	50.0	-34.0	-203.9
Max =					**2.7**					**3.8**					**15.8**

Notes
1) Peak flow is equal to the product of 2.78 x C x I x A
2) Rainfall Intensity, $I = A/(Tc+C)^B$
3) Release Rate = Min (Release Rate, Peak Flow)
4) Storage Rate = Peak Flow - Release Rate
5) Storage = Duration x Storage Rate
6) Maximium Storage = Max Storage Over Duration
7) Parameters a,b,c are for City of Ottawa

City of Ottawa IDF Data (from SDG002)

IDF curve equations (Intensity in mm/hr)

100 year Intensity = 1735.688 / (Time in min + 6.014) $^{0.820}$
50 year Intensity = 1569.580 / (Time in min + 6.014) $^{0.820}$
25 year Intensity = 1402.884 / (Time in min + 6.018) $^{0.819}$
10 year Intensity = 1174.184 / (Time in min + 6.014) $^{0.816}$
5 year Intensity = 998.071 / (Time in min + 6.053) $^{0.814}$
2 year Intensity = 732.951 / (Time in min + 6.199) $^{0.810}$

Table D11 **Storage Volumes for 2-year, 5-Year and 100-Year Storms (MRM)**

Area No: **A5-2**
C_{AVG} = 0.88 (2-yr)
C_{AVG} = 0.88 (5-yr)
C_{AVG} = 1.00 (100-yr, Max 1.0)
Time Interval = 5.00 (mins)
Drainage Area = 0.0764 (hectares)

Actual Release Rate (L/sec) = 30.00
Percentage of Actual Rate (City of Ottawa requirement) = 100% (Set to 50% when U/G storage used)
Release Rate Used for Estimation of 100-year Storage (L/sec) = 30.00

Duration (mins)	Release Rate = 14.32 (L/sec); Return Period = 2 (years); IDF Parameters, A = 733.0, B = 0.810, C = 6.199 ($I = A/(T_c+C)$)					Release Rate = 19.42 (L/sec); Return Period = 5 (years); IDF Parameters, A = 998.1, B = 0.814, C = 6.053 ($I = A/(T_c+C)$)					Release Rate = 30.00 (L/sec); Return Period = 100 (years); IDF Parameters, A = 1735.7, B = 0.820, C = 6.014 ($I = A/(T_c+C)$)				
	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
0	167.2	31.2	14.3	16.9	0.0	230.5	43.0	19.4	23.5	0.0	398.6	84.6	30.0	54.6	0.0
5	103.6	19.3	14.3	5.0	1.5	141.2	26.3	19.4	6.9	2.1	242.7	51.5	30.0	21.5	6.5
10	76.8	14.3	14.3	0.0	0.0	104.2	19.4	19.4	0.0	0.0	178.6	37.9	30.0	7.9	4.7
15	61.8	11.5	14.3	-2.8	-2.5	83.6	15.6	19.4	-3.8	-3.5	142.9	30.3	30.0	0.3	0.3
20	52.0	9.7	14.3	-4.6	-5.5	70.3	13.1	19.4	-6.3	-7.6	120.0	25.5	30.0	-4.5	-5.4
25	45.2	8.4	14.3	-5.9	-8.8	60.9	11.4	19.4	-8.1	-12.1	103.8	22.1	30.0	-7.9	-11.9
30	40.0	7.5	14.3	-6.9	-12.3	53.9	10.1	19.4	-9.4	-16.9	91.9	19.5	30.0	-10.5	-18.9
35	36.1	6.7	14.3	-7.6	-16.0	48.5	9.0	19.4	-10.4	-21.8	82.6	17.5	30.0	-12.5	-26.2
40	32.9	6.1	14.3	-8.2	-19.7	44.2	8.2	19.4	-11.2	-26.9	75.1	16.0	30.0	-14.0	-33.7
45	30.2	5.6	14.3	-8.7	-23.4	40.6	7.6	19.4	-11.9	-32.0	69.1	14.7	30.0	-15.3	-41.4
50	28.0	5.2	14.3	-9.1	-27.3	37.7	7.0	19.4	-12.4	-37.2	64.0	13.6	30.0	-16.4	-49.3
55	26.2	4.9	14.3	-9.4	-31.2	35.1	6.5	19.4	-12.9	-42.5	59.6	12.7	30.0	-17.3	-57.2
60	24.6	4.6	14.3	-9.7	-35.1	32.9	6.1	19.4	-13.3	-47.8	55.9	11.9	30.0	-18.1	-65.3
65	23.2	4.3	14.3	-10.0	-39.0	31.0	5.8	19.4	-13.6	-53.2	52.6	11.2	30.0	-18.8	-73.4
70	21.9	4.1	14.3	-10.2	-43.0	29.4	5.5	19.4	-13.9	-58.6	49.8	10.6	30.0	-19.4	-81.6
75	20.8	3.9	14.3	-10.4	-47.0	27.9	5.2	19.4	-14.2	-64.0	47.3	10.0	30.0	-20.0	-89.8
80	19.8	3.7	14.3	-10.6	-51.0	26.6	5.0	19.4	-14.5	-69.5	45.0	9.6	30.0	-20.4	-98.1
85	18.9	3.5	14.3	-10.8	-55.0	25.4	4.7	19.4	-14.7	-74.9	43.0	9.1	30.0	-20.9	-106.5
90	18.1	3.4	14.3	-10.9	-59.1	24.3	4.5	19.4	-14.9	-80.4	41.1	8.7	30.0	-21.3	-114.9
95	17.4	3.2	14.3	-11.1	-63.1	23.3	4.3	19.4	-15.1	-86.0	39.4	8.4	30.0	-21.6	-123.3
100	16.7	3.1	14.3	-11.2	-67.2	22.4	4.2	19.4	-15.2	-91.5	37.9	8.0	30.0	-22.0	-131.7
Max =					**1.5**					**2.1**					**6.5**

Notes
1) Peak flow is equal to the product of 2.78 x C x I x A
2) Rainfall Intensity, $I = A/(Tc+C)^B$
3) Release Rate = Min (Release Rate, Peak Flow)
4) Storage Rate = Peak Flow - Release Rate
5) Storage = Duration x Storage Rate
6) Maximium Storage = Max Storage Over Duration
7) Parameters a,b,c are for City of Ottawa

City of Ottawa IDF Data (from SDG002)

IDF curve equations (Intensity in mm/hr)
100 year Intensity $= 1735.688 / (\text{Time in min} + 6.014)^{0.820}$
50 year Intensity $= 1569.580 / (\text{Time in min} + 6.014)^{0.820}$
25 year Intensity $= 1402.884 / (\text{Time in min} + 6.018)^{0.819}$
10 year Intensity $= 1174.184 / (\text{Time in min} + 6.014)^{0.816}$
5 year Intensity $= 998.071 / (\text{Time in min} + 6.053)^{0.814}$
2 year Intensity $= 732.951 / (\text{Time in min} + 6.199)^{0.810}$

Table D12 Storage Volumes for 2-year, 5-Year and 100-Year Storms (MRM)

Area No: A6-1
C_{AVG} = 0.90 (2-yr)
C_{AVG} = 0.90 (5-yr)
C_{AVG} = 1.00 (100-yr, Max 1.0)
Time Interval = 5.00 (mins)
Drainage Area = 0.1600 (hectares)

Actual Release Rate (L/sec) = 70.00
Percentage of Actual Rate (City of Ottawa requirement) = 100% (Set to 50% when U/G storage used)
Release Rate Used for Estimation of 100-year Storage (L/sec) = 70.00

Duration (mins)	Release Rate = 30.74 (L/sec); Return Period = 2 (years); IDF Parameters, A = 733.0, B = 0.810, C = 6.199 ($I = A/(T_c+C)$)					Release Rate = 41.71 (L/sec); Return Period = 5 (years); IDF Parameters, A = 998.1, B = 0.814, C = 6.053 ($I = A/(T_c+C)$)					Release Rate = 70.00 (L/sec); Return Period = 100 (years); IDF Parameters, A = 1735.7, B = 0.820, C = 6.014 ($I = A/(T_c+C)$)				
	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
0	167.2	66.9	30.7	36.2	0.0	230.5	92.3	41.7	50.6	0.0	398.6	177.3	70.0	107.3	0.0
5	103.6	41.5	30.7	10.7	3.2	141.2	56.5	41.7	14.8	4.4	242.7	107.9	70.0	37.9	11.4
10	76.8	30.7	30.7	0.0	0.0	104.2	41.7	41.7	0.0	0.0	178.6	79.4	70.0	9.4	5.6
15	61.8	24.7	30.7	-6.0	-5.4	83.6	33.4	41.7	-8.3	-7.4	142.9	63.6	70.0	-6.4	-5.8
20	52.0	20.8	30.7	-9.9	-11.9	70.3	28.1	41.7	-13.6	-16.3	120.0	53.3	70.0	-16.7	-20.0
25	45.2	18.1	30.7	-12.7	-19.0	60.9	24.4	41.7	-17.3	-26.0	103.8	46.2	70.0	-23.8	-35.7
30	40.0	16.0	30.7	-14.7	-26.5	53.9	21.6	41.7	-20.1	-36.2	91.9	40.9	70.0	-29.1	-52.5
35	36.1	14.4	30.7	-16.3	-34.2	48.5	19.4	41.7	-22.3	-46.8	82.6	36.7	70.0	-33.3	-69.9
40	32.9	13.2	30.7	-17.6	-42.2	44.2	17.7	41.7	-24.0	-57.6	75.1	33.4	70.0	-36.6	-87.8
45	30.2	12.1	30.7	-18.6	-50.3	40.6	16.3	41.7	-25.4	-68.7	69.1	30.7	70.0	-39.3	-106.1
50	28.0	11.2	30.7	-19.5	-58.6	37.7	15.1	41.7	-26.6	-79.9	64.0	28.4	70.0	-41.6	-124.7
55	26.2	10.5	30.7	-20.3	-66.9	35.1	14.1	41.7	-27.6	-91.2	59.6	26.5	70.0	-43.5	-143.5
60	24.6	9.8	30.7	-20.9	-75.3	32.9	13.2	41.7	-28.5	-102.7	55.9	24.9	70.0	-45.1	-162.5
65	23.2	9.3	30.7	-21.5	-83.8	31.0	12.4	41.7	-29.3	-114.2	52.6	23.4	70.0	-46.6	-181.7
70	21.9	8.8	30.7	-22.0	-92.3	29.4	11.8	41.7	-29.9	-125.8	49.8	22.1	70.0	-47.9	-201.0
75	20.8	8.3	30.7	-22.4	-100.9	27.9	11.2	41.7	-30.5	-137.4	47.3	21.0	70.0	-49.0	-220.4
80	19.8	7.9	30.7	-22.8	-109.5	26.6	10.6	41.7	-31.1	-149.2	45.0	20.0	70.0	-50.0	-240.0
85	18.9	7.6	30.7	-23.2	-118.1	25.4	10.2	41.7	-31.6	-160.9	43.0	19.1	70.0	-50.9	-259.6
90	18.1	7.3	30.7	-23.5	-126.8	24.3	9.7	41.7	-32.0	-172.7	41.1	18.3	70.0	-51.7	-279.3
95	17.4	7.0	30.7	-23.8	-135.5	23.3	9.3	41.7	-32.4	-184.5	39.4	17.5	70.0	-52.5	-299.0
100	16.7	6.7	30.7	-24.0	-144.2	22.4	9.0	41.7	-32.7	-196.4	37.9	16.9	70.0	-53.1	-318.9
Max =					**3.2**					**4.4**					**11.4**

Notes
1) Peak flow is equal to the product of 2.78 x C x I x A
2) Rainfall Intensity, I = $A/(Tc+C)^B$
3) Release Rate = Min (Release Rate, Peak Flow)
4) Storage Rate = Peak Flow - Release Rate
5) Storage = Duration x Storage Rate
6) Maximium Storage = Max Storage Over Duration
7) Parameters a,b,c are for City of Ottawa

City of Ottawa IDF Data (from SDG002)

IDF curve equations (Intensity in mm/hr)

100 year Intensity = 1735.688 / (Time in min + 6.014) $^{0.820}$
50 year Intensity = 1569.580 / (Time in min + 6.014) $^{0.820}$
25 year Intensity = 1402.884 / (Time in min + 6.018) $^{0.819}$
10 year Intensity = 1174.184 / (Time in min + 6.014) $^{0.816}$
5 year Intensity = 998.071 / (Time in min + 6.053) $^{0.814}$
2 year Intensity = 732.951 / (Time in min + 6.199) $^{0.810}$

Table D13 Storage Volumes for 2-year, 5-Year and 100-Year Storms (MRM)

Area No: **A6-2**

C_{AVG} = 0.90 (2-yr)

C_{AVG} = 0.90 (5-yr)

C_{AVG} = 1.00 (100-yr, Max 1.0)

Time Interval = 5.00 (mins)

Drainage Area = 0.0521 (hectares)

Actual Release Rate (L/sec) = 15.00

Percentage of Actual Rate (City of Ottawa requirement) = 100% (Set to 50% when U/G storage used)

Release Rate Used for Estimation of 100-year Storage (L/sec) = 15.00

Duration (mins)	Release Rate = 10.02 (L/sec); Return Period = 2 (years); IDF Parameters, A = 733.0, B = 0.810, C = 6.199; ($I = A/(T_c+C)$)					Release Rate = 13.59 (L/sec); Return Period = 5 (years); IDF Parameters, A = 998.1, B = 0.814, C = 6.053; ($I = A/(T_c+C)$)					Release Rate = 15.00 (L/sec); Return Period = 100 (years); IDF Parameters, A = 1735.7, B = 0.820, C = 6.014; ($I = A/(T_c+C)$)				
	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
0	167.2	21.8	10.0	11.8	0.0	230.5	30.1	13.6	16.5	0.0	398.6	57.8	15.0	42.8	0.0
5	103.6	13.5	10.0	3.5	1.0	141.2	18.4	13.6	4.8	1.4	242.7	35.2	15.0	20.2	6.1
10	76.8	10.0	10.0	0.0	0.0	104.2	13.6	13.6	0.0	0.0	178.6	25.9	15.0	10.9	6.5
15	61.8	8.1	10.0	-2.0	-1.8	83.6	10.9	13.6	-2.7	-2.4	142.9	20.7	15.0	5.7	5.1
20	52.0	6.8	10.0	-3.2	-3.9	70.3	9.2	13.6	-4.4	-5.3	120.0	17.4	15.0	2.4	2.9
25	45.2	5.9	10.0	-4.1	-6.2	60.9	7.9	13.6	-5.6	-8.5	103.8	15.1	15.0	0.1	0.1
30	40.0	5.2	10.0	-4.8	-8.6	53.9	7.0	13.6	-6.6	-11.8	91.9	13.3	15.0	-1.7	-3.0
35	36.1	4.7	10.0	-5.3	-11.2	48.5	6.3	13.6	-7.3	-15.3	82.6	12.0	15.0	-3.0	-6.4
40	32.9	4.3	10.0	-5.7	-13.8	44.2	5.8	13.6	-7.8	-18.8	75.1	10.9	15.0	-4.1	-9.9
45	30.2	3.9	10.0	-6.1	-16.4	40.6	5.3	13.6	-8.3	-22.4	69.1	10.0	15.0	-5.0	-13.5
50	28.0	3.7	10.0	-6.4	-19.1	37.7	4.9	13.6	-8.7	-26.0	64.0	9.3	15.0	-5.7	-17.2
55	26.2	3.4	10.0	-6.6	-21.8	35.1	4.6	13.6	-9.0	-29.7	59.6	8.6	15.0	-6.4	-21.0
60	24.6	3.2	10.0	-6.8	-24.5	32.9	4.3	13.6	-9.3	-33.5	55.9	8.1	15.0	-6.9	-24.8
65	23.2	3.0	10.0	-7.0	-27.3	31.0	4.0	13.6	-9.5	-37.2	52.6	7.6	15.0	-7.4	-28.7
70	21.9	2.9	10.0	-7.2	-30.1	29.4	3.8	13.6	-9.8	-41.0	49.8	7.2	15.0	-7.8	-32.7
75	20.8	2.7	10.0	-7.3	-32.9	27.9	3.6	13.6	-10.0	-44.8	47.3	6.8	15.0	-8.2	-36.7
80	19.8	2.6	10.0	-7.4	-35.7	26.6	3.5	13.6	-10.1	-48.6	45.0	6.5	15.0	-8.5	-40.7
85	18.9	2.5	10.0	-7.5	-38.5	25.4	3.3	13.6	-10.3	-52.4	43.0	6.2	15.0	-8.8	-44.7
90	18.1	2.4	10.0	-7.7	-41.3	24.3	3.2	13.6	-10.4	-56.3	41.1	6.0	15.0	-9.0	-48.8
95	17.4	2.3	10.0	-7.7	-44.2	23.3	3.0	13.6	-10.6	-60.1	39.4	5.7	15.0	-9.3	-52.9
100	16.7	2.2	10.0	-7.8	-47.0	22.4	2.9	13.6	-10.7	-64.0	37.9	5.5	15.0	-9.5	-57.0
Max =					**1.0**					**1.4**					**6.5**

Notes

1) Peak flow is equal to the product of 2.78 x C x I x A

2) Rainfall Intensity, I = A/(Tc+C)^B

3) Release Rate = Min (Release Rate, Peak Flow)

4) Storage Rate = Peak Flow - Release Rate

5) Storage = Duration x Storage Rate

6) Maximium Storage = Max Storage Over Duration

7) Parameters a,b,c are for City of Ottawa

City of Ottawa IDF Data (from SDG002)

IDF curve equations (Intensity in mm/hr)

100 year Intensity = 1735.688 / (Time in min + 6.014)$^{0.820}$

50 year Intensity = 1569.580 / (Time in min + 6.014)$^{0.820}$

25 year Intensity = 1402.884 / (Time in min + 6.018)$^{0.819}$

10 year Intensity = 1174.184 / (Time in min + 6.014)$^{0.816}$

5 year Intensity = 998.071 / (Time in min + 6.053)$^{0.814}$

2 year Intensity = 732.951 / (Time in min + 6.199)$^{0.810}$

Table D14 Storage Volumes for 2-year, 5-Year and 100-Year Storms (MRM)

Area No: **A7-1A7A8**
C_{AVG} = 0.63 (2-yr)
C_{AVG} = 0.63 (5-yr)
C_{AVG} = 0.79 (100-yr, Max 1.0)
Time Interval = 5.00 (mins)
Drainage Area = 0.2048 (hectares)

Actual Release Rate (L/sec) = 43.00
Percentage of Actual Rate (City of Ottawa requirement) = 100% (Set to 50% when U/G storage used)
Release Rate Used for Estimation of 100-year Storage (L/sec) = 43.00

Duration (mins)	Release Rate = 27.70 (L/sec); Return Period = 2 (years); IDF Parameters, A = 733.0, B = 0.810, C = 6.199 ($I = A/(T_c+C)$)					Release Rate = 37.58 (L/sec); Return Period = 5 (years); IDF Parameters, A = 998.1, B = 0.814, C = 6.053 ($I = A/(T_c+C)$)					Release Rate = 43.00 (L/sec); Return Period = 100 (years); IDF Parameters, A = 1735.7, B = 0.820, C = 6.014 ($I = A/(T_c+C)$)				
	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
0	167.2	60.3	27.7	32.6	0.0	230.5	83.1	37.6	45.5	0.0	398.6	179.7	43.0	136.7	0.0
5	103.6	37.4	27.7	9.7	2.9	141.2	50.9	37.6	13.3	4.0	242.7	109.4	43.0	66.4	19.9
10	76.8	27.7	27.7	0.0	0.0	104.2	37.6	37.6	0.0	0.0	178.6	80.5	43.0	37.5	22.5
15	61.8	22.3	27.7	-5.4	-4.9	83.6	30.1	37.6	-7.4	-6.7	142.9	64.4	43.0	21.4	19.3
20	52.0	18.8	27.7	-8.9	-10.7	70.3	25.3	37.6	-12.2	-14.7	120.0	54.1	43.0	11.1	13.3
25	45.2	16.3	27.7	-11.4	-17.1	60.9	22.0	37.6	-15.6	-23.4	103.8	46.8	43.0	3.8	5.7
30	40.0	14.4	27.7	-13.3	-23.9	53.9	19.4	37.6	-18.1	-32.6	91.9	41.4	43.0	-1.6	-2.9
35	36.1	13.0	27.7	-14.7	-30.9	48.5	17.5	37.6	-20.1	-42.2	82.6	37.2	43.0	-5.8	-12.1
40	32.9	11.9	27.7	-15.8	-38.0	44.2	15.9	37.6	-21.6	-51.9	75.1	33.9	43.0	-9.1	-21.9
45	30.2	10.9	27.7	-16.8	-45.3	40.6	14.7	37.6	-22.9	-61.9	69.1	31.1	43.0	-11.9	-32.1
50	28.0	10.1	27.7	-17.6	-52.8	37.7	13.6	37.6	-24.0	-72.0	64.0	28.8	43.0	-14.2	-42.5
55	26.2	9.4	27.7	-18.3	-60.3	35.1	12.7	37.6	-24.9	-82.2	59.6	26.9	43.0	-16.1	-53.2
60	24.6	8.9	27.7	-18.8	-67.8	32.9	11.9	37.6	-25.7	-92.5	55.9	25.2	43.0	-17.8	-64.1
65	23.2	8.3	27.7	-19.3	-75.5	31.0	11.2	37.6	-26.4	-102.9	52.6	23.7	43.0	-19.3	-75.1
70	21.9	7.9	27.7	-19.8	-83.1	29.4	10.6	37.6	-27.0	-113.3	49.8	22.4	43.0	-20.6	-86.3
75	20.8	7.5	27.7	-20.2	-90.9	27.9	10.1	37.6	-27.5	-123.8	47.3	21.3	43.0	-21.7	-97.6
80	19.8	7.2	27.7	-20.5	-98.6	26.6	9.6	37.6	-28.0	-134.4	45.0	20.3	43.0	-22.7	-109.0
85	18.9	6.8	27.7	-20.9	-106.4	25.4	9.1	37.6	-28.4	-145.0	43.0	19.4	43.0	-23.6	-120.5
90	18.1	6.5	27.7	-21.2	-114.2	24.3	8.8	37.6	-28.8	-155.6	41.1	18.5	43.0	-24.5	-132.1
95	17.4	6.3	27.7	-21.4	-122.1	23.3	8.4	37.6	-29.2	-166.3	39.4	17.8	43.0	-25.2	-143.8
100	16.7	6.0	27.7	-21.7	-130.0	22.4	8.1	37.6	-29.5	-177.0	37.9	17.1	43.0	-25.9	-155.5
Max =					**2.9**					**4.0**					**22.5**

Notes
1) Peak flow is equal to the product of 2.78 x C x I x A
2) Rainfall Intensity, $I = A/(Tc+C)^B$
3) Release Rate = Min (Release Rate, Peak Flow)
4) Storage Rate = Peak Flow - Release Rate
5) Storage = Duration x Storage Rate
6) Maximium Storage = Max Storage Over Duration
7) Parameters a,b,c are for City of Ottawa

City of Ottawa IDF Data (from SDG002)

IDF curve equations (Intensity in mm/hr)
100 year Intensity $= 1735.688 / (\text{Time in min} + 6.014)^{0.820}$
50 year Intensity $= 1569.580 / (\text{Time in min} + 6.014)^{0.820}$
25 year Intensity $= 1402.884 / (\text{Time in min} + 6.018)^{0.819}$
10 year Intensity $= 1174.184 / (\text{Time in min} + 6.014)^{0.816}$
5 year Intensity $= 998.071 / (\text{Time in min} + 6.053)^{0.814}$
2 year Intensity $= 732.951 / (\text{Time in min} + 6.199)^{0.810}$

Table D15 5-YEAR STORM SEWER CALCULATION SHEET

Return Period Storm = **5** (5-years, 100-years)
Default Inlet Time= 10 (minutes)
Manning Coefficient = 0.013 (dimensionless)

LOCATION			AREA (hectares)				FLOW (UNRESTRICTED - RATIONAL METHOD)							SEWER DATA										
Location	From Node	To Node	Area No.	Area (ha)	∑ Area (ha)	Average R	Indiv. 2.78*A*R	Accum. 2.78*A*R	Tc (mins)	I (mm/h)	Indiv. Flow (L/sec)	Return Period	Q (L/sec)	Dia (mm) Actual	Dia (mm) Nominal	Type	Slope (%)	Length (m)	Capacity (L/sec)	Velocity (m/s) Vf	Velocity (m/s) Va	Time in Pipe, Tt (min)	Hydraulic Ratios Qa/Qf	Hydraulic Ratios Va/Vf
	Trench Drain	900	A1-1	0.02	0.02	0.90	0.06	0.06	10.00	104.19	6.02	5.00	6.0	201.16	200	PVC	1.00	35.31	33.3	1.04	0.67	0.88	0.18	0.64
	900	800	A1,A2	0.16	0.18	0.81	0.35	0.41	10.88	99.76	35.12	5.00	40.9	299.36	300	PVC	0.50	64.36	68.0	0.97	0.87	1.23	0.60	0.90
	800	700	A3-1, A3-2	0.09	0.27	0.77	0.19	0.60	12.11	94.22	17.86	5.00	56.5	299.36	300	PVC	0.46	62.98	65.2	0.93	0.93	1.13	0.87	1.00
	700	600	A4	0.08	0.35	0.79	0.17	0.77	13.24	89.70	15.27	5.00	69.0	366.42	375	PVC	0.30	85.69	90.3	0.87	0.85	1.68	0.76	0.98
	BLDG	501	A11	0.80	0.80	0.90	2.00	2.00	10.00	104.19	208.36	5.00	208.4	366.42	375	PVC	2.00	22.98	233.1	2.25	2.25	0.17	0.89	1.00
	501	502			0.80			2.00	10.17	103.30		5.00	206.6	447.87	450	PVC	1.17	3.43	304.5	1.94	1.63	0.04	0.68	0.84
	Trench Drain	502	A9	0.01	0.01	0.90	0.04	0.04	10.00	104.19	3.90	5.00	3.9	201.16	200	PVC	1.02	21.57	33.6	1.05	0.59	0.61	0.12	0.56
	502	600	A5-1, A5-2, A6-1, A6-2	0.44	1.25	0.87	1.06	3.10	10.61	101.08	107.07	5.00	313.0	533	525	CONC	1.00	57.10	447.8	1.99	1.89	0.50	0.70	0.95
	100	200	A71, A7	0.16	0.16	0.75	0.33	0.33	10.00	104.19	34.34	5.00	34.3	299.36	300	PVC	0.39	57.08	60.0	0.85	0.60	1.57	0.57	0.71
	200	300			0.16			0.33	11.57	96.56		5.00	31.8	299.36	300	PVC	0.44	36.11	63.8	0.91	0.64	0.94	0.50	0.71
	300	400	A8	0.05	0.20	0.24	0.03	0.36	12.51	92.57	2.87	5.00	33.4	299.36	300	PVC	0.44	75.77	63.8	0.91	0.64	1.97	0.52	0.71
	400	600			0.20			0.36	14.48	85.28		5.00	30.8	299.36	300	PVC	0.51	14.04	68.7	0.98	0.69	0.34	0.45	0.71
	600	601			1.81			4.23	14.82	84.15		5.00	355.7	610	600	CONC	0.50	9.72	453.7	1.54	1.50	0.11	0.78	0.98
	601	Storm Main			1.81			4.23	14.93	83.80		5.00	354.2	610	600	CONC	0.50	12.85	453.7	1.54	1.50	0.14	0.78	0.98

Definitions:
Q = 2.78*AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Watershed Area (hectares)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficients (dimensionless)

Notes:
Ottawa Rainfall Intensity Values:
From Sewer Desing Guidelines, 2004

	5yr	100yr
a =	998.071	1735.688
b=	0.814	0.820
c =	6.053	6.014

Designed: **Aaditya Jariwala, Meng, PEng.**
Checked: **A. Ansari, PEng.**
Dwg Reference: **C101, C102**
Project: **1485 Upper Street**
Location: **Ottawa, Ontario**
File Ref: **22023462 - STM Design Sheet**
Sheet No: **1 of 1**

HYDROVEX®

VHV/SVHV Vortex Flow Regulator

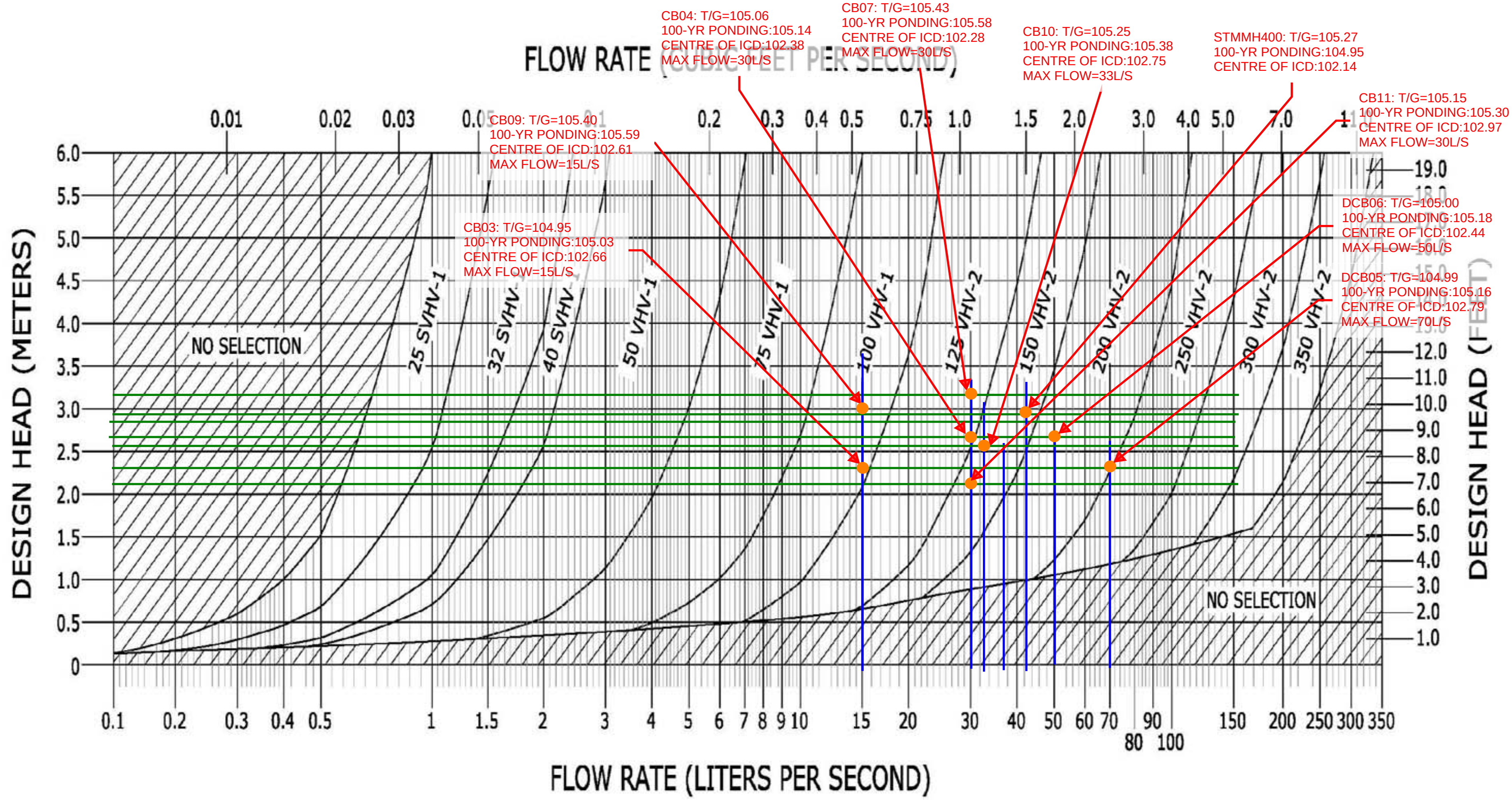


FIGURE 3

JOHN MEUNIER

Appendix E – Additional Information

File Number: PC2022-0277
November 15, 2022

Pre-Application Consultation Meeting Minutes

Property Address: 1485 Upper Canada
Location: Virtual – Microsoft Teams
Meeting Date: November 15, 2022

Attendees: Sarah Ezzio – Planner, City of Ottawa
Steven Payne – Planning Coop, City of Ottawa
Ann O'Connor– Urban Design, City of Ottawa
Julie Candow – Engineer, City of Ottawa
Patrick McMahon – Transportation, City of Ottawa
Jeff Goettling – Parks, City of Ottawa
Mercedes Liedtke - MVCA
Toon Dreessen - Architects DCA
Jimmy Wang, Property Owner - Konson Homes
Doug Burnside – Dolyn Construction
Melissa Guimond – Dolyn Construction

Regrets: Hayley Murray – Forester
Matthew Hayley – Environmental Planning

Policies/Designations of the site

- Official Plan – Suburban Transect, Mixed Industrial Designation
- Zoning – IP13, Business Park Industrial Zone
- Community Design Plan – Kanata West Concept Plan

Planning

1. This would be considered a complex site plan application, information about the fees is available at this link. A Lifting of a Holding Symbol application is also needed in order to accommodate the proposed use.
2. Thank you for showing the pedestrian connections on the site. Please continue to develop the connections to and within the site.
3. Retail is not a permitted use on this site. Showrooms must be accessory to a permitted use, and are not permitted to exceed 25% of the GFA as per the provisions of the zoning by-law.
4. Please indicate where the snow storage is proposed to be located on the site plan.
5. Please look for opportunities to consolidate the loading areas to one area of the site where possible.
6. Show all the dimensions (in metric units) on the site plan for items like the garbage storage, snow storage, etc.
7. There is a Holding Symbol with an urban exception 2166 along the western edge of the property which would require a vibration and noise study to have it lifted.

   a. For more information, please see here.
8. Please limit the amount of hard surfacing where possible on the site.
9. The new Official Plan calls for a 40% tree canopy coverage across neighbourhoods so we would appreciate finding opportunities on the site to plant more trees.
10. We would request landscaped medians around the parking to provide more tree canopy cover.
11. The subject property is located within the boundary of the Kanata West CDP, where it is designated as Prestige Business Park, and thus must conform to the policy. Please refer to the Kanata West CDP found here.

Feel free to contact Sarah Ezzio, Planner (File Lead), at sarah.ezzio@ottawa.ca for follow-up questions.

Urban Design

1. An Urban Design Brief that follows the provided Terms of Reference is required upon submission of application.

2. Provisions of the Kanata West CDP and SP should be complied with.

3. Provide tree and soft-landscaping plantings
   a. Please consider planting multiple trees between the front and corner property lines on Upper Canada St and Campeau Dr and the proposed internal road that winds around the proposed building. Between the planted trees, consider also including shrubs and other soft-landscaping/vegetative elements. Substantial landscaping on-site, aligned with the public ROW is highly encouraged.

4. Prioritize pedestrian and cycling movement and safety
   a. Design staff support the five pedestrian crosswalks/pavement markings provided across the internal road and the associated pathways to the existing concrete sidewalk on the public roads.
   b. Design staff support the provision of the three bicycle racks. Please ensure the movement of a cyclist coming into the site toward these bicycle spots is considered moving forward.
   c. Ensure public sidewalks are built along the lot lines abutting the public ROW

5. Create animated facades facing the public realm
   a. No elevations were provided in advance of this pre-consultation; however, when they are drafted, please consider creating an animated façade along the building walls that face the public ROW. Also, consider locating any internal office or commercial uses to be along these facades, to provide more interaction with the public realm than a storage use would.

Feel free to contact Ann O'Connor, Urban Design, at ann.oconnor@ottawa.ca for follow-up questions.

Transportation

1. Follow Traffic Impact Assessment Guidelines:
   a) Start this process as soon as possible.
   b) Applicant advised that the application will not be deemed complete until the submission of the draft step 1-4. Collaboration and communication between development proponents and City staff are required at the end of every step of the TIA process.

2. A noise study is not required.

3. On site plan:
   a) Turning templates will be required for all accesses showing the largest vehicle to access the site; required for internal movements and at all access (entering and exiting and going in both directions). Accesses will require justification for a width of greater than 9m.
   b) Show all curb radii measurements; ensure that all curb radii are reduced as much as possible.
   c) Sidewalks are to be continuous across accesses as per City Specification 7.1.

4. Please review access configurations with respect to the Private Approach By-law. Some are too close to property lines and do not meet minimum offsets from each other.

Feel free to contact Patrick McMahon, Transportation Project Manager, at patrick.mcmahon@ottawa.ca for follow-up questions.

Forestry

1. Minimum Setbacks
   - Maintain 1.5m from sidewalk or MUP/cycle track or water service laterals.
   - Maintain 2.5m from curb
   - Coniferous species require a minimum 4.5m setback from curb, sidewalk or MUP/cycle track/pathway.
   - Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing, except where otherwise approved in naturalization / afforestation areas. Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when **planting around overhead primary conductors.**

2. Tree specifications
   - Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
   - Maximize the use of large deciduous species wherever possible to maximize future canopy coverage
   - Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and include watering and warranty as described in the specification (can be provided by Forestry Services).
   - Plant native trees whenever possible
   - No root barriers, dead-man anchor systems, or planters are permitted.
   - No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)

3. Hard surface planting
   - Curb style planter is highly recommended
   - No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.
   - Trees are to be planted at grade

4. Soil Volume
   - Please document on the LP that adequate soil volumes can be met:

Tree Type/Size	Single Tree Soil Volume (m3)	Multiple Tree Soil Volume (m3/tree)
Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15
Large	30	18
Conifer	25	15

     Please note that these soil volumes are not applicable in cases with Sensitive Marine Clay.
   - Please follow the City's 2017 Tree Planting in Sensitive Marine Clay guidelines

5. Tree Canopy
   - The landscape plan shall show how the proposed tree planting will replace and increase canopy cover on the site over time, to support the City's 40% urban forest canopy cover target.
   - At a site level, efforts shall be made to provide as much canopy cover as possible, through tree planting and tree retention, with an aim of 40% canopy cover at 40 years, as appropriate.
   - Indicate on the plan the projected future canopy cover at 40 years for the site.

Feel free to contact Hayley Murray, Forester, at hayley.murray@ottawa.ca for follow-up questions.

Engineering

1. The Servicing Study Guidelines for Development Applications are available at the following address: https://ottawa.ca/en/planning-development-and-construction/development-information-residents/development-application-20#section-servicing-study-guidelines-for-development-applications

2. Servicing and site works shall be in accordance with the following documents:
   - ⇨ Ottawa Sewer Design Guidelines (October 2012)
   - ⇨ Ottawa Design Guidelines – Water Distribution (2010)
   - ⇨ Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
   - ⇨ City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
   - ⇨ City of Ottawa Environmental Noise Control Guidelines (January, 2016)
   - ⇨ City of Ottawa Park and Pathway Development Manual (2012)
   - ⇨ City of Ottawa Accessibility Design Standards (2012)
   - ⇨ Ottawa Standard Tender Documents (latest version)
   - ⇨ Ontario Provincial Standards for Roads & Public Works (2013)

3. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at geoinformation@ottawa.ca or by phone at (613) 580-2424 x.44455).
4. The water, sanitary, storm servicing and stormwater management criteria for the subject site are to be in accordance with the Kanata West Business Park – Phase 5 Design Brief, prepared by IBI Group (September 2019), attached, and the Kanata West Master Servicing Study (2006). The existing storm, sanitary and watermain infrastructure within Upper Canada Street, as well as the receiving storm pond, were designed to accommodate this site as per the KWBP – Phase 5

Design Brief. The capacity of pipes receiving flows from the subject site should be reviewed and confirmed within the Site Servicing Report. Flows to the storm sewer in excess of the allocated release rate, up to and included the 100-yr storm event, must be detained onsite.

5. All services to be grouped in one common trench to minimize the number of road cuts.
6. Water Boundary condition requests must include the location of the service (map or plan with connection location(s) indicated) and the expected loads required by the proposed development, including calculations. Please provide the following information:

   a) Location of service
   b) Type of development and the amount of fire flow required (as per FUS).
   c) Average daily demand: ___ l/s.
   d) Maximum daily demand: ___l/s.
   e) Maximum hourly daily demand: ___ l/s.

7. An MECP Environmental Compliance Approval is not anticipated to be required for this application unless the proposed development does not meet the following exemption criteria:

   a) Is designed to service one lot or parcel of land;
   b) Discharges into a storm sewer that is not a combined sewer;
   c) Does not service industrial land or a structure located on industrial land; and
   d) Is not located on industrial land. O.Reg. 525/98, s. 3; O.Reg. 40/15, s. 4.

In which “industrial land” means land used for the production, processing, repair, maintenance or storage of goods or materials, or the processing, storage, transfer or disposal of waste, but does not include land used primarily for the purpose of buying or selling;

a) Goods or materials other than fuel, or
b) Services other than vehicle repair services.

8. Phase 1 ESAs and Phase 2 ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.

Feel free to contact Julie Candow, Infrastructure Project Manager, at julie.candow@ottawa.ca for follow-up questions.

Environmental Planning

- Please review and incorporate bird safe design elements. Some of the risk factors include glass and related design traps such as corner glass and fly-through conditions, ventilation grates and open pipes, landscaping, light pollution. More guidance and solutions are available in the guidelines which can be found here: https://documents.ottawa.ca/sites/documents/files/birdsafedesign_guidelines_en.pdf

Feel free to contact Matthew Hayley, Environmental Planner, at matthew.hayley@ottawa.ca for follow-up questions.

Parks

1. As per the Parkland Dedication (By-law No. 2022-280) | City of Ottawa, as amended, parkland dedication will be required as a condition of development. In this circumstance given the parcel size and proposed use, Cash in Lieu of Parkland (CILP) would be considered appropriate.

2. Based in the details provided, the proposal would be best considered a commercial or industrial development for the purposes of the parkland dedication by-law. The applicant is encouraged to review the parkland dedication by-law should they feel that an alternative land use category be more appropriate. The parkland requirement for a commercial, industrial or retail use is calculated as 2% of the gross land area of the site being developed.

3. Has there been any past Parkland Dedication credited to the subject property parcel(s)? If so, please provide the associated documentation for Parks and Facilities Planning (PFP) review/ consideration. The conveyance of land for purposes or the payment of money in-lieu of accepting the conveyance is not required for development, redevelopment, subdivisions or consents, where it is known, or can be demonstrated that the required parkland conveyance or money in-lieu thereof has been previously satisfied.
4. Please identify for example in the Planning Rationale or by other means (when the initial development application is submitted) how the requirements in the Parkland Dedication (By-law No. 2022-280) will be or have been achieved.

5. Given the above comments and should Cash in Lieu of Parkland (CILP) be collected, the value of the land shall be determined by the City's Realty Services Branch or submitted otherwise according to By-law No. 2022-280. The owner is responsible for any appraisal costs incurred by the City.

6. Please note that the park comments are preliminary and will be finalized (and subject to change) upon receipt of the requested supporting documentation. Additionally, if the proposed land use changes, then the parkland dedication requirement will be re-evaluated accordingly.

Feel free to contact Jeff Goettling with Parks and Facilities Planning Services, at jeff.goettling@ottawa.ca for follow-up questions.

MVCA

1. MVCA has no concerns from a natural heritage/ natural hazard standpoint

2. We will require a stormwater management plan.
    a. Please include the design criteria for the existing pond (Pond 6 West).
    b. 80% TSS removal, or enhanced level of protection, is required as per the Carp River Watershed Subwatershed Study.
    c. Thermal mitigation is required as Feedmill Creek is a coolwater watercourse

3. The Carp River Watershed Subwatershed Study identifies this site as a low groundwater recharge area, which has an annual infiltration target of 73mm/year.

Feel free to contact Mercedes Liedtke, Infrastructure Project Manager, at mliedtke@mvc.on.ca for follow-up questions.

General Comments

The list of required plans and studies are attached to this email.

Please refer to the links to "Guide to preparing studies and plans" and fees for general information. Additional information is available related to building permits, development charges, and the Accessibility Design Standards. Be aware that other fees and permits may be required, outside of the development review process. You may obtain background drawings by contacting informationcentre@ottawa.ca.

These pre-con comments are valid for one year. If you submit a development application(s) after this time, you may be required to meet for another pre-consultation meeting and/or the submission requirements may change. You are as well encouraged to contact us for a follow-up meeting if the plan/concept will be further refined.

PATERSON GROUP

memorandum

re: **Geotechnical Response to City Comments**
Proposed Commercial-Industrial Building
1485 Upper Canada Street - Ottawa
to: Dolyn Developments Inc. - **Ms. Melissa Guimond** – melissa@dolyn.com
date: September 6, 2023
file: PG6477-MEMO.01

Further to your request, Paterson Group (Paterson) has prepared the current memo to provide our responses to the geotechnical-related comments from the City of Ottawa for the proposed development to be located at the aforementioned site. This memo should be read in conjunction with the updated Geotechnical Investigation PG6477-1 dated January 10, 2023.

Comment 1: *Geotechnical Investigation – Proposed Commercial-Industrial Building, Report PG6477-1 prepared by Paterson Group, dated January 10, 2023. 1.14. The Geotechnical Report should address the infiltration target of 73mm/yr and the anticipated hydraulic conductivity of the onsite soils. The hydraulic conductivity specified by the Geotechnical Consultant should then be used in the infiltration calculations within the Site Servicing Report.*

Response: Based on the soils observed during our geotechnical investigation at the subject site, the theoretical infiltration rates are as follows:

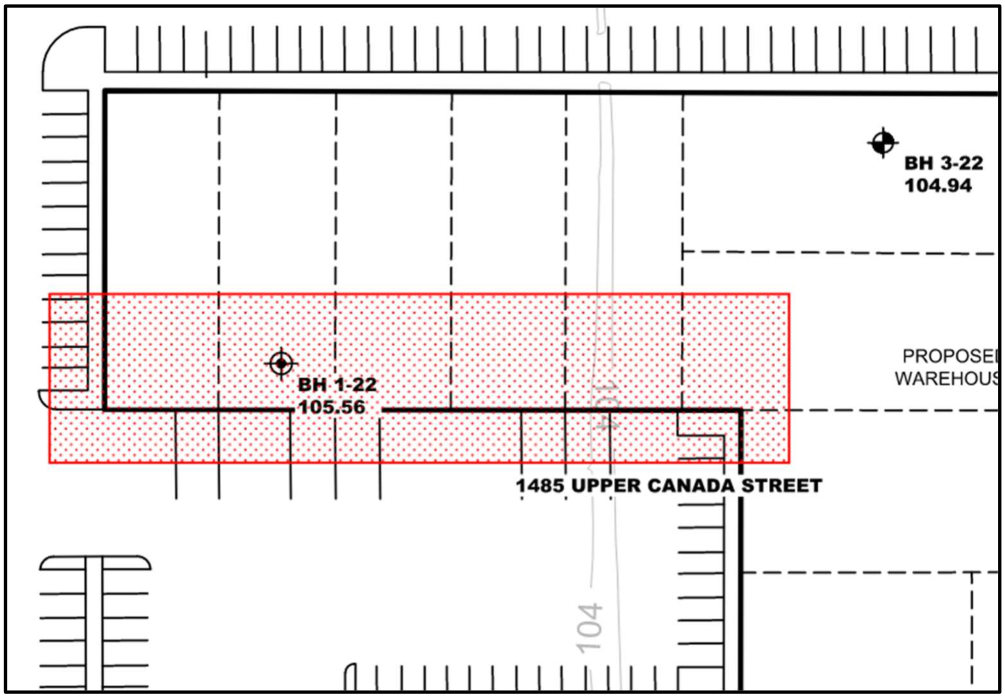
- Silty Clay – <10 to 30 mm/hour
- Glacial Till – 25 to 75 mm/hour
- Silty Sand – 50 to >150 mm/hour
- Sandy Silt – 25 to 75 mm/hour

Based on internal meetings with the civil consultant, Paterson provided the above noted theoretical infiltration rates based on the soils encountered on site. The infiltration systems proposed by the civil servicing plans are understood to be designed to an infiltration rate of 43 mm/hour based on the subgrade soils expected below the systems. Therefore, the infiltration rates used by the civil consultant are considered acceptable from a geotechnical perspective.

Comment 2: *The building foundation setback must be determined by the geotechnical engineer. If there are no sensitive marine clay impacts here, there are no required foundation setbacks.*

Response:

Generally, tree planting setbacks are required when a continuous silty clay deposit is located at the founding elevation of the proposed footings. Based on our findings during the geotechnical investigation, the bearing medium will consist of compact silty sand. Therefore, no setbacks are required for those areas from a geotechnical perspective. However, one isolated area was observed to have a very thin layer of silty clay below the USF level as shown below:



Although a silty clay layer is encountered in BH1-22, the thickness of the silty clay layer along with the sand content would lessen the shrinkage and volume changes of this layer as a result of tree roots extending below the footings. Therefore, it is safe to consider that a minimum 7.5 m spacing is acceptable for small to medium sized trees for this portion of the building.

For due diligence purposes, Paterson reviewed the landscaping plan prepared by James B. Lennox & Associates, Drawing No. L1 – Landscape Plan – Block 1, South Half Lot 4, Concession 1 – 23MIS2322 dated April 14, 2023.Based on our review, the proposed trees are proposed to be placed at least 14.9 and 11.5 m away from the northwestern and southeastern foundation walls of the building, respectively. From a geotechnical perspective, the proposed tree planting spacing is considered acceptable.

We trust that the current submission meets your immediate requirements.

Best Regards,

Paterson Group Inc.

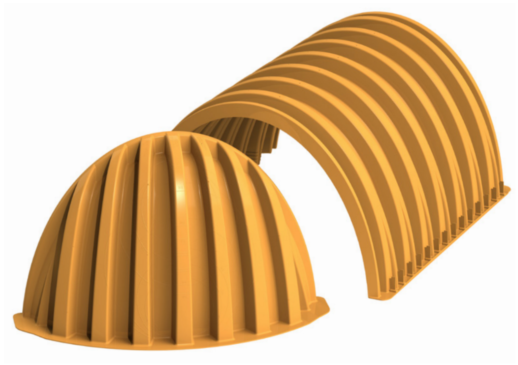
LICENSED PROFESSIONAL ENGINEER
Sept. 6, 2023
F. I. ABOU-SEIDO
100156744
PROVINCE OF ONTARIO

Puneet Bandi, M.Eng.

Faisal I. Abou-Seido, P.Eng.

StormTech® MC-3500 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.



Nominal Chamber Specifications

(not to scale)

Size (L x W x H)
90” x 77” x 45”
2286 mm x 1956 mm x 1143 mm

Chamber Storage
109.9 ft^3 (3.11 m^3)

Min. Installed Storage*
175.0 ft^3 (4.96 m^3)

Weight
134 lbs (60.8 kg)

Shipping
15 chambers/pallet
7 end caps/pallet
7 pallets/truck

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below chambers, 6” (150 mm) of stone between chambers/ end caps and 40% stone porosity.

Nominal End Cap Specifications

(not to scale)

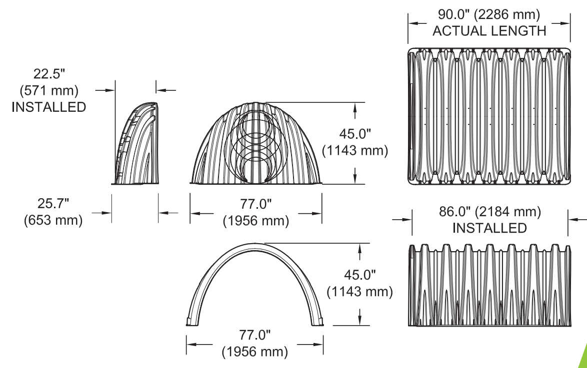
Size (L x W x H)
26.5” x 71” x 45.1”
673 mm x 1803 mm x 1145 mm

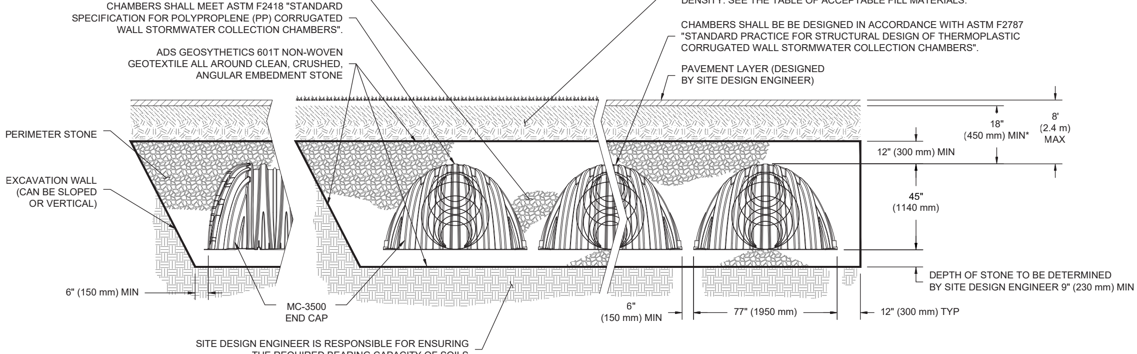
End Cap Storage
14.9 ft^3 (0.42 m^3)

Min. Installed Storage*
45.1 ft^3 (1.28 m^3)

Weight
49 lbs (22.2 kg)

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below, 6” (150 mm) of stone perimeter, 6” (150 mm) of stone between chambers/ end caps and 40% stone porosity.





*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 24" (600 mm).

ADS StormTech™

StormTech MC-3500 Specifications

Storage Volume Per Chamber

	Bare Chamber Storage ft³ (m³)	Chamber and Stone Foundation Depth in. (mm)			
		9 in (230 mm)	12 in (300 mm)	15 in (375 mm)	18 in (450 mm)
Chamber	109.9 (3.11)	175.0 (4.96)	179.9 (5.09)	184.9 (5.24)	189.9 (5.38)
End Cap	14.9 (0.42)	45.1 (1.28)	46.6 (1.32)	48.3 (1.37)	49.9 (1.41)

Note: Assumes 6" (150 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume.

Amount of Stone Per Chamber

English Tons (yds³)	Stone Foundation Depth			
	9 in	12 in	15 in	18 in
Chamber	8.5 (6.0)	9.1 (6.5)	9.7 (6.9)	10.4 (7.4)
End Cap	3.9 (2.8)	4.1 (2.9)	4.3 (3.1)	4.5 (3.2)
Metric Kilograms (m³)	**230 mm**	**300 mm**	**375 mm**	**450 mm**
Chamber	7711 (4.6)	8255 (5.0)	8800 (5.3)	9435 (5.7)
End Cap	3538 (2.1)	3719 (2.2)	3901 (2.4)	4082 (2.5)

Note: Assumes 12" (300 mm) of stone above and 6" (150 mm) row spacing and 6" (150 mm) of perimeter stone in front of end caps.

Volume Excavation Per Chamber yd³ (m³)

	Stone Foundation Depth			
	9 in (230 mm)	12 in (300 mm)	15 in (375mm)	18 in (450 mm)
Chamber	11.9 (9.1)	12.4 (9.5)	12.8 (9.8)	13.3 (10.2)
End Cap	4.0 (3.1)	4.1 (3.3)	4.3 (3.3)	4.4 (3.4)

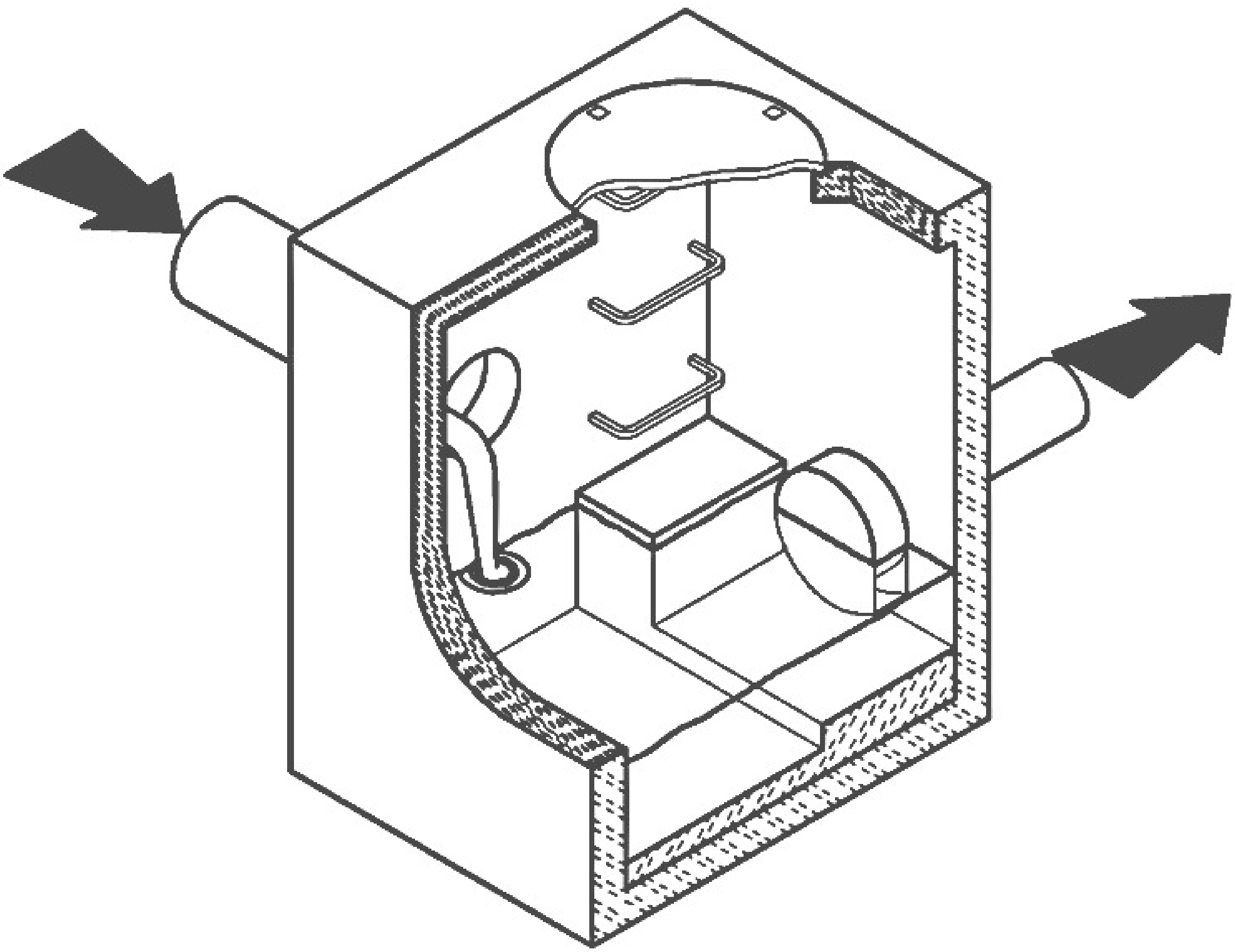
Note: Assumes 6" (150 mm) of separation between chamber rows and 24" (600 mm) of cover. The volume of excavation will vary as depth of cover increases.

ADS StormTech products, manufactured in accordance with ASTM F2418 or ASTMF2922, comply with all requirements in the Build America, Buy America (BABA) Act.

Working on a project?
Visit us at adspipe.com/stormtech and utilize the Design Tool

adspipe.com
800-821-6710

® HYDROVEX® VHV / SVHV
Vertical Vortex Flow Regulator



JOHN MEUNIER

APPLICATIONS

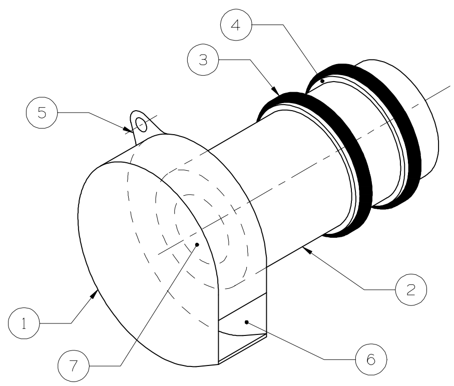
One of the major problems of urban wet weather flow management is the runoff generated after a heavy rainfall. During a storm, uncontrolled flows may overload the drainage system and cause flooding. Due to increased velocities, sewer pipe wear is increased dramatically and results in network deterioration. 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.

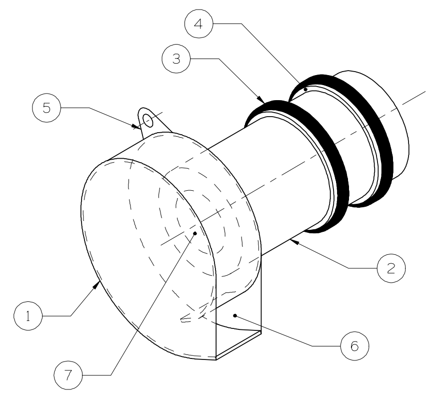
The vortex flow regulator design is based on the fluid mechanics principle of the forced vortex. This grants flow regulation without any moving parts, thus reducing maintenance. The operation of the regulator, depending on the upstream head and discharge, switches between orifice flow (gravity flow) 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.

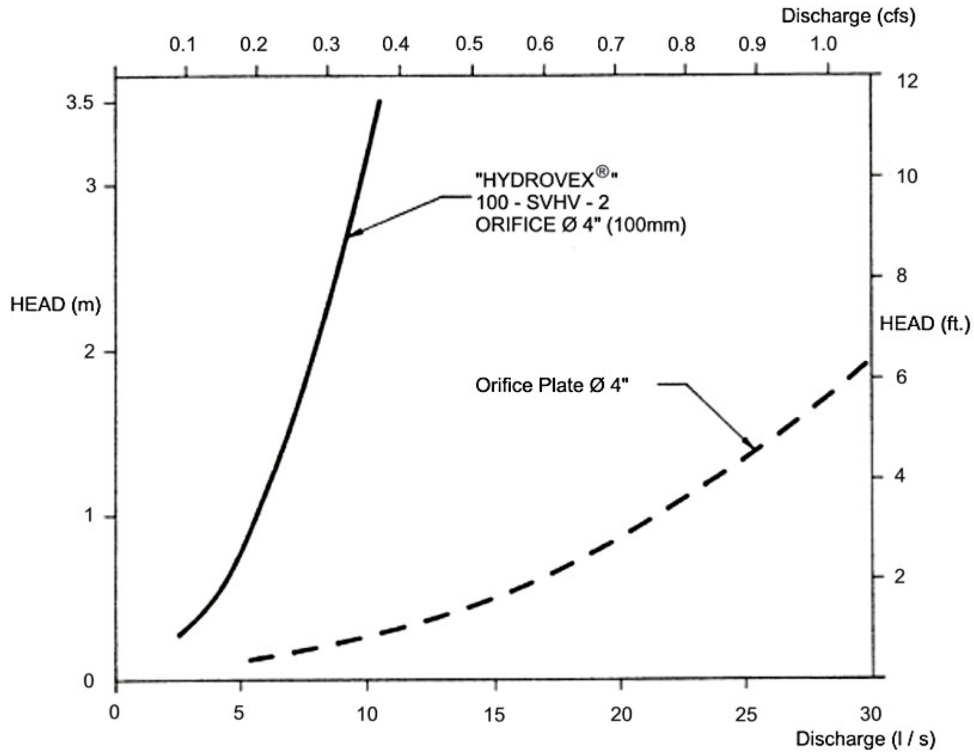


FIGURE 2: DISCHARGE CURVE SHOWING A HYDROVEX® FLOW REGULATOR VS AN ORIFICE PLATE

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:

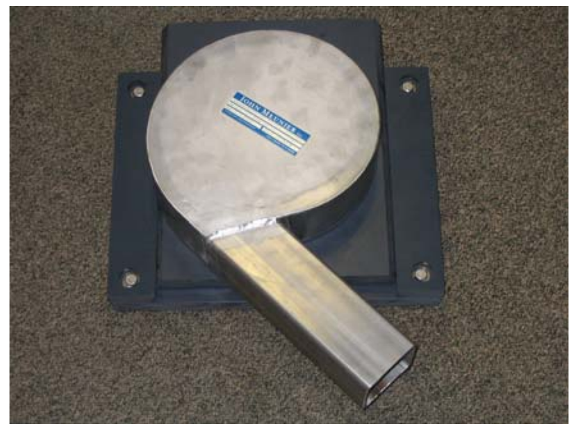
- ***project design flow rate***
- ***pressure head***
- ***chamber's outlet pipe diameter and type***

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

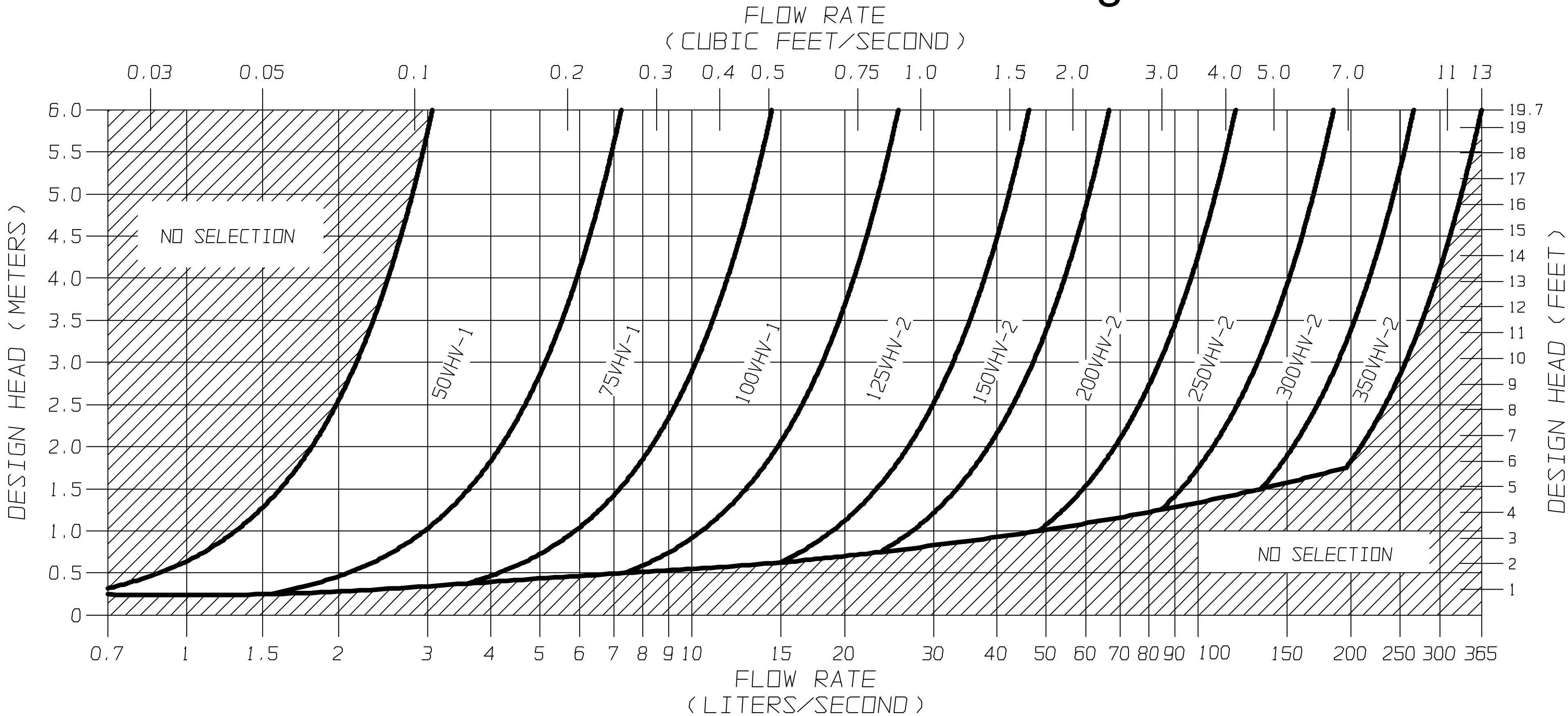


FIGURE 3 - VHV

JOHN MEUNIER

HYDROVEX®

SVHV Vertical Vortex Flow Regulator

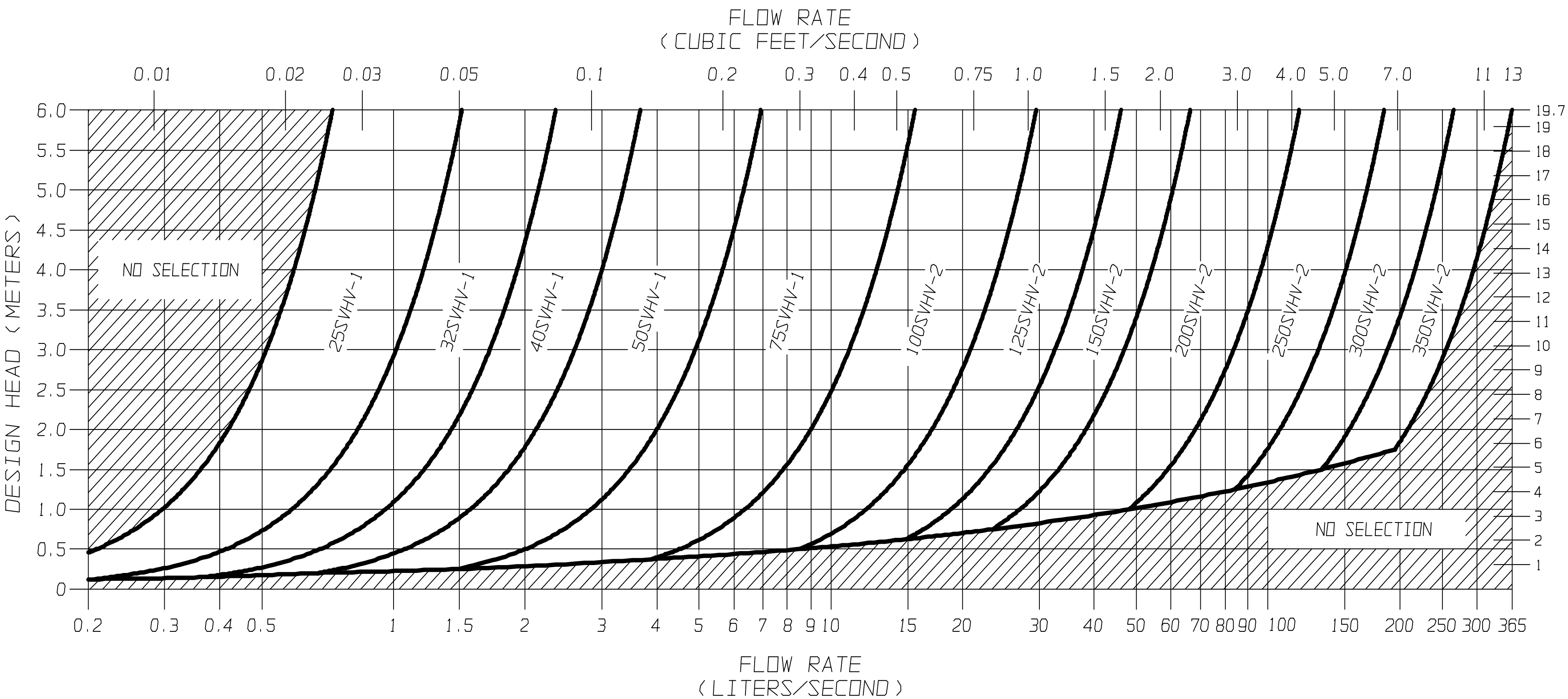
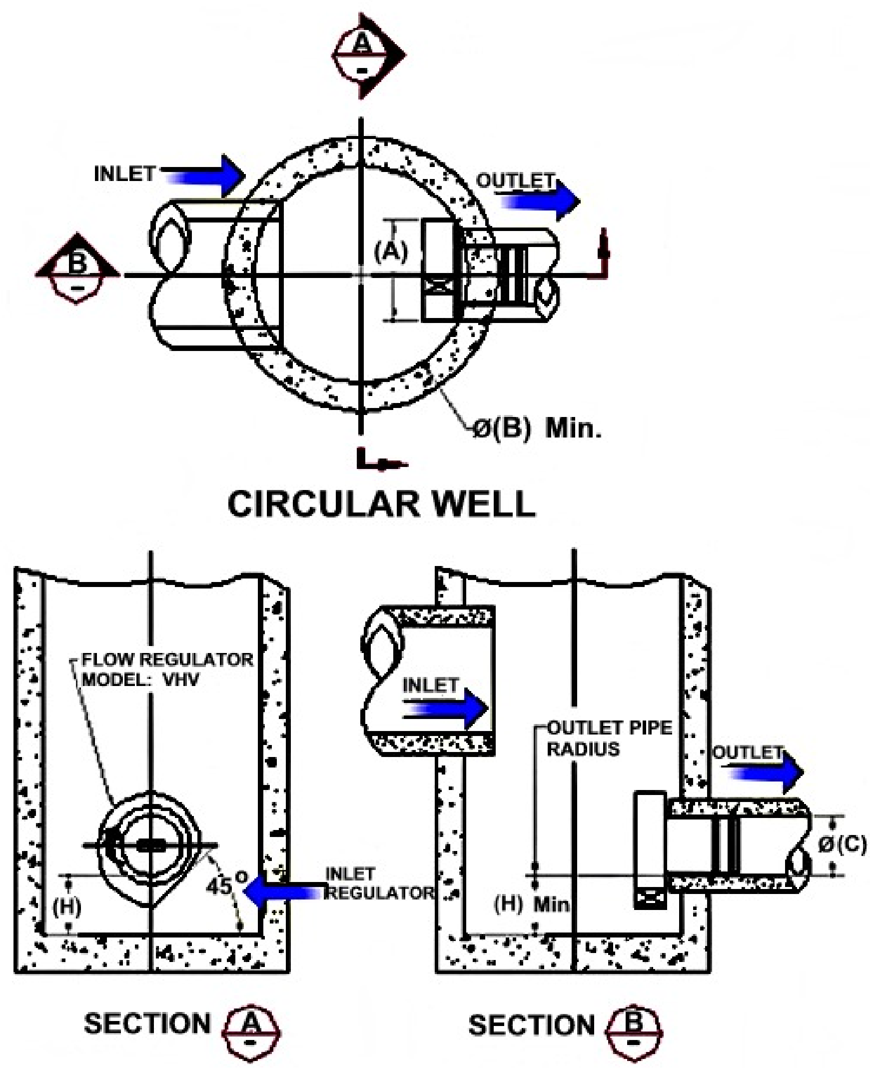


FIGURE 3 - SVHV

JOHN MEUNIER

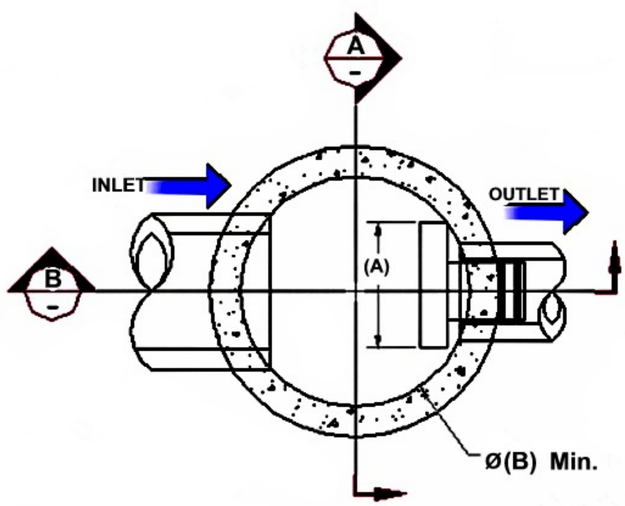
FLOW REGULATOR TYPICAL INSTALLATION IN CIRCULAR MANHOLE
FIGURE 4 (MODEL VHV)

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

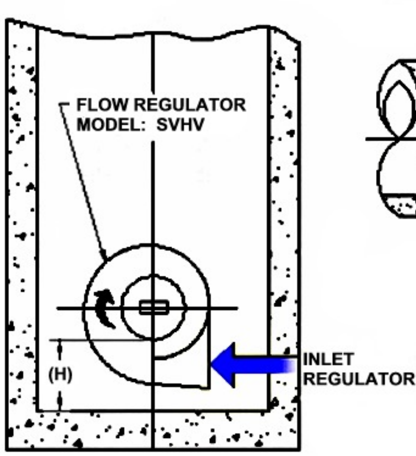


FLOW REGULATOR TYPICAL INSTALLATION IN CIRCULAR MANHOLE
FIGURE 4 (MODEL SVHV)

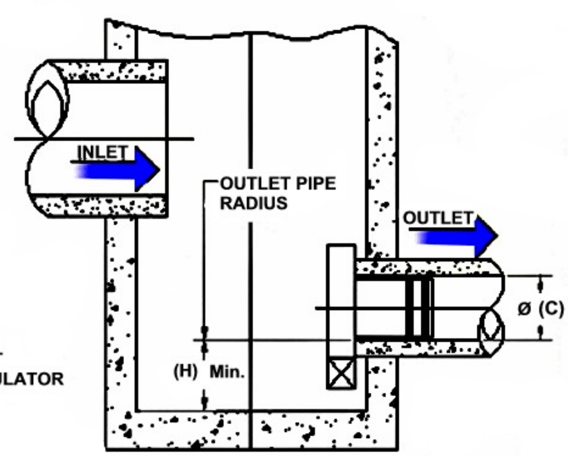
Model Number	Regulator Diameter		Minimum Manhole Diameter		Minimum Outlet Pipe Diameter		Minimum Clearance	
	A (mm)	**A** (in.)	**B** (mm)	**B** (in.)	**C** (mm)	**C** (in.)	**H** (mm)	**H** (in.)
25 SVHV-1	125	5	600	24	150	6	150	6
32 SVHV-1	150	6	600	24	150	6	150	6
40 SVHV-1	200	8	600	24	150	6	150	6
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



CIRCULAR WELL



SECTION A

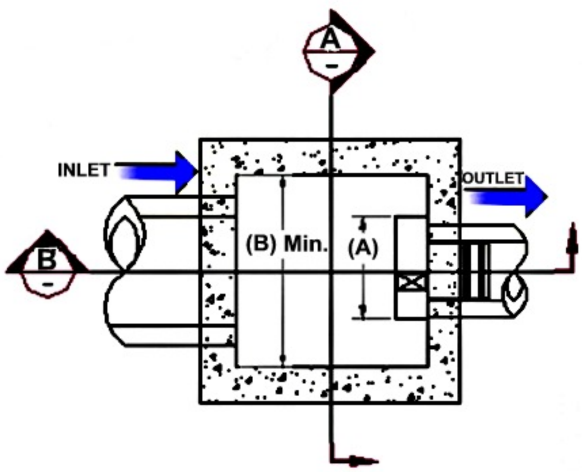


SECTION B

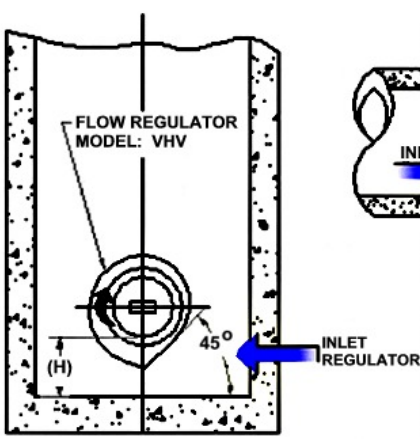
FLOW REGULATOR TYPICAL INSTALLATION IN SQUARE MANHOLE
FIGURE 4 (MODEL VHV)

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

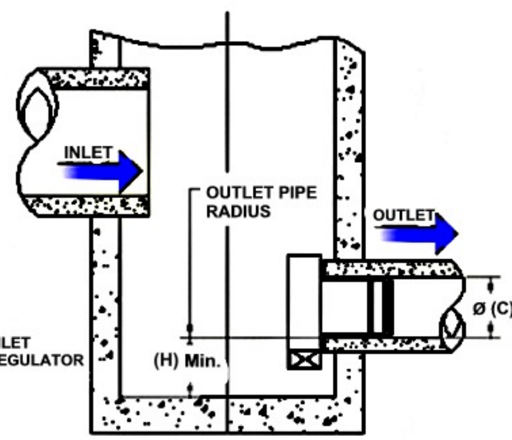
NOTE: *In the case of a square manhole, the outlet flow pipe must be centered on the wall to ensure enough clearance for the unit.*



SQUARE / RECTANGULAR WELL



SECTION A

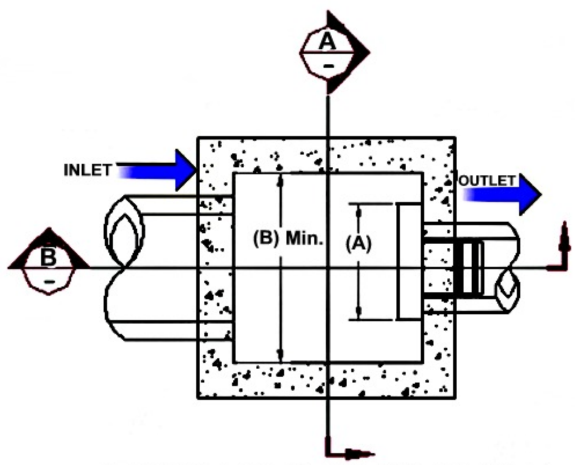


SECTION B

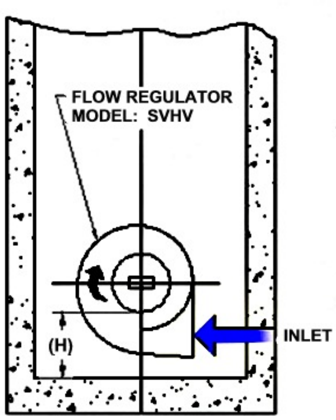
FLOW REGULATOR TYPICAL INSTALLATION IN SQUARE MANHOLE
FIGURE 4 (MODEL SVHV)

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

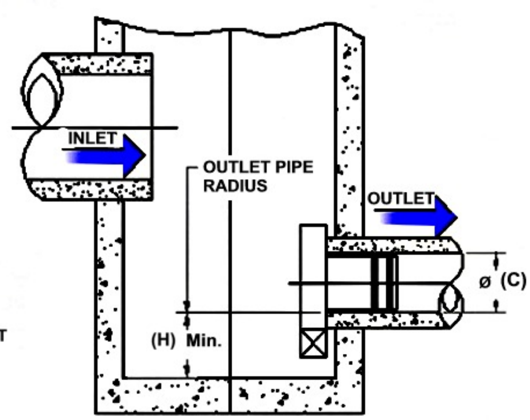
NOTE: *In the case of a square manhole, the outlet flow pipe must be centered on the wall to ensure enough clearance for the unit.*



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.

John Meunier Inc.
ISO 9001 : 2008

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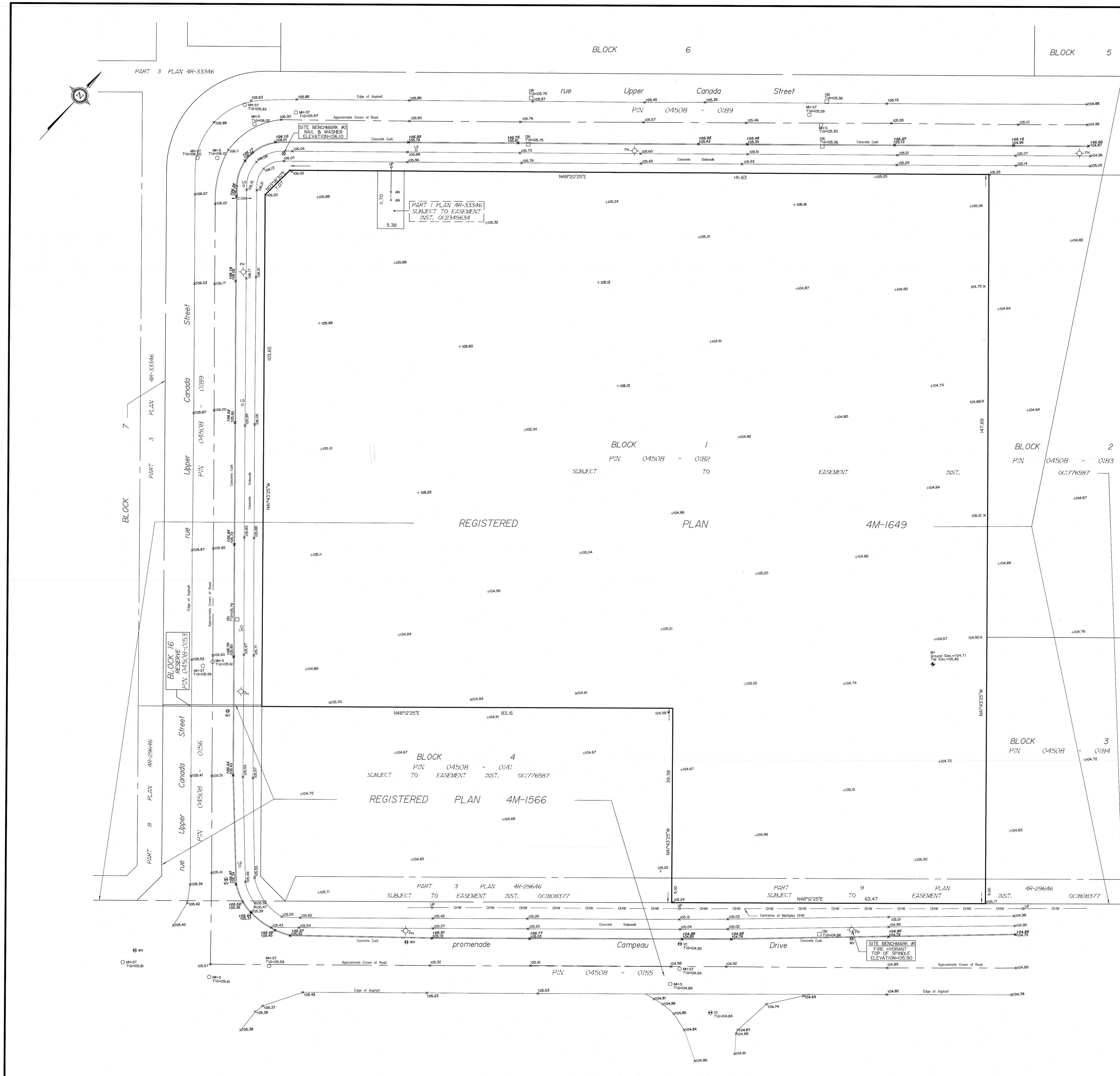
Fax: 215-885-4741 asteele@johnmeunier.com

VEOLIA WATER Solutions & Technologies

Revised: 2011-05-03

Appendix F – Drawings



TOPOGRAPHIC PLAN OF

BLOCK 1
REGISTERED PLAN 4M-1649
CITY OF OTTAWA

Prepared by Annis, O'Sullivan, Vollebekk Ltd.
January 10, 2023
Fieldwork completed December 20, 2022

Scale 1 : 300

12 9 6 3 0 6 12 Metres

Metric

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

JAN. 10, 2023
Date

E. H. Herweyer
Ontario Land Surveyor

Notes & Legend

	Denotes	
FH	"	Fire Hydrant
WV	"	Water Valve
MH-ST	"	Maintenance Hole (Storm Sewer)
MH-S	"	Maintenance Hole (Sanitary)
T/G	"	Top of Grate
VC	"	Valve Chamber (Watermain)
OHW	"	Overhead Wires
CBI	"	Catch Basin Inlet
BH	"	Borehole
UP	"	Utility Pole
AN	"	Anchor
LS	"	Light Standard
+ 65.00	"	Location of Elevations
+ 65.00	"	Top of Concrete Curb Elevation

SITE AREA = 18394 m²

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
V-40807

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

Bearings are grid, derived from bearings shown on Plan 4M-1649 and are referred to the Central Meridian of MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

ELEVATION NOTES

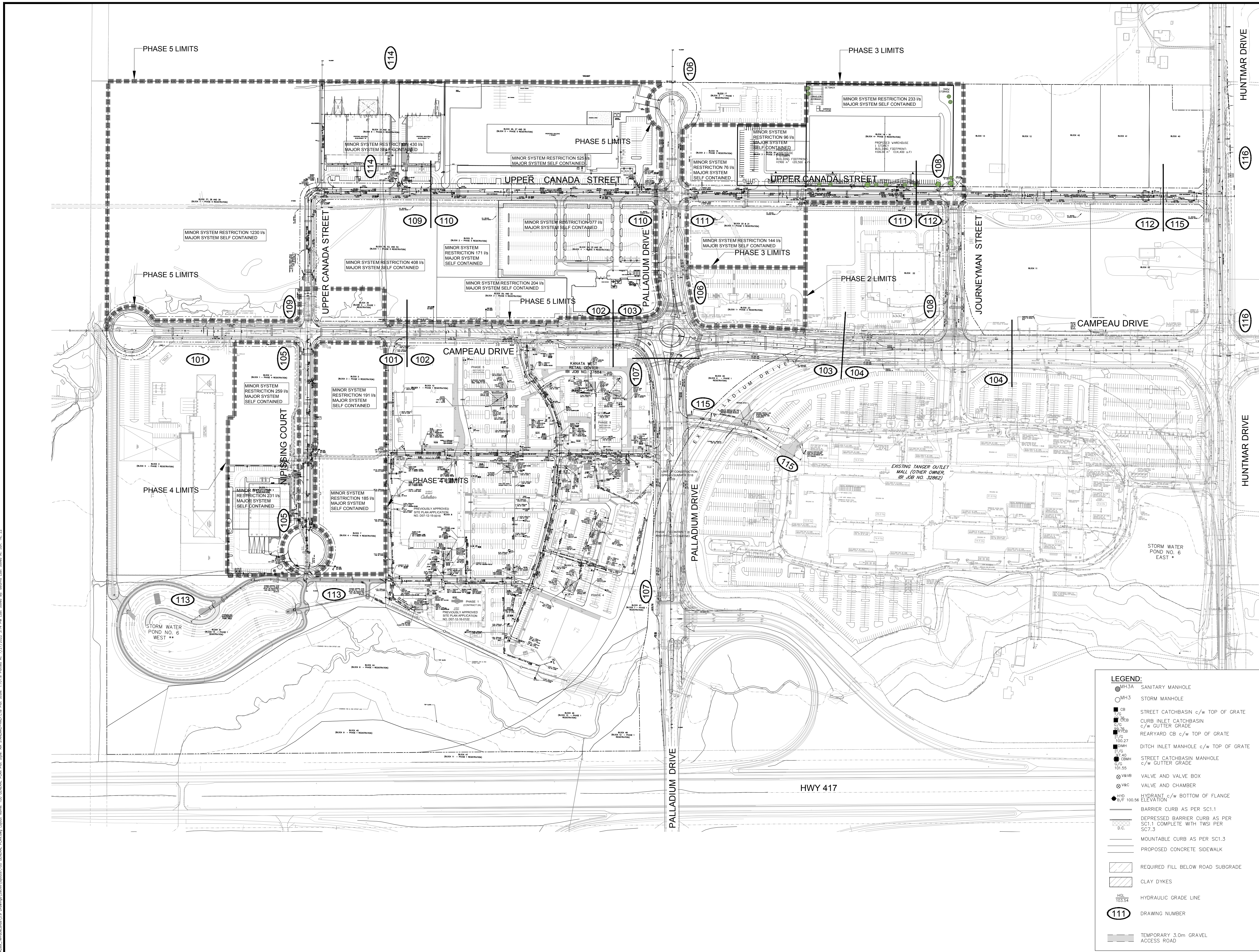
1. Elevations shown are geodetic and are referred to the CGVD28 geodetic datum and are referred to monument No. 70U242 having a elevation of 114.69 metres.
2. It is the responsibility of the user of this information to verify that the job benchmark has not been altered or disturbed and that it's relative elevation and description agrees with the information shown on this drawing.
3. Elevations within Block 1 are in part acquired via City of Ottawa LiDAR data.

UTILITY NOTES

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

Ontario Land Surveyors
ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com

Job No. 23528-22 KonsonHomesInc Blkl 4M-1649 T F | wj



NOTES:

* REFER TO KANATA WEST BUSINESS PARK STORMWATER MANAGEMENT REPORT AND POND 6 EAST DESIGN REPORT. 337 HUNTMAR DRIVE TANGER OUTLET CENTERS REPORT 32862.5.2.3 REVISION 4 NOVEMBER 2014.

** REFER TO KANATA WEST BUSINESS PARK STORMWATER MANAGEMENT REPORT AND POND 6 WEST DESIGN BRIEF REPORT 14289.5.2.3 SEPTEMBER 2015.

SITE BENCHMARK TO BE OBTAINED FROM LEGAL SURVEYOR STANTEC GEOMATICS

FOR EXTENT OF EXISTING CONSTRUCTION REFER TO DRAWING 14289-100A

No.	REVISIONS	By	Date
32	RECORD DRAWINGS	LME	22:07:27
31	ADD SERVICE CONNECTIONS FOR BLOCKS 5 AND 6	LME	20:06:17
30	ISSUED FOR CONSTRUCTION PHASE 4 AND 5	LME	20:05:27
29	ISSUED FOR TENDER PHASE 4 AND 5	LME	20:02:12
28	REVISED AS PER PHASE 5 COMMENTS	LME	19:10:25
27	ISSUED FOR PHASE 5 REGISTRATION	LME	19:09:10
26	ISSUED FOR PHASE 3 CONSTRUCTION	LME	19:08:15
25	REVISED AS PER PHASE 4 COMMENTS	LME	19:07:25
24	REVISED AS PER PHASE 4 COMMENTS	LME	19:07:22
23	REVISED AS PER PHASE 4 COMMENTS	LME	19:06:24
22	ISSUED FOR PHASE 4 REGISTRATION	LME	19:04:25
21	REVISED AS PER PHASE 3 COMMENTS	LME	19:03:08
20	REVISED AS PER PHASE 3 COMMENTS	LME	19:02:11
19	ISSUED FOR PHASE 3 TENDER	LME	19:01:11
18	REVISED AS PER PHASE 3 COMMENTS	LME	18:12:14
17	REVISED FOR PHASE 3 REGISTRATION	LME	18:09:14
16	ADDED CITY FILE NUMBER	LME	18:05:30
15	REVISED FOR PHASE 2 REGISTRATION	LME	18:04:20
14	REVISED DMA CHAMBER IN BLK 10 & RELOCATE HYD. BLK 35/36	LME	16:05:05
13	ISSUED AS PER REVISED CARPENTERS UNION	LME	16:04:25
12	REVISE HYDRANT ON UPPER CANADA ST. AT BLOCK 36 P/L	LME	16:04:20
11	REVISE ENTRANCE TO TANGER MALL FROM PALLADIUM DRIVE	LME	16:03:02
10	RE-ISSUED FOR CONSTRUCTION	LME	16:02:03
9	ISSUED FOR CONSTRUCTION	LME	16:01:19
8	ISSUED FOR MYLARS	LME	16:01:12
7	ISSUED TO TAGGART	LME	15:12:14
6	ISSUED TO TAGGART	LME	15:10:16
5	REVISED AS PER CITY COMMENTS	LME	15:10:15
4	REVISE WM, STM, AND SAN ON CAMPEAU AND UPPER CANADA	LME	15:08:19
3	REVISED AS PER NEW SITE PLAN AND CITY COMMENTS	LME	15:06:19
2	REVISED AS PER CITY COMMENTS	LME	15:04:08
1	ISSUED TO CITY FOR APPROVAL	LME	14:11:27

TAGGART REALTY MANAGEMENT

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

Project Title

KANATA WEST BUSINESS PARK PHASE 5

LICENSED PROFESSIONAL ENGINEER
L. M. ERION
13379508
22/07/27
PROVINCE OF ONTARIO

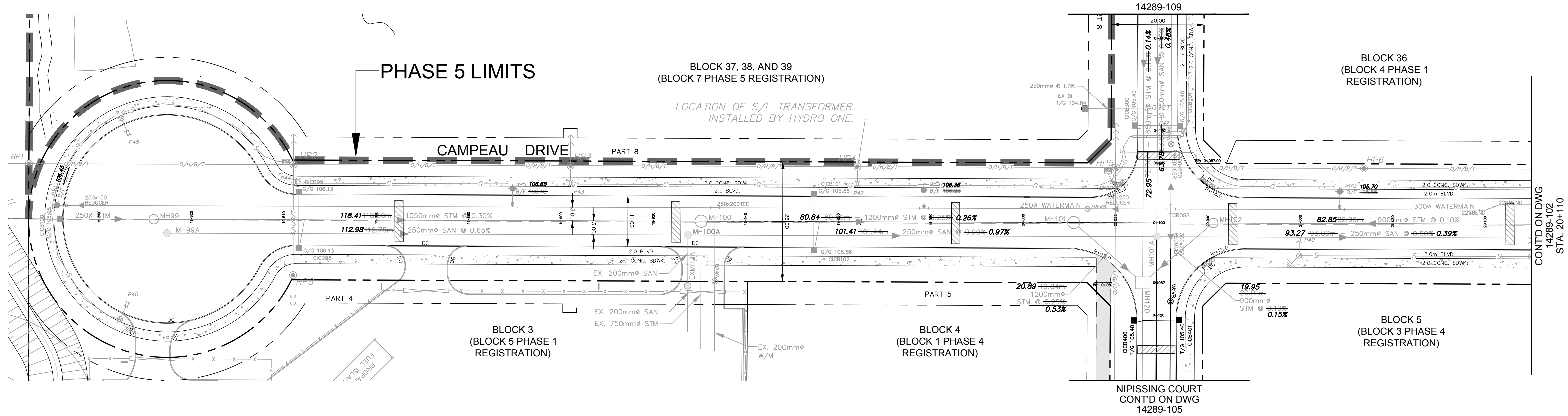
Drawing Title

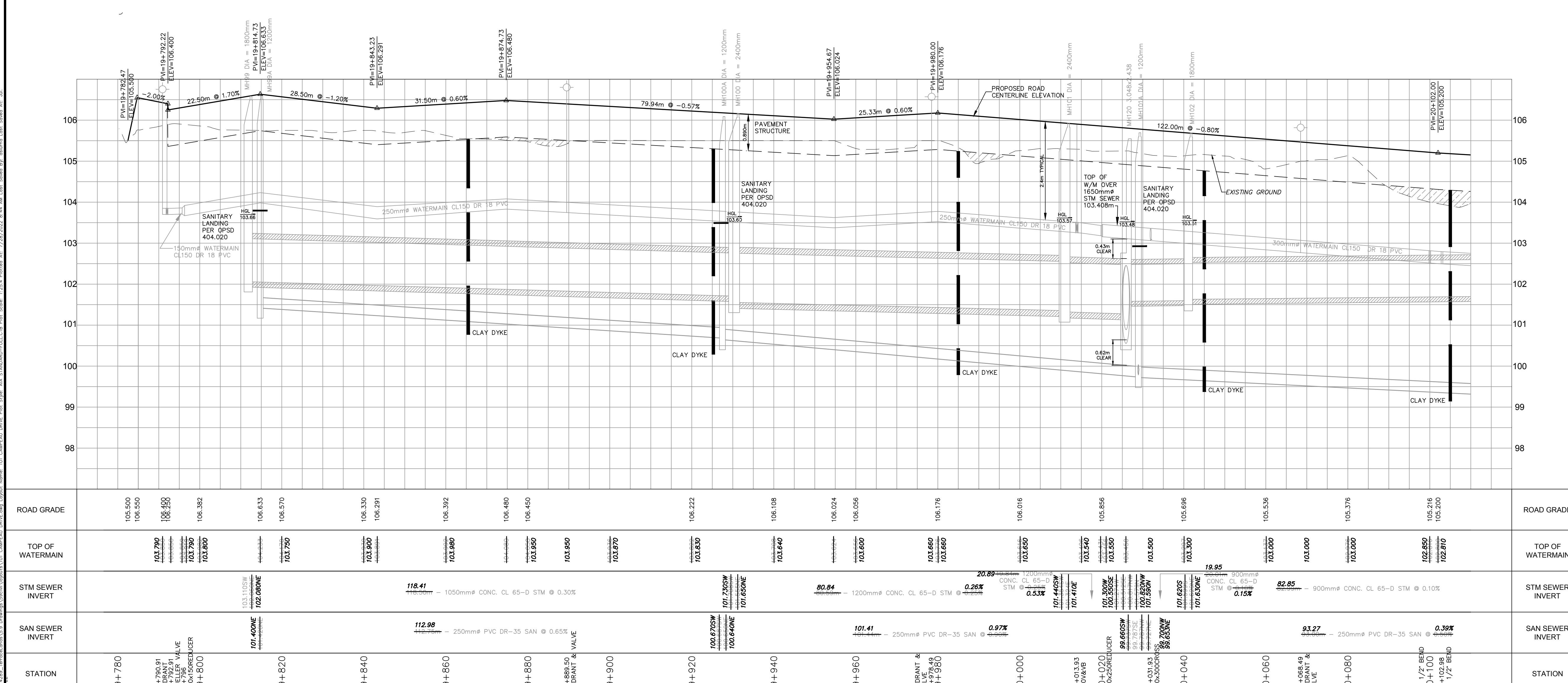
GENERAL PLAN OF SERVICES

Scale 1:2000	
Design LME	Date NOV. 2014
Drawn DPS	Checked TRB
Project No. 14289	Drawing No. 100

D07-16-14-0003_P5

#17661





LEGEND:

- MH3A SANITARY MANHOLE
- MH3 STORM MANHOLE
- CB T/G 99.76 STREET CATCHBASIN c/w TOP OF GRATE
- CICB G/G 99.76 CURB INLET CATCHBASIN c/w GUTTER GRADE
- RYCB T/G 100.27 REARYARD CB c/w TOP OF GRATE
- DIMH T/G 97.40 DITCH INLET MANHOLE c/w TOP OF GRATE
- CBMH G/G 101.55 STREET CATCHBASIN MANHOLE c/w GUTTER GRADE
- V&VB VALVE AND VALVE BOX
- V&C VALVE AND CHAMBER
- HYD B/F 100.56 HYDRANT c/w BOTTOM OF FLANGE ELEVATION
- BARRIER CURB AS PER SC1.1
- D.C. DEPRESSED BARRIER CURB AS PER SC1.1 COMPLETE WITH TWSI PER SC7.3
- MOUNTABLE CURB AS PER SC1.3
- PROPOSED CONCRETE SIDEWALK
- REQUIRED FILL BELOW ROAD SUBGRADE
- CLAY DYKES
- HGL 103.54 HYDRAULIC GRADE LINE
- TEMPORARY 3.0m GRAVEL ACCESS ROAD

FOR EXTENT OF EXISTING CONSTRUCTION REFER TO DRAWING 14289-100A

No.	REVISIONS	By	Date
15	RECORD DRAWINGS	LME	22:06:22
14	ISSUED FOR CONSTRUCTION PHASE 4 AND 5	LME	20:05:27
13	ISSUED FOR TENDER PHASE 4 AND 5	LME	20:02:12
12	ISSUED FOR PHASE 5 REGISTRATION	LME	19:09:10
11	REVISED FOR PHASE 3 REGISTRATION	LME	18:09:14
10	ADDED CITY FILE NUMBER	LME	18:05:30
9	REVISED FOR PHASE 2 REGISTRATION	LME	18:04:20
8	ISSUED FOR CONSTRUCTION	LME	16:01:19
7	ISSUED FOR MYLARS	LME	16:01:12
6	ISSUED TO TAGGART	LME	15:12:14
5	REVISED AS PER CITY COMMENTS	LME	15:10:15
4	REMOVE V&C AT STA 20+102.60	LME	15:08:19
3	REVISED AS PER NEW SITE PLAN AND CITY COMMENTS	LME	15:06:19
2	REVISED AS PER CITY COMMENTS	LME	15:04:08
1	ISSUED TO CITY FOR APPROVAL	LME	14:11:27

TAGGART REALTY MANAGEMENT

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Project Title

KANATA WEST BUSINESS PARK PHASE 5

LICENSED PROFESSIONAL ENGINEER
L. M. ERION
13379508
2022/06/22
PROVINCE OF ONTARIO

Drawing Title

CAMPEAU DRIVE

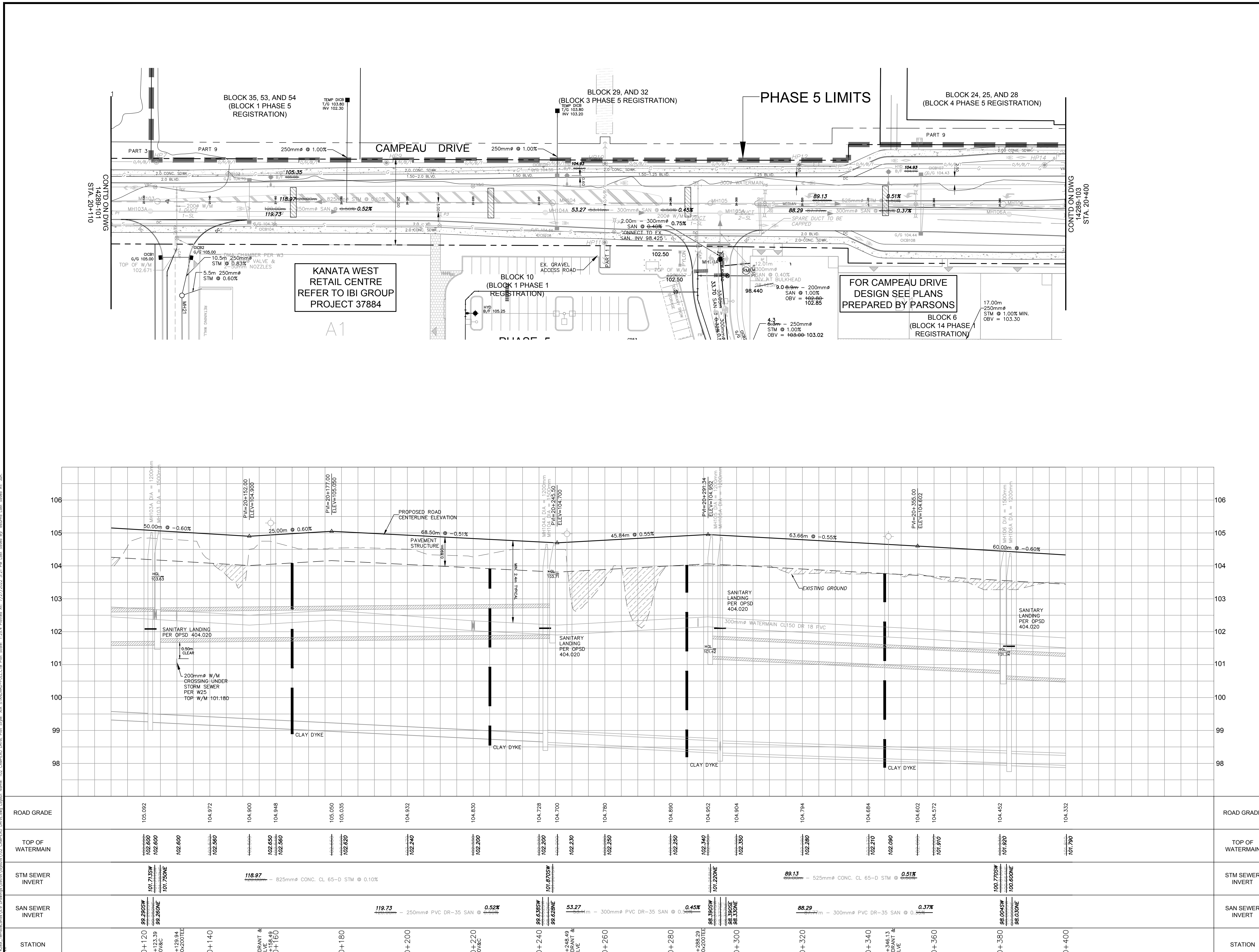
FROM STA 19+780 TO STA 20+110

Scale
HORIZ. SCALE 1:500
VERT. SCALE 1:50

Design	Date
LME	NOV. 2014
Drawn	Checked
DPS	TRB
Project No.	Drawing No.
14289	101

D07-16-14-0003_P5

#17661



LEGEND:

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- CLAY DYKES
- HGL 103.54 HYDRAULIC GRADE LINE

FOR EXTENT OF EXISTING CONSTRUCTION REFER TO DRAWING 14289-100A

No.	REVISIONS	By	Date
19	RECORD DRAWINGS	LME	22:06:22
18	ISSUED FOR CONSTRUCTION PHASE 4 AND 5	LME	20:05:27
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16	REVISED TEMP DICB BLOCK 29/32	LME	19:11:16
15	REVISED AS PER PHASE 5 COMMENTS	LME	19:10:25
14	ISSUED FOR PHASE 5 REGISTRATION	LME	19:09:10
13	REVISED FOR PHASE 3 REGISTRATION	LME	18:09:14
12	ADDED CITY FILE NUMBER	LME	18:05:30
11	REVISED FOR PHASE 2 REGISTRATION	LME	18:04:20
10	REVISED DMA CHAMBER	LME	16:05:04
9	RE-ISSUED FOR CONSTRUCTION	LME	16:02:03
8	ISSUED FOR CONSTRUCTION	LME	16:01:19
7	ISSUED FOR MYLARS	LME	16:01:12
6	ISSUED TO TAGGART	LME	15:12:14
5	REVISED AS PER CITY COMMENTS	LME	15:10:15
4	ADD V&C AT STA 20+123.39	LME	15:08:19
3	REVISED AS PER NEW SITE PLAN AND CITY COMMENTS	LME	15:06:19
2	REVISED AS PER CITY COMMENTS	LME	15:04:08
1	ISSUED TO CITY FOR APPROVAL	LME	14:11:27

TAGGART REALTY MANAGEMENT

IBI GROUP
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tel 613 225 1311 fax 613 225 9868
ibigroup.com

Project Title

KANATA WEST BUSINESS PARK PHASE 5

LICENSED PROFESSIONAL ENGINEER L. M. ERION 13379508 2022/06/22 PROVINCE OF ONTARIO

Drawing Title

CAMPEAU DRIVE

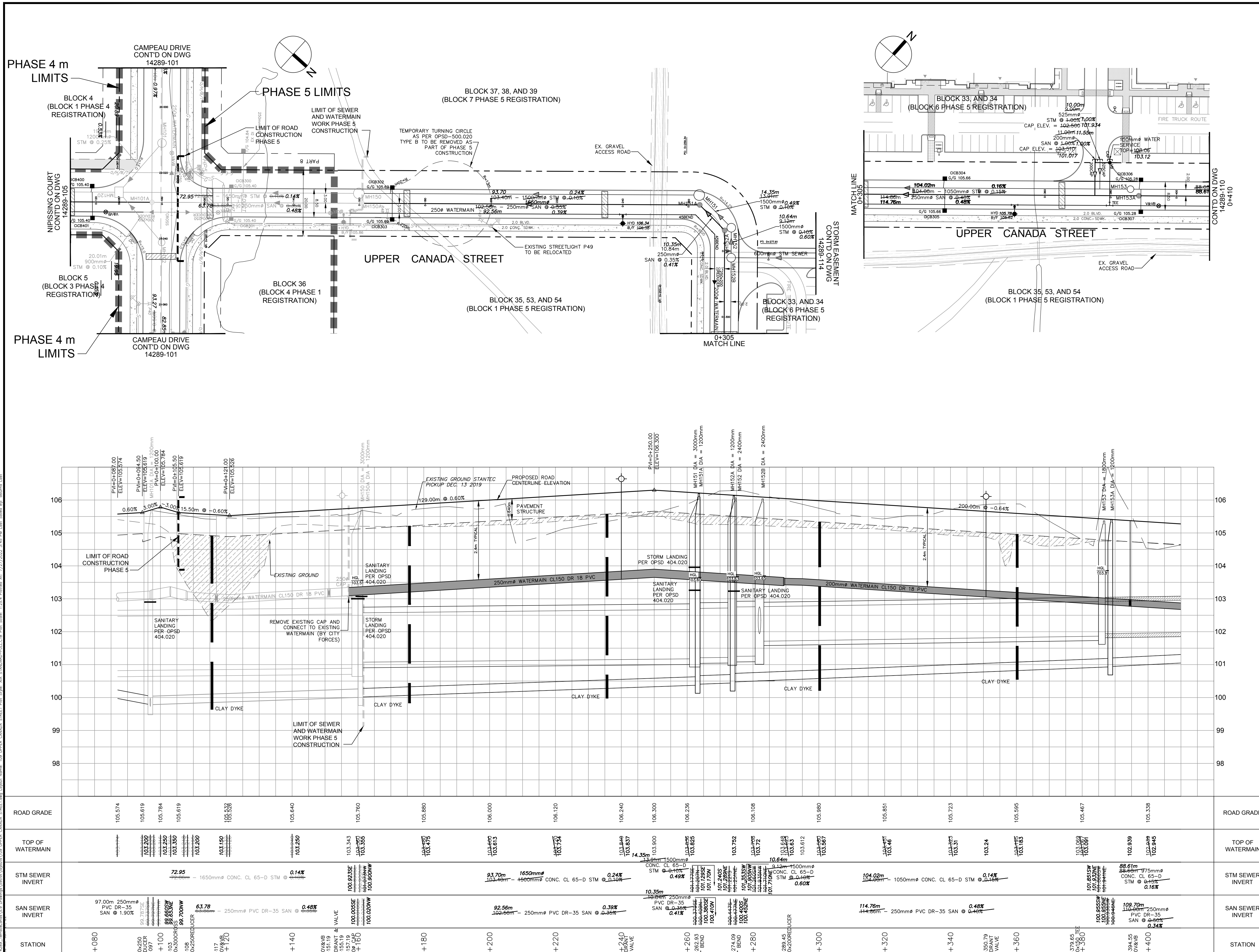
FROM STA 20+110 TO STA 20+400

Scale
HORIZ. SCALE 1:500
VERT. SCALE 1:50

Design	Date
LME	NOV. 2014
Drawn	**Checked**
DPS	TRB
Project No.	**Drawing No.**
14289	102

D07-16-14-0003_P5

#17661



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13	REVISED FOR PHASE 3 REGISTRATION	LME	18:09:14
12	ADDED CITY FILE NUMBER	LME	18:05:30
11	REVISED FOR PHASE 2 REGISTRATION	LME	18:04:20
10	RELOCATE V&VB, HYDRANT AND CAP AT BLOCK 35/36	LME	16:05:05
9	REVISED LIMIT BLK 36, RELOCATE V&VB, HYDRANT AND CAP.	LME	16:04:20
8	ISSUED FOR CONSTRUCTION	LME	16:01:19
7	ISSUED FOR MYLARS	LME	16:01:12
6	ISSUED TO TAGGART	LME	15:12:14
5	REVISED AS PER CITY COMMENTS	LME	15:10:15
4	REVISE PHASE 1 LIMITS	LME	15:08:19
3	REVISED AS PER NEW SITE PLAN AND CITY COMMENTS	LME	15:06:19
2	REVISED AS PER CITY COMMENTS	LME	15:04:08
1	ISSUED TO CITY FOR APPROVAL	LME	14:11:27

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Project Title

KANATA WEST BUSINESS PARK PHASE 5

LICENSED PROFESSIONAL ENGINEER
L. M. ERION
13379508
2022/06/22
PROVINCE OF ONTARIO

Drawing Title

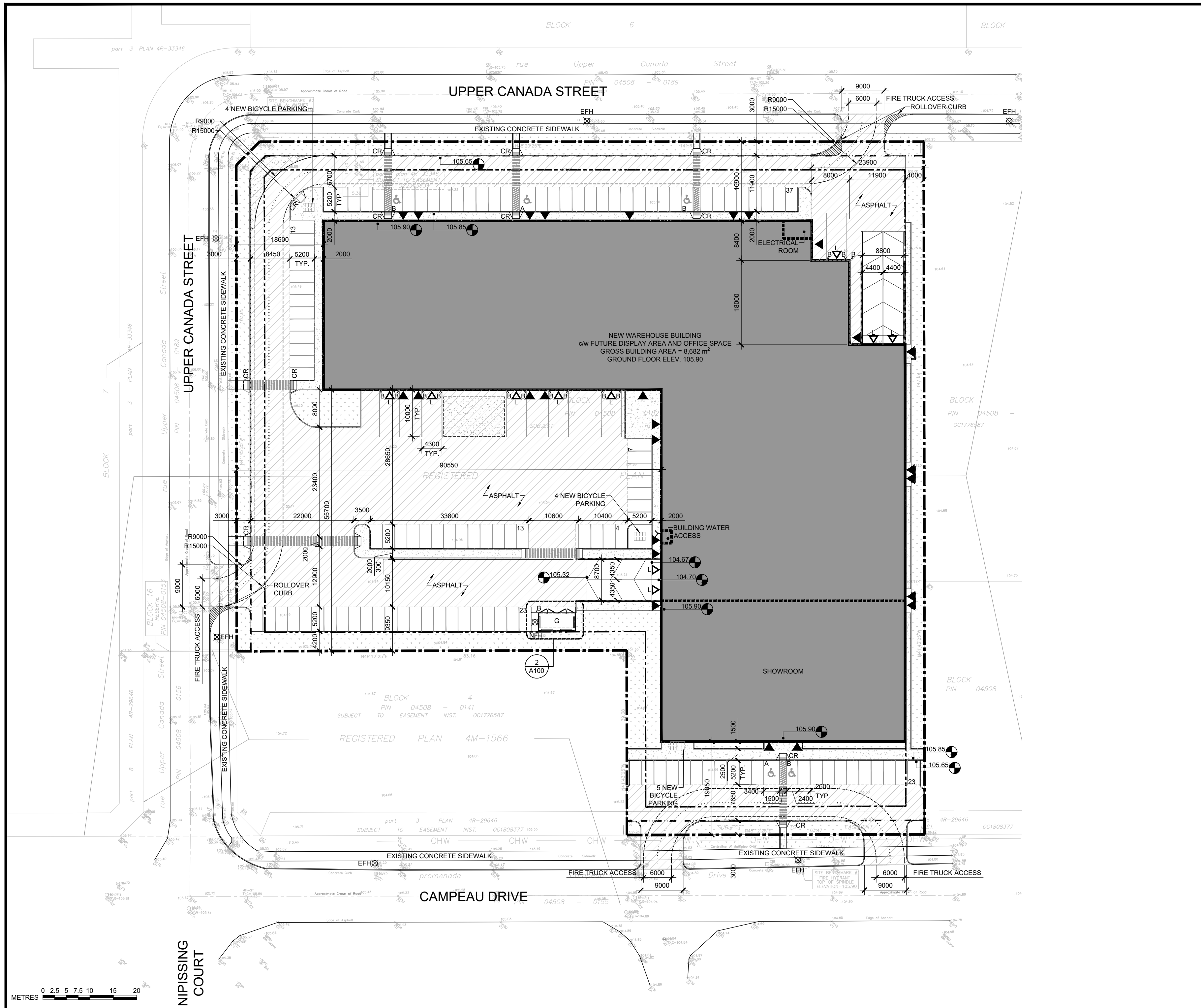
UPPER CANADA STREET

FROM CAMPEAU DRIVE to STA. 0+410

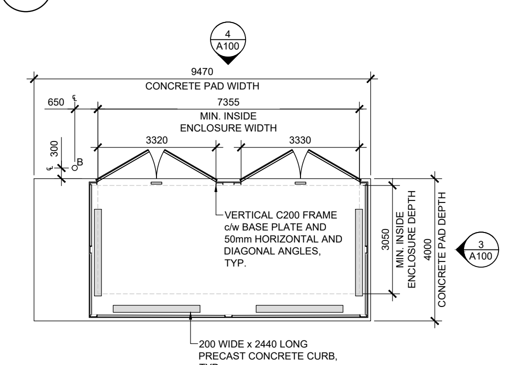
Scale	HORIZ. SCALE 1:500
	VERT. SCALE 1:50
Design: LME	Date: NOV. 2014
Drawn: DPS	Checked: TRB
Project No.: 14289	Drawing No.: 109

D07-16-14-0003_P5

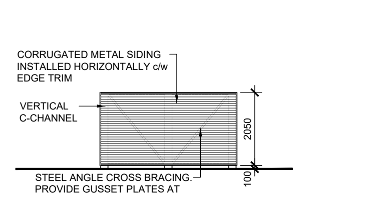
#17661



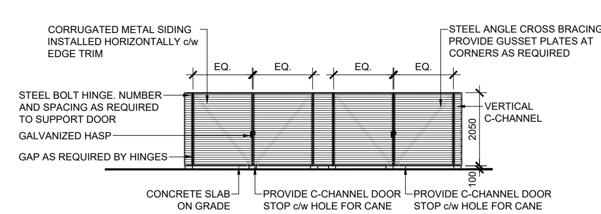
1 A100 SITE PLAN
SCALE: 1:500



2 A100 GARBAGE ENCLOSURE PLAN
SCALE: 1:100



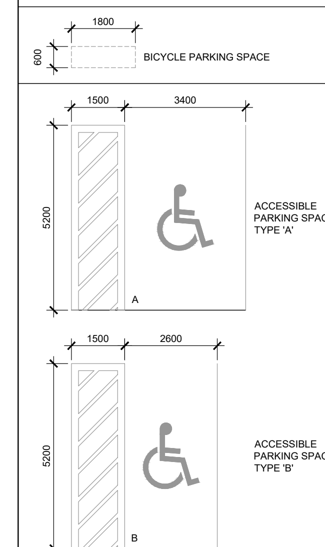
3 A100 GARBAGE ENCLOSURE SIDE ELEVATION
SCALE: 1:100



4 A100 GARBAGE ENCLOSURE FRONT ELEVATION
SCALE: 1:100

DRAWING LEGEND:

▲	LOCATION OF PEDESTRIAN DOORS
△	LOCATION OF VEHICULAR DOORS
oB	BOLLARD
♿	ACCESSIBLE PARKING SPACE C/W PAINTED LOGO & SIGN ON POST OR WALL
L	DESIGNATED LOADING ZONE
CR	CURB RAMP W/TWSI
G	NEW CONCRETE PAD MOUNTED GARBAGE ENCLOSURE
⊙	LIGHT STANDARD, SEE ELECTRICAL
EFH	EXISTING FIRE HYDRANT
NFH	NEW FIRE HYDRANT
Y	FIRE DEPARTMENT CONNECTION
	PROPERTY LINE
	PROPERTY SET BACK LINE
	LANDSCAPE SET BACK LINE
	FIRE TRUCK BACK-UP SPACE
	RETAINING WALL, SEE CIVIL
	OUTLINE OF PROPOSED BUILDING
	SOFT LANDSCAPING, REFER TO LANDSCAPING DRAWING L1
	CONCRETE WALKING SURFACE, REFER TO CIVIL DRAWINGS C001, C201-202
	EXTENT OF NEW FIRE ACCESS ROUTE c/w HEAVY DUTY ASPHALT, REFER TO CIVIL DRAWINGS C001, C201-202
	SNOW STORAGE
	CONCRETE TRUCK RAMP



GENERAL SITE PLAN NOTES:

PROPERTY BOUNDARY INFORMATION, AND TOPOGRAPHIC INFORMATION DERIVED FROM SURVEYOR'S REAL PROPERTY REPORT BLOCK 1, REGISTERED PLAN 4M-1649, CITY OF OTTAWA.
PREPARED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD., SIGNED AND DATED 10 JANUARY, 2023

SITE AND BUILDING DATA:

SITE AREA	18,383 m²
BUILDING AREA	7,983 m²
GROSS AREA (O.B.C.)	8,682 m²
GROSS FLOOR AREA (CITY OF OTTAWA)	8,433 m²
ACCESSORY DISPLAY AND SALES AREA (MAX. 25% OF GFA)	1,521 m² (18% OF GFA)
BUILDING HEIGHT	8.4 m

GENERAL NOTES:
1. FOR PAVED SURFACES, GRADING, SITE SERVICING, DRAINAGE EROSION AND SEDIMENT CONTROL, REFER TO CIVIL DRAWINGS.
2. FOR PLANTING DETAILS, REFER TO LANDSCAPE DRAWINGS.

GROSS AREA (8,682):
[1] (ONTARIO BUILDING CODE DEFINITION): THE TOTAL AREA OF ALL FLOORS ABOVE GRADE MEASURED BETWEEN THE OUTSIDE SURFACES OF EXTERIOR WALLS.

GROSS FLOOR AREA (8,433):
[2] (CITY OF OTTAWA ZONING BYLAW DEFINITION FOR THE PURPOSE OF DETERMINING PARKING REQUIREMENTS): THE TOTAL AREA OF EACH FLOOR WHETHER LOCATED ABOVE, AT OR BELOW GRADE, MEASURED FROM THE INTERIORS OF OUTSIDE WALLS AND INCLUDING FLOOR AREA OCCUPIED BY INTERIOR WALLS AND FLOOR AREA CREATED BY BAY WINDOWS, BUT EXCLUDING:

- FLOOR AREA OCCUPIED BY SHARED MECHANICAL, SERVICE AND ELECTRICAL EQUIPMENT THAT SERVE THE BUILDING (BY-LAW 2008-326)
- COMMON HALLWAYS; CORRIDORS; STAIRWELLS, ELEVATOR SHAFTS AND OTHER VOIDS; STEPS AND LANDINGS; (BY-LAW 2008-326) (BY-LAW 2017-302)
- BICYCLE PARKING; MOTOR VEHICLE PARKING OR LOADING FACILITIES;
- COMMON LAUNDRY, STORAGE AND WASHROOM FACILITIES THAT SERVE THE BUILDING OR TENANTS;
- COMMON STORAGE AREAS THAT ARE ACCESSORY TO THE PRINCIPAL USE OF THE BUILDING; (BY-LAW 2008-326)
- COMMON AMENITY AREA AND PLAY AREAS ACCESSORY TO A PRINCIPLE USE ON THE LOT; AND (BY-LAW 2008-326)
- LIVING QUARTERS FOR A CARETAKER OF THE BUILDING.

ZONING:

ZONING DESIGNATIONS (PART 11):
ZONE IP13 - BUSINESS PARK INDUSTRIAL ZONE

ZONING PROVISIONS

LOT AREA:
MINIMUM: 750 m²
PROPOSED: 18,383 m²

LOT WIDTH:
MINIMUM: NO MINIMUM
PROPOSED: 147.70 m

LOT COVERAGE:
MAXIMUM: 55%
PROPOSED: 43%

SETBACKS (SECTIONS 205 AND 206):	MIN.	PROVIDED
FRONT YARD	6.00m	19.85m
CORNER SIDE YARD:	6.00m	18.60m
INTERIOR SIDE YARD:	4.00m	7.34m
INTERIOR SIDE YARD:	4.00m	55.70m
INTERIOR SIDE YARD:	4.00m	4.00m
REAR YARD:	6.00m	16.90m

FLOOR SPACE INDEX:
MAXIMUM: 2.00
PROPOSED: 0.47

BUILDING HEIGHT:
MAXIMUM: 22.0 m
PROPOSED: 8.4 m

LANDSCAPING (SECTION 205):	MIN.	PROVIDED
ABUTTING A STREET:	3.0 m	3.0 m
NOT ABUTTING A STREET:	0.0 m	0.0 m

PARKING REQUIREMENTS

GROSS FLOOR AREA: 8,433 m²

VEHICLE PARKING - PER PART 4 ZONING BYLAW TABLE 101, PARKING FOR WAREHOUSE, AREA C ON SCHEDULE 1A, IS REQUIRED AT THE FOLLOWING RATE:
0.8 PER 100 m² FOR FIRST 5,000 m² OF GFA
0.4 PER 100 m² ABOVE 5,000 m² OF GFA

REQUIRED PARKING FOR FIRST 5,000 m²:	40
REQUIRED PARKING FOR REMAINING 3,433 m²:	14
TOTAL REQUIRED PARKING:	54
PROVIDED PARKING:	112

BICYCLE PARKING - PER PART 4 ZONING BYLAW TABLE 111A:

REQUIRED PARKING:	5
PROVIDED PARKING:	13

LOADING ZONE - PER PART 4 ZONING BYLAW TABLE 113A:

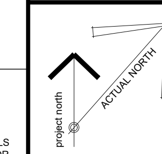
REQUIRED LOADING ZONES:	1
PROVIDED LOADING ZONES:	10

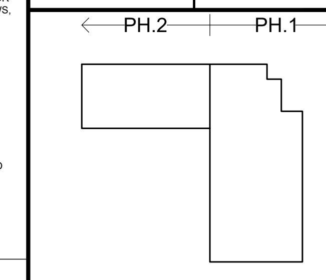
PARKING FOR THE PHYSICALLY DISABLED - PER PARKING BYLAW 2003-530, SECTION 111:

REQUIRED PARKING:	2
PROVIDED PARKING:	5

GENERAL NOTES

1. DO NOT SCALE DRAWINGS; ONLY FIGURED DIMENSIONS ARE TO BE USED. WHERE DOUBT EXISTS; FILE REQUEST FOR INTERPRETATION AND REQUEST CLARITY.
2. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO VERIFY DIMENSIONS ON SITE; REPORT DISCREPANCIES TO THE ARCHITECT PROMPTLY.
3. GENERAL CONTRACTOR TO TAKE INTO ACCOUNT CONSTRUCTION TOLERANCE; GENERAL CONTRACTOR TO COORDINATE THE WORK OF DIFFERENT TRADES TO COMPLY WITH DESIGN INTENT.
4. ALL WORK DESCRIBED IN THESE DRAWINGS AND SPECIFICATIONS ARE TO COMPLY WITH THE CURRENT EDITION OF THE ONTARIO BUILDING CODE (2012) OR NATIONAL BUILDING CODE (2010) INCLUDING MOST RECENT AMENDMENTS.
5. DRAWINGS AND SPECIFICATIONS ARE COMPLEMENTARY AND ARE TO BE READ TOGETHER.





ISSUE RECORD:

NO.	DESCRIPTION	DATE
5	FOR CO-ORDINATION/REVIEW	2023/02/28
6	SUBMITTED FOR SPA	2023/04/14
7	ISSUED FOR COORDINATION	2023/06/16
8	(A100) ISSUED FOR COORDINATION	2023/06/26
9	ISSUED FOR COORDINATION	2023/07/14
10	ISSUED FOR COORDINATION	2023/07/28
11	ISSUED FOR REVISED SPA	2023/09/19
12	ISSUED FOR CLIENT / CONTRACTOR REVIEW - NOT FOR TENDER	2023/09/20
13	ISSUED FOR BUILDING PERMIT APPLICATION	2023/10/11
14	ISSUED FOR ZONING RESPONSE	2023/11/08
15	ISSUED FOR PLANNER REVIEW	2023/11/08

OWNER
KONSON HOMES INC.
361 CHURCHILL AVE N,
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CONSULTANTS
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JAMES B LENNOX & ASSOCIATES INC.
LANDSCAPE ARCHITECTS
TEL: 613-722-5168

GENERAL CONTRACTOR
DOLYN CONSTRUCTION LTD.
888 LADY ELLEN PLACE,
OTTAWA, ON K1Z 5L5,
CANADA
TEL: 613-224-7268

DCA
A GROUP OF ARCHITECTS
201-1339 WELLINGTON ST. WEST OTTAWA ON K1Y 3B8
WWW.ARCHITECTSDCA.COM 613.725.2294

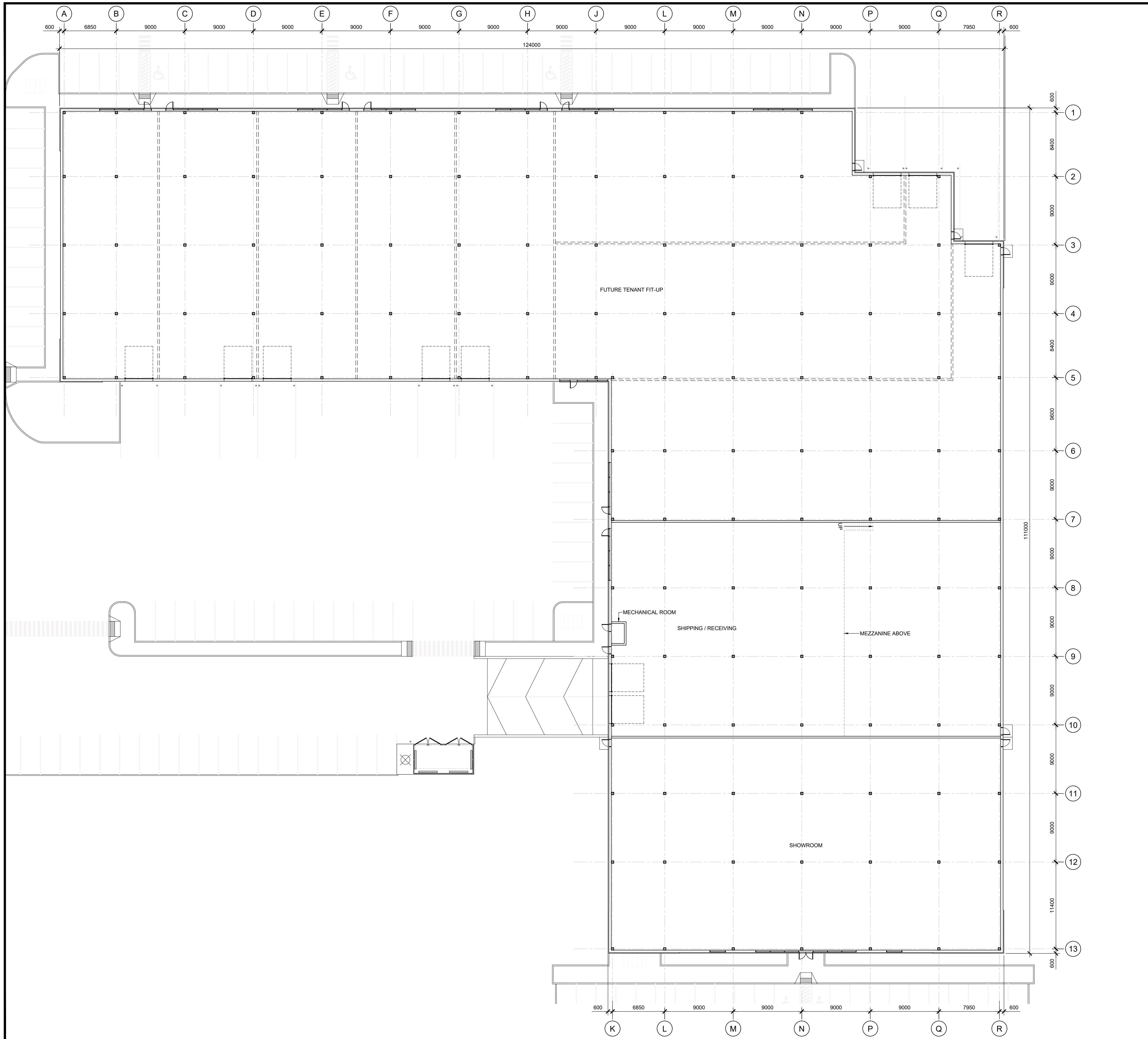
PROJECT TITLE
1485 UPPER CANADA STREET
OTTAWA, ON, K0A 1L0

DRAWING TITLE
SITE PLAN

DATE	DRAWN	JOB NO.	DRAWING NO.
JAN 2023	BR | DR	3482	A100
SCALE	REVIEWED DR | TD		

ARCHITECTURAL

FILE # D07-12-23-0051



1 A200 GROUND FLOOR PLAN
SCALE: 1:250

GENERAL NOTES

1. DO NOT SCALE DRAWINGS; ONLY FIGURED DIMENSIONS ARE TO BE USED. WHERE DOUBT EXISTS, FILE REQUEST FOR INTERPRETATION AND REQUEST CLARITY.
2. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO VERIFY DIMENSIONS ON SITE; REPORT DISCREPANCIES TO THE ARCHITECT PROMPTLY.
3. GENERAL CONTRACTOR TO TAKE INTO ACCOUNT CONSTRUCTION TOLERANCE; GENERAL CONTRACTOR TO COORDINATE THE WORK OF DIFFERENT TRADES TO COMPLY WITH DESIGN INTENT.
4. ALL WORK DESCRIBED IN THESE DRAWINGS AND SPECIFICATIONS ARE TO COMPLY WITH THE CURRENT EDITION OF THE ONTARIO BUILDING CODE (2012) OR NATIONAL BUILDING CODE (2010) INCLUDING MOST RECENT AMENDMENTS.
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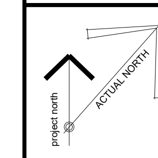

ISSUE RECORD:

NO.	DESCRIPTION	DATE
1	FOR CLIENT REVIEW	2022/05/12
2	FOR CLIENT APPROVAL	2022/08/09
3	FOR REVIEW	2022/11/01
4	FOR CO-ORDINATION/REVIEW	2023/02/08
5	FOR CO-ORDINATION/REVIEW	2023/02/28

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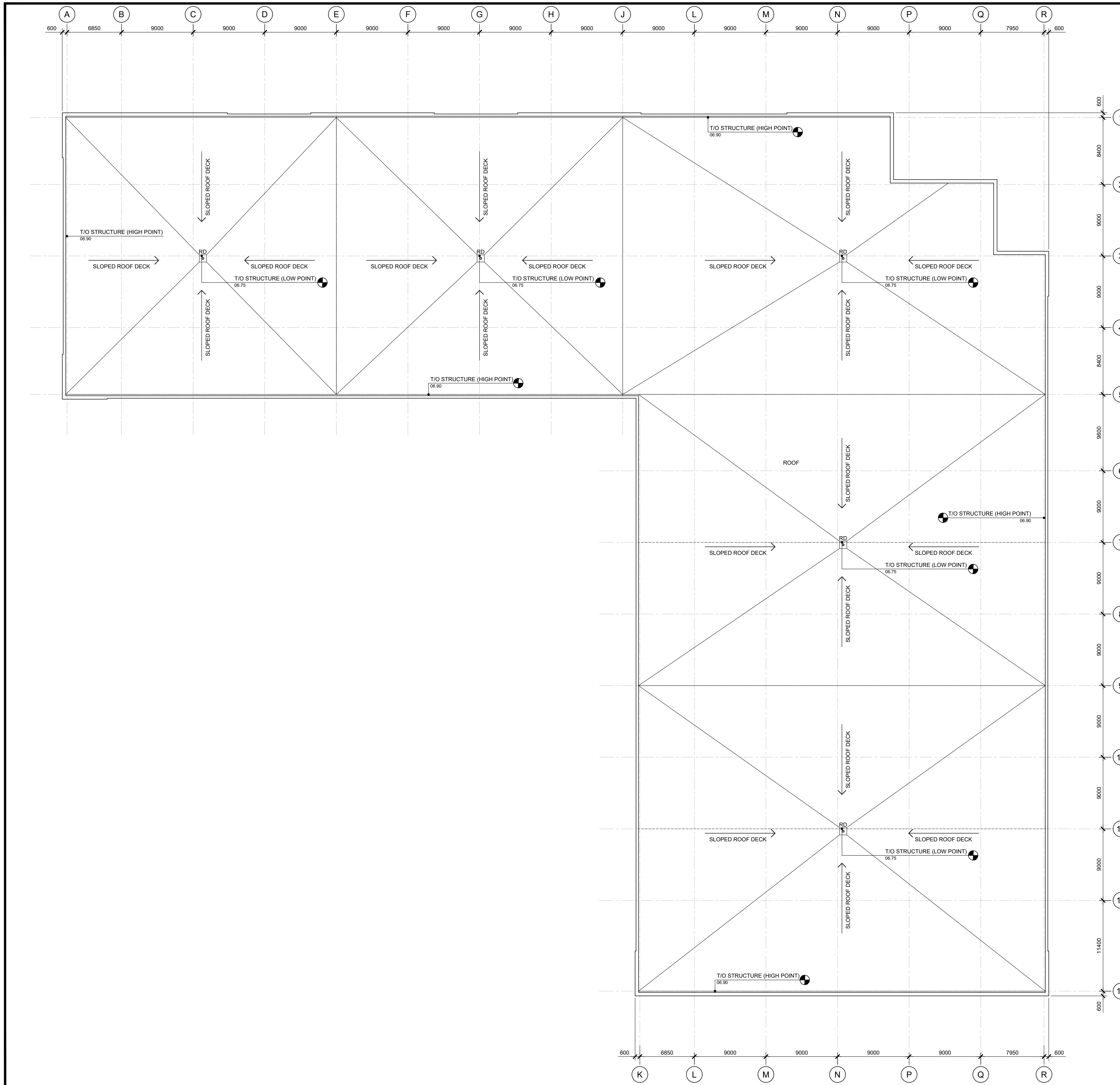
A GROUP OF ARCHITECTS
201-1339 WELLINGTON ST. WEST OTTAWA ON K1Y 3B8
WWW.ARCHITECTSDCA.COM 613.725.2294

PROJECT TITLE
KONSON WAREHOUSE
BLOCK 1, SOUTH HALF LOT 4, CONCESSION 1
OTTAWA, ON

DRAWING TITLE
GROUND FLOOR PLAN

DATE	DRAWN	JOB NO.	DRAWING NO.
JAN. 2023	BR/IC	3482	A200
SCALE AS NOTED	REVIEWED TD		

ARCHITECTURAL



1
A202
ROOF PLAN
SCALE: 1:250

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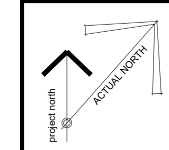

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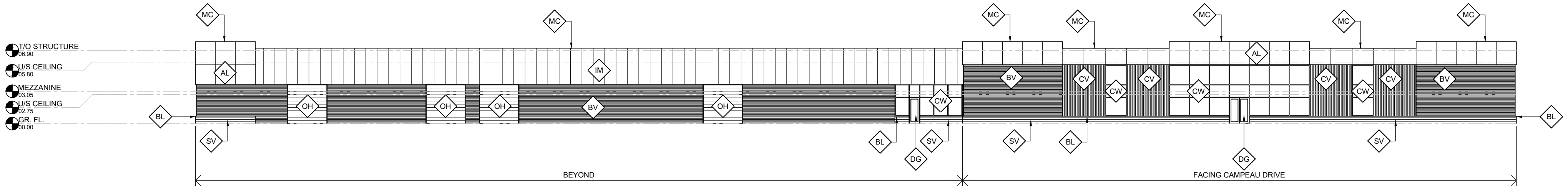
PROJECT TITLE
KONSON WAREHOUSE
BLOCK 1, SOUTH HALF LOT 4, CONCESSION 1
OTTAWA, ON

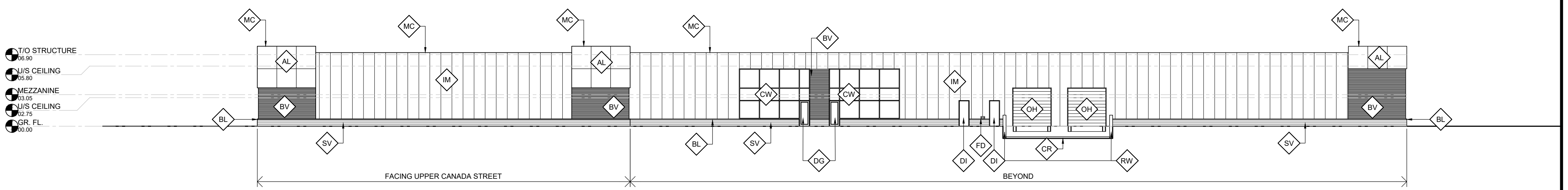
DRAWING TITLE
ROOF PLAN

DATE	DRAWN	JOB NO.	DRAWING NO.
JAN. 2023	BR/IC	3482	A202
SCALE AS NOTED	REVIEWED TD		

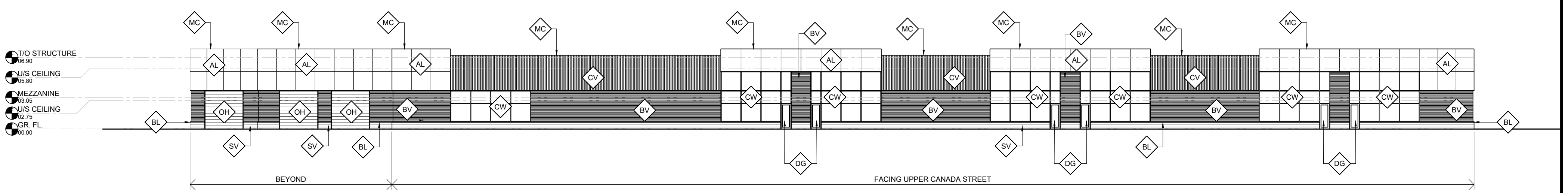
ARCHITECTURAL



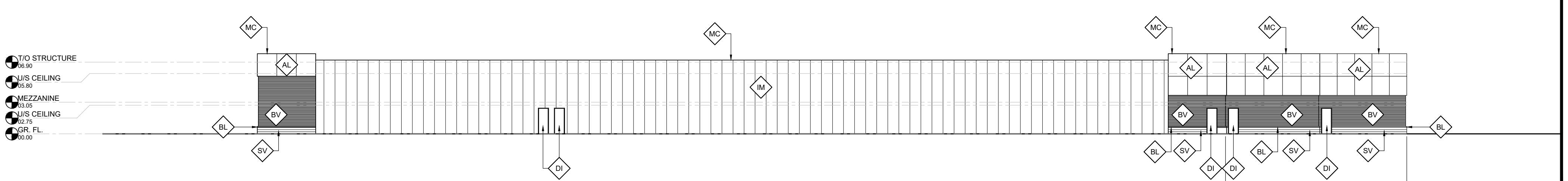
1 / A300 **SOUTH ELEVATION**
SCALE: 1:250



2 / A300 **WEST ELEVATION**
SCALE: 1:250



3 / A300 **NORTH ELEVATION**
SCALE: 1:250



4 / A300 **EAST ELEVATION**
SCALE: 1:250

DRAWING LEGEND:

- AL — ALUMINUM COMPOSITE PANEL
- BV — BRICK VENEER
- BL — BRICK LEDGE
- CR — CONCRETE RAMP
- CV — PRE FINISHED CORRUGATED METAL SIDING (VERTICAL)
- CW — CURTAINWALL
- DG — DOOR, GLAZED
- DI — DOOR, INSULATED HOLLOW METAL
- FD — FIRE DEPARTMENT CONNECTION
- IM — INSULATED METAL PANEL
- MC — PRE FINISHED METAL CAP FLASHING
- OH — OVERHEAD DOOR
- RW — CONCRETE RETAINING WALL
- SV — SPLIT-FACE MASONRY VENEER

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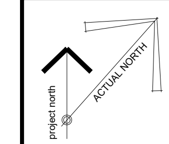

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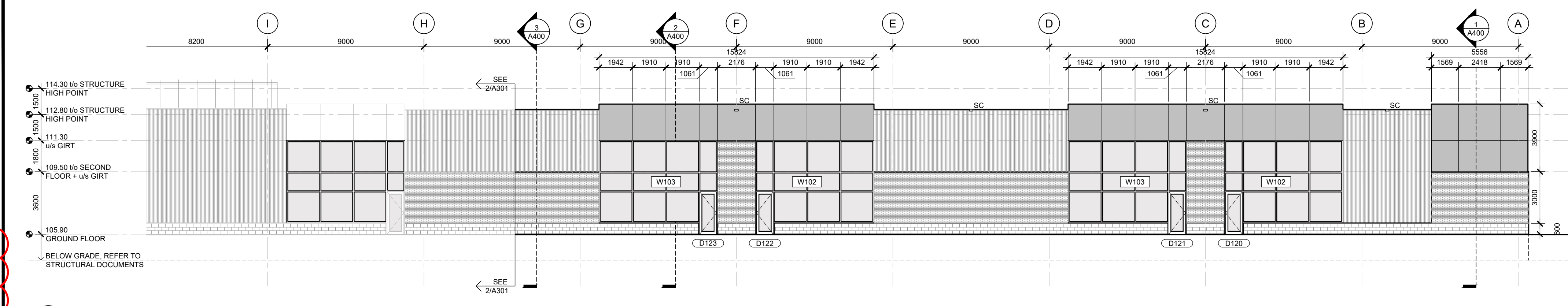
PROJECT TITLE
KONSON WAREHOUSE
BLOCK 1, SOUTH HALF LOT 4, CONCESSION 1
OTTAWA, ON

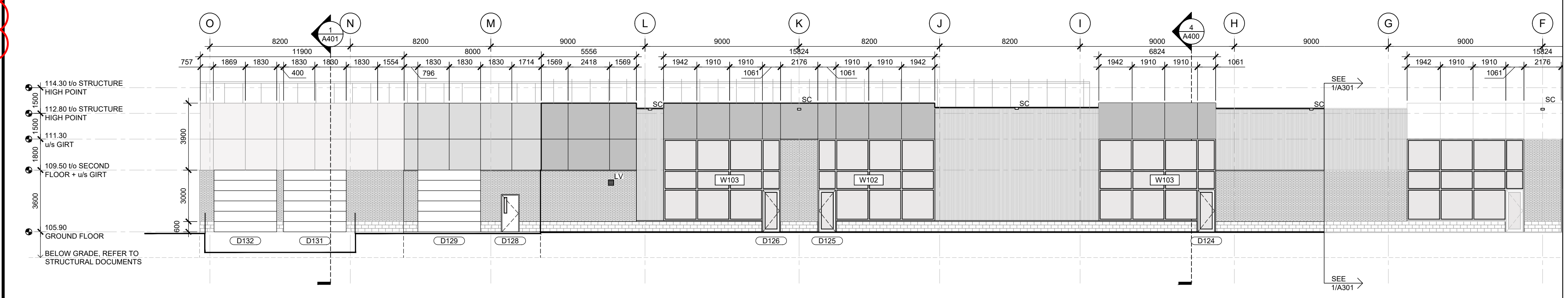
DRAWING TITLE
BUILDING ELEVATIONS

DATE	DRAWN	JOB NO.	DRAWING NO.
JAN. 2023	BR/IC	3482	A300
SCALE AS NOTED	REVIEWED TD		

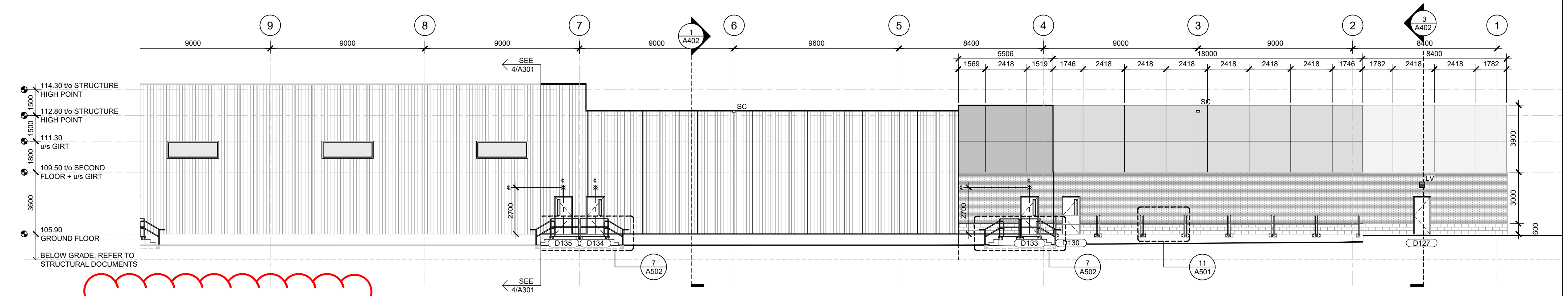
ARCHITECTURAL



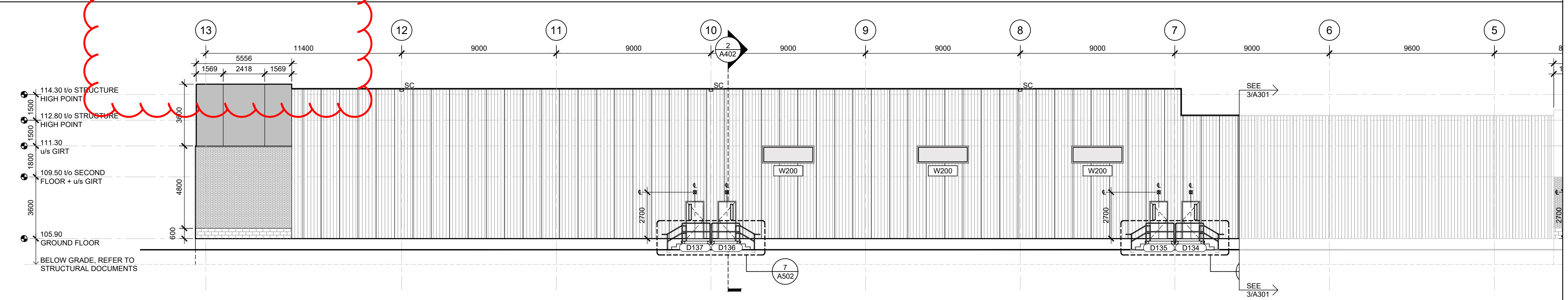
1 A301 PARTIAL NORTH ELEVATION
SCALE: 1 : 150



2 A301 PARTIAL NORTH ELEVATION
SCALE: 1 : 150



3 A301 PARTIAL EAST ELEVATION
SCALE: 1 : 150



4 A301 PARTIAL EAST ELEVATION
SCALE: 1 : 150

ELEVATION NOTES:

1. COORDINATE LOCATIONS OF MECHANICAL PENETRATIONS THROUGH EXTERIOR WALL WITH MECHANICAL DOCUMENTS.

ELEVATION LEGEND:

SC	OVERFLOW SCUPPER DRAIN, REFER TO ROOF PLAN FOR SIZE AND LOCATION
LV	MECHANICAL LOUVER, REFER TO MECHANICAL DOCUMENTS

- VERTICAL SIDING, REFER TO SPECIFICATIONS
- MASONRY VENEER: CLAY BRICK, REFER TO SPECIFICATIONS
- MASONRY VENEER: CONCRETE BRICK, REFER TO SPECIFICATIONS
- ALUMINUM COMPOSITE METAL, REFER TO SPECIFICATIONS
- INSULATED METAL PANEL, REFER TO SPECIFICATIONS
- W000 WINDOW IDENTIFICATION NUMBER, REFER TO WINDOW SCHEDULE
- D000 DOOR IDENTIFICATION NUMBER, REFER TO DOOR SCHEDULE
- LOCATION OF LIGHT FIXTURE, REFER TO ELECTRICAL FOR TYPE

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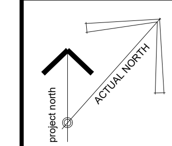

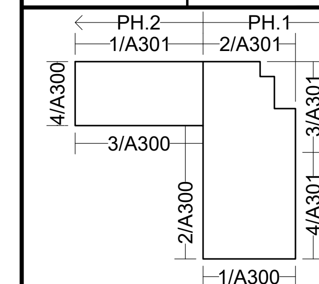

ISSUE RECORD:

NO.	DESCRIPTION	DATE
5	FOR CO-ORDINATION/REVIEW	2023/02/28
6	SUBMITTED FOR SPA	2023/04/14
7	ISSUED FOR COORDINATION	2023/06/16
8	(A100) ISSUED FOR COORDINATION	2023/06/26
9	ISSUED FOR COORDINATION	2023/07/14
10	ISSUED FOR COORDINATION	2023/07/28
11	ISSUED FOR REVISED SPA	2023/09/19
12	ISSUED FOR CLIENT / CONTRACTOR REVIEW - NOT FOR TENDER	2023/09/20
13	ISSUED FOR BUILDING PERMIT APPLICATION	2023/10/11
14	ISSUED FOR ZONING RESPONSE	2023/11/08
15	ISSUED FOR PLANNER REVIEW	2023/11/08

OWNER

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361 CHURCHILL AVE N,
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PROJECT TITLE

1485 UPPER CANADA STREET
OTTAWA, ON, K0A 1L0

DRAWING TITLE

BUILDING ELEVATIONS

DATE	DRAWN	JOB NO.	DRAWING NO.
JAN 2023	BR | DR	3482	A301
SCALE	REVIEWED DR | TD		

ARCHITECTURAL