Capital Dodge Building Addition

2500 Palladium Drive #1200
Kanata, ON

Stormwater Management & Site Servicing Report

July 13th, 2023
Revision 1 – November 10th, 2023
Revision 2 – March 18th, 2024
Revision 3 – April 29th, 2024

FULL SPEED BUILDERS
16788 Highway #7, Perth, ON, K7H 3C8 (613) 466-0400

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FULL SPEED BUILDERS 16788 Highway #7, Perth, ON, K7H 3C8 (613) 466-0400

1.0 Introduction

Full Speed Builders have been retained by Capital Two Investments Limited (Client) to prepare the Stormwater Management & Servicing Design Brief for a Site Plan Control Application for a proposed building addition located at Capital Dodge, 2500 Palladium Drive Unit 1200, Ottawa.

The purpose of this report is to determine the servicing requirements for the proposed building addition in accordance with guidelines provided by the City of Ottawa, Mississippi Valley Conservation Authority, and the Ministry of Environment, Conservation, and Parks. The report will address the water, sanitary, and stormwater requirements for the development, ensuring that the existing services are adequate for the site.

2.0 Site Description

The subject site is located within the Palladium Auto Park, at the intersection of Palladium Drive and the private entrance to the Park. The approximately 1.45 hectare site is currently developed and used as a car dealership. The building is 2363m^2 and is serviced by water, sanitary, gas, hydro, and Rogers. The site has a stormwater management plan that falls within the guidelines of the *Palladium Auto-Park Stormwater Management Report prepared by J.L. Richards & Associates Limited, April 2003*.

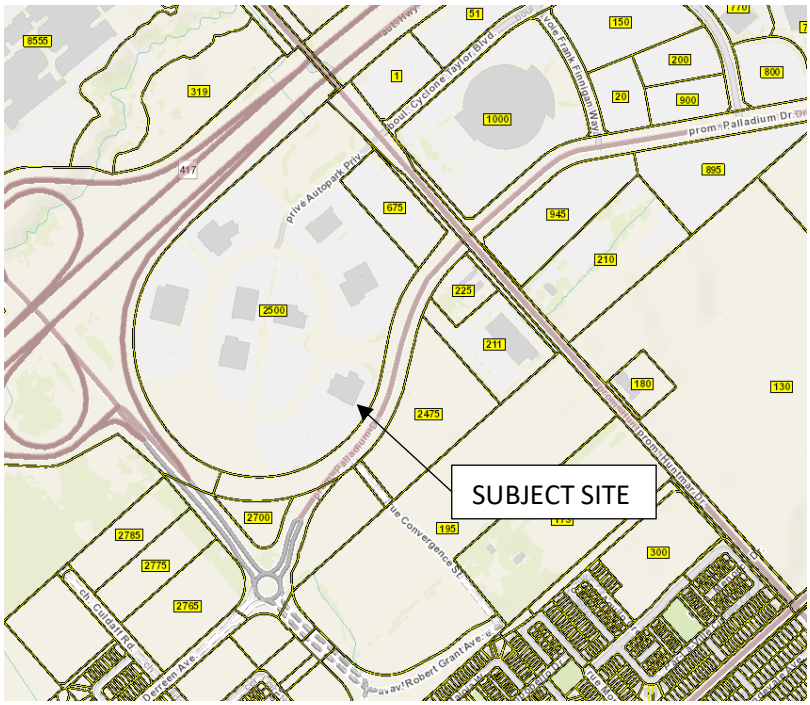


Figure 1: Site Location

3.0 Proposed Development

Proposed development of the subject property consists of the construction of a two-storey car dealership with private car wash that has a building area of 1151m^2 and gross floor area of 1477m^2. The addition will connect to existing water and sanitary services internally. The gas and hydro services will be relocated at the direction of the relevant utility providers. The stormwater servicing will be revised to accommodate the addition while still providing the needed quantity control onsite.

4.0 Water Servicing

Required daily water flow was calculated in accordance with the City of Ottawa Water Distribution Design Guidelines, the Ministry of Environment, Conservation, and Parks (MECP) Design Guidelines for Drinking-Water Systems, and flow data from the car wash manufacturer.

Site Area	1.45 ha
Dealership – Car Wash	196L/vehicle/day
Dealership – Employees	75L/person/day
Dealership – Cars Serviced	40L/car serviced/day
Commercial Maximum Daily Peaking Factor	1.5 x avg day
Commercial Maximum Hour Peaking Factor	1.8 x max day

Table 1: Water Service Design Criteria

The parameters listed in the table above are as per the Ottawa Water Design Guidelines and manufacturers data to calculate the daily required flow. The carwash manufacturer provided a maximum volume of 52 gallons (196 L) per vehicle. This resulted in an average daily flow of 0.15 L/second, a Peak Hour Flow of 0.48 L/s, and a Maximum Daily Flow of 0.27 L/s.

Demand	Flow Rate (L/s)
Average Daily Demand	0.15
Maximum Day Demand	0.27
Max Day + Fire Flow	167.15
Peak Hour Demand	0.48

Table 2: Water Demand Summary

A hydraulic model of the water distribution system from the connection point on Palladium Drive was prepared using EPANET 2.2. The AutoPark is a private development, the water modelling included assumed flows for the existing developed lots. Flow assumptions for the existing properties was derived from the AutoParks sanitary report. The City of Ottawa provided a Boundary Condition at the intersection of the Private Road and Palladium Drive. The Boundary Conditions are:

Demand	Proposed Demand (L/S)	Boundary Condition Head (m)	Pressure (psi)
Average Day Demand	0.15	160.7	81.6
Maximum Day Demand	0.27	160.7	81.4
Max Day + Fire Flow	120.22	153.7	71.6
Peak Hour Demand	0.48	156.5	75.7

Table 3: Boundary Conditions

The existing water service can adequately provide the required flows at an acceptable pressure. The EPANET results are summarized below. A pressure reducing valve will be installed inside the building to ensure the operating pressure is not greater than 80 psi.

Demand	Flow Result	Pressure (psi)
Average Day Demand	0.15	82.2
Maximum Day Demand	0.27	82.2
Peak Hour Demand	0.48	76.5

Table 4: Boundary Condition Results

4.1 Fire Flow

The site is currently serviced by a 150mm diameter water service and an existing fire hydrant on the site.

Required fire flow for a new building is calculated in accordance with the Fire Protection Underwriters Survey (FUS) – Water Supply for Public Fire Protection – 2020. The required fire flow is based on floor area, separation distance from other buildings, fire suppression systems, type of construction and building content type.

The proposed building addition will be constructed as Ordinary construction. FUS describes ordinary construction as '*when exterior walls are of masonry construction (or other approved material) with a minimum 1-hour fire resistance rating, but where other elements such as interior walls, arches, floors and/or roof do not have a minimum 1-hour fire resistance rating.'*

The required fire flows are calculated in Appendix A. The minimum fire flow was calculated to be 150 liters per second at 70 kPa.

To confirm the adequacy of the fire flow for the proposed building addition, public and private fire hydrants within 150m of the subject site were analyzed as per City of Ottawa **ITSB 2018-02 Appendix I Table 1.**

Fire Flow Demand (L/min)	**Hydrants within 75m**	**Hydrants within 150m**	**Combined Fire Flow (L/min)**
9000	**4**	**4**	**38,000**

Table 5: Fire Hydrant Flow

The water network was analyzed to ensure adequate fire flow at the existing hydrants. Based on City guidelines, the existing hydrants can provide adequate fire protection to the subject site.

4.0 Sanitary Sewer

4.1 Criteria

The sanitary design flow for the site was designed in accordance with the City of Ottawa's Sewer Design Guidelines, and the *Palladium AutoPark Sanitary Flow Analysis – Revision #1"* prepared by Stantec Consulting Limited, dated March 18, 2016.

Minimum Velocity	0.6 m/s
Maximum Velocity	3.0 m/s
Manning Roughness Coefficient	0.013
Total Site Area	1.46 ha
Commercial Flow	10,000 L/ha/day
Infiltration Allowance	0.28 L/s/ha
Commercial Peaking Factor	1.5

Table 6: Sanitary Design Criteria

Site Area	1. ha	
Commercial Flow	10,000 L/ha/day	14,500L/day = 0.17 L/s
Commercial Peaking Factor	1.5	
Infiltration Allowance (excluding building footprint)	0.28 L/s/ha	0.31 L/s
Total Allowable Flow (Flow X Peaking Factor + Infiltration Allowance)		**0.61 L/s = 52,704 L/day**

Table 7: Allowable Sanitary Flow

Dealership – Car Wash	196L/vehicle/day	40 vehicle/day	7,840L/day
Dealership – Employees	75L/person/day	40 Employees	3,000L/day
Dealership – Cars Serviced	40L/car serviced/day	50 Cars/day	2,000L/day
Peaking Factor			1.5
Infiltration Allowance	0.28L/s/ha	1.1 ha	0.31L/s
Total			**44,928L/day**

Table 8: Sanitary Design Flows

The site is currently serviced by a 150mm diameter sanitary sewer. The site is part of the Signature Ridge Pump Station Tributary.

As per the *Palladium AutoPark Sanitary Flow Analysis – Revision #1, dated March 18, 2016,* the maximum sanitary flow rate for existing commercial buildings is 10,000 L/day/ha, resulting in a maximum allowable discharge of 52,704 litres per day (0.61 L/s). The sanitary flow from the site was calculated to be 0.53L/s, including the car wash. Calculations assume a peak factor of 1.5 and an infiltration allowance of 0.28 L/sec/hectare.

The sanitary plumbing for the addition will be connected internally within the existing building. The carwash will discharge into a sediment interceptor before connecting to the existing sanitary plumbing inside the building. The existing 150mm sanitary lateral has a capacity of 15.23L/s at a 1% slope. A MISA manhole is located approximately 3.27m inside the property line for sample testing.

The existing 150mm sanitary main is sufficiently sized to handle the additional flow and will not exceed the allowable rate of 0.54 L/s required by the *Palladium AutoPark Sanitary Flow Analysis – Revision #1*.

5.0 Stormwater Management

The site has a current approved stormwater management plan designed by Novatech Consulting Engineers Ltd. The original report can be found in Appendix E. The report states that the site has three separate outlets into the storm sewers located in the Private Road. The area north of the building outlets through a Hydrovex model 75 SVHV-1 installed in EX-CBMH4. The building roof outlets through EX-STM MH2, the roof is controlled by flow restricting roof drains. The area south of the building outlets through a 143mm diameter plug orifice located in EX-STM MH1. The total combined release rate of the site is 84.0 L/s for the 100-year storm and 81.8 L/s for the 5-year storm.

5.1 Design Criteria

To determine proposed runoff rates the Rational Method was utilized. In order to delineate drainage areas existing topographic survey information and the proposed grading plan were utilized. Runoff calculations are derived using the Rational Method:

$$Q = 2.78CIA\ (L/s)$$

Where: Q = Runoff Rate (l/s)

C = Runoff coefficient

I = Rainfall intensity (mm/hr)

A = Drainage Area (hectares)

The following coefficients were used to develop an average C for each area.

Roofs/Concrete/Asphalt	0.90
Gravel	0.90

Landscaped	0.25

Rainfall intensities were derived from the City of Ottawa IDF curves. A minimum inlet time of 20 minutes was used as requested by City staff.

5.2 Existing Drainage

The existing site is divided into three drainage areas: the area north of the existing building, the existing building, and the area south of the existing building. The site discharges into privately owned storm sewers in the street. As per the *Palladium Auto-Park Stormwater Management Report, April 2003,* Prepared by J.L. Richards & Associates Limited the existing site has two inlet control devices restricting flow leaving the site to 73.5L/s during a 100-year storm.

The roof drains for the existing building also discharge into the private storm sewer network at a total restricted flow of 7.2 L/s for a 100-year storm. The existing roof contains six roof drains, each drain is fitted with a flow control device restricting the release rate for each roof drain to 1.2L/s.

The site utilizes parking lot storage to a maximum depth of 260mm on the north portion of the site, and 210mm on the south potion of the site.

The north area of the site will not be altered during the building addition; therefore, it will not be included in the stormwater calculations.

Existing stormwater management report and servicing drawings can be found in Appendix E.

5.3 Post-Development Drainage

The site will be regraded around the proposed addition to direct water to two new catch basin manholes and one relocated catch basin. Two existing catch basin manholes will be removed during the work on-site. The existing inlet control devices will be left in their original structures and will not be altered. The total release rate for the site will not be altered for the new development.

Post-Development drainage areas can be found in Appendix C.

5.4 Quantity Control – Area A-3

An existing inlet control device will be utilized to restrict release rates for the 5 and 100-year storms. The below table summarizes the post-development release rates and required storage volumes. The 2-year storm was also analyzed, and it was determined that the pipes and structures have surplus volume, and parking lot ponding will not occur.

Return Period	Controlled Release Rate (L/s)	Storage Required (m^3)
5-year	67.9	82

100-Year	68.8	228

Table 9: Required Storage Volume

The site will continue to utilize parking lot, rooftop storage, and underground storage to provide quantity control. Flows in excess of the 5-year storm, up to the 100-year storm will be contained on site using the previously mentioned storage methods. An inlet control device in Storm Manhole 1 will limit runoff from the parking lot area, and flow control roof drains, limiting flow to 2.5L/s, will be utilized to achieve storage on the roof of the addition. Ponding volumes were determined using AutoCAD Civil 3D. Ponding depths were limited to 150mm for the 5-year storm and 300mm for the 100-year storm. The table below summarizes the storage volumes on-site.

Structure	Storage Volume (m^3)
Ex-CB 1	14.02
Ex-CB 2	14.02
Ex-CB 3	9.12
Ex-CB 4	11.18
Ex-CB 5	89.41
EX-CBMH 2	10.29
EX-CBMH 4	62.41
EX-CBMH 5	46.35
PR-CBMH 6	38.45
PR-CBMH 7	3.85
Pipe Volume	41.1
Underground Storage	311.6
Addition Roof	86.32
Existing Roof	93.40
TOTAL	**831.52**

Table 10: Post Development Storage

5.5 Underground Storage System

The site will utilize and underground storage system to retain excess flows to meet the storage volume requirements from the J.L. Richards Stormwater Management Report. The underground storage was designed to have a capacity of 311.6m^3. A Graf EcoBloc system will be utilized to provide storage.

5.6 Quality Control

The site outlets to a stormwater management pond located at the northern end of the Auto Park that provides quality control. Therefore, no on-site quality control measures are needed.

5.7 Major Overland Flow Route

As per the site's existing Stormwater Management Report, the site has two overland flow routes in the case a major rainfall event exceeds the design storms.

Post Development area A-1 will pond to a maximum depth of 300mm before overflowing into lower downstream areas and eventually draining to the main entrance and onto the Private Road.

Post Development area A-3 will pond to a maximum depth of 300mm before overflowing into lower downstream areas and eventually draining to a curb cut located near the garbage enclosure where it will spill into the drainage ditch along Palladium Drive.

5.8 Temporary Sediment and Erosion Control

During Construction the risk of contamination by sediment to the stormwater receiver increases. Temporary sediment and erosion control measures will be implemented before construction and remain in place until construction and reinstatement of the lands are completed.

Suitable areas shall be designated and agreed upon for the disposal of any accumulated sediment or other debris or disposed of in accordance with OPSS 180.

Sediment traps will be installed in all catch basins on site and will remain in place until grading and paving are complete. The sediment and erosion control measures will be inspected periodically and maintained during construction by the Contractor. These measures will be removed up completion of the permanent quality control devices and establishment of vegetation.

All areas disturbed by construction are to be reinstated as soon as possible. Damage to existing vegetated areas is to be minimized by fencing the work area to maintain constructions activities to pre-defined areas.

Stockpiles of excavated material or stockpiled granular are to be located to minimize the possibility of runoff beyond the construction zone. Silt fences will be required to contain runoff from stockpiles.

6.0 Conclusions

Based on the information provided above it was determined that the proposed building addition can be serviced with the existing on-site services.

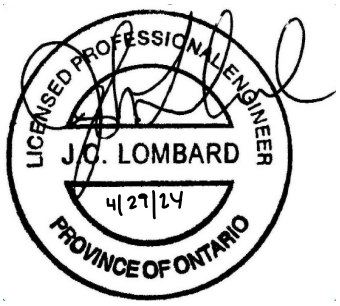
Adequate fire flow protection and domestic supply will be provided by the existing fire hydrant and 150mm water service.

The existing 150mm sanitary service is adequately sized to handle the building addition and will not create and issues on downstream receivers.

Stormwater runoff for the 5-year through 100-year storms will be stored on-site before being released at the pre-established release rates.

Prepared by:

Full Speed Builders Limited



Daniel Fox

Josh Lombard, M. Eng., P.Eng.

Appendix A

Servicing Calculation Sheets

FULL SPEED BUILDERS

Fire Flow Design Sheet

Project: Capital Dodge

Location: 2500 Palladium Drive, Ottawa, ON

Building Footprint (m^2)	3514	Construction Type (C):	Ordinary	1
Number of Storeys	2	Fire Supression System	NFPA Sprinkler System	-0.5
			Standard Water Supply	-0.1
Total Floor Area (m^2) (A)	4285	Distance from Other Buildings (m)	Greater Than 30m	0
		Content Type	Combustable	0

$$RFF = 220C\sqrt{A}$$

*Fire Underwriters Survey Water Supply for Public Fire Protection (2020)

Where: RFF = Required Fire Flow (Litres per min.)

C = Construction Coefficient

A = Total Effective Floor Area (m^2)

RFF Before Reduction	14401	lpm
	14000	lpm
Total Change	-40%	

Total Required Fire Flow	**8641**	**lpm**
	9000	**lpm**

Daily Water Flow

Project: Capital Dodge

Location: 2500 Palladium Drive, Ottawa, ON

Design Criteria

		Average Flow			
Car Wash	40	196	L/Vehicle/day	Max. Daily Factor:	1.5
Employees	40	75	L/person/day	Max. Hour Factor	1.8
Cars Serviced	50	40	L/car serviced		

Average Daily Demand:	**12840**	**L/day**	**0.15**	**L/sec**
Maximum Daily Demand			**0.27**	**L/sec**

(Average Daily Demand x 1.5)

Maximum Hour Demand			**0.48**	**L/sec**

(Maximum Daily Demand x 1.8)

Ministry of the Environment, Conservation and Parks requires a water distribution system to be assessed under the worst-case demand scenario

Max Daily Flow + Fire Flow

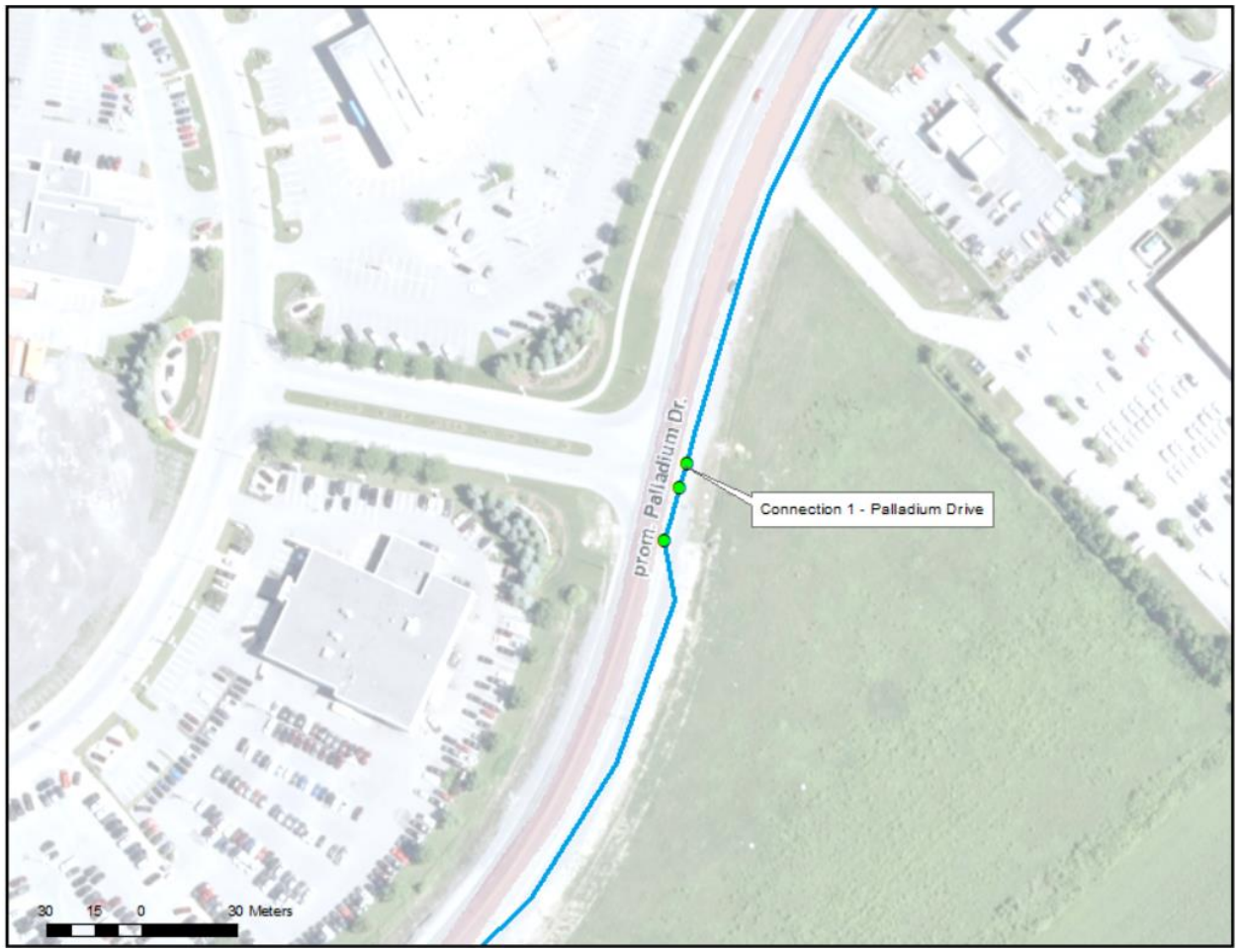
Peak Hour Flow

Boundary Conditions
2500 Palladium Drive

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	9	0.15
Maximum Daily Demand	16	0.27
Peak Hour	29	0.48
Fire Flow Demand #1	9,000	150.00

Location



Results

Connection 1 – Palladium Drive

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	160.7	81.6
Peak Hour	156.5	75.7
Max Day plus Fire Flow #1	153.7	71.6

[1] Ground Elevation = 103.3 m

Notes

1. As per the Ontario Building Code in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi.) Pressure control measures to be considered are as follows, in order of preference:
    a. If possible, systems to be designed to residual pressures of 345 to 552 kPa (50 to 80 psi) in all occupied areas outside of the public right-of-way without special pressure control equipment.
    b. Pressure reducing valves to be installed immediately downstream of the isolation valve in the home/ building, located downstream of the meter so it is owner maintained.

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.

Sanitary Sewer Calculation Sheet

FULL SPEED BUILDERS

DRAINAGE AREA DESCRIPTION						SANITARY FLOWS						PIPE DATA									
	MANHOLE		INCREMENTAL AREA		CONTRIBUTING AREAS	q	Peak Factor	Peak Flow	Σ	Infiltration	Q	SIZE	SLOPE	AREA (m^2)	WETTED PERIMETER	HYDRAULIC RADIUS	CAPACITY	Q/Qfull	VELOCITY	LENGTH	FALL
LOCATION	FROM	TO	Catchment	Area (ha)		(L/day)	M	(L/s)	AREA (ha)	(L/s)	(L/s)	(mm)	(%)				(L/s)		(m/s)	(m)	(m)
CAPITAL DODGE	BLDG	SAN MH1	1	1.10	A1	12840	1.500	0.22	1.10	0.31	0.53	150	1.00%	0.0177	0.4712	0.0375	15.23	0.03	0.86	23.9	0.239

DESIGN PARAMETER

Mannings n =		0.0130	
Average Daily Flow (q)=			
Vehicles	40	196	L/vehicle/day (Manufacturers Specs)
Employees	40	75	L/person/day
Cars Serviced	50	40	L/car serviced/day
Peaking Factor		1.5	(City of Ottawa Guidelines)
Infiltration Rate (I) =		0.28	L/s/ha (Stantec Report Recommendations)

Designed By:
Daniel Fox

Checked By:
Josh Lombard

Dwg. Reference:
C-2

PROJECT:
Capital Dodge Building Addition

LOCATION:
2500 Palladium Drive, Kanata

Project Number:
F1248

Date:
1-Sep-23

5-Year Storm Sewer Calculation Sheet

STREET	STRUCTURE		AREA		CONTRIBUTING	RUNOFF DATA						PIPE DATA								
	From	To	No	Ha	AREAS	C	AC	Σ AC	Tc (min.)	I (mm/hr)	Q (L/s)	Size (mm)	Slope (%)	AREA (m^2)	WETTED	HYDRAULIC	Capacity (L/s)	Q/Q_{full}	Velocity (m/s)	Length (m)	FALL (m)
Capital Dodge Kanata	EX-CB4	PR-CBMH6		0.087		0.90	0.078	0.078	20.0	70	15.24	250	0.35%	0.0491	0.7854	0.0625	35.2	0.433	0.72	26.4	0.09
	PR-CBMH6	PR-STMMH1		0.080		0.90	0.072	0.150	20.6	69	28.66	250	0.35%	0.0491	0.7854	0.0625	35.2	0.815	0.72	38	0.13
	EX-CB3	EX-CBMH2		0.132		0.90	0.118	0.118	20.0	70	23.11	250	0.45%	0.0491	0.7854	0.0625	39.9	0.579	0.81	31.4	0.14
	EX-CBMH2	Storage		0.110		0.90	0.099	0.217	20.6	69	41.63	300	0.75%	0.0707	0.9425	0.0750	83.7	0.497	1.18	24	0.18
	PR-CBMH7	PR-STMMH1		0.408		0.90	0.367	0.367	21.0	70	71.42	375	0.35%	0.1104	1.1781	0.0938	103.7	0.689	0.94	16	0.06
	PR-STMMH1	STORAGE		0.099		0.90	0.089	0.456	21.3	68	85.71	375	0.35%	0.1104	1.1781	0.0938	103.7	0.826	0.94	23.7	0.08
	STORAGE	PR-STMMH4		0.915		0.90	0.823	0.823	21.7	67	152.76	300	0.30%	0.0707	0.9425	0.0750	53.0	2.884	0.75	15.2	0.05
	PR-STMMH4	EX-STMMH1		0.915		0.90	0.824	1.647	22.0	66	302.58	375	0.35%	0.1104	1.1781	0.0938	103.7	2.917	0.94	19.8	0.07
	EX-CB1	EX-STMMH1		0.122		0.90	0.109	0.109	20.0	70	21.37	200	1.00%	0.0314	0.6283	0.0500	32.8	0.652	1.04	12.6	0.13
	EX-CB2	EX-STMMH1		0.073		0.90	0.066	0.066	20.0	70	12.85	200	1.00%	0.0314	0.6283	0.0500	32.8	0.392	1.04	15.7	0.16
	EX-STMMH1	STREET		1.109		0.90	0.998	1.064	21.7	67	197.49	375	0.35%	0.1104	1.1781	0.0938	103.7	1.904	0.94	28.6	0.10

DESIGN PARAMETER

Mannings n = 0.013

Q = 2.78CiA

Q= Peak Flow in Litres per second (L/s)

A = Area in Hectares (ha)

i = Rainfall Intensity in Millimeters per hour (mm/hr)

[i= 998.071/(TC+6.053)^0.814] 5 YEAR

[i=1735.688/(TC+6.014)^0.820] 100 YEAR

Designed By: D.F.

Checked By: J.L.

Dwg. Reference: C-3

PROJECT: Capital Dodge Building Addition

LOCATION: 2500 Palladium Drive, Kanata

Project Number: F1248

Date: 27-Jun-23

100-Year Storm Sewer Calculation Sheet

STREET	STRUCTURE		AREA		CONTRIBUTING	RUNOFF DATA						PIPE DATA								
	From	To	No	Ha	AREAS	C	AC	Σ AC	Tc (min.)	I (mm/hr)	Q (L/s)	Size (mm)	Slope (%)	AREA (m^2)	WETTED	HYDRAULIC	Capacity (L/s)	Q/Q_{full}	Velocity (m/s)	Length (m)	FALL (m)
Capital Dodge Kanata	EX-CB4	PR-CBMH6		0.087		0.90	0.078	0.078	20.0	120	26.03	250	0.35%	0.0491	0.7854	0.0625	35.2	0.740	0.72	26.4	0.09
	PR-CBMH6	PR-STMMH1		0.080		0.90	0.072	0.150	20.6	118	48.93	250	0.35%	0.0491	0.7854	0.0625	35.2	1.391	0.72	38	0.13
	EX-CB3	EX-CBMH2		0.132		0.90	0.118	0.118	20.0	120	39.48	250	0.45%	0.0491	0.7854	0.0625	39.9	0.990	0.81	31.4	0.14
	EX-CBMH2	Storage		0.110		0.90	0.099	0.217	20.6	120	72.51	300	0.75%	0.0707	0.9425	0.0750	83.7	0.866	1.18	24	0.18
	PR-CBMH7	PR-STMMH1		0.408		0.90	0.367	0.367	21.0	120	122.44	375	0.35%	0.1104	1.1781	0.0938	103.7	1.180	0.94	16	0.06
	PR-STMMH1	STORAGE		0.099		0.90	0.089	0.456	21.3	116	147.55	375	0.35%	0.1104	1.1781	0.0938	103.7	1.422	0.94	23.7	0.08
	STORAGE	PR-STMMH4		0.915		0.90	0.823	0.823	21.7	114	260.71	300	0.30%	0.0707	0.9425	0.0750	53.0	4.922	0.75	15.2	0.05
	PR-STMMH4	EX-STMMH1		0.915		0.90	0.824	1.647	22.0	113	516.37	375	0.35%	0.1104	1.1781	0.0938	103.7	4.978	0.94	19.8	0.07
	EX-CB1	EX-STMMH1		0.122		0.90	0.109	0.109	20.0	120	36.51	200	1.00%	0.0314	0.6283	0.0500	32.8	1.113	1.04	12.6	0.13
	EX-CB2	EX-STMMH1		0.073		0.90	0.066	0.066	20.0	120	21.95	200	1.00%	0.0314	0.6283	0.0500	32.8	0.669	1.04	15.7	0.16
	EX-STMMH1	STREET		1.109		0.90	0.998	1.064	21.7	114	337.05	375	0.35%	0.1104	1.1781	0.0938	103.7	3.249	0.94	28.6	0.10

DESIGN PARAMETER

Mannings n = 0.013

Q = 2.78CiA

Q= Peak Flow in Litres per second (L/s)

A = Area in Hectares (ha)

i = Rainfall Intensity in Millimeters per hour (mm/hr)

[i= 998.071/(TC+6.053)^0.814] 5 YEAR

[i=1735.688/(TC+6.014)^0.820] 100 YEAR

Designed By: D.F.

Checked By: J.L.

PROJECT: Capital Dodge Building Addition

LOCATION: 2500 Palladium Drive, Kanata

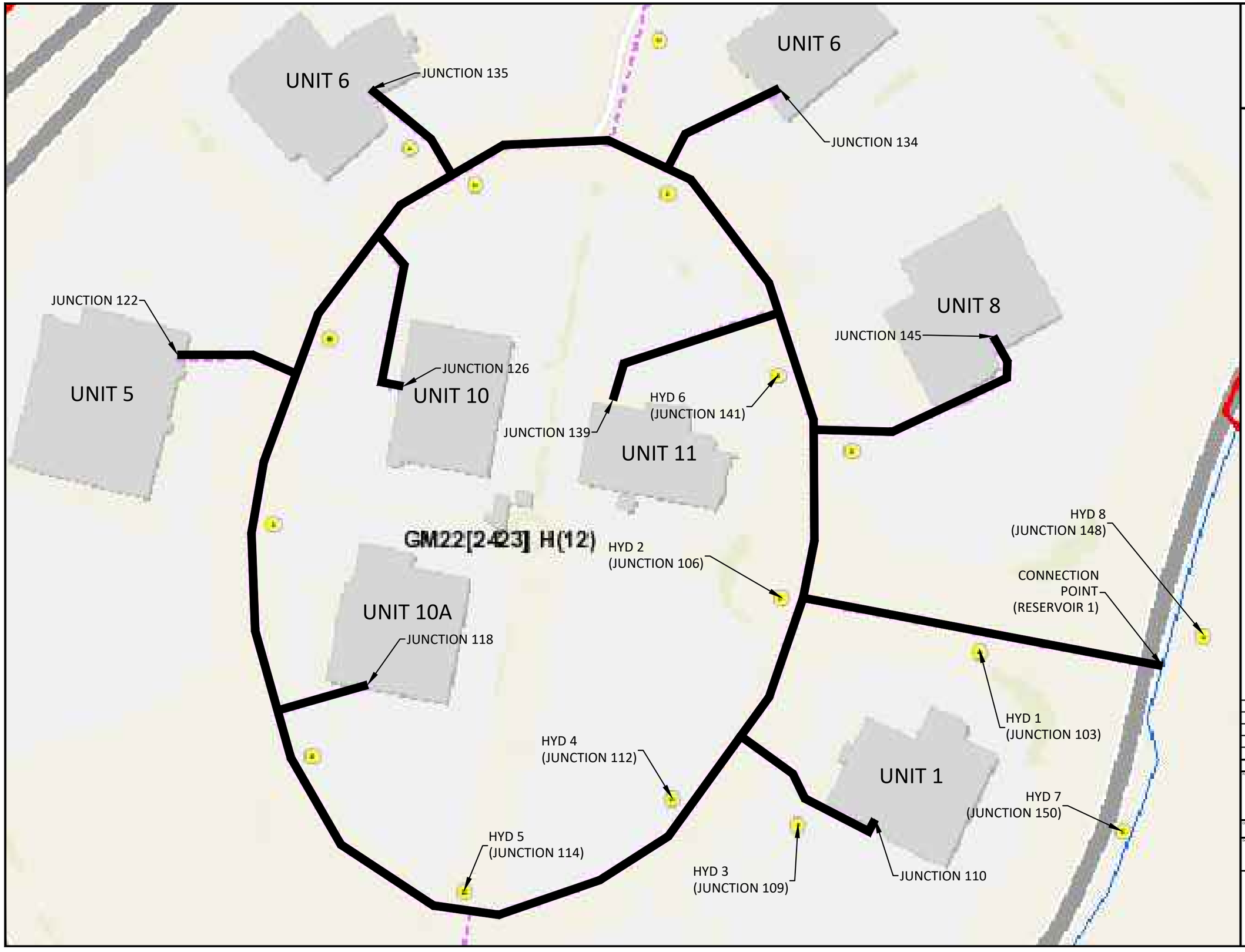
Dwg. Reference: C-3

Project Number: F1248

Date: 27-Jun-23

Appendix B

Water Model Results



FULL SPEED BUILDERS

No.	DATE	REVISIONS	BY
1	03/08/24	ISSUED FOR SERVICING REPORT	DF

Project:
CAPITAL DODGE
BUILDING ADDITION
2500 PALLADIUM DRIVE #1200
KANATA, ON

Client:
BUTLER AUTOMOTIVE GROUP

Drawing Title:
WATER MODELLING DETAILS

Client Project No.: F1248
Date: 03/08/2024
Designed By: J.L.
Drawn By: D.F.
Scale: N.T.S.
Dwg. No.: WM

Network Table - Nodes

Node ID	Elevation m	Demand LPS	Head m	Pressure m
Junc 109	103	95.00	138.73	35.73
Junc 110	102.90	0.27	139.50	36.60
Junc 106	102.7	95.00	140.23	37.53
Junc 103	103.00	95.00	145.51	42.51
Junc 118	100.6	0.63	139.89	39.29
Junc 122	101.1	0.49	140.10	39.00
Junc 145	100.4	0.45	140.72	40.32
Junc 141	103.0	63.30	140.06	37.06
Junc 139	100.4	0.22	140.53	40.13
Junc 114	100.6	63.30	139.47	38.87
Junc 134	100	0.16	140.38	40.38
Junc 135	100.3	0.34	140.28	39.98
Junc 126	100.6	0.22	140.22	39.62
Junc 112	103.3	95.00	138.99	35.69
Junc 148	102.8	63.30	153.49	50.69
Junc 150	103.8	63.30	153.39	49.59

Max Day Plus Fire Flow

Network Table - Nodes

Node ID	Elevation m	Demand LPS	Head m	Pressure m
Junc 110	102.90	0.48	156.50	53.60
Junc 118	100.6	1.13	156.49	55.89
Junc 122	101.1	0.87	156.49	55.39
Junc 145	100.4	0.81	156.49	56.09
Junc 139	100.4	0.39	156.50	56.10
Junc 134	100	0.29	156.50	56.50
Junc 135	100.3	0.62	156.49	56.19
Junc 126	100.6	0.39	156.50	55.90

Peak Hour Demand

Network Table - Nodes

Node ID	Elevation m	Demand LPS	Head m	Pressure m
Junc 110	102.90	0.27	160.70	57.80
Junc 118	100.6	0.63	160.70	60.10
Junc 122	101.1	0.49	160.70	59.60
Junc 145	100.4	0.45	160.70	60.30
Junc 139	100.4	0.22	160.70	60.30
Junc 134	100	0.16	160.70	60.70
Junc 135	100.3	0.34	160.70	60.40
Junc 126	100.6	0.22	160.70	60.10

Maximum Day Demand

Network Table - Nodes

Node ID	Elevation m	Demand LPS	Head m	Pressure m
Junc 110	102.90	0.15	160.70	57.80
Junc 118	100.6	0.35	160.70	60.10
Junc 122	101.1	0.27	160.70	59.60
Junc 145	100.4	0.25	160.70	60.30
Junc 139	100.4	0.12	160.70	60.30
Junc 134	100	0.09	160.70	60.70
Junc 135	100.3	0.19	160.70	60.40
Junc 126	100.6	0.12	160.70	60.10

Average Day Demand

Appendix C

Post Development Drawings

AUTOPARK PRIVATE

EXISTING CAR DEALERSHIP
F.F.E. 102.90m

PROPOSED
ADDITION
F.F.E. 102.90m

PALLADIUM

PART 4

ORP 'A'

ORP 'B'

SIB (1442)

SSIB (857)

Hydro Transformer On Concrete Pad

Hydro Transformer

UTB On Concrete Pad

EX-CB 1
TOG: 102.53
E INV: 100.55

EX-STM MH 1 w/ ICD
TOG: 102.73
N INV(ICD): 100.24
E INV: 100.42
S INV: 100.29
W INV: 100.42

EX-CB 2
TOG: 102.53
W INV: 100.58

EX-STM MH 2
TOG: 102.45
N INV: 100.23
S INV: 100.09

EX-CBMH 2
TOG: 102.57
N INV: 100.68
NW INV:100.63
SE INV: 100.68

EX-CB 3
TOG: 102.60
INV: 100.82

PR-MH 4
TOG:
W INV: 100.36
S INV: 100.38

PR-MH 3
TOG: 102.80
E INV: 100.78
N INV: 100.78
W INV: 100.76

PR-CBMH 7
TOG: 102.59
SE INV: 100. 83
S INV: 100.85

PR-CBMH 6
TOG: 102.47
NW INV: 100.91
E INV: 100.93

PR-CB 4
TOG: 102.65
INV: 101.03

EX-CBMH 4 W/ ICD
TOG: 102.45
N INV(ICD): 100.35
S INV: 100.43

EX-CBMH 5
TOG: 102.45
N INV: 100.59
SW INV: 100.54

EX-CB 5
TOG: 102.45
INV: 100.78

CURB CUT OUTLET

A-1 | 0.49 ha | 0.76

A-2 | 0.23 ha | 0.90

A-3 | 0.82 ha | 0.84

CATCHMENT ID / CATCHMENT AREA

A-# | 0.00 ha | 0.90

RUNOFF COEFFICIENT

OVERLAND FLOW ROUTE

FULL SPEED BUILDERS

No.	DATE	REVISIONS	BY
3	03/14/24	REVISED AS PER COMMENTS	DF
2	11/07/23	REVISED AS PER COMMENTS	DF
1	07/05/23	ISSUED FOR SPA	DF

Project:
CAPITAL DODGE
BUILDING ADDITION
2500 PALLADIUM DRIVE #1200
KANATA, ON

Client:
BUTLER AUTOMOTIVE GROUP

Drawing Title:
POST DEVELOPMENT DRAINAGE AREAS

Client Project No.: F1248
Date: 07/05/2023
Designed By: J.L.
Drawn By: D.F.
Scale: 1:250
Dwg. No.:

POST

Appendix D

Stormwater Calculation Sheets

FULL SPEED BUILDERS

1:2 YEAR STORM

Project: Capital Dodge
Location: 2500 Palladium Drive
Client: Butler Automotive Group

POST-DEVELOPMENT												
LOCATION		AREAS								DESIGN FLOW		
Catchment Areas	Area (m^2)	Building Area (m^2)	C	Asphalt & Gravel Area (m^2)	C	Landscaped Area (m^2)	C	Average C	C x A (m^2)	Time of Concentration	I (mm/hr)	Peak Flow (L/s)
A-1	4094	0	0.90	3224	0.90	870	0.25	0.76	3119.1	10	77.10	67
A-2	2363	2363	0.90	0	0.90	0	0.25	0.90	2126.7	10	77.10	46
A-3	8162	1151	0.90	6274	0.90	737	0.25	0.84	6866.75	10	77.10	147
										TOTAL		260

STORAGE REQUIREMENTS AREA A-3					
TIME	(mm/hr)	(L/s)	(L/s)	(L/s)	(m^3)
5	102.80	196	67.9	128	39
10	77.10	147	67.9	79	48
15	63.30	121	67.9	53	48
30	39.90	76	67.9	8	15
60	24.40	47	67.9	-21	-77

FULL SPEED BUILDERS

1:5 YEAR STORM

Project: Capital Dodge
Location: 2500 Palladium Drive
Client: Butler Automotive Group

POST-DEVELOPMENT												
LOCATION		AREAS								DESIGN FLOW		
Catchment Areas	Area (m^2)	Building Area (m^2)	C	Asphalt & Gravel Area (m^2)	C	Landscaped Area (m^2)	C	Average C	C x A (m^2)	Time of Concentration	I (mm/hr)	Peak Flow (L/s)
A-1	4094	0	0.90	3224	0.90	870	0.25	0.76	3119.1	10	104.19	90
A-2	2363	2363	0.90	0	0.90	0	0.25	0.90	2126.7	10	104.19	62
A-3	8162	1151	0.90	6274	0.90	737	0.25	0.84	6866.75	10	104.19	199
										TOTAL		351

STORAGE REQUIREMENTS AREA A-3					
TIME	(mm/hr)	(L/s)	(L/s)	(L/s)	(m^3)
5	141.18	270	67.9	202	60
10	104.19	199	67.9	131	79
15	83.56	160	67.9	92	82
30	53.93	103	67.9	35	63
60	32.94	63	67.9	-5	-18

FULL SPEED BUILDERS

1:100 YEAR STORM

Project: Capital Dodge
Location: 2500 Palladium Drive
Client: Butler Automotive Group

POST-DEVELOPMENT												
LOCATION		AREAS								DESIGN FLOW		
Catchment Areas	Area (m^2)	Building Area (m^2)	C	Asphalt & Gravel Area (m^2)	C	Landscaped Area (m^2)	C	Average C	C x A (m^2)	Time of Concentration	I (mm/hr)	Peak Flow (L/s)
A-1	4094	0	1.00	3224	1.00	870	0.31	0.85	3493.7	10	178.56	173
A-2	2363	2363	1.00	0	1.00	0	0.31	1.00	2363	10	178.56	117
A-3	8162	1151	1.00	6274	1.00	737	0.31	0.94	7653.47	10	178.56	380
										TOTAL		671

STORAGE REQUIREMENTS AREA A-3					
TIME	(mm/hr)	(L/s)	(L/s)	(L/s)	(m^3)
5	242.70	516	68.8	448	134
10	178.56	380	68.8	311	187
15	142.89	304	68.8	235	212
30	91.87	195	68.8	127	228
60	55.89	119	68.8	50	180

Appendix E

Original SWM Report & Civil Drawings

PALLADIUM AUTO PARK
CAPITAL DODGE CHRYSLER
STORMWATER MANAGEMENT REPORT

Prepared for:

CAPITAL TWO INVESTMENTS LIMITED

Prepared by:

NOVATECH ENGINEERING CONSULTANTS LTD.
Suite 200, 240 Michael Cowpland Drive
Kanata, Ontario
K2M 1P6

May 4, 2006

Ref: R-2006-070
Novatech File No: 106034-1

NOVATECH
ENGINEERING
CONSULTANTS LTD

May 4, 2006

Capital Two Investments Limited
1 Laser Street
Ottawa, Ontario
K2E 7V1

Attention: Mr. Jim Durrell

Dear Sir:

Re: Palladium Auto Park
Capital Dodge Chrysler
Stormwater Management Report
Our File No.: 106034-1

Please find enclosed a copy of the Stormwater Management (SWM) Report for the above noted project. This study addresses the mitigation of stormwater related impacts due to the development of the proposed site. This report is hereby submitted for your review and approval. If you require any additional information, please do not hesitate to contact the undersigned.

Yours truly,

NOVATECH ENGINEERING CONSULTANTS LTD.

François Thauvette

François Thauvette, P. Eng.
Project Engineer

FT/ft

cc: Rob Phillips (City of Ottawa) – 4 copies
Ken Hoppner (Morley Hoppner Group) – 1 copy
Dave Mungall (Pye & Richards Architects) – 1 copy
Rob Lefebvre (GWAL) – 1 copy

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ATTACHED PLANS:

106034-GP GENERAL PLAN OF SERVICES
106034-GR GRADING PLAN
106034-SWM STORMWATER MANAGEMENT PLAN

1.0 INTRODUCTION

The development of the site is being proposed by Capital Two Investments Limited and will consist of a new Dodge Chrysler car dealership. The site is located within the 14-lot Palladium Auto Park in the City of Ottawa (formerly Kanata). The site is bordered by the main entrance to the 14-lot development to the northeast, Palladium Drive to the southeast, the existing Ring Road to the northwest and a vacant lot to be developed to the southwest. Refer to the key plan shown on the attached plans.

The proposed car dealership will be serviced by connecting to the existing sanitary, storm and water stubs previously constructed, up to the property line, as part of the Palladium Auto Park servicing. A new fire hydrant will also be constructed on site to provide fire protection for the proposed building. Stormwater will be stored and controlled on-site prior to being directed to the existing stormwater management (SWM) pond located near the northeast corner of the 14-lot development. The existing SWM pond will provide water quality control.

In order to compare the post-development flow to the allowable flow, the assessment was limited to a 1.50-hectare area (i.e. lot to be developed + a portion of the existing landscaped entrance feature area draining onto the site).

2.0 STUDY OBJECTIVES

The approach for the stormwater management design is not to exceed the allowable runoff for the site, as specified by the previously approved Palladium Auto Park Stormwater Management Report (JLR 15941-04) prepared by J. L. Richards & Associates Limited, dated April 2003.

On-site stormwater quantity control, including rooftop and parking lot surface detention will be required and will be achieved by the use of controlled flow roof drains and inlet control devices (ICD) at the outlet manholes. All post-development runoff in excess of the allowable will be stored and controlled on site, for a return period of 1:5 years up to and including the 1:100 year design event.

3.0 PRE-DEVELOPMENT CONDITIONS

3.1 THE SITE

The site currently consists of an undeveloped grass field. A small berm is located within the eastern portion of the site. The main entrance to the Palladium Auto Park as well as the existing Ring Road including concrete sidewalks, street lights, utilities, sewers and the watermain have all been constructed as part of the Palladium Auto Park development. Some landscaping features, such as trees, sod and the main entrance

sign have also been constructed along the property lines. Refer to Figure 1: Existing Conditions Plan for details.

3.2 EXISTING DRAINAGE

The majority of the stormwater runoff generally sheet drains in a northerly direction towards the existing main entrance to the Palladium Auto Park, where it enters the existing storm sewer via roadway catchbasins. A small portion of the runoff from the site drains east towards the existing drainage ditch that runs along Palladium Drive. Stormwater from this drainage ditch is also being directed to the existing SWM pond located near the northeast corner of the 14-lot development.

3.3 ALLOWABLE RELEASE RATE

As mentioned previously, the approach is to undertake a stormwater management design, which will not exceed the allowable runoff for the site, as specified by the previously approved Palladium Auto Park Stormwater Management Report (JLR 15941-04) prepared by J. L. Richards & Associates Limited, dated April 2003. The maximum allowable release rate for the site is 84 L/s (2 x 42 L/s). Refer to the JLR SWM Report.

4.0 POST-DEVELOPMENT CONDITIONS

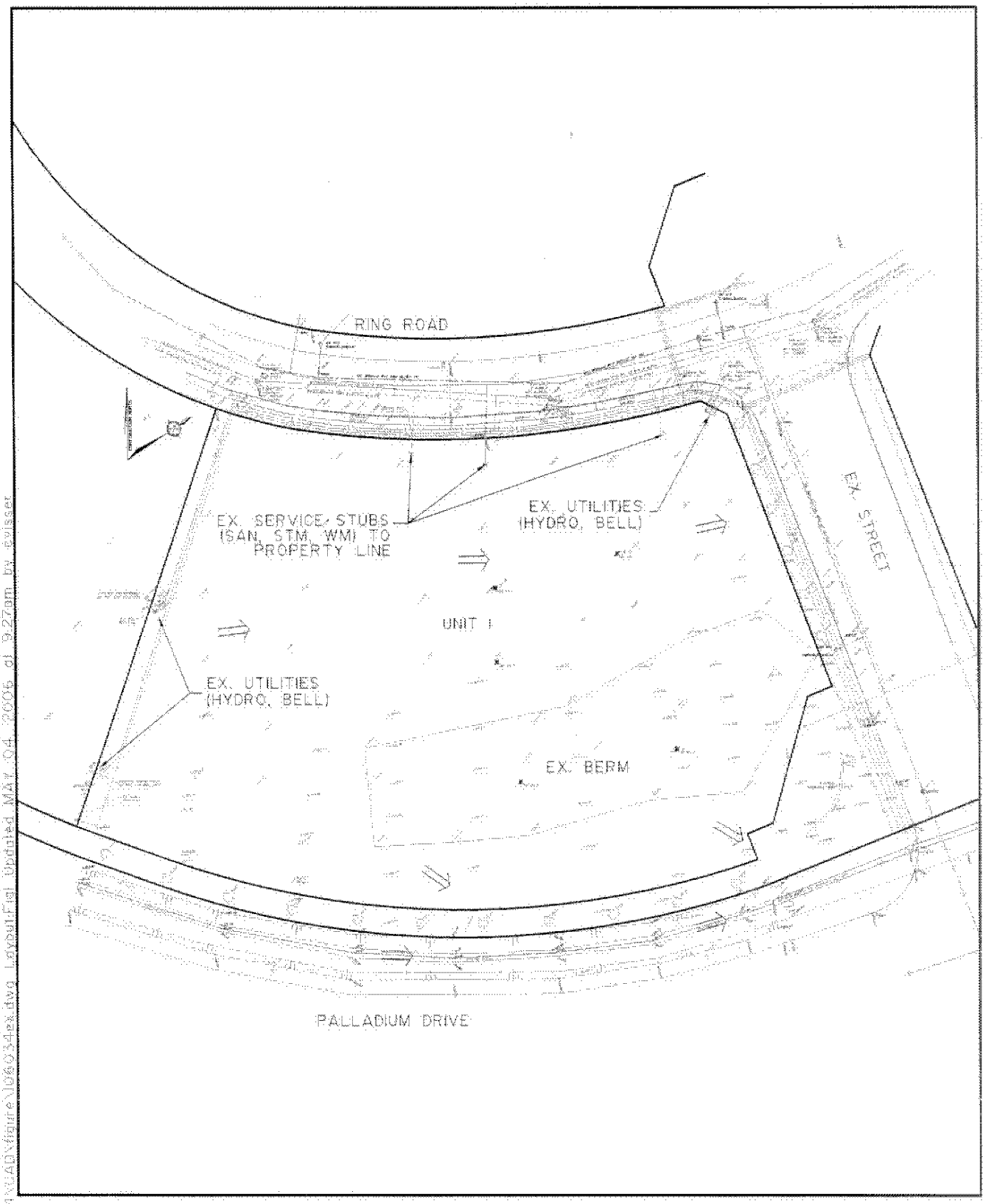
4.1 DEVELOPMENT PROPOSAL

Due to the extent of hard surfaced areas and limited allowable release rate from the site, all post-development runoff in excess of the allowable quantity will be stored and controlled on site, prior to being directed to the existing SWM pond. This will be required for the 1:5 year design event up to and including the 1:100 year design event.

On-site stormwater quantity control, including rooftop and parking lot detention will be achieved by the use of controlled flow roof drains and inlet control devices (ICD) at the outlet manholes.

4.2 POST-DEVELOPMENT FLOW

The post-development flow from the site includes direct runoff from the landscaped areas adjacent to the property lines, controlled flow from the building roof and from the paved parking lot areas. Refer to the attached plans (106034-SWM, 106034-GP and 106034-GR) for details.



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ENGINEERS & PLANNERS

CAPTIAL DOGE CHRYSLER
PALLADIUM DRIVE

EXISTING CONDITIONS PLAN

106034 NOT TO SCALE FIGURE 1

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Drawing: M:\2006\106034\CAD\figure\106034ex.dwg, Layout: Final Updated MAY 04, 2006 at 9:27am by sylsser

4.2.1 AREA A-1: DIRECT RUNOFF

The direct runoff from the site, was calculated using the Rational Method to be 2.0 L/s for the 1:5 year design event and 3.3 L/s for the 1:100 year design event (refer to Appendix A for detailed calculations and 106034-SWM for drainage areas).

4.2.2 AREAS A-2, A-3 & A-4

Consequently, the allowable flow remaining for Areas A-2, A-3 and A-4 is the allowable release rate for the entire site less the uncontrolled direct runoff. The following table indicates the allowable release rate for the entire site, the direct runoff from Area A-1, as well as the allowable release rate for the remainder of the site for both the 1:5 year and 1:100 year design events.

Design Event	Pre-Development	Post-Development	
	Allowable Release Rate for the Site (L/s)	Direct Runoff Area A-1 (L/s)	Maximum Allowable Flow for Areas A-2, A-3 & A-4 (L/s)
1:5 yr	84.0	2.0	82.0
1:100 yr	84.0	3.3	80.7

A portion of the maximum allowable flow for Areas A-2, A-3 and A-4 will be allotted to each drainage area based on relative size of the area, storage available and relative ponding depth. The controlled flow for these drainage areas is described in the following sections of the report.

4.2.3 AREA A-2: BUILDING ROOF

The post-development flow from Area A-2, was calculated using the Rational Method to be 42.2 L/s for the 1:5 year design event and 72.1 L/s for the 1:100 year design event, which exceeds the maximum allowable flow for this area (refer to Appendix A for detailed calculations and 106034-SWM for drainage areas). Flow from the building roof will be controlled by a total of 6 roof drains to a maximum of 7.2 Ls (or 1.2 L/s per drain).

The Modified Rational Method was used to determine the storage volume required for the various rooftop drainage areas. Based on a controlled flow of 1.2 L/s per drain, the ponding depth on the roof above the drains will range from approximately 0.11m to 0.12m for the 1:5 year design event and from 0.13m to 0.15m for the 1:100 year design event (Refer to the Appendix B and to the Roof Drain Table shown on 106034-GP for details).

4.2.4 AREA A-3: PAVED PARKING LOT + LANDSCAPED AREAS

The post-development flow from Area A-3, which will sheet drain towards the various CBs and CBMHs, was calculated using the Rational Method to be 137.9 L/s for the 1:5 year design event and 235.4 L/s for the 1:100 year design event, which exceeds the maximum allowable flow for this area (refer to Appendix A for detailed calculations and 106034-SWM for drainage areas).

The Modified Rational Method was used to determine the storage volume required for this area. Since the storage requirement for the 1:100 year design event is greater than the storage requirement for the 1:5 year design event and the allowable flow for the 1:100 year design event is less than the allowable flow for the 1:5 year design event, it was used to size the plug type orifice control located in the outlet pipe of STM MH 1. Based on a release rate of 68.8 L/s, the required storage volume for the 1:100 year design event was calculated to be approximately 202 m^3 (refer to Appendix B for detailed calculations). The paved parking area around the various CBs and CBMHs, including the structures themselves, provide a volume of approximately 398 m^3 up to an elevation of 102.80m. The required storage volume for the 1:100 year design event will be stored within the structures and on the surface of the parking lot, resulting in a water elevation of 102.74m. The required storage volume for the 1:5 year design event, approximately 86 m^3, will be stored within the structures and on the surface of the parking lot, resulting in a water elevation of 102.68m. Refer to Appendix B for detailed calculations.

Required storage volumes, maximum storage provided, ponding elevations and controlled design flows are shown in the following table.

Design Event	Storage Volume (m^3)		Ponding Elevation (m)	Controlled Design Flow (L/s)
	Required (m^3)	Max Provided (m^3)		
1:5 year	86	398	102.68	67.9
1:100 year	202	398	102.74	68.8

A 143mm diameter plug type orifice will be installed in the outlet pipe of STM MH 1 to control the release rate to 68.8 L/s for the 1:100 year design event, with a design head of 2.43m. The same orifice will also control the 1:5 year flow, releasing it at 67.9 L/s, with a design head of 2.37m (refer to Appendix A for orifice control sample calculations).

4.2.5 AREA A-4: PAVED PARKING LOT + LANDSCAPED AREAS

The post-development flow from Area A-4, which will sheet drain towards the CB and various CBMHs, was calculated using the Rational Method to be 57.2 L/s for the 1:5 year design event and 97.6 L/s for the 1:100 year design event, which exceeds the maximum allowable flow for this area (refer to Appendix A for detailed calculations and 106034-SWM for drainage areas).

000077

The Modified Rational Method was used to determine the storage volume required for this area. Based on a release rate of 4.7 L/s, the required storage volume for the 1:100 year design event was calculated to be approximately 149 m^3, (refer to Appendix B for detailed calculations). The paved parking area around the CB and the various CBMHs, including the structures themselves, provide a volume of approximately 208 m^3 up to an elevation of 102.75m. The required storage volume for the 1:100 year design event will be stored within the structures and on the surface of the parking lot, resulting in a water elevation of 102.71m. The required storage volume for the 1:5 year design event, approximately 80 m^3, will be stored within the structures and on the surface of the parking lot, resulting in a water elevation of 102.66m. Refer to Appendix B for detailed calculations.

Required storage volumes, maximum storage provided, ponding elevations and controlled design flows are shown in the following table.

Design Event	Storage Volume (m^3)		Ponding Elevation (m)	Controlled Design Flow (L/s)
	Required (m^3)	Max Provided (m^3)		
1:5 year	80	208	102.66	4.7
1:100 year	149	208	102.71	4.7

A Hydrovex model 75 SVHV-1 will be installed in the outlet pipe of CBMH 4 to control the release rate to 4.7 L/s for the 1:100 year design event, with a design head of 2.36m. The same Hydrovex will also control the 1:5 year flow, releasing it at 4.7 L/s, with a design head of 2.31m (refer to Appendix C for information on the Hydrovex).

4.2.6 AREA A-4: PROPOSED FLOW

The following table indicates the allowable release rate for the entire site, the direct runoff from Area A-1 and the controlled design flow from Areas A-2, A-3 and A-4 as well as the total flow from the site for both the 1:5 year and 1:100 year design events.

Design Event	Pre-Development	Post-Development				
	Allowable Release Rate for the Site (L/s)	Direct Runoff A-1:(L/s)	Area A-2:(L/s)	Area A-3:(L/s)	Area A-4:(L/s)	Total Site Flow (L/s)
1:5 yr	84.0	2.0	7.2	67.9	4.7	81.8
1:100 yr	84.0	3.3	7.2	68.8	4.7	84.0

4.3 MAJOR OVERLAND FLOW ROUTE

In the case of a major rainfall event exceeding the design events provided for, the stormwater located within the paved areas in the northern portion of the site will pond to a maximum depth of 0.3m before overflowing into lower downstream drainage areas

and eventually spilling through the main entrance onto the Ring Road. The stormwater located within the paved areas in the southern portion of the site will pond to a maximum depth of 0.3m before overflowing into lower downstream drainage areas and eventually spilling through the curb cut near the garbage enclosure and spill into the existing drainage ditch that runs along Palladium Drive. The major system is shown on Drawing 106034-SWM.

5.0 EROSION AND SEDIMENT CONTROL MEASURES

Temporary erosion and sediment control measures will be implemented during construction in accordance with the "Guidelines on Erosion and Sediment Control for Urban Construction Sites", (Government of Ontario, May 1987). These measures include:

- Placement of filter fabric under all catchbasins and maintenance hatches
- Silt fences around the area under construction placed as per OPSS 577 and OPSD 219.110

The proposed erosion and sediment control measures will be implemented prior to construction and will remain in place during all phases of construction. Regular inspection and maintenance of the erosion control measures will be under taken.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The conclusions are as follows:

- On-site stormwater quantity control is required and will be achieved by a combination of rooftop storage and paved parking lot surface detention. The existing SWM detention pond located near the northeast corner of the 14-lot Palladium Auto Park will provide quality control for the site runoff.
- Water quantity control on the building roof (Area A-2) will be achieved by the use of controlled flow roof drains. A total of 6 drains will control the flow from the roof to a maximum of 1.2 L/s per drain (or 7.2 L/s).
- Water quantity control for the paved parking lot (Area A-3) will be achieved by the use of a 143mm diameter plug type orifice installed within the outlet pipe of STM MH 1 to control the release rate for the 1:100 year design event to 68.8 L/s, with a head of water of 2.43m. The same plug type orifice will also control the 1:5 year design event, releasing it to 67.9 L/s, with a head of water of 2.37m. Stormwater within this area will pond to an elevation of 102.68m for the 1:5 year design event and to 102.74m for the 1:100 year design event.

- Water quantity control within the paved parking lot (Area A-4) will be achieved by the use of a Hydrovex model 75 SVHV-1 installed within the outlet pipe of CBMH 4 to control the release rate for the 1:100 year design event to 4.7 L/s, with a head of water of 2.36m. The same Hydrovex will also control the 1:5 year design event, releasing it to 4.7 L/s, with a head of water of 2.31m. Stormwater within this area will pond to an elevation of 102.66m for the 1:5 year design event and to 102.71m for the 1:100 year design event.

- The total post-development flow from the site (Areas A-1, A-2, A-3 and A-4) will be controlled to the maximum allowable 84.0 L/s for the 1:100 year design event and slightly over-controlled to 81.8 L/s for the 1:5 year design event.

- Temporary erosion and sediment control measures will be implemented during construction.

It is recommended that the proposed stormwater management system be approved for implementation.

NOVATECH ENGINEERING CONSULTANTS LTD.

Prepared by:

F. Thauvette, P. Eng.

LICENSED PROFESSIONAL ENGINEER
F.S. THAUVETTE
100041399
MAY 4, 2006
PROVINCE OF ONTARIO

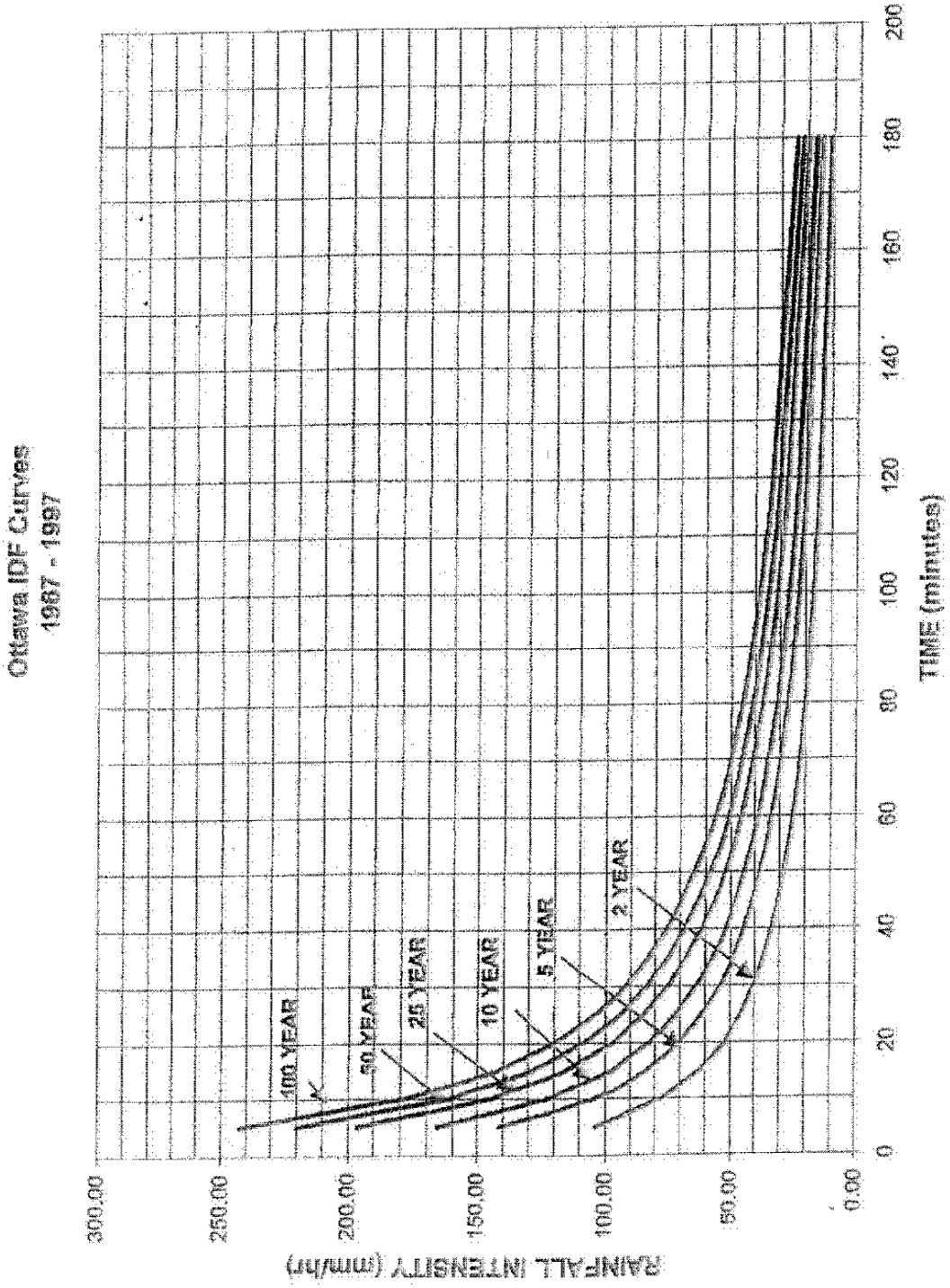
Reviewed by:

R.S. Cebryk, P. Eng.

APPENDIX A

IDF CURVES, RATIONAL METHOD, RUNOFF, ORIFICE CALCULATIONS

APPENDIX 5-A OTTAWA INTENSITY DURATION FREQUENCY (IDF) CURVE



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

The IDF curves based on the above equations can be found in Appendix 5-A.

5.4.3 Design Storms

Computer modeling requires the input of a design storm. The design storm is then used to generate a runoff hydrograph to determine how an area will respond and perform. Numerous types of design storms can be used ranging from historical storms to IDF curve-derived storms. This section briefly discusses the various types of design storms.

5.4.3.1 Application to Hydrologic Models

The design storms presented herein are meant to be used in hydrologic models to simulate runoff from events of various return frequencies. When choosing a design storm, the designer should perform a sensitivity analysis using various storms and use the one that is most conservative.

As noted below, the Chicago distribution is one of the most used storms for urban runoff applications. When dealing with rural areas, the SCS Type II storm is preferred. The AES storm can also be used for urban applications; however, care must be taken when choosing the type of distribution. As a rule of thumb, the 30% distribution should be used unless historical data proves otherwise.

When using a design storm, the designer must be careful in choosing the right storm time step. The storm's duration should be greater than twice the basin's time of concentration. A time step that is too small may overestimate peak flows. Should it be required to maintain a storm time step less than 10 minutes, consideration should be given to averaging the peak intensities to a 10-minute or greater average.

Some historical storms are also presented below and are to be used as a check of how various systems function during extreme events. It is not the intent of these guidelines to require that these storms be used for design purposes.

5.4.3.2 Chicago Design Storm

The Chicago storm distribution was developed by C.J. Keifer and H. Chu and is based on 25 years of rainfall record in the city of Chicago. This storm distribution, which is derived with IDF curves, is generally applied to urban basins where peak runoff rates are largely influenced by peak rainfall intensities.

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RATIONAL METHOD

The Rational Method was used to determine both the allowable runoff as well as the post-development runoff for the proposed site. The equation is as follows:

$Q=2.78\ CIA$

Where:
Q is the runoff in L/s
C is the weighted runoff coefficient*
I is the rainfall intensity in mm/hr**
A is the area in hectares

*The weighted runoff coefficient is determined for each of the catchment areas as follows:

$$C = \frac{(A_{perv} \times C_{perv}) + (A_{imp} \times C_{imp})}{A_{tot}}$$

Where:
A_{perv} is the pervious area in hectares
C_{perv} is the pervious area runoff coefficient (C_{perv}=0.20)
A_{imp} is the impervious area in hectares
C_{imp} is the impervious area runoff coefficient (C_{imp}=0.90)
A_{tot} is the catchment area (A_{perv} + A_{imp}) in hectares

** The rainfall intensity is taken from the City of Ottawa IDF Curves with a time of concentration of 20 min (refer to attached IDF Curves) as per the previous JLR SWM Report.

POST-DEVELOPMENT FLOW

AREA A-1: DIRECT RUNOFF

Drainage Area (A) = 0.05 ha
Impervious Area = 0.05 ha
Pervious Area = NA
Runoff Coefficient (C) = 0.20
Intensity (I_5) = 70.3 mm/hr
Intensity (I_{100}) = 120.0 mm/hr

Q_5= 2.78 CIA
Q_5= 2.78 x 0.20 x 70.3 x 0.07
Q_5= 2.0 L/s

Q_{100}= 2.78 CIA
Q_{100}= 2.78 x 0.20 x 120.0 x 0.05
Q_{100}= 3.3 L/s

AREA A-2: BUILDING ROOF

Drainage Area (A) = 0.24 ha
Impervious Area = 0.24 ha
Pervious Area = NA
Runoff Coefficient (C) = 0.90
Intensity (I_5) = 70.3 mm/hr
Intensity (I_{100}) = 120.0 mm/hr

Q_5= 2.78 CIA
Q_5= 2.78 x 0.90 x 70.3 x 0.24
Q_5= 42.2 L/s

Q_{100}= 2.78 CIA
Q_{100}= 2.78 x 0.90 x 120.0 x 0.24
Q_{100}= 72.1 L/s

Flow from the building roof will be controlled by a total of 6 roof drains to a maximum of 1.2 L/s per drain. The total flow from the building roof will therefore be 7.2 L/s (6 x 1.2 L/s).

AREA A-3: PAVED PARKING LOT + LANDSCAPED AREAS

Drainage Area (A) = 0.83 ha
Impervious Area = 0.77 ha
Pervious Area = 0.06 ha
Runoff Coefficient (C) = 0.85
Intensity (I_5) = 70.3 mm/hr
Intensity (I_{100}) = 120.0 mm/hr

Q_5= 2.78 CIA
Q_5= 2.78 x 0.85 x 70.3 x 0.83
Q_5= 137.9 L/s

Q_{100}= 2.78 CIA
Q_{100}= 2.78 x 0.85 x 120.0 x 0.83
Q_{100}= 235.4 L/s

AREA A-4: PAVED PARKING LOT + LANDSCAPED AREAS

Drainage Area (A) = 0.38 ha
Impervious Area = 0.31 ha
Pervious Area = 0.07 ha
Runoff Coefficient (C) = 0.77
Intensity (I_5) = 70.3 mm/hr
Intensity (I_{100}) = 120.0 mm/hr

Q_5= 2.78 CIA
Q_5= 2.78 x 0.77 x 70.3 x 0.38
Q_5= 57.2 L/s

Q_{100}= 2.78 CIA
Q_{100}= 2.78 x 0.77 x 120.0 x 0.38
Q_{100}= 97.6 L/s

ORIFICE CONTROLS

The following equation is used to size the orifice, given a specified release rate and design head.

$Q = 0.62 \times A \times (2gh)^{1/2}$

Where:
Q is the release rate in m^3/s
A is the orifice area in m^2
g is the acceleration due to gravity, 9.81 m/s^2
h is the head of water in m
d is the diameter of the orifice in m

AREA A-3: PAVED PARKING LOT + LANDSCAPED AREAS

A 143mm diameter orifice will be installed in the outlet pipe of STM MH 1 to control the release rate to 68.8 L/s for the 1:100 year design event. The head is calculated from the water elevation to the centreline of the orifice and was calculated to be 2.43m (2.50m – 0.07m). Refer to Appendix B for Stage Storage Curves.

$Q = 0.62 \times A \times (2gh)^{1/2}$
$0.0688 = 0.62 \times A \times (2 \times 9.81 \times 2.43)^{1/2}$
$A = 0.01607$
$A = 3.14 \times d^2/4$
$d = 0.14304$, therefore use a 143mm orifice

The area of the 143mm diameter orifice = 0.01606m^2
The release rate for the 1:100 year design event was calculated using a 143mm diameter orifice to be 68.8 L/s. Iterative calculations were done to determine the release rate for the 1:5 year design events. The same 143mm diameter orifice will release the 1:5 year design event at the rate of 67.9 L/s with a design head of 2.37m (2.44m – 0.07m).

$Q_5 = 0.62 \times A \times (2gh)^{1/2}$
$Q_5 = 0.62 \times 0.01606 \times (2 \times 9.81 \times 2.37)^{1/2}$
$Q_5 = 0.067.9$ or 67.9 L/s

APPENDIX B

SWM CALCULATIONS

PALLADIUM AUTO PARK
CAPITAL DODGE CHRYSLER
PROJECT NO.106034-1
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-2: ROOF DRAIN 1

OTTAWA IDF CURVE

Area =	0.050	ha	Qallow =	1.20	L/s
C =	0.90		Vol(max) =	10.54	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	17.66	16.46	4.94
10	104.19	13.03	11.83	7.10
15	83.56	10.45	9.25	8.33
20	70.25	8.79	7.59	9.11
25	60.90	7.62	6.42	9.63
30	53.93	6.75	5.55	9.98
35	48.52	6.07	4.87	10.23
40	44.18	5.53	4.33	10.39
45	40.63	5.08	3.88	10.48
50	37.65	4.71	3.51	10.53
55	35.12	4.39	3.19	10.54
60	32.94	4.12	2.92	10.52
65	31.04	3.88	2.68	10.47

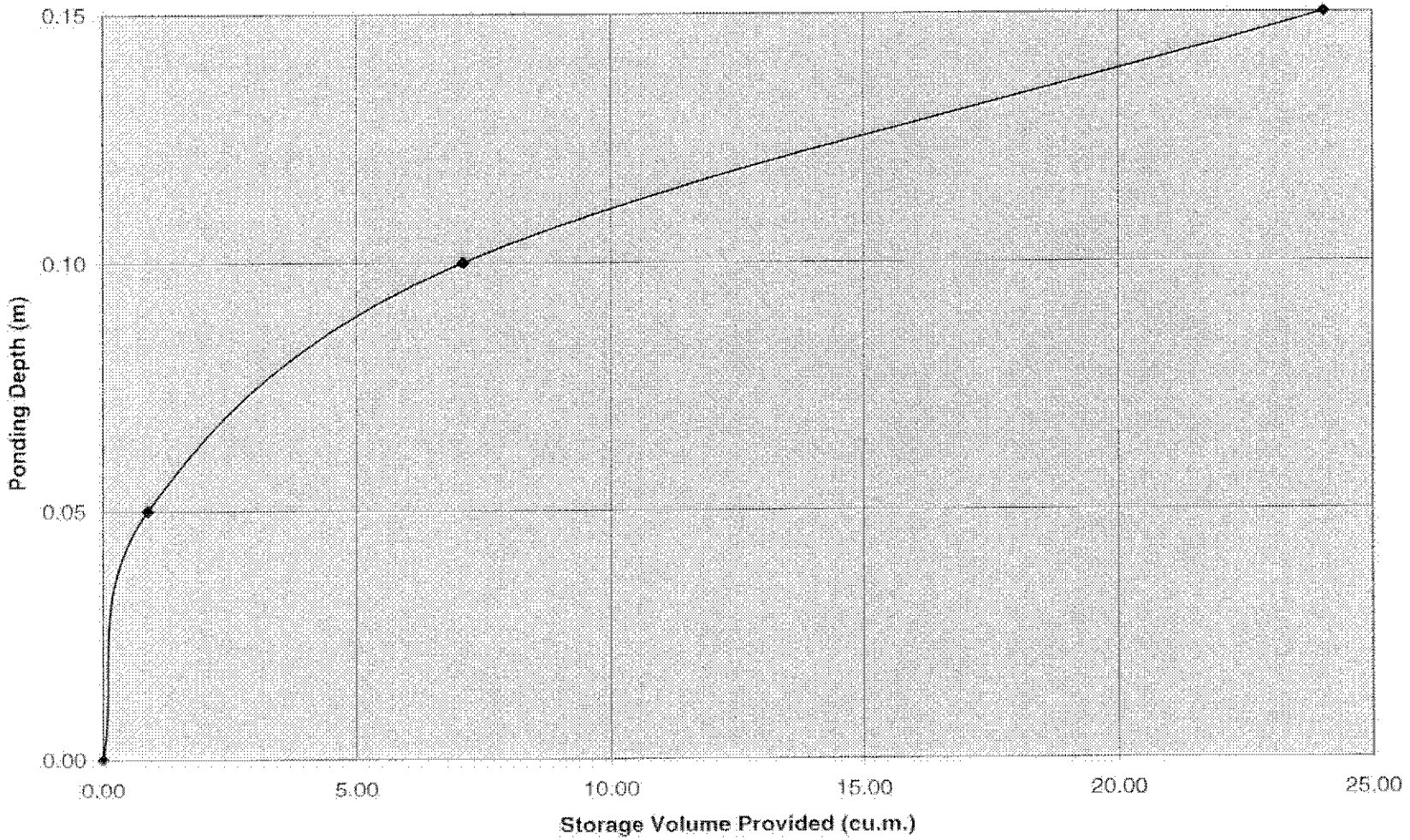
PALLADIUM AUTO PARK
CAPITAL DODGE CHRYSLER
PROJECT NO.106034-1
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-2: ROOF DRAIN 1

OTTAWA IDF CURVE

Area =	0.050	ha	Qallow =	1.20	L/s
C =	0.90		Vol(max) =	21.01	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	30.36	29.16	8.75
10	178.56	22.34	21.14	12.68
15	142.89	17.88	16.68	15.01
20	119.95	15.01	13.81	16.57
25	103.85	12.99	11.79	17.69
30	91.87	11.49	10.29	18.53
35	82.58	10.33	9.13	19.17
40	75.15	9.40	8.20	19.68
45	69.05	8.64	7.44	20.08
50	63.95	8.00	6.80	20.40
55	59.62	7.46	6.26	20.65
60	55.89	6.99	5.79	20.85
65	52.65	6.59	5.39	21.01

PALLADIUM AUTO PARK
Capital Dodge Chrysler
Area A-2: RD 1 Stage Storage Curve - Roof Top Storage



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PALLADIUM AUTO PARK
CAPITAL DODGE CHRYSLER
PROJECT NO.106034-1
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-2: ROOF DRAIN 2

OTTAWA IDF CURVE

Area =	0.047	ha	Qallow =	1.20	L/s
C =	0.90		Vol(max) =	9.68	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	16.60	15.40	4.62
10	104.19	12.25	11.05	6.63
15	83.56	9.83	8.63	7.76
20	70.25	8.26	7.06	8.47
25	60.90	7.16	5.96	8.94
30	53.93	6.34	5.14	9.25
35	48.52	5.71	4.51	9.46
40	44.18	5.20	4.00	9.59
45	40.63	4.78	3.58	9.66
50	37.65	4.43	3.23	9.68
55	35.12	4.13	2.93	9.67
60	32.94	3.87	2.67	9.63
65	31.04	3.65	2.45	9.56

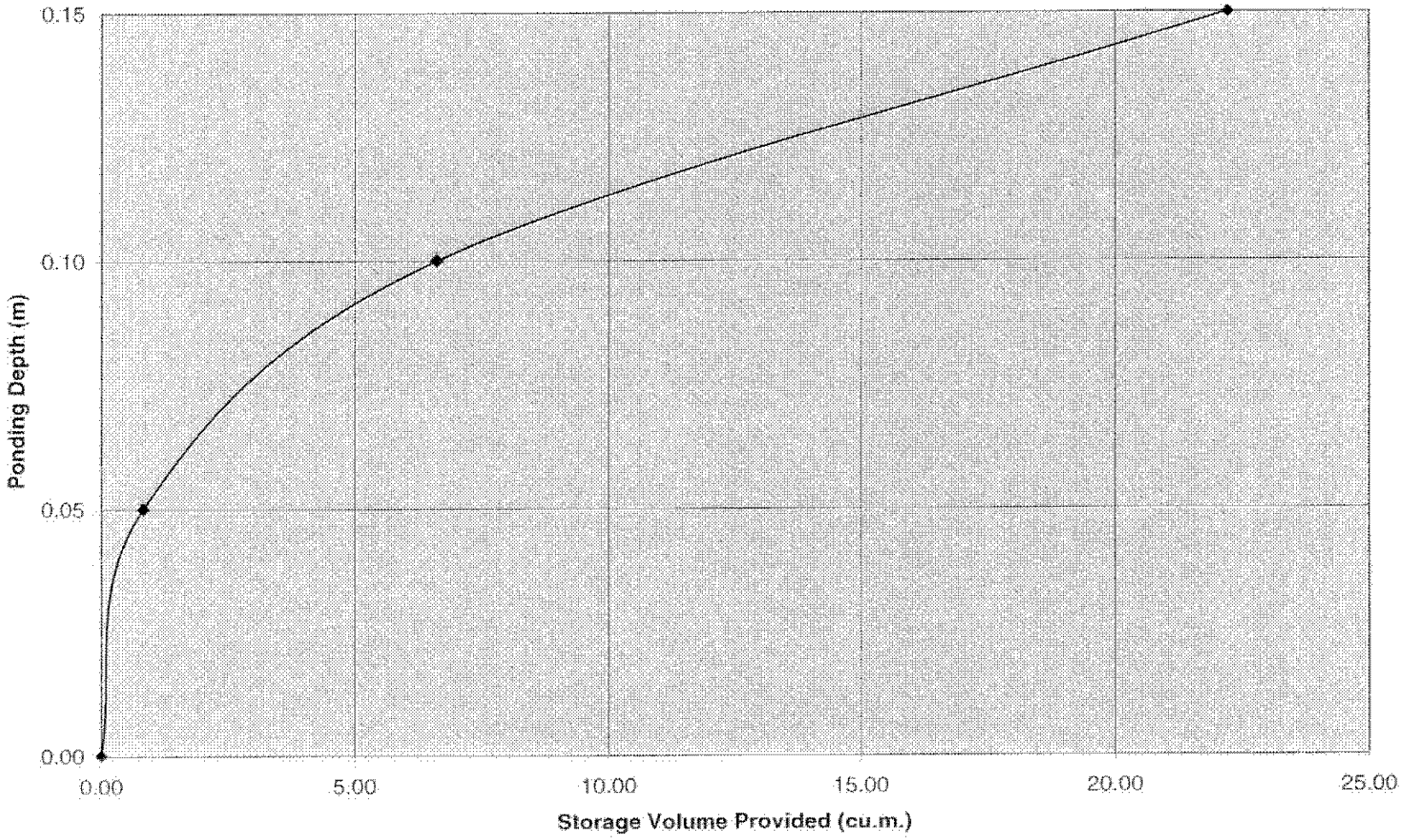
PALLADIUM AUTO PARK
CAPITAL DODGE CHRYSLER
PROJECT NO.106034-1
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-2: ROOF DRAIN 2

OTTAWA IDF CURVE

Area =	0.047	ha	Qallow =	1.20	L/s
C =	0.90		Vol(max) =	19.46	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	28.54	27.34	8.20
10	176.56	21.00	19.80	11.88
15	142.89	16.80	15.60	14.04
20	119.95	14.11	12.91	15.49
25	103.85	12.21	11.01	16.52
30	91.87	10.80	9.60	17.29
35	82.58	9.71	8.51	17.87
40	75.15	8.84	7.64	18.33
45	69.05	8.12	6.92	18.68
50	63.95	7.52	6.32	18.96
55	59.62	7.01	5.81	19.18
60	55.89	6.57	5.37	19.34
65	52.65	6.19	4.99	19.46

PALLADIUM AUTO PARK
Capital Dodge Chrysler
Area A-2: RD 2 Stage Storage Curve - Roof Top Storage



PALLADIUM AUTO PARK
CAPITAL DODGE CHRYSLER
PROJECT NO.106034-1
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-2: ROOF DRAIN 3

OTTAWA IDF CURVE

Area =	0.044	ha	Qallow =	1.20	L/s
C =	0.90		Vol(max) =	8.84	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	15.54	14.34	4.30
10	104.19	11.47	10.27	6.16
15	83.56	9.20	8.00	7.20
20	70.25	7.73	6.53	7.84
25	60.90	6.70	5.50	8.26
30	53.93	5.94	4.74	8.53
35	48.52	5.34	4.14	8.70
40	44.18	4.86	3.66	8.79
45	40.63	4.47	3.27	8.84
50	37.65	4.15	2.95	8.84
55	35.12	3.87	2.67	8.80
60	32.94	3.63	2.43	8.74
65	31.04	3.42	2.22	8.65

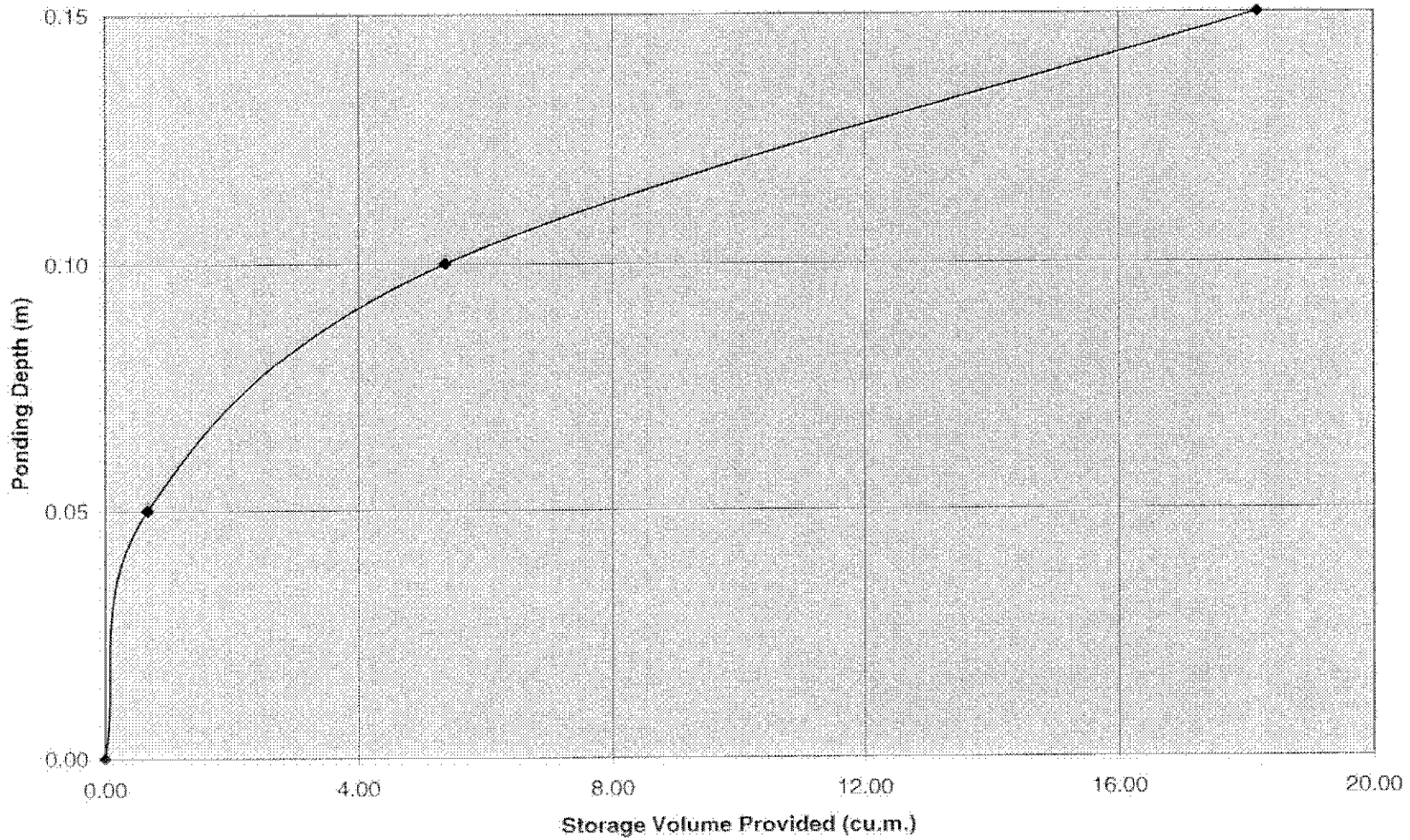
PALLADIUM AUTO PARK
CAPITAL DODGE CHRYSLER
PROJECT NO.106034-1
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-2: ROOF DRAIN 3

OTTAWA IDF CURVE

Area =	0.044	ha	Qallow =	1.20	L/s
C =	0.90		Vol(max) =	17.92	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	26.72	25.52	7.66
10	178.56	19.66	18.46	11.07
15	142.89	15.73	14.53	13.08
20	119.95	13.21	12.01	14.41
25	103.85	11.43	10.23	15.35
30	91.87	10.11	8.91	16.04
35	82.58	9.09	7.89	16.57
40	75.15	8.27	7.07	16.97
45	69.05	7.60	6.40	17.28
50	63.95	7.04	5.84	17.52
55	59.62	6.56	5.36	17.70
60	55.89	6.15	4.95	17.83
65	52.65	5.80	4.60	17.92

PALLADIUM AUTO PARK
Capital Dodge Chrysler
Area A-2: RD 3 Stage Storage Curve - Roof Top Storage



PALLADIUM AUTO PARK
CAPITAL DODGE CHRYSLER
PROJECT NO.106034-1
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-2: ROOF DRAIN 4

OTTAWA IDF CURVE

Area =	0.038	ha	Qallow =	1.20	L/s
C =	0.90		Vol(max) =	7.20	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	13.42	12.22	3.67
10	104.19	9.91	8.71	5.22
15	83.56	7.94	6.74	6.07
20	70.25	6.68	5.48	6.58
25	60.90	5.79	4.59	6.88
30	53.93	5.13	3.93	7.07
35	48.52	4.61	3.41	7.17
40	44.18	4.20	3.00	7.20
45	40.63	3.86	2.66	7.19
50	37.65	3.58	2.38	7.14
55	35.12	3.34	2.14	7.06
60	32.94	3.13	1.93	6.96
65	31.04	2.95	1.75	6.83

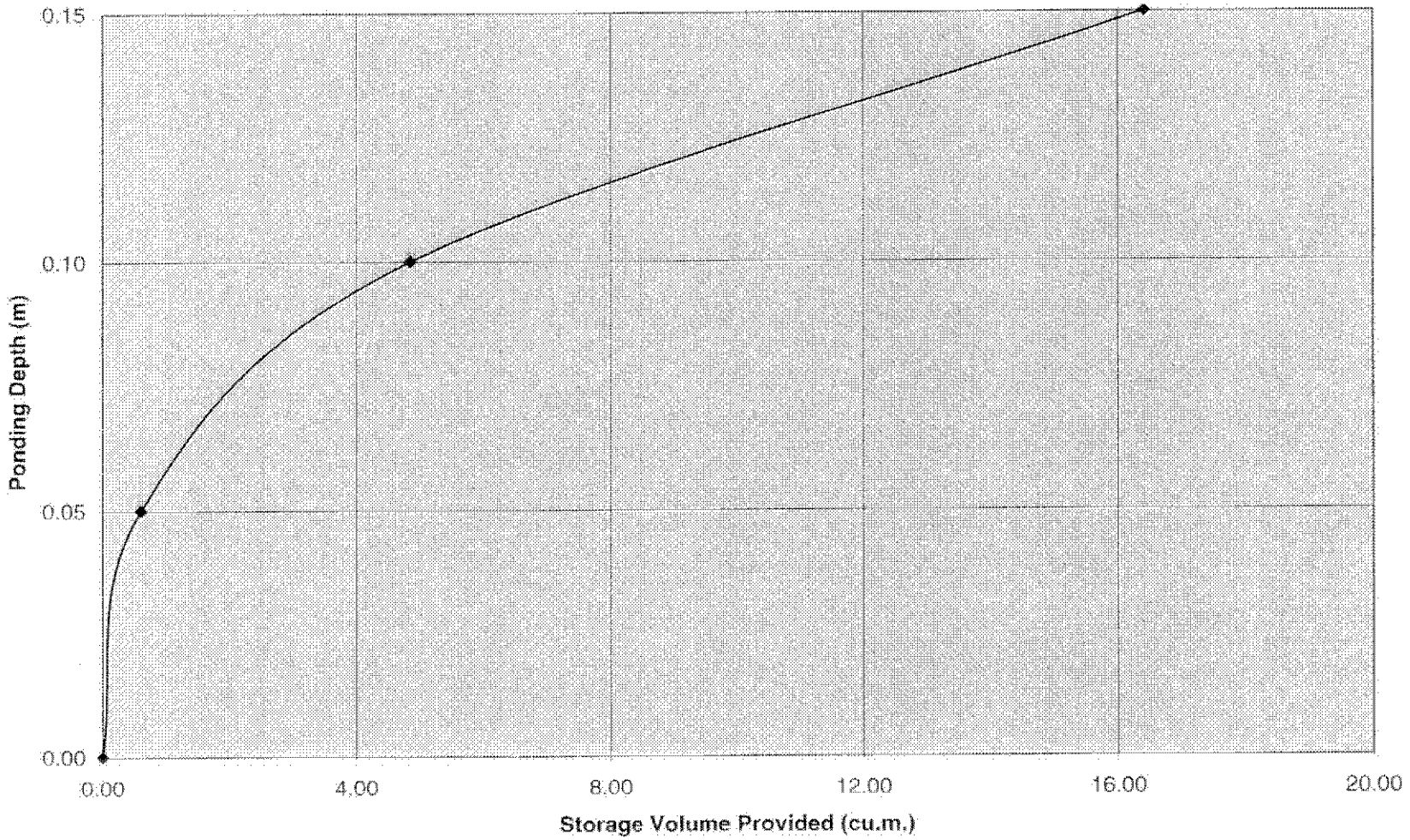
PALLADIUM AUTO PARK
CAPITAL DODGE CHRYSLER
PROJECT NO.106034-1
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-2: ROOF DRAIN 4

OTTAWA IDF CURVE

Area =	0.038	ha	Qallow =	1.20	L/s
C =	0.90		Vol(max) =	14.84	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	23.08	21.88	6.56
10	178.56	16.98	15.78	9.47
15	142.89	13.59	12.39	11.15
20	119.95	11.40	10.20	12.25
25	103.85	9.87	8.67	13.01
30	91.87	8.73	7.53	13.56
35	82.58	7.85	6.65	13.97
40	75.15	7.14	5.94	14.27
45	69.05	6.57	5.37	14.49
50	63.95	6.08	4.88	14.64
55	59.62	5.67	4.47	14.75
60	55.89	5.31	4.11	14.81
65	52.65	5.01	3.81	14.84

PALLADIUM AUTO PARK
Capital Dodge Chrysler
Area A-2: RD 4 Stage Storage Curve - Roof Top Storage



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PALLADIUM AUTO PARK
CAPITAL DODGE CHRYSLER
PROJECT NO.106034-1
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-2: ROOF DRAIN 5

OTTAWA IDF CURVE

Area =	0.032	ha	Qallow =	1.20	L/s
C =	0.90		Vol(max) =	5.64	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	11.30	10.10	3.03
10	104.19	8.34	7.14	4.29
15	83.56	6.69	5.49	4.94
20	70.25	5.62	4.42	5.31
25	60.90	4.88	3.68	5.51
30	53.93	4.32	3.12	5.61
35	48.52	3.88	2.68	5.64
40	44.18	3.54	2.34	5.61
45	40.63	3.25	2.05	5.54
50	37.65	3.01	1.81	5.44
55	35.12	2.81	1.61	5.32
60	32.94	2.64	1.44	5.18
65	31.04	2.49	1.29	5.01

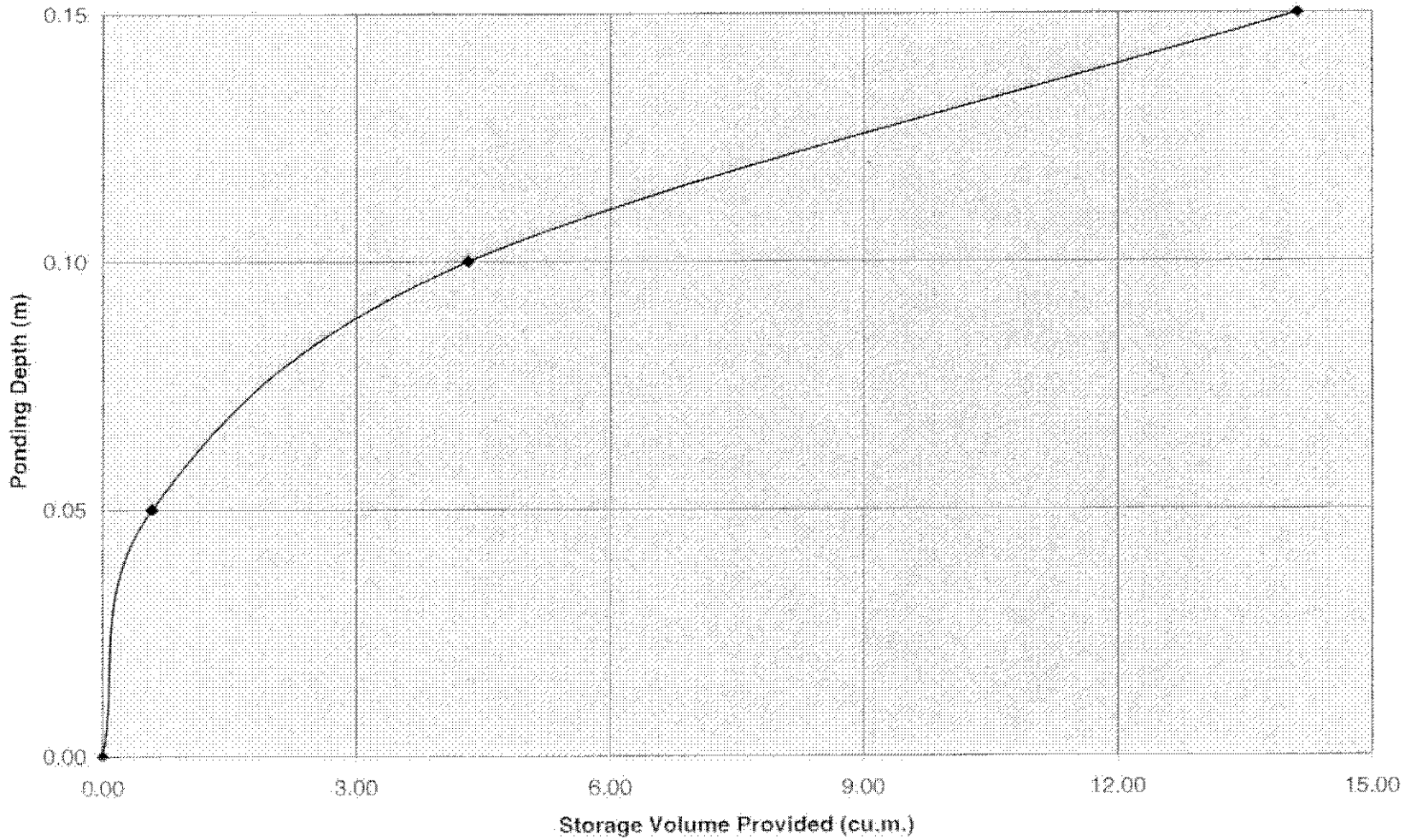
PALLADIUM AUTO PARK
CAPITAL DODGE CHRYSLER
PROJECT NO.106034-1
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-2: ROOF DRAIN 5

OTTAWA IDF CURVE

Area =	0.032	ha	Qallow =	1.20	L/s
C =	0.90		Vol(max) =	11.79	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	19.43	18.23	5.47
10	178.56	14.30	13.10	7.86
15	142.89	11.44	10.24	9.22
20	119.95	9.60	8.40	10.08
25	103.85	8.31	7.11	10.67
30	91.87	7.36	6.16	11.08
35	82.58	6.61	5.41	11.36
40	75.15	6.02	4.82	11.56
45	69.05	5.53	4.33	11.69
50	63.95	5.12	3.92	11.76
55	59.62	4.77	3.57	11.79
60	55.89	4.48	3.28	11.79
65	52.65	4.22	3.02	11.76

PALLADIUM AUTO PARK
Capital Dodge Chrysler
Area A-2: RD 5 Stage Storage Curve - Roof Top Storage



860000

PALLADIUM AUTO PARK
CAPITAL DODGE CHRYSLER
PROJECT NO.106034-1
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-2: ROOF DRAIN 6

OTTAWA IDF CURVE

Area =	0.025	ha	Qallow =	1.20	L/s
C =	0.90		Vol(max) =	3.91	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	8.83	7.63	2.29
10	104.19	6.52	5.32	3.19
15	83.56	5.23	4.03	3.62
20	70.25	4.39	3.19	3.83
25	60.90	3.81	2.61	3.91
30	53.93	3.37	2.17	3.91
35	48.52	3.03	1.83	3.85
40	44.18	2.76	1.56	3.75
45	40.63	2.54	1.34	3.62
50	37.65	2.36	1.16	3.47
55	35.12	2.20	1.00	3.29
60	32.94	2.06	0.86	3.10
65	31.04	1.94	0.74	2.89

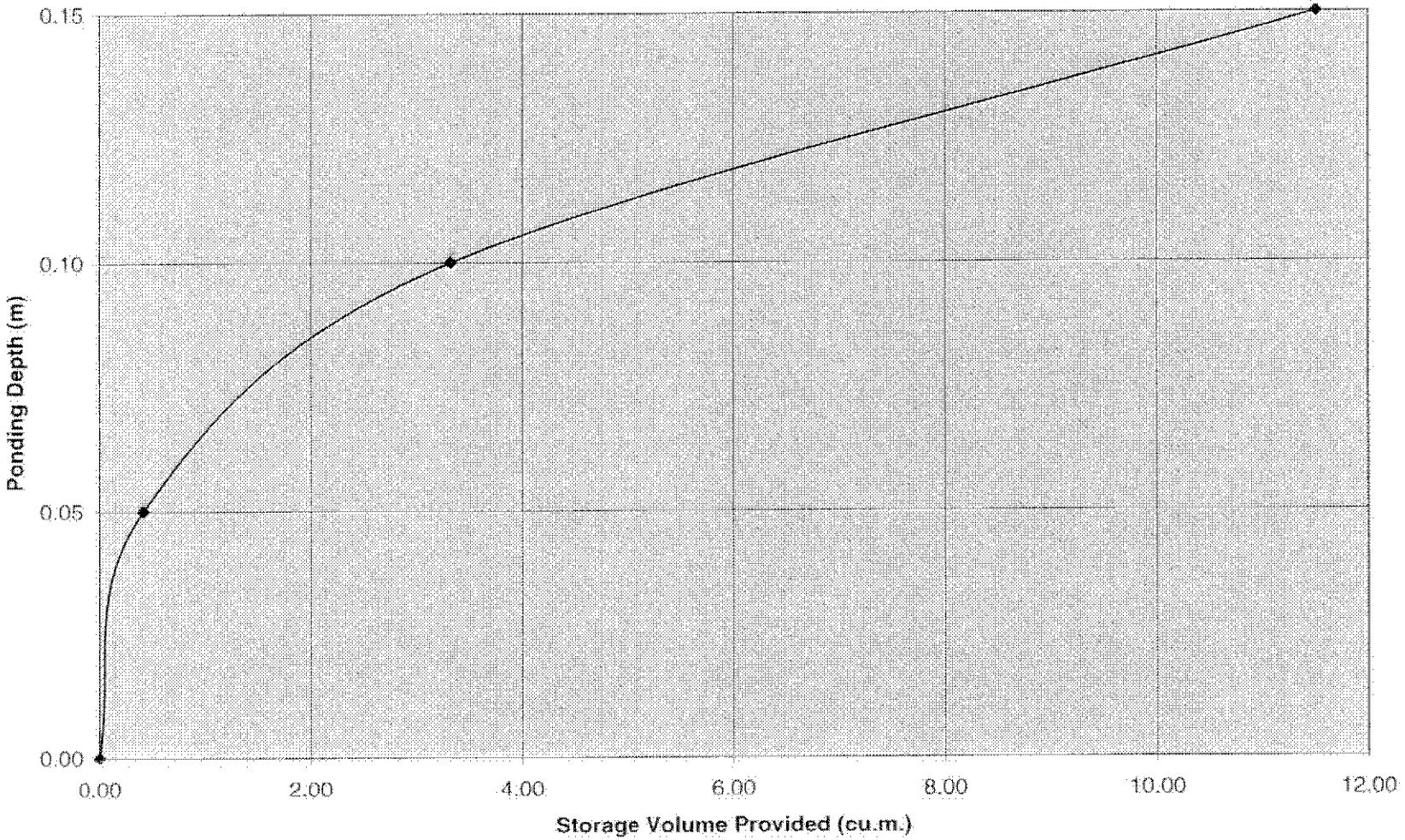
PALLADIUM AUTO PARK
CAPITAL DODGE CHRYSLER
PROJECT NO.106034-1
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-2: ROOF DRAIN 6

OTTAWA IDF CURVE

Area =	0.025	ha	Qallow =	1.20	L/s
C =	0.90		Vol(max) =	8.42	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	15.18	13.98	4.19
10	178.56	11.17	9.97	5.98
15	142.89	8.94	7.74	6.96
20	119.95	7.50	6.30	7.56
25	103.85	6.50	5.30	7.94
30	91.87	5.75	4.55	8.18
35	82.58	5.17	3.97	8.33
40	75.15	4.70	3.50	8.40
45	69.05	4.32	3.12	8.42
50	63.95	4.00	2.80	8.40
55	59.62	3.73	2.53	8.35
60	55.89	3.50	2.30	8.27
65	52.65	3.29	2.09	8.16

PALLADIUM AUTO PARK
Capital Dodge Chrysler
Area A-2: RD 6 Stage Storage Curve - Roof Top Storage



PALLADIUM AUTO PARK
CAPITAL DODGE CHRYSLER
PROJECT NO.106034-1
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA 3: PAVED PARKING LOT + LANDSCAPED AREAS

OTTAWA IDF CURVE

Area =	0.83	ha	Qallow =	67.90	L/s
C =	0.85		Vol(max) =	86.38	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	276.89	208.99	62.70
10	104.19	204.35	136.45	81.87
15	83.56	163.88	95.98	86.38
20	70.25	137.78	69.88	83.86
25	60.90	119.43	51.53	77.30
30	53.93	105.77	37.87	68.16
35	48.52	95.16	27.26	57.24
40	44.18	86.66	18.76	45.02
45	40.63	79.68	11.78	31.82
50	37.65	73.85	5.95	17.85
55	35.12	68.89	0.99	3.26
60	32.94	64.61	-3.29	-11.84
65	31.04	60.89	-7.01	-27.36

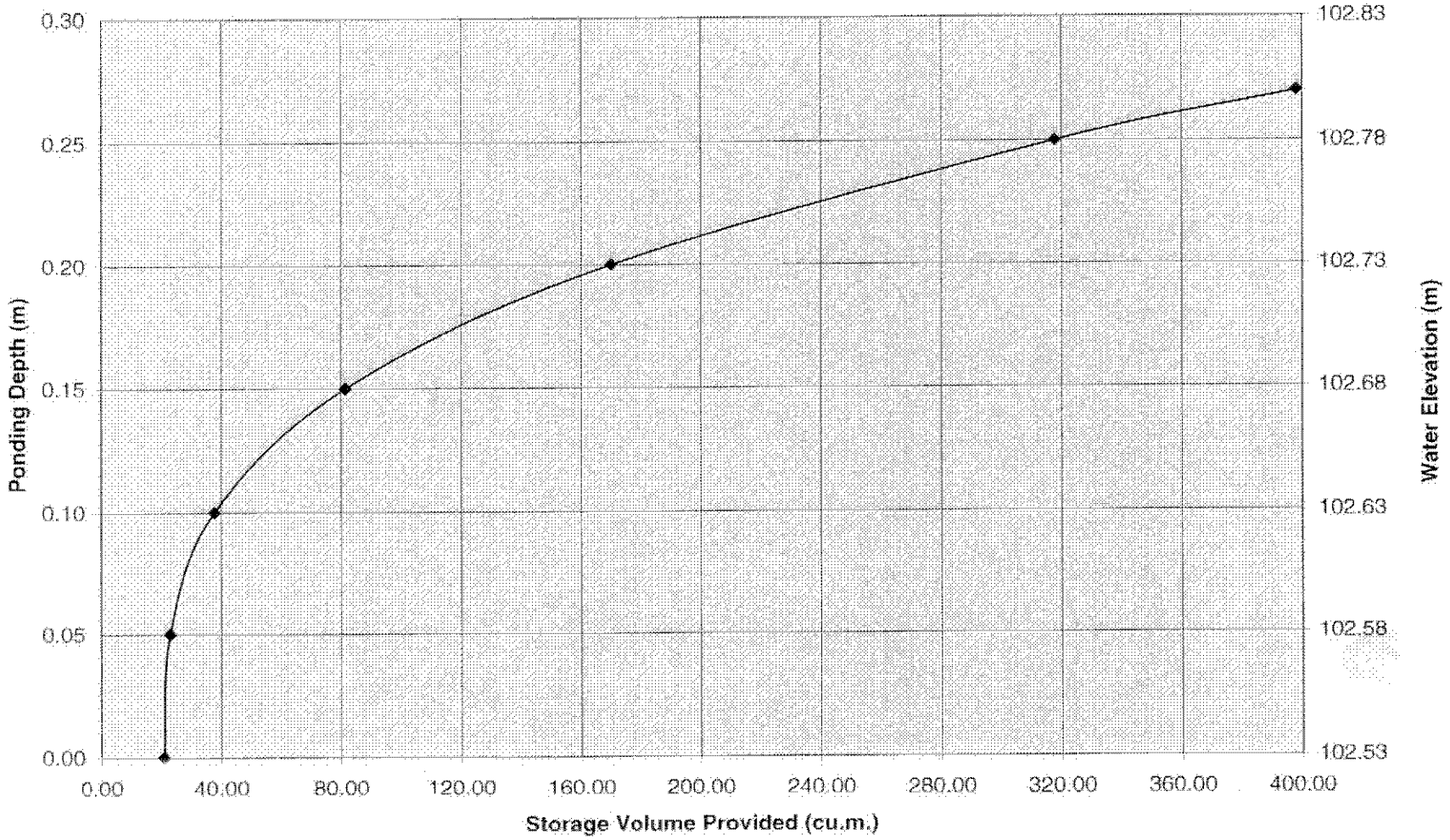
PALLADIUM AUTO PARK
CAPITAL DODGE CHRYSLER
PROJECT NO.106034-1
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA 3: PAVED PARKING LOT + LANDSCAPED AREAS

OTTAWA IDF CURVE

Area =	0.83	ha	Qallow =	68.80	L/s
C =	0.85		Vol(max) =	202.31	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	476.01	407.21	122.16
10	178.56	350.21	281.41	168.84
15	142.89	280.26	211.46	190.31
20	119.95	235.26	166.46	199.75
25	103.85	203.67	134.87	202.31
30	91.87	180.18	111.38	200.48
35	82.58	161.96	93.16	195.64
40	75.15	147.38	78.58	188.60
45	69.05	135.43	66.63	179.90
50	63.95	125.43	56.63	169.90
55	59.62	116.94	48.14	158.86
60	55.89	109.63	40.83	146.97
65	52.65	103.26	34.46	134.37

PALLADIUM AUTO PARK
Capital Dodge Chrysler
Area A-3: Stage Storage Curve - Surface Storage



PALLADIUM AUTO PARK
CAPITAL DODGE CHRYSLER
PROJECT NO.106034-1
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA 4: PAVED PARKING LOT + LANDSCAPED AREAS

OTTAWA IDF CURVE

Area =	0.38	ha	Qallow =	4.70	L/s
C =	0.77		Vol(max) =	80.15	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	114.84	110.14	33.04
10	104.19	84.75	80.05	48.03
15	83.56	67.97	63.27	56.94
20	70.25	57.14	52.44	62.93
25	60.90	49.53	44.83	67.25
30	53.93	43.87	39.17	70.50
35	48.52	39.47	34.77	73.01
40	44.18	35.94	31.24	74.98
45	40.63	33.05	28.35	76.54
50	37.65	30.63	25.93	77.78
55	35.12	28.57	23.87	78.77
60	32.94	26.80	22.10	79.55
65	31.04	25.25	20.55	80.15

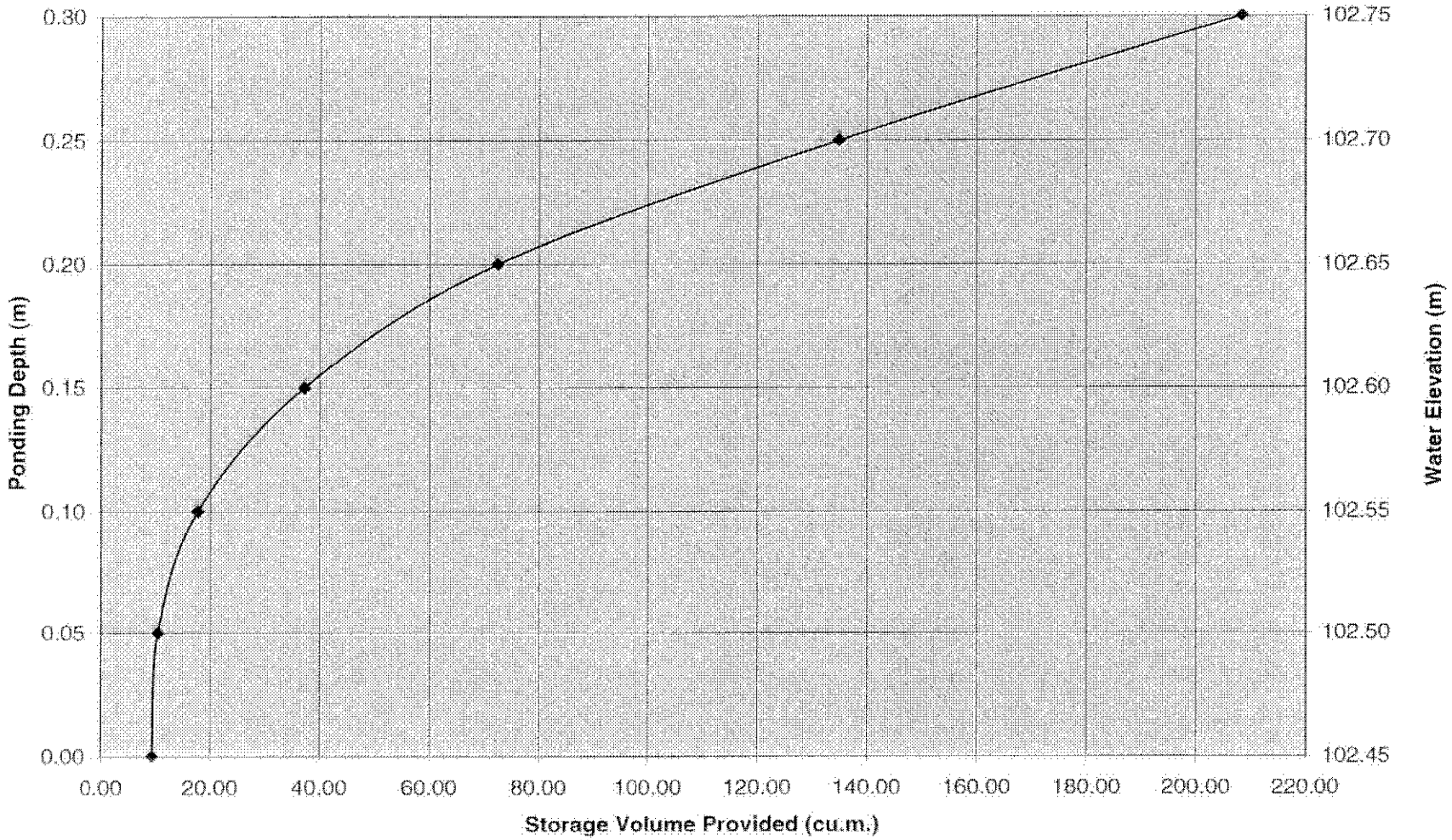
PALLADIUM AUTO PARK
CAPITAL DODGE CHRYSLER
PROJECT NO.106034-1
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA 4: PAVED PARKING LOT + LANDSCAPED AREAS

OTTAWA IDF CURVE

Area =	0.38	ha	Qallow =	4.70	L/s
C =	0.77		Vol(max) =	148.68	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	197.42	192.72	57.82
10	178.56	145.24	140.54	84.33
15	142.89	116.23	111.53	100.38
20	119.95	97.57	92.87	111.45
25	103.85	84.47	79.77	119.66
30	91.87	74.73	70.03	126.05
35	82.58	67.17	62.47	131.19
40	75.15	61.13	56.43	135.42
45	69.05	56.17	51.47	138.96
50	63.95	52.02	47.32	141.97
55	59.62	48.50	43.80	144.54
60	55.89	45.47	40.77	146.76
65	52.65	42.82	38.12	148.68

PALLADIUM AUTO PARK
Capital Dodge Chrysler
Area A-4: Stage Storage Curve - Surface Storage

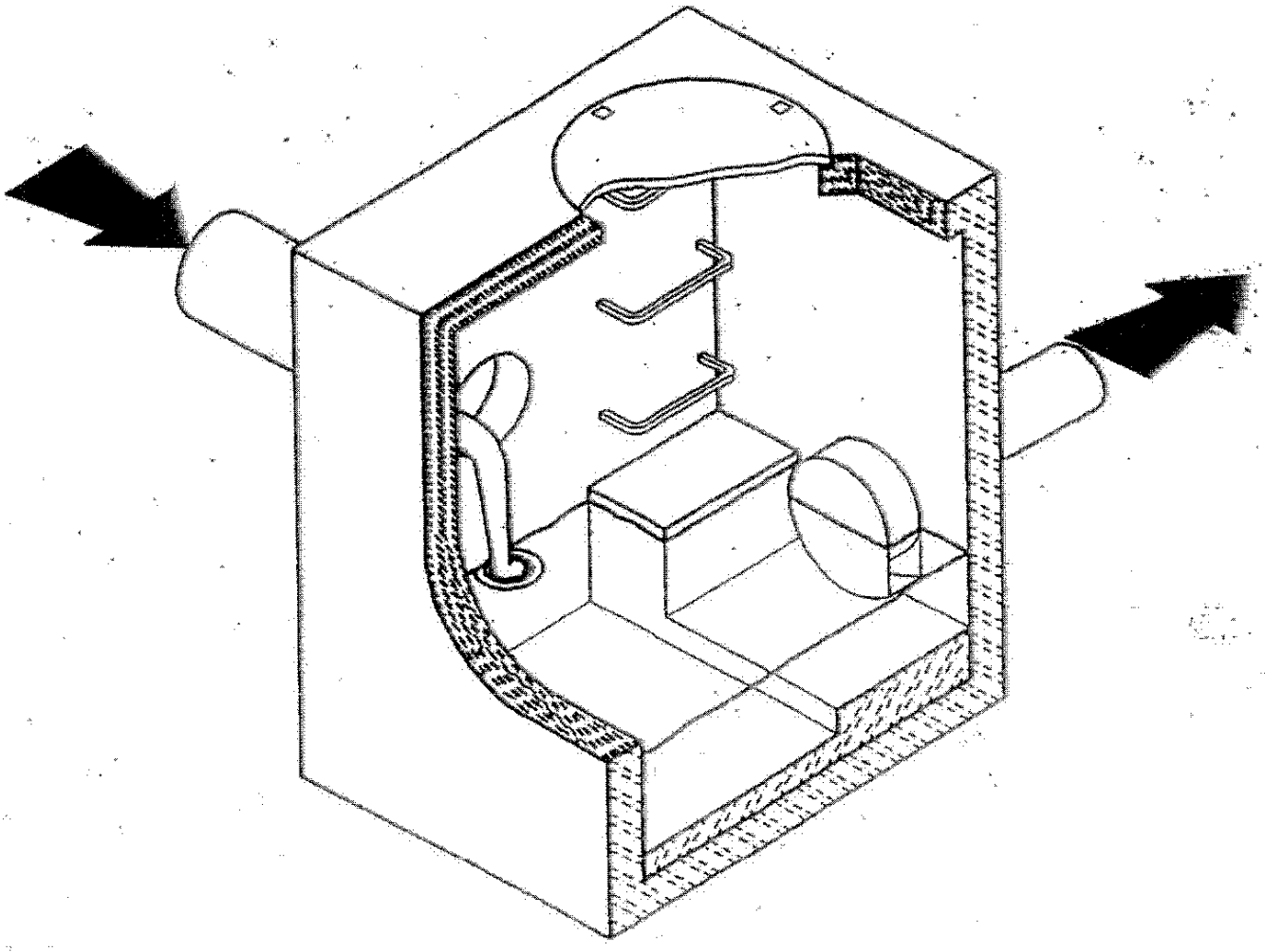


APPENDIX C

JOHN MEUNIER – HYDROVEX INFORMATION

CSO/STORMWATER MANAGEMENT

®Hydrovex® VHV / SVHV
Vertical Vortex Flow Regulator



JOHN MEUNIER

HYDROVEX® VHV / SVHV VERTICAL VORTEX FLOW REGULATOR

INTRODUCTION

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.

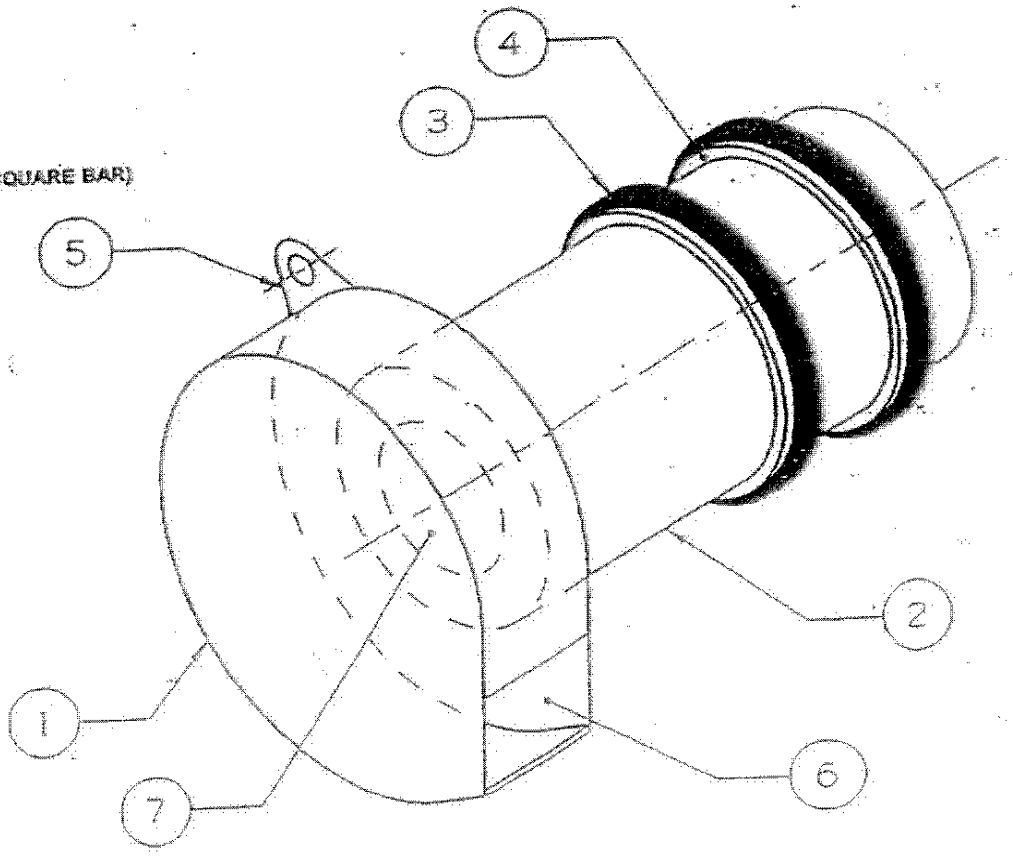
A simple means of controlling excessive water runoff is by controlling excessive flows at their origin (manholes). *JOHN MEUNIER INC.* manufactures the HYDROVEX® VHV / SVHV line of vortex flow regulators to control stormwater flows in sewer networks as well as manholes.

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 Vertical Vortex Flow Regulator (refer to Figure 1) is manufactured entirely of stainless steel, and consists 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.

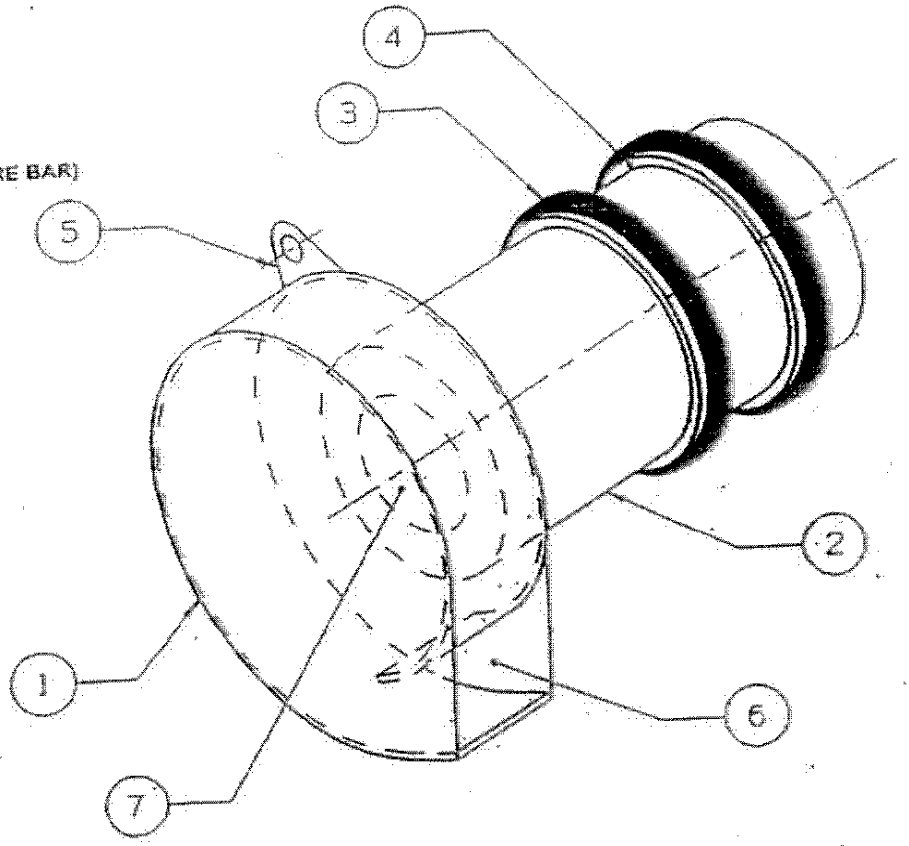
HYDROVEX® VHV VERTICAL VORTREX FLOW REGULATOR
FIGURE 1 - VHV

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



HYDROVEX® SVHV SPECIAL VERTICAL VORTEX FLOW REGULATOR
FIGURE 1 – SVHV

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



ADVANTAGES OF THE HYDROVEX FLOW REGULATORS

- 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.
- 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.

HYDROVEX SELECTION CRITERIA VHV OR SVHV

Figure 2 is a graphical representation of the head vs. discharge range for various VHV or SVHV regulators. This curve is a function o the maximum upstream static water pressure (head) and the discharge. As may be seen from the two curves, the SVHV models hav larger cross-sectional flow areas than the VHV's for a given discharge and head.

Model selection is performed by determining the maximum design flow at the manhole outlet and the maximum design head at the inse of the manhole outlet pipe. Each regulator is applicable for operation within a range of head and discharge values, as illustrated by th graph. Using this information one can refer to Figure 2 and determine which model is applicable. All selection should be verified b *JOHN MEUNIER INC.* personnel prior fabrication.

®Hydrovex® VHV

Vertical Vortex Flow Regulator

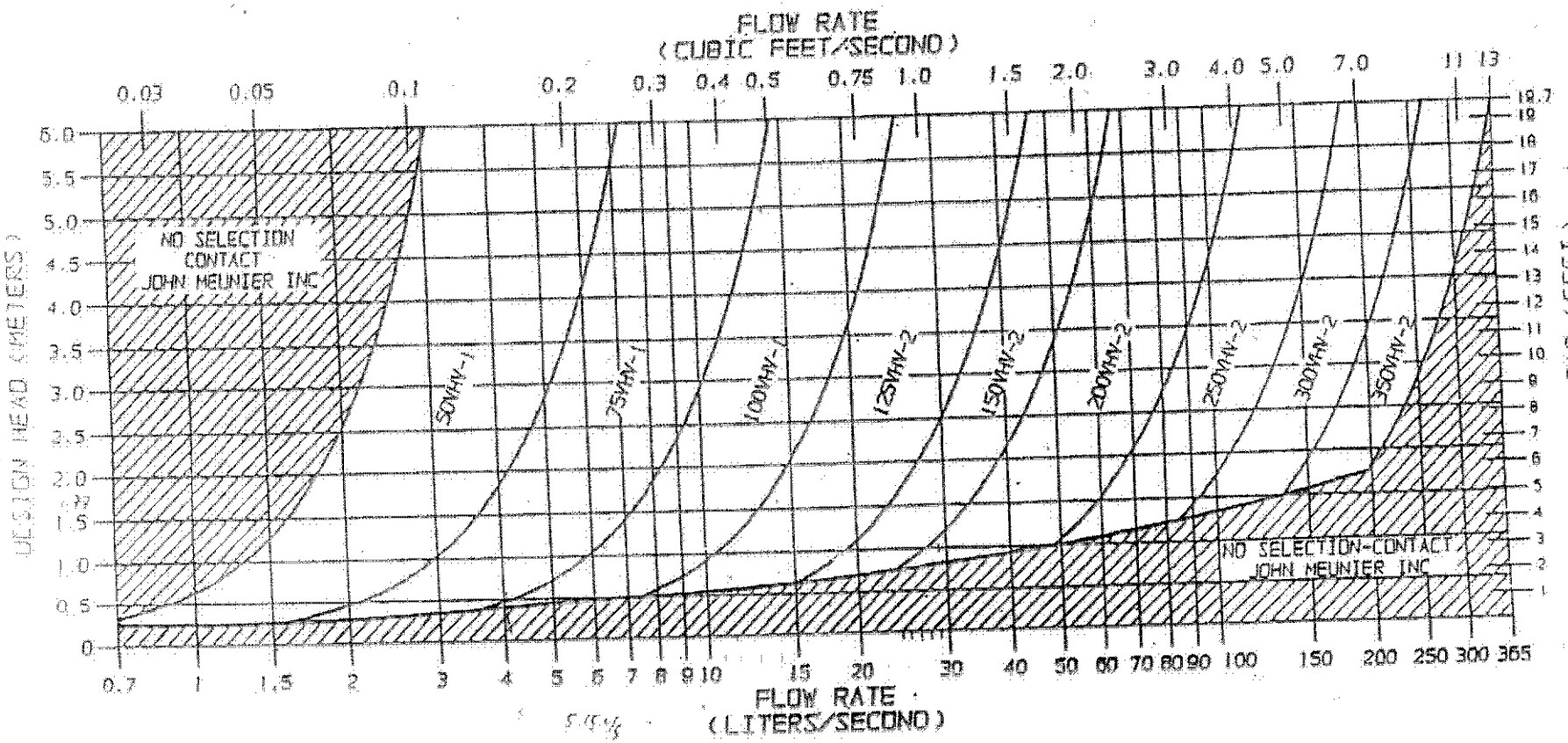


FIGURE 2 - VHV

JOHN MEUNIER

®Hydrovex® SVHV

Vertical Vortex Flow Regulator

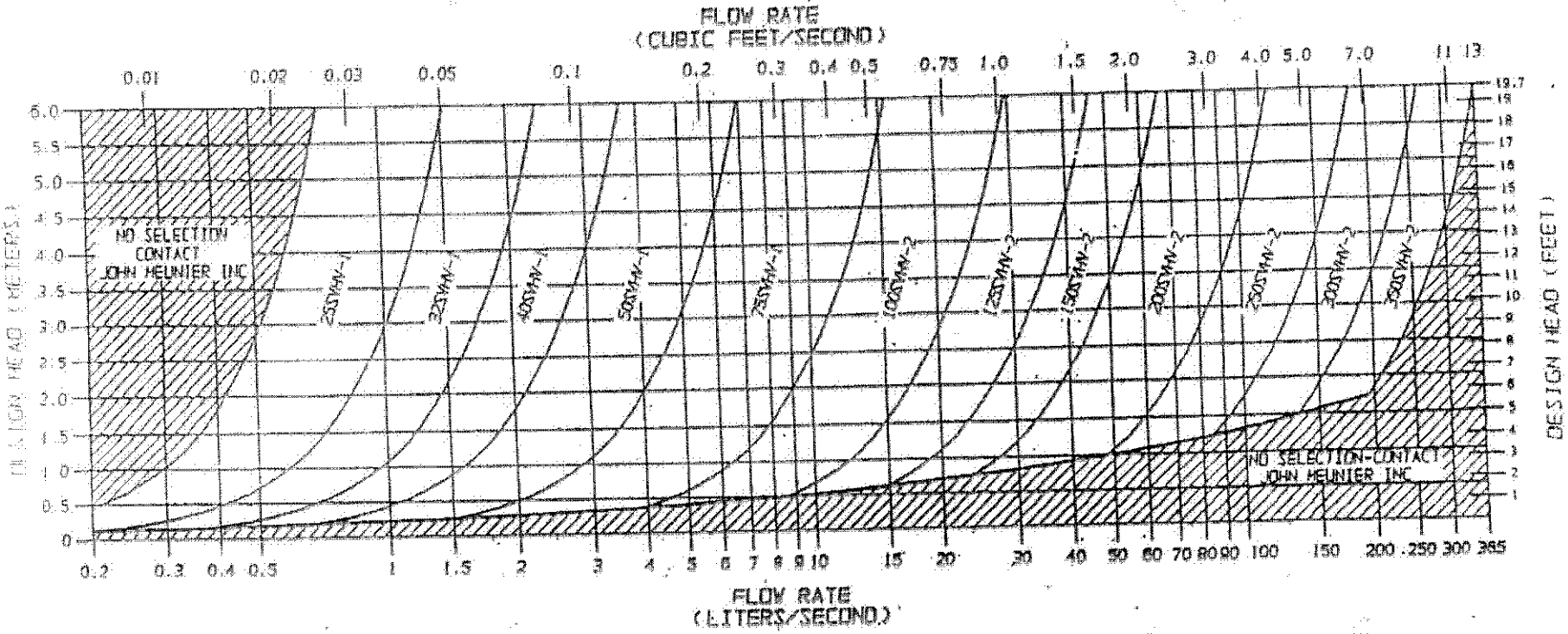
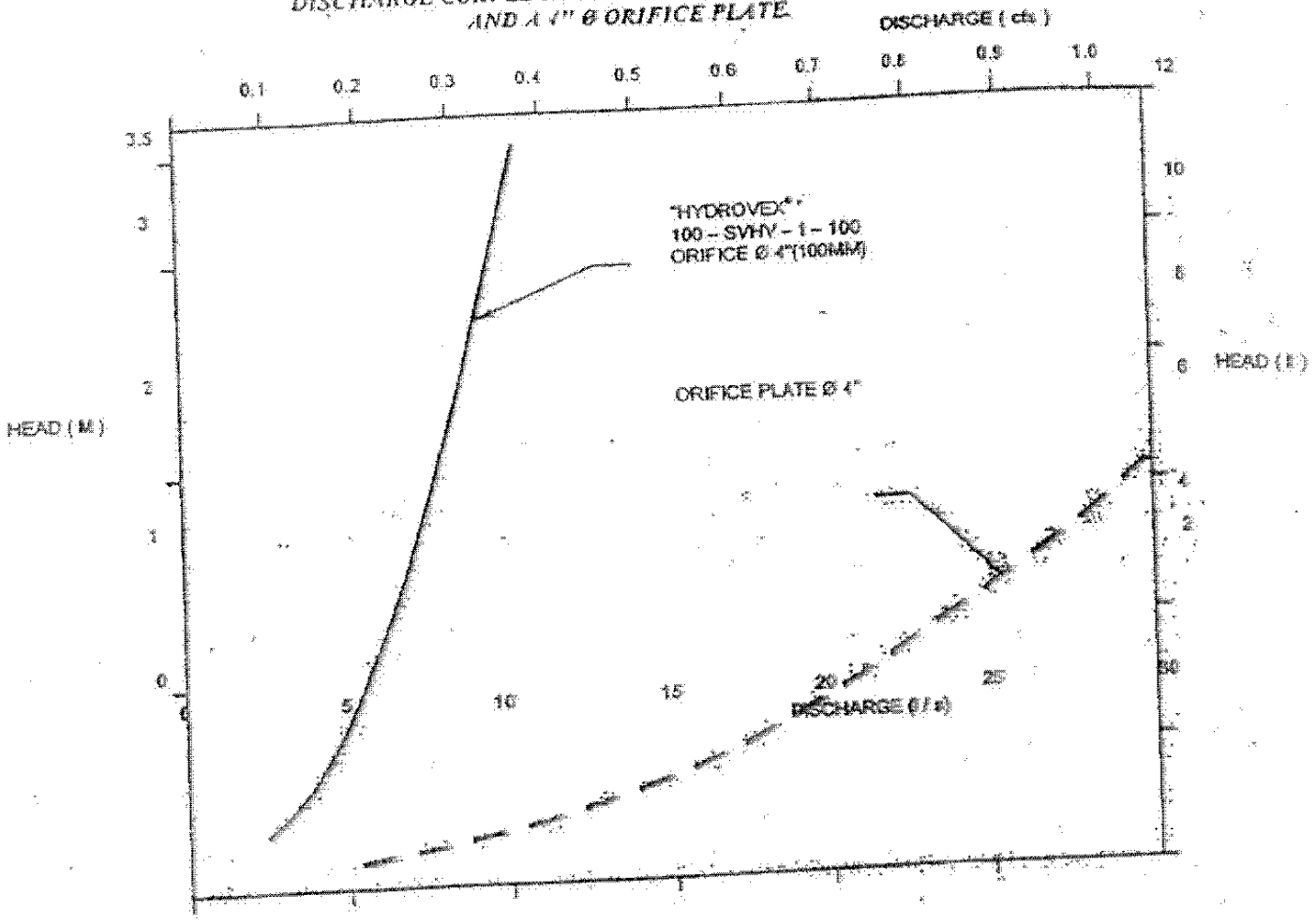


FIGURE 2 - SVHV

JOHN MEUNIER

000110

FIGURE 3
DISCHARGE CURVES FOR A HYDROVEX® 100 SVHV-1-100 AND A 4" Ø ORIFICE PLATE



DIMENSIONING OF MANHOLES

Most HYDROVEX® models may be installed in a standard 36-inch diameter manhole. All models may also be installed in a rectangular manhole with a minimum dimension of 36 inches (24 inch diameter or rectangular manhole may be used for smaller models).

NOTE that in the case of a square manhole, the outlet flow pipe must be centered on the wall to ensure enough clearance for the unit. A minimum clearance "H" should be established between the floor of the manhole and the invert of the outlet pipe to install the regulator. Figure 4 gives the various dimensions required for a given regulator.

HOW TO SPECIFY THE TYPE OF HYDROVEX - REGULATOR

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

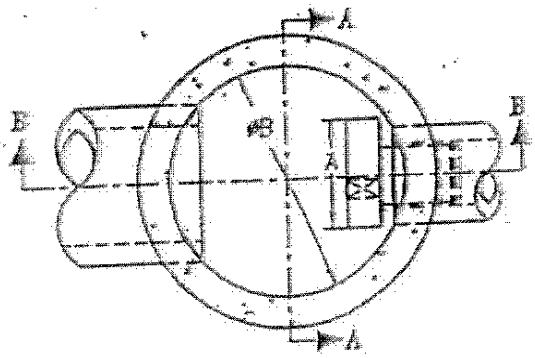
- The model number (ex.: 100-VHV-1)
- The diameter and type of the outlet pipe (ex.: 6" dia. SDR 35 or 8" dia. RCP)
- The desired discharge (ex.: 50 l/s or 1.76 CFS)
- The upstream head (ex: 2 m or 6.56 ft.)
- The manhole diameter (ex: 36" dia.)
- The minimum clearance "H" (ex.: 10 inches)
- The material type (ex.: 304 s/s, 11 Ga. standard)

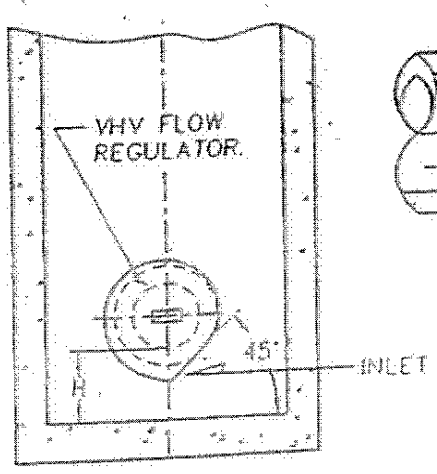
NOTE: Upstream head is defined as the difference in elevation between the maximum upstream water level and the invert of the outlet pipe where the HYDROVEX® flow regulator is to be installed.

FLOW REGULATOR TYPICAL INSTALLATION
FIGURE 4 (VHV)

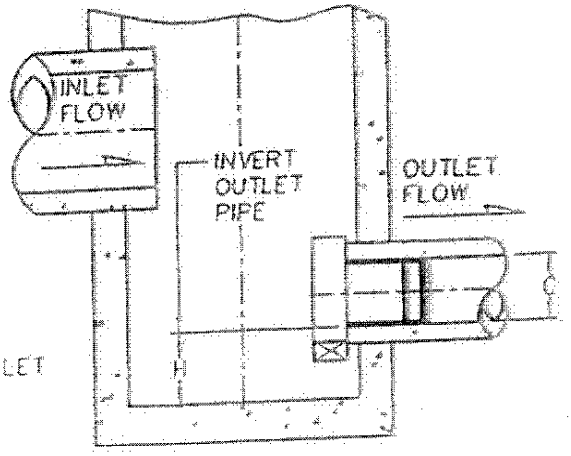
Model Number	Regulator Dia. A (inches)	Manhole Dia. B (inches)	Min. Outlet Pipe C (inches)	Min. Clearance H (inches)
50VHV-1	8"	24"	6"	5"
75VHV-1	11"	24"	6"	6"
100VHV-1	14"	36"	6"	8"
125VHV-2	13"	36"	8"	8"
150VHV-2	16"	36"	8"	9"
200VHV-2	21"	48"	10"	12"
250VHV-2	26"	48"	12"	14"
300VHV-2	31"	64"	15"	16"
350VHV-2	36"	72"	15"	20"

Note: Minimum clearance "H" relates to the diameter indicated in the chart. If the outlet diameter decreases, the "H" clearance will also decrease.





SECTION A-A

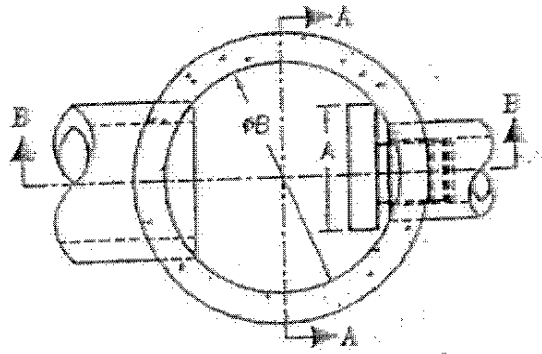


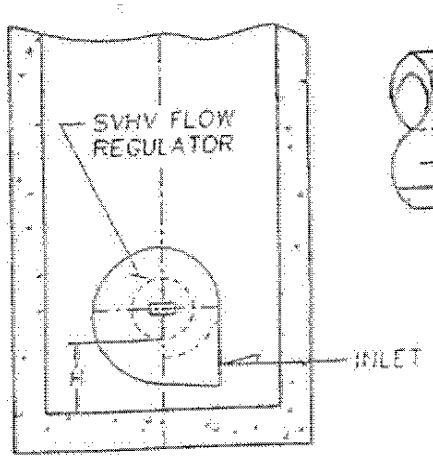
SECTION B-B

FLOW REGULATOR TYPICAL INSTALLATION
FIGURE 4 (SVHV)

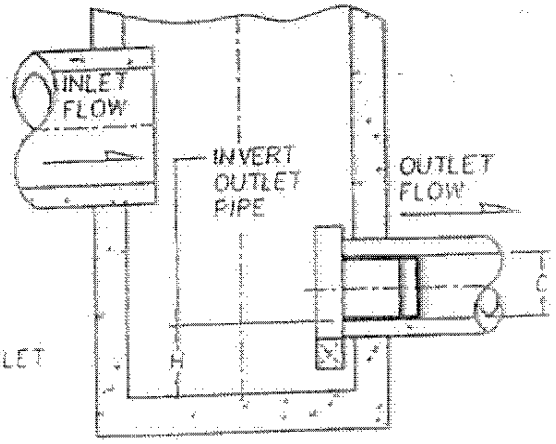
Model Number	Regulator Dia. A (inches)	Manhole Dia. B (inches)	Min. Outlet Pipe C (inches)	Min. Clearance H (inches)
25 SVHV-1	6"	24"	6"	6"
32 SVHV-1	7"	24"	6"	6"
40 SVHV-1	9"	24"	6"	6"
50 SVHV-1	11"	24"	6"	6"
75 SVHV-1	17"	36"	6"	11"
100 SVHV-2	14"	36"	8"	10"
125 SVHV-2	17"	36"	8"	12"
150 SVHV-2	22"	36"	10"	14"
200 SVHV-2	27"	36"	12"	18"
250 SVHV-2	34"	42"	15"	22"
300 SVHV-2	41"	48"	15"	26"
350 SVHV-2	47"	64"	15"	28"

Note: Minimum clearance "H" relates to the diameter indicated in the chart. If the outlet diameter decreases, the "H" clearance will also decrease.





SECTION A-A



SECTION B-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, 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.

GUARANTEE

The HYDROVEX® line of regulators are guaranteed against both design and manufacturing defects for a period of 5 years. Should a uni be defective, *JOHN MEUNIER INC.* is solely responsible for either modification or replacement of the unit, at their discretion.

JOHN MEUNIER / USFilter
4105 Sartelon Street
St-Laurent (Quebec)
H4S 2B3
ISO 9001
Tel. : 514-334-7230 http://www.johnmeunier.com/
Fax. : 514-334-5070 mailto:sales@johnmeunier.com

VIVENDI water

CONNECTION TO EXISTING 150mmø WATER SERVICE STUB BY CITY FORCES. EXCAVATION, BACKFILL AND REINSTATEMENT BY CONTRACTOR.

CONNECTION TO EXISTING 150mmø SANITARY, 200mmø STORM AND 150mmø WATER SERVICE STUBS (IN COMMON TRENCH). T/WM=100.59±, SANITARY INV.=100.30±, STORM INV.=100.23±. CONTRACTOR TO DETERMINE EXACT LOCATION AND ELEVATION OF STUBS TO CONFIRM DESIGN PRIOR TO CONSTRUCTION. REPORT ANY DISCREPANCES TO THE ENGINEER. PROPOSED SANITARY AND STORM SERVICE EXTENSIONS TO BE DEFLECTED AS REQUIRED (MAXIMUM 15° PER PIPE LENGTH) FROM EXISTING STUBS TO PROPOSED MONITORING MANHOLES.

RING ROAD

CONSTRUCTION NORTH

EX HYD T/SPINDLE=103.41

EX HYD T/SPINDLE=103.48

EX. 300mmø PVC DRIP CL 150 WM

EX. 375mmø PVC DR 35 STM

EX. 300mmø PVC DRIP CL 150 WM

EX. 300mmø PVC DR 35 STM

EX. 375mmø PVC DR35 STM

EX. 450mmø PVC DR35 STM

EX. 525mmø PVC DR35 STM

EX. 600mmø PVC DR35 STM

EX. BELL PEDESTAL

EX. TRANSFORMER ON PAD C/W BOLLARD

EX. CABLE PEDASTAL

EX. SECURITY POST

EXISTING TRANSFORMER ON PAD C/W BOLLARDS

EXISTING ENTRANCE SIGN

SAN MH 12 T/G=102.52 INV. W=99.35 INV. E=99.31

SAN MH 11 T/G=102.68 INV. W=99.50 INV. E=99.46

SAN MH 10 T/G=102.27 INV. W=98.63 INV. E=98.62

STM MH 107 T/G=102.19 INV. W=99.56 INV. E=99.55

STM MH 108 T/G=102.62 INV. W=99.30 INV. E=99.26

STM MH 109 T/G=102.53 INV. W=99.20

67.0m-375mmø PVC DR 35 SAN @ 0.5%

46.7m-675mmø CONC 65.0 STM @ 0.12%

86.6m-825mmø CONC 65.0 STM @ 0.12%

63.4m-1050mmø CONC 65.0 STM @ 0.066%

65.0m-1200mmø PVC DR 35 SAN @ 0.37%

SIDEWALK

DEPRESSED SIDEWALK

CB 1 T/G=102.53

CB 2 T/G=102.53

CB 3 T/G=102.60 INV.=100.82

CB 4 T/G=102.53 INV.=100.71

CB 5 T/G=102.45 INV.=100.78

CBMH 1 T/G=102.53 (1200mmø) INV.N=100.41 INV.S=100.49 INV.W=100.49

CBMH 2 T/G=102.57 (1200mmø) INV.E=100.63 INV.S=100.68

CBMH 3 T/G=102.53 (1200mmø) INV.N=100.58 INV.S=100.63

CBMH 4 T/G=102.45 (1200mmø) INV.N=100.33 INV.S=100.43

CBMH 5 T/G=102.45 (1200mmø) INV.N=100.59 INV.SW=100.64

STM MH 1 T/G=102.73 (1200mmø) INV.N=100.24 INV.E=100.42 INV.S=100.29 INV.W=100.42

STM MH 2 T/G=103.05 (1200mmø) INV.N=100.32 INV.S=100.37

CONNECTION TO EXISTING 375mmø STORM STUB, EXISTING INV.=100.21±. CONTRACTOR TO DETERMINE EXACT LOCATION AND ELEVATION OF STUB TO CONFIRM DESIGN PRIOR TO CONSTRUCTION. REPORT ANY DISCREPANCES TO THE ENGINEER.

CONNECT TO EXISTING 375mmø STORM STUB. EXISTING INV.=100.29±. CONTRACTOR TO DETERMINE EXACT LOCATION AND ELEVATION OF STUB TO CONFIRM DESIGN PRIOR TO CONSTRUCTION. REPORT ANY DISCREPANCES TO THE ENGINEER.

200mmø x 150mmø WYE CONNECTION. ROLL WYE 45 REQUIRED.

BACK WATER PIT @ VALVE. REFER TO DETAIL BELOW.

PROVIDE ICD

6.6m-200mmø PVC SDR35 STM @ 1.0%

15.7m-200mmø PVC SDR35 STM @ 1.0%

6.5m-375mmø PVC SDR35 STM @ 0.35%

21.3m-100mmø PVC SDR35 STM @ 1.0%(MIN)

23.9m-150mmø PVC SDR35 SAN @ 1.00%

24.5m-200mmø PVC SDR35 STM @ 2.3%

45° H. BEND

VBVB 0-20

0-40

0-00

CONNECT WEEPING TILE TO 100mmø STM PIPE. INV.=101.20±

SAN INV. =99.60± STM INV. =100.80±

BH 06-1

BH 06-2

BH 02-3

BH 06-3

BH 06-4

RD 1

RD 2

RD 3

RD 4

RD 5

RD 6

PROPOSED DEALERSHIP BUILDING FFE=102.90m

SIAMESE CONNECTION

WEEPING TILE AROUND BUILDING FOOTINGS (REFER TO ARCHITECTURAL PLANS FOR DETAILS)

WASTE OIL ON CONCRETE PAD

40.6m-300mmø PVC SDR35 STM @ 0.35%

34.4m-250mmø PVC SDR35 STM @ 0.45%

37.8m-375mmø PVC SDR35 STM @ 0.35%

58.0m-300mmø PVC SDR35 STM @ 0.35%

18.8m-250mmø PVC SDR35 STM @ 0.45%

32.0m-250mmø PVC SDR35 STM @ 0.45%

47.1m-300mmø PVC SDR35 STM @ 0.35%

TREES

GARBAGE

3:1 SLOPE

EXISTING DITCH

EXISTING 1500mmø CULV

CURB CUT

CONCESSION COURT

LS

WL

DC

H

VBV

VBVC

LEGEND

- 150mmø — PROPOSED WATERMAIN AND DIAMETER
- VBVB — PROPOSED VALVE & VALVE BOX LOCATION
- T/F=103.15 — PROPOSED TOP OF BOTTOM FLANGE
- HYD — PROPOSED HYDRANT C/W VALVE & LEAD
- PROPOSED BEND AND THRUSTBLOCK
- M — PROPOSED WATER METER LOCATION
- R — PROPOSED REMOTE WATER METER LOCATION
- G — PROPOSED GAS METER LOCATION
- SAN MH 1 — PROPOSED SANITARY MH & SEWER
- STM MH 1 — PROPOSED STORM MH & SEWER
- CB 2 — PROPOSED CATCHBASIN C/W SUBDRAIN
- CBMH 3 — PROPOSED CATCHBASIN MANHOLE C/W SUBDRAIN
- DIRECTION OF FLOW
- EX SAN MH — EXISTING SANITARY MH & SEWER
- EX STM MH — EXISTING STORM MH & SEWER
- 400mmø WM — EXISTING WATERMAIN
- EXISTING HYDRO TRANSFORMER LOCATION
- EXISTING BELL PEDASTAL
- PROPOSED BUILDING ENTRANCE/EXIT
- LS — EXISTING LIGHT STANDARD
- LS — PROPOSED SITE LIGHTING
- DC — PROPOSED DEPRESSED CURB
- BH — BORE HOLE
- EXISTING U/G HYDRO LINES
- EXISTING U/G CABLE LINES
- EXISTING U/G BELL LINES
- GAS — GAS — EXISTING U/G GAS LINE

GENERAL NOTES:

1. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
2. DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME RESPONSIBILITY FOR ALL EXISTING UTILITIES WHETHER OR NOT SHOWN ON THIS DRAWING.
3. OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA BEFORE COMMENCING CONSTRUCTION.
4. BEFORE COMMENCING CONSTRUCTION OBTAIN AND PROVIDE PROOF OF COMPREHENSIVE, ALL RISK AND OPERATIONAL LIABILITY INSURANCE FOR $2,000,000.00. INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND ARCHITECTS AS CO-INSURED.
5. RESTORE ALL DISTURBED AREAS ON-SITE AND OFF-SITE, INCLUDING TRENCHES AND SURFACES ON PUBLIC ROAD ALLOWANCES TO EXISTING CONDITIONS OR BETTER TO THE SATISFACTION OF THE CITY OF OTTAWA.
6. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL UNLESS OTHERWISE INSTRUCTED BY ENGINEER. EXCAVATE AND REMOVE FROM SITE ALL ORGANIC MATERIAL AND DEBRIS.
7. ALL ELEVATIONS ARE GEODETIC.
8. REFER TO GEOTECHNICAL REPORT No. 06-120-025 (DATED APRIL 2006) PREPARED BY GOLDER ASSOCIATES LTD. FOR SUBSURFACE CONDITIONS, CONSTRUCTION RECOMMENDATIONS, AND GEOTECHNICAL INSPECTION REQUIREMENTS. THE GEOTECHNICAL CONSULTANT IS TO REVIEW ON-SITE CONDITIONS AFTER EXCAVATION FOR ALL PARKING ACCESS\ ROADWAY ACCESS, PRIOR TO PLACEMENT OF THE GRANULAR MATERIAL.
9. THESE PLANS ARE TO BE READ IN CONJUCTION WITH WITH THE PALLADIUM AUTO PARK CAPITAL DODGE CHRYSLER STORMWATER MANAGEMENT REPORT No. R-2006-070 BY NOVATECH ENGINEERING CONSULTANTS LTD., DATED MAY 4, 2006 AND THE STORMWATER MANAGEMENT PALLADIUM AUTO-PARK REPORT No. JLR 15941-04 BY J.L. RICHARDS, DATED APRIL 2003.
10. REFER TO ARCHITECTS DRAWING FOR BUILDING AND HARD SURFACE AREAS AND DIMENSIONS.
11. PROVIDE LINE/PARKING PAINTING.

ROOF DRAIN TABLE

ROOF DRAIN No.	RELEASE RATE (L/S)	STORAGE VOLUME 1:5 YR	STORAGE VOLUME 1:100 YR	PONDING DEPTH (m) 1:5 YR	PONDING DEPTH (m) 1:100 YR
1	1.2 L/s	10.5m³	21.0m³	0.18m	0.34m
2	1.2 L/s	9.7m³	19.5m³	0.18m	0.34m
3	1.2 L/s	8.8m³	17.9m³	0.12m	0.25m
4	1.2 L/s	7.2m³	14.8m³	0.18m	0.34m
5	1.2 L/s	5.6m³	11.8m³	0.18m	0.34m
6	1.2 L/s	3.9m³	8.4m³	0.18m	0.25m

NOTE: REFER TO STORMWATER MANAGEMENT PLAN (106034-SWM) FOR PONDING LIMITS

WATERMAIN TABLE

STATION	SURFACE ELEVATION	T/WM ELEVATION	COMMENTS
0+00	102.75	100.59±**	CONNECT TO EXISTING CAP/ * HYDRANT LEAD TEE
0+07.3	102.52	100.12 **	45° H. BEND
0+16.6	102.70	100.30	45° H. BEND
0+17.6	102.72	100.32	HYDRANT LEAD TEE
0+19.9	102.77	100.37	VBVB
0+20	102.77	100.37	-
0+40	102.78	100.38	-
0+43.5	102.82	100.42	45° H. BEND
0+45.0	102.84	100.44	45° H. BEND
0+45.7	102.85	100.45	CAP 1.0m FROM BUILDING
1+00	102.72	100.32	HYDRANT LEAD TEE
1+02	102.77	100.37	VBVB
1+06.6	103.00	100.60	HYDRANT

* 150mmø CONNECTION TO EXISTING 150mmø WATER SERVICE CAP. EXACT ELEVATION TO BE FIELD DETERMINED.

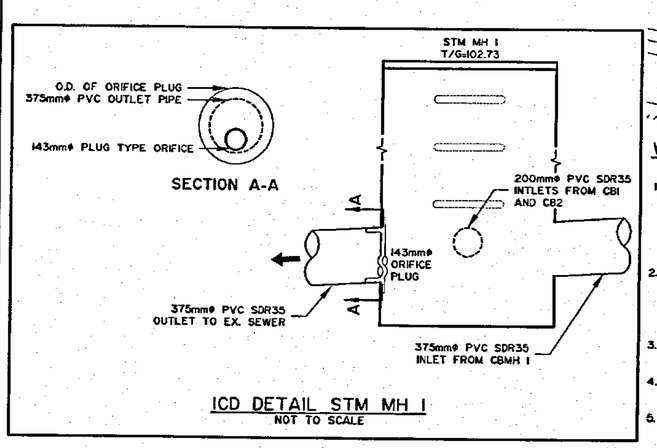
** PROVIDE THERMAL INSULATION AS PER CITY OF OTTAWA DETAIL W23 OR DETAIL W22 WHERE COVER IS LESS THAN 2.4m

INLET CONTROL DEVICE @ STM MH 1

DESIGN EVENT	PLUG TYPE ORIFICE SIZE (mm)	DIAMETER OF OUTLET PIPE (mm)	DESIGN FLOW (L/s)	UPSTREAM HEAD (m)
1:5 YEAR	143mmø	375mmø	67.9 L/s	2.37m
1:100 YEAR	143mmø	375mmø	68.8 L/s	2.43m

INLET CONTROL DEVICE @ CBMH 4

DESIGN EVENT	HYDROVEX MODEL TYPE ICD	DIAMETER OF OUTLET PIPE (mm)	DESIGN FLOW (L/s)	UPSTREAM HEAD (m)
1:5 YEAR	75 SVHV-1	375mmø	4.7 L/s	2.34m
1:100 YEAR	75 SVHV-1	375mmø	4.7 L/s	2.36m



ICD DETAIL STM MH 1
NOT TO SCALE

WATERMAIN NOTES:

1. SPECIFICATIONS:

ITEM	SPEC. No.	REFERENCE
WATERMAIN TRENCHING	WI7	CITY OF OTTAWA
WATERMAIN INSULATION	W23	CITY OF OTTAWA
WATERMAIN CROSSING BELOW SEWER	W25	CITY OF OTTAWA
SERVICE INSTALLATION AT SEWER CROSSING WATERMAIN	W38 PVC DR 18	CITY OF OTTAWA

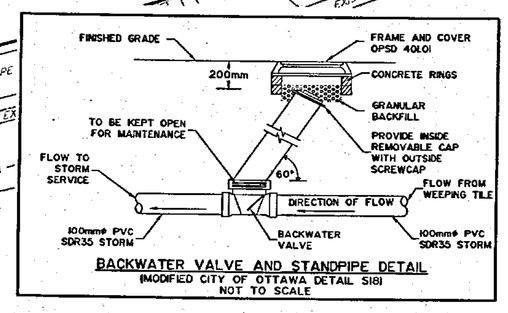
2. SUPPLY AND CONSTRUCT ALL WATERMAINS AND APPURTENANCES IN ACCORDANCE WITH THE CITY OF OTTAWA STANDARDS AND SPECIFICATIONS. EXCAVATION, INSTALLATION, BACKFILL AND RESTORATION OF ALL WATERMAINS BY THE CONTRACTOR. ALL BLANKINGS AND CONNECTIONS TO THE WATER SYSTEM SHALL BE PERFORMED BY CITY OFFICIALS.
3. WATERMAIN SHALL BE MINIMUM 2.4m DEPTH BELOW GRADE UNLESS OTHERWISE INDICATED
4. WATER SERVICE IS TO BE CONSTRUCTED TO WITHIN 1m OF FOUNDATION WALL AND CAPPED.
5. MAX DOMESTIC WATER DEMAND = 62 USGPM (3.9 L/S)

SEWER NOTES:

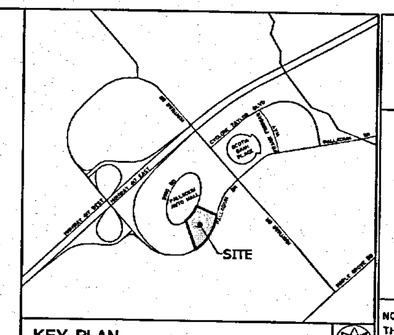
1. SPECIFICATIONS:

ITEM	SPEC. No.	REFERENCE
CATCHBASIN (600x600mm)	705.010	OPSD
STORM/SANITARY MANHOLE (1200ø)	701.010	OPSD
CB, FRAME & COVER	400.02	OPSD
STORM MH FRAME & COVER	401.01	OPSD
SEWER TRENCH - BEDDING (GRANULAR A)		OPSD
COVER (GRANULAR A OR GRANULAR B TYPE I, WITH MAXIMUM PARTICLE SIZE=25mm)		OPSD
STORM SEWER	PVC SDR 35	
SANITARY SEWER	PVC SDR 35	
CATCHBASIN LEAD	PVC SDR 35	

2. SERVICES ARE TO BE CONSTRUCTED TO 1.0m FROM FACE OF BUILDING. AT A MINIMUM SLOPE OF 1.0%.
3. PIPE BEDDING, COVER AND BACKFILL ARE TO BE COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY. THE USE OF CLEAR CRUSHED STONE AS A BEDDING LAYER SHALL NOT BE PERMITTED.
4. FLEXIBLE CONNECTIONS ARE REQUIRED FOR CONNECTING PIPES TO MANHOLES (FOR EXAMPLE KOR-N-SEAL, PSX: POSITIVE SEAL AND DURASEAL). THE CONCRETE CRADLE FOR THE PIPE CAN BE ELIMINATED.
5. THE OWNER SHALL REQUIRE THAT THE SITE SERVICING CONTRACTOR PERFORM FIELD TESTS FOR QUALITY CONTROL OF ALL SANITARY SEWERS. SPECIFICALLY THE LEAKAGE TESTING SHALL BE COMPLETED IN ACCORDANCE WITH OPSS 410.07.15.04 AND 407.07.26. THE FIELD TESTS SHALL BE PERFORMED IN THE PRESENCE OF A CERTIFIED PROFESSIONAL ENGINEER WHO SHALL SUBMIT A CERTIFIED COPY OF THE TEST RESULTS.
6. STORM MANHOLES AND CBMHS ARE TO BE 1200mmø WITH 300mm SUMPS UNLESS OTHERWISE INDICATED ON DRAWING.
7. PROVIDE 50mm OF HI-60 INSULATION AGAINST THE SIDES AND BOTTOM OF ALL SHALLOW DRAINAGE STRUCTURES.
8. CONTRACTOR TO TELEVISE (CCTV) ALL PROPOSED SEWERS.



BACKWATER VALVE AND STANDPIPE DETAIL
(MODIFIED CITY OF OTTAWA DETAIL SIOI)
NOT TO SCALE



KEY PLAN
N.T.S.

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

CHRYSLER

NOVATECH ENGINEERING CONSULTANTS LTD.
ENGINEERS & PLANNERS
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada
K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Email: novatech@novatech-eng.com

NO.	ISSUE & REVISIONS	DATE
5	ISSUED FOR CONSTRUCTION	31 AUG 06
4	ISSUED FOR FINAL APPROVAL	13 JULY 06
3	REVISED PER CITY COMMENTS/ISSUED FOR TENDER	23 JUNE 06
2	ISSUED FOR BUILDING PERMIT	5 JUNE 06
1	ISSUED FOR SITE PLAN APPLICATION	4 MAY 06

SEAL — LICENSED PROFESSIONAL ENGINEER — R.S. CEBRYK — PROVINCE OF ONTARIO
Not for construction unless SEALED and SIGNED.

SEAL — LICENSED PROFESSIONAL ENGINEER — F.S. THAUVETTE — 100041399 — PROVINCE OF ONTARIO
Not for construction unless SEALED and SIGNED.

MORLEY CONSTRUCTION INC. — RECEIVED

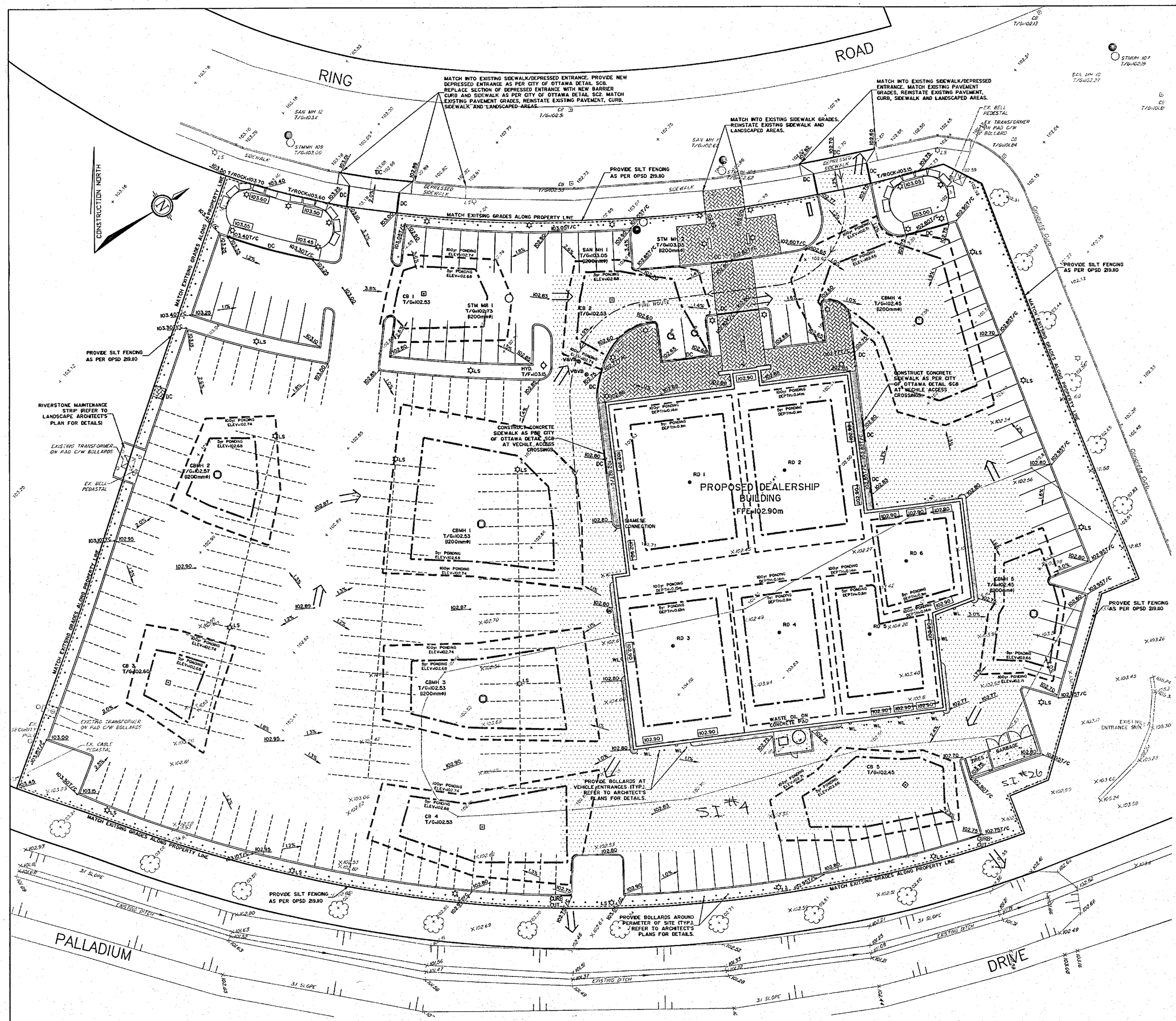
PROJECT
CAPITAL DODGE CHRYSLER MORLEY HOPPNER DESIGN BUILD

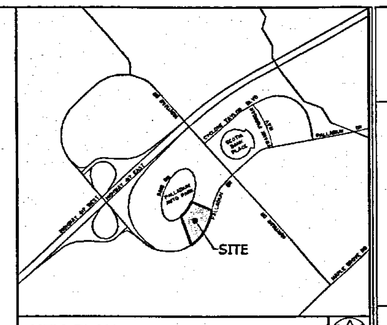
PALLADIUM AUTO PARK — OTTAWA, ONTARIO

DRAWING
GENERAL PLAN OF SERVICES
2500 PALLADIUM DRIVE, UNIT 1200

Do not scale. Refer any dimensional errors and/or possible trade interference/conflict to the architects for clarification prior to commencement of the work. The conditions of the contract apply.

PROJECT NO. 06-14	DRAWING NO. 106034-GP
SCALE — 1:250	
DRAWN — FST	
CHECKED — RSC	
PLOT DATE — 20-Feb-2006	REVISION NO.





KEY PLAN
N.T.S.

LEGEND

- 102.50 — PROPOSED ELEVATION
- 102.65T/C — PROPOSED TOP OF CURB ELEVATION
- 102.40 — *EXISTING ELEVATION*
- FFE=102.90 — PROPOSED FINISHED FLOOR ELEVATION
- 102.90 — PROPOSED ELEVATION
- MAXIMUM 3:1 SIDESLOPE
- 2.0% — GRADE AND DIRECTION
- DIRECTION OF MAJOR OVERLAND FLOW
- STM MH 1 — PROPOSED STORM MH
- CB 2 — PROPOSED CATCHBASIN
- CBMH 3 — PROPOSED CATCHBASIN MANHOLE
- PROPOSED BUILDING ENTRANCE/EXIT
- PROPOSED SILT FENCING
- EXISTING HYDRO TRANSFORMER LOCATION
- EXITSING BELL PEDASTAL
- LS — *EXISTING LIGHT STANDARD*
- LS — PROPOSED SITE LIGHTING
- DC — PROPOSED DEPRESSED CURB
- HYD — PROPOSED HYDRANT C/W VALVE
- 100yr PONDING LIMIT
- 5yr PONDING LIMIT

GENERAL NOTES:

1. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
2. DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME RESPONSIBILITY FOR ALL EXISTING UTILITIES WHETHER OR NOT SHOWN ON THIS DRAWING.
3. OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA BEFORE COMMENCING CONSTRUCTION.
4. BEFORE COMMENCING CONSTRUCTION OBTAIN AND PROVIDE PROOF OF COMPREHENSIVE, ALL RISK AND OPERATIONAL LIABILITY INSURANCE FOR $2,000,000.00. INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND ARCHITECTS AS CO-INSURED.
5. RESTORE ALL DISTURBED AREAS ON-SITE AND OFF-SITE, INCLUDING TRENCHES AND SURFACES ON PUBLIC ROAD ALLOWANCES TO EXISTING CONDITIONS OR BETTER TO THE SATISFACTION OF THE CITY OF OTTAWA.
6. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL UNLESS OTHERWISE INSTRUCTED BY ENGINEER. EXCAVATE AND REMOVE FROM SITE ALL ORGANIC MATERIAL AND DEBRIS.
7. ALL ELEVATIONS ARE GEODETIC.
8. REFER TO GEOTECHNICAL REPORT No. 06-120-025 (DATED APRIL 2006) PREPARED BY GOLDER ASSOCIATES LTD., FOR SUBSURFACE CONDITIONS, CONSTRUCTION RECOMMENDATIONS, AND GEOTECHNICAL INSPECTION REQUIREMENTS. THE GEOTECHNICAL CONSULTANT IS TO REVIEW ON-SITE CONDITIONS AFTER EXCAVATION FOR ALL PARKING ACCESS\ ROADWAY ACCESS, PRIOR TO PLACEMENT OF THE GRANULAR MATERIAL.
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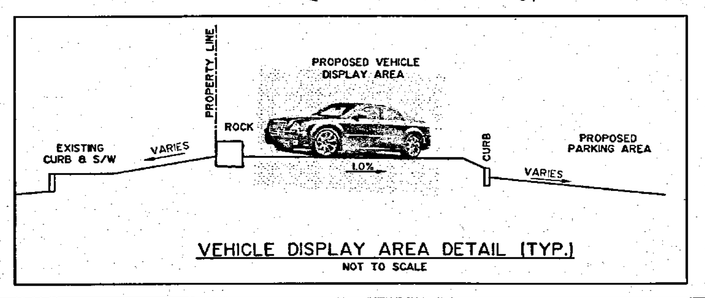
10. REFER TO ARCHITECTS DRAWING FOR BUILDING AND HARD SURFACE AREAS AND DIMENSIONS.

GRADING NOTES:

1. ALL TOPSOIL, ORGANIC OR DELETERIOUS MATERIAL MUST BE ENTIRELY REMOVED FROM BENEATH THE PROPOSED PAVED AREAS.
2. EXPOSED SUBGRADES IN PROPOSED PAVED AREAS SHOULD BE PROOF ROLLED WITH A LARGE STEEL DRUM ROLLER AND INSPECTED BY GEOTECHNICAL PERSONNEL.
3. ANY SOFT AREAS EVIDENT FROM THE PROOF ROLLING SHOULD BE SUBEXCAVATED AND REPLACED WITH SUITABLE EARTH BORROW MATERIAL THAT IS FROST COMPATIBLE WITH THE EXISTING SOILS.
4. THE GRANULAR BASE SHOULD BE COMPACTED TO AT LEAST 100% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY VALUE. ANY ADDITIONAL GRANULAR FILL USED FOR GRADE RAISE PURPOSES BELOW THE PROPOSED PAVEMENT SHOULD BE COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY VALUE.
5. GRADE AND/OR FILL BEHIND PROPOSED CURB AND BETWEEN BUILDINGS AND CURBS, WHERE REQUIRED TO PROVIDE POSITIVE DRAINAGE.
6. MINIMUM OF 2% GRADE FOR ALL GRASS AREAS UNLESS OTHERWISE NOTED.
7. ALL GRADES BY CURBES ARE EDGE OF PAVEMENT GRADES UNLESS OTHERWISE INDICATED.
8. ALL CURBS SHALL BE BARRIER CURB (150mm) UNLESS OTHERWISE NOTED AND CONSTRUCTED AS PER CITY OF OTTAWA STANDARDS (SCII).
9. REFER TO LANDSCAPE PLAN FOR PLANTING AND OTHER LANDSCAPE FEATURE DETAILS.
10. ALL CONCRETE SIDEWALKS SHALL BE CONSTRUCTED AS PER CITY OF OTTAWA STANDARDS (SC2, SC5, SC8).

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.



VEHICLE DISPLAY AREA DETAIL (TYP.)
NOT TO SCALE

CONCRETE PAD STRUCTURE DETAILS

- CONCRETE PAD (WASTE OIL): 200mm CONCRETE, 150mm GRAN "A", 250mm GRAN "B"
- CONCRETE PAD (TIRES & GARBAGE): 150mm CONCRETE, 150mm GRAN "A", 450mm GRAN "B"
- CONCRETE SIDEWALK: 150mm CONCRETE, 150mm GRAN "A"

PAVEMENT STRUCTURE DETAILS

- LIGHT DUTY: 50mm HL3, 150mm GRAN "A", 300mm GRAN "B" TYPE II
- HEAVY DUTY: 40mm HL3, 50mm HL8, 150mm GRAN "A", 450mm GRAN "B" TYPE II
- UNIT PAVERS (WITHIN ROADWAY): 80 mm UNIT PAVERS, 150mm GRAN "A", 450mm GRAN "B" TYPE II
- UNIT PAVERS (VEHICLE DISPLAY AND SIDEWALK): 80 mm UNIT PAVERS, 150mm GRAN "A", 300mm GRAN "B" TYPE II

EROSION AND SEDIMENT CONTROL NOTES:

1. THE OWNER AGREES TO PREPARE AND IMPLEMENT AN EROSION AND SEDIMENT CONTROL PLAN TO THE SATISFACTION OF THE CITY OF OTTAWA, APPROPRIATE TO THE SITE CONDITIONS, PRIOR TO UNDERTAKING ANY SITE ALTERATIONS (FILLING, GRADING, REMOVAL OF VEGETATION, ETC.) AND DURING ALL PHASES OF SITE PREPARATION AND CONSTRUCTION IN ACCORDANCE WITH THE CURRENT BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROL SUCH AS BUT NOT LIMITED TO INSTALLING FILTER CLOTHS ACROSS MANHOLE/CATCHBASIN LIDS TO PREVENT SEDIMENTS FROM ENTERING STRUCTURES AND INSTALL AND MAINTAIN A LIGHT DUTY SILT FENCE BARRIER AS REQUIRED.
2. THE CONTRACTOR SHALL PLACE FILTER CLOTH UNDER THE CATCHBASIN AND MANHOLE GRATES FOR THE DURATION OF CONSTRUCTION AND WILL REMAIN IN PLACE DURING ALL PHASES OF CONSTRUCTION.
3. SILT FENCING FOR ENTIRE PERIMETER OF SITE, SHALL BE UTILIZED TO CONTROL EROSION FROM THE SITE DURING CONSTRUCTION.
4. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.

CHRYSLER

NOVATECH ENGINEERING CONSULTANTS LTD.
ENGINEERS & PLANNERS
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada
K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Email novatech@novatech-eng.com

NO.	ISSUE & REVISIONS	DATE
5	ISSUED FOR CONSTRUCTION	31 AUG 06
4	ISSUED FOR FINAL APPROVAL	13 JULY 06
3	REVISED PER CITY COMMENTS/ISSUED FOR TENDER	23 JUNE 06
2	ISSUED FOR BUILDING PERMIT	5 JUNE 06
1	ISSUED FOR SITE PLAN APPLICATION	4 MAY 06

SEAL — LICENSED PROFESSIONAL ENGINEER — R.S. CEBRYK — PROVINCE OF ONTARIO
Not for construction unless SEALED and SIGNED.

SEAL — LICENSED PROFESSIONAL ENGINEER — F.S. THAUVETTE — 100043619 — PROVINCE OF ONTARIO
Not for construction unless SEALED and SIGNED.

PROJECT
CAPITAL DODGE CHRYSLER
MORLEY HOPPNER DESIGN BUILD
PALLADIUM AUTO PARK — OTTAWA, ONTARIO

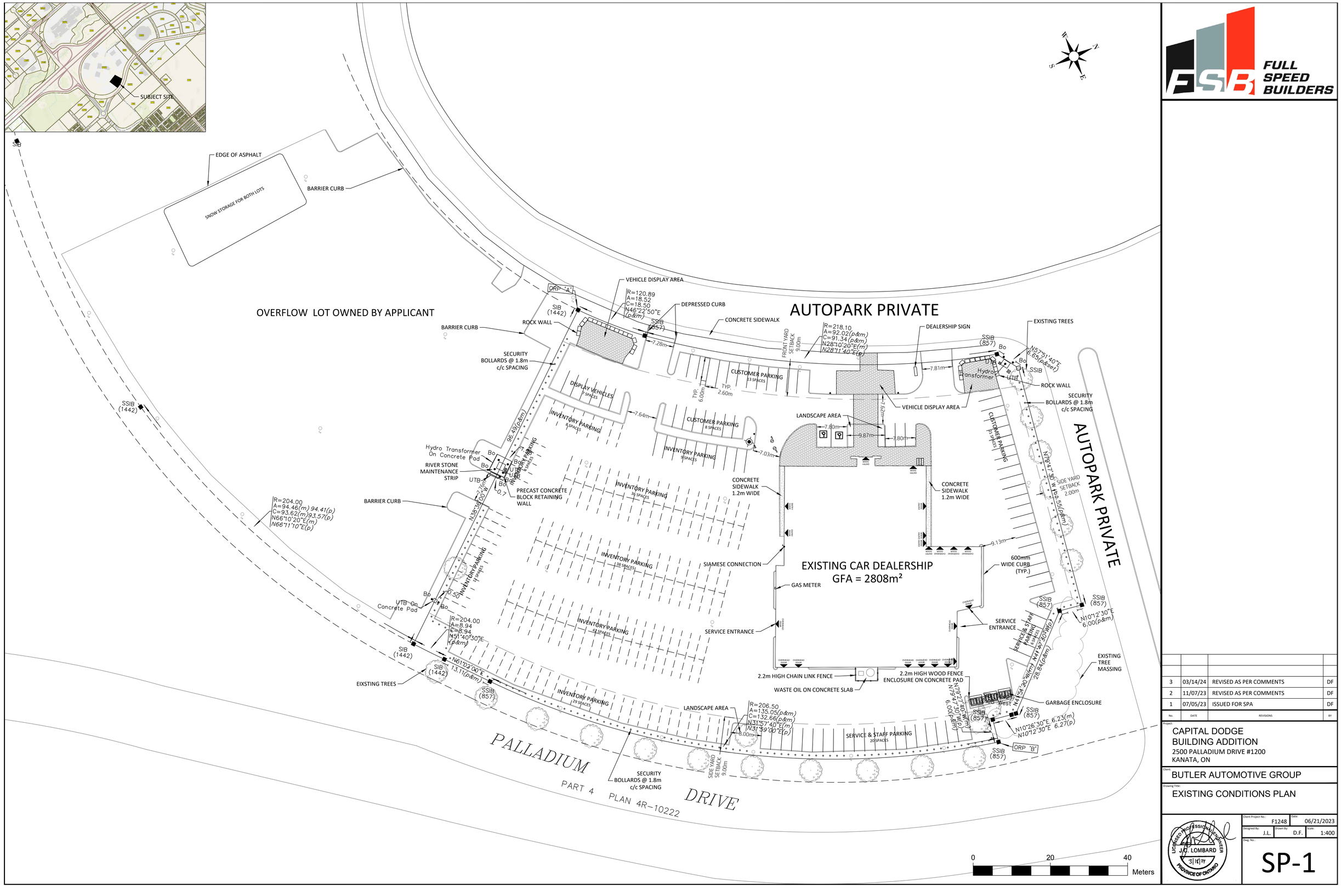
DRAWING
GRADING PLAN
2500 PALLADIUM DRIVE, UNIT 1200

Do not scale. Refer any dimensional errors and/or possible trade interference/conflict to the architects for clarification prior to commencement of the work. The conditions of the contract apply.

PROJECT NO. 06-14	DRAWING NO. 106034-GR
SCALE – 1:250	
DRAWN – FST	
CHECKED – RSC	
PLOT DATE – 20-Feb-2006	REVISION NO.

Appendix F

Design Drawings



FULL SPEED BUILDERS

No.	DATE	REVISIONS	BY
3	03/14/24	REVISED AS PER COMMENTS	DF
2	11/07/23	REVISED AS PER COMMENTS	DF
1	07/05/23	ISSUED FOR SPA	DF

Project:
CAPITAL DODGE
BUILDING ADDITION
2500 PALLADIUM DRIVE #1200
KANATA, ON

Client:
BUTLER AUTOMOTIVE GROUP

Drawing Title:
EXISTING CONDITIONS PLAN

LICENSED PROFESSIONAL ENGINEER
J.C. LOMBARD
3/19/24
PROVINCE OF ONTARIO

Client Project No.:	F1248	DATE:	06/21/2023
Designed By:	J.L.	Drawn By:	D.F.
SCALE:	1:400		

Dwg. No.:
SP-1

AUTOPARK PRIVATE

ORP 'A'

SIB (1442)

SSIB (857)

ROCK WALL

DEPRESSED CURB

CONCRETE SIDEWALK

1.8m LANDSCAPE BUFFER

VEHICLE DISPLAY AREA

PROPOSED PLANTINGS

SECURITY BOLLARDS @ 1.8m c/c SPACING

DISPLAY VEHICLES 7 SPACES

CUSTOMER PARKING 11 SPACES

CUSTOMER PARKING 8 SPACES

FRONT YARD SETBACK 9.00m

FIRE ROUTE

FIRE ROUTE SIGN

DEALERSHIP SIGN

FIRE ROUTE SIGN

VEHICLE DISPLAY AREA

Hydro Transformer

UTB

Bo

ROCK WALL

SECURITY BOLLARDS @ 1.8m c/c SPACING

EXISTING TREES

SIDE YARD SETBACK 2.00m

LANDSCAPE BUFFER 5.97m

AUTOPARK PRIVATE

LANDSCAPE AREA

BARRIER ~~FREE LINE PAINT~~ TO BE REMOVED AND REPAINTED AS PER DETAIL 5-C3

LINE PAINT TO BE REMOVED AND REPAINTED AS BARRIER FREE PARKING DETAIL 5-C3

3 x BICYCLE PARKING SPACES 0.6m X 1.8m EACH

EXISTING DEPRESSED CURB

Hydro Transformer On Concrete Pad

RIVER STONE MAINTENANCE STRIP

PRECAST CONCRETE BLOCK RETAINING WALL

INVENTORY PARKING 4 SPACES

INVENTORY PARKING 14 SPACES

INVENTORY PARKING TO BE CONVERTED TO CUSTOMER PARKING (9 SPACES)

CONCRETE SIDEWALK 1.2m WIDE

LIGHT POLE TO BE REMOVED

2 x LOADING SPACES

CANOPY

SIAMESE CONNECTION TO BE RELOCATED

NEW 1.3m WIDE SIDEWALK

CONCRETE SIDEWALK 1.2m WIDE

CUSTOMER PARKING 34 SPACES

600mm WIDE CURB (TYP.)

PROPOSED ADDITION GFA = 1477m²

EXISTING CAR DEALERSHIP GFA = 2808m²

CAR WASH

3.05m X 3.05m HEATED CONCRETE PAD

GAS METER TO BE RELOCATED

CURB TO BE REMOVED

LIGHT POLE TO BE REMOVED

SERVICE ENTRANCE

CURB TO BE REMOVED

SERVICE ENTRANCE

INVENTORY PARKING 12 SPACES

INVENTORY PARKING 18 SPACES

INVENTORY PARKING 29 SPACES

SERVICE & STAFF PARKING 6 SPACES

SERVICE & STAFF PARKING 20 SPACES

LIMIT OF CONSTRUCTION

2.2m HIGH CHAIN LINK FENCE

WASTE OIL ON CONCRETE SLAB

2.2m HIGH WOOD FENCE ENCLOSURE ON CONCRETE PAD

GARBAGE ENCLOSURE

LANDSCAPE BUFFER 2.00m

EXISTING TREES

EXISTING TREE MASSING

LANDSCAPE AREA

SECURITY BOLLARDS @ 1.8m c/c SPACING

SIDE YARD SETBACK 9.00m

ORP 'B'

PALLADIUM DRIVE

PART 4 PLAN 4R-10222

0 10 20 Meters

FULL SPEED BUILDERS

PROJECT DATA

LEGAL DESCRIPTION
UNIT 1, LEVEL 1
OTTAWA-CARLETON VACANT
LAND CONDOMINIUM PLAN 690
CITY OF OTTAWA

SURVEY INFORMATION
SURVEY INFORMATION PROVIDED BY:
McINTOSH PERRY SURVEYING INC. - DATED JUNE 7, 2023

SITE COVERAGE

	EXISTING	PROPOSED
GROUND FLOOR AREA	2363m²	3514m²
SECOND FLOOR AREA	445m²	326m²
TOTAL GROSS AREA	2808m²	4285m²
SITE AREA	14588m²	14588m²

ZONING
GM22 - GENERAL MIXED USE

BUILDING SETBACKS	REQUIRED	EXISTING	PROPOSED
FRONT YARD	9.0m	23.7m	23.7m
REAR YARD	7.5m	21.2m	14.9m
SIDE YARD	2.0m	20.4m	20.4m
LOT AREA	1,800m²	14,588m²	14,588m²
LOT WIDTH	30m	110.55m	110.55m
BUILDING HEIGHT	18m	9.3m	7.55m
LOT COVERAGE		16.17%	24.08%

PARKING	REQUIRED	EXISTING	PROPOSED
SALES/SHOWROOM 456m² 2 PER 100m² OF GFA	10	10	10
SERVICE AREA 28 SERVICE BAYS 2 PER SERVICE BAY	56	42	56
OTHER AREAS 1770m² 1 PER 100m²	18	32	18
TOTAL	84		84
INVENTORY PARKING Typical Stall Size	2.6m X 5.2m	2.6m X 6.0m	101
Barrier Free Size Type A - 3.7m X 6.0m Type B - 2.6m X 6.0m	4	3	4

No.	DATE	REVISIONS	BY
3	03/14/24	REVISED AS PER COMMENTS	DF
2	11/07/23	REVISED AS PER COMMENTS	DF
1	07/05/23	ISSUED FOR SPA	DF

Project:
CAPITAL DODGE
BUILDING ADDITION
2500 PALLADIUM DRIVE #1200
KANATA, ON

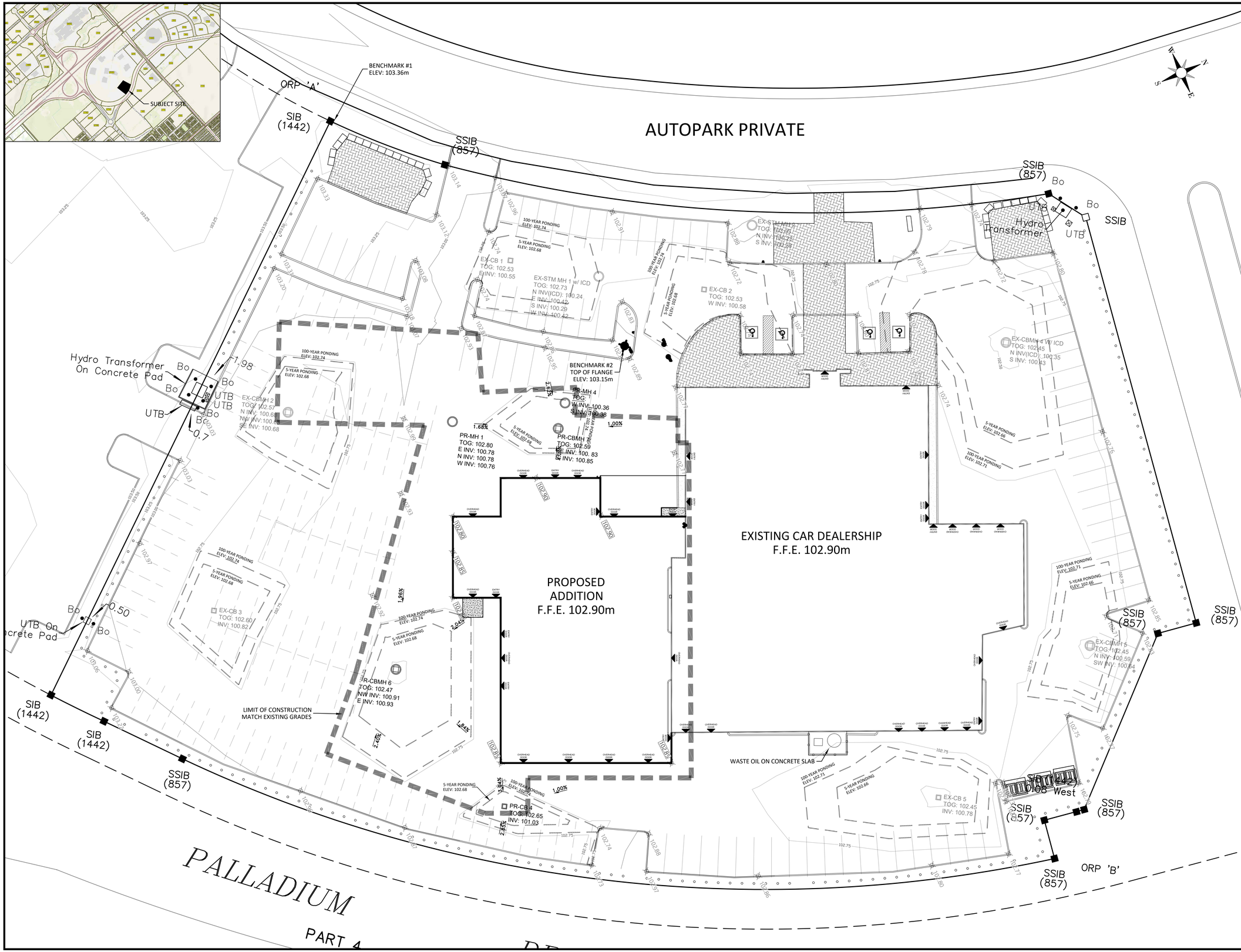
Client:
BUTLER AUTOMOTIVE GROUP

Drawing Title:
PROPOSED SITE PLAN

LICENSED PROFESSIONAL ENGINEER
J.C. LOMBARD
PROVINCE OF ONTARIO

Client Project No.: F1248
Date: 07/05/2023
Designed By: J.L.
Drawn By: D.F.
Scale: 1:250
Dwg. No.:

SP-2



FULL SPEED BUILDERS

XX.XX	PROPOSED ELEVATION
XX.XX	EXISTING ELEVATION
TOG:XX.XX	TOP OF GRATE ELEVATION
TC:XX.XX	TOP OF CONCRETE / CURB
BC:XX.XX	BOTTOM OF CONCRETE / CURB
XX.XX	EXISTING MAJOR CONTOUR (1m)
XX.XX	EXISTING MINOR CONTOUR (0.25m)

No.	DATE	REVISIONS	BY
3	03/14/24	REVISED AS PER COMMENTS	DF
2	11/07/23	REVISED AS PER COMMENTS	DF
1	07/05/23	ISSUED FOR SPA	DF

Project:
CAPITAL DODGE
BUILDING ADDITION
2500 PALLADIUM DRIVE #1200
KANATA, ON

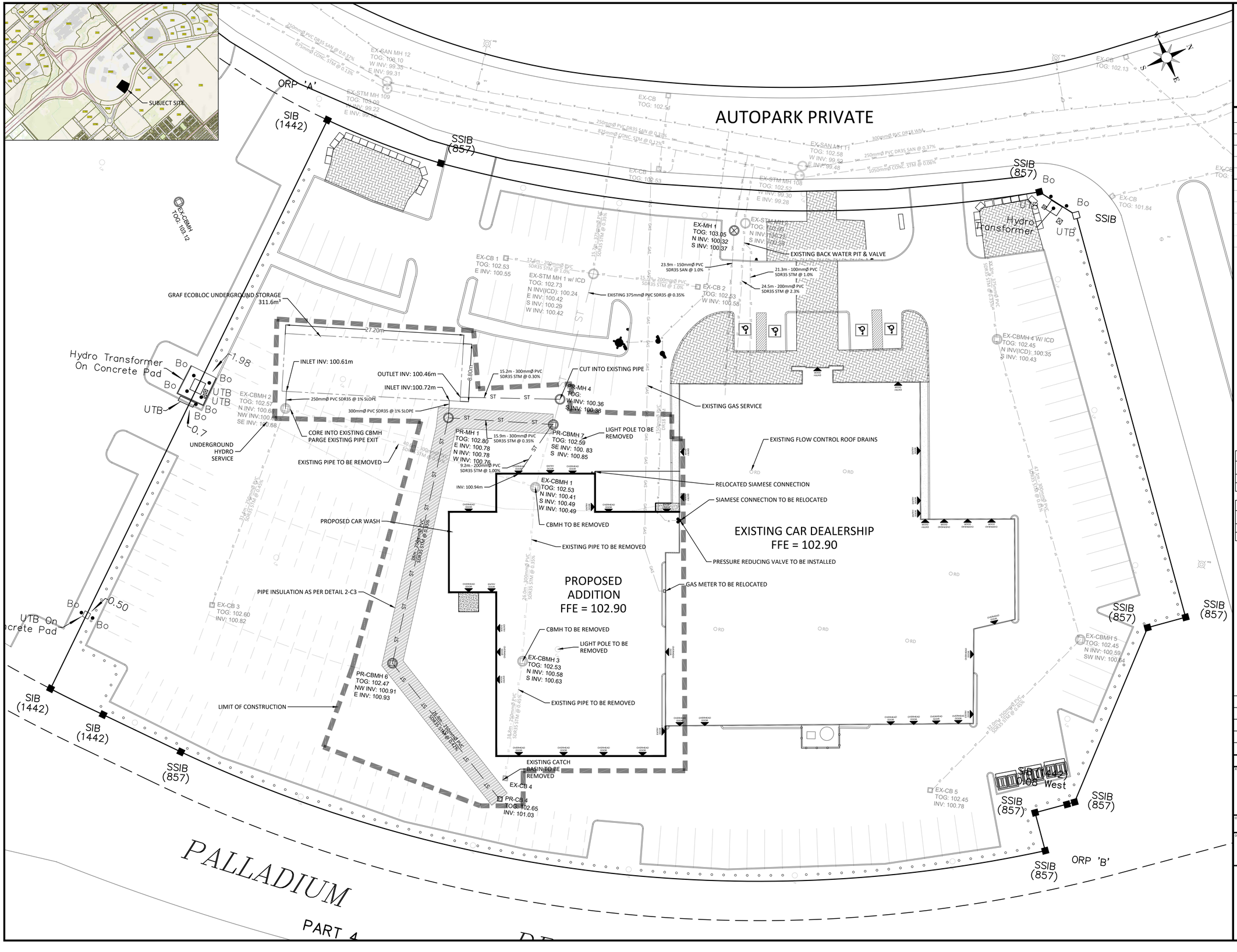
Client:
BUTLER AUTOMOTIVE GROUP

Drawing Title:
LOT GRADING PLAN

LICENCED PROFESSIONAL ENGINEER
J.G. LOMBARD
3/18/24
PROVINCE OF ONTARIO

Client Project No.:	F1248	Date:	07/05/2023
Designed By:	J.L.	Drawn By:	D.F.
Scale:	1:250		

Dwg. No.:
C-1



FULL SPEED BUILDERS

- NEW - STORM PIPE NETWORK
- NEW - SANITARY PIPE NETWORK
- NEW - WATER PIPE NETWORK
- NEW - POWER SUPPLY
- NEW - PHONE/FIBER SUPPLY
- NEW - GAS SUPPLY
- EXISTING - STORM PIPE NETWORK
- EXISTING - SANITARY PIPE NETWORK
- EXISTING - WATER PIPE NETWORK
- EXISTING - POWER SUPPLY
- EXISTING - PHONE/FIBER SUPPLY
- EXISTING - GAS SUPPLY

STRUCTURE SYMBOLS

- MANHOLE
- CATCH BASIN MANHOLE
- DOUBLE CATCH BASIN MANHOLE
- DITCH INLET BASIN MANHOLE
- MISA MANHOLE

WATER SERVICE SYMBOLS

- WATER VALVE
- CURB STOP
- FIRE HYDRANT
- SIAMESE CONNECTION
- MONITORING WELL

EX-STM MH1 ICD			
DESIGN EVENT	ORIFICE SIZE	DESIGN FLOW (L/S)	INVERT
5-YEAR	143mmØ	67.9	100.24m
100-YEAR	143mmØ	68.8	100.24m

EX-CBMH4 ICD			
DESIGN EVENT	ORIFICE TYPE	DESIGN FLOW (L/S)	INVERT
5-YEAR	HYDROVEX 75 SVHV-1	4.7	100.43m
100-YEAR		4.7	100.43m

No.	DATE	REVISIONS	BY
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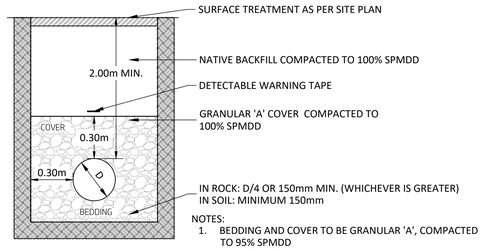
Project:
CAPITAL DODGE
BUILDING ADDITION
2500 PALLADIUM DRIVE #1200
KANATA, ON

Client:
BUTLER AUTOMOTIVE GROUP

Drawing Title:
SITE SERVICING PLAN

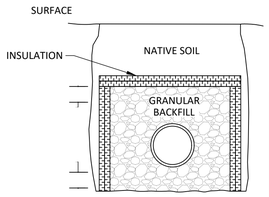
LICENSED PROFESSIONAL ENGINEER
J.G. LOMBARD
3/11/24
PROVINCE OF ONTARIO

Client Project No.: F1248
Date: 07/05/2023
Designed By: J.L.
Drawn By: D.F.
Scale: 1:250
Dwg. No.: C-2



NOTES:
1. BEDDING AND COVER TO BE GRANULAR 'A', COMPACTED TO 95% SPMDD
2. THE BEDDING IS TO BE CAREFULLY SHAPED TO RECEIVE THE PIPE

STORM TYPICAL TRENCH 1 C-3

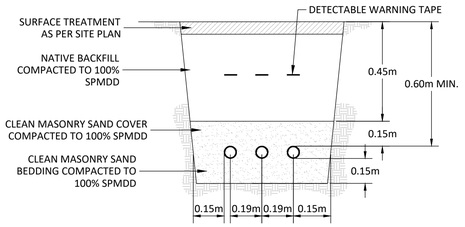


PIPE INSULATION TABLE

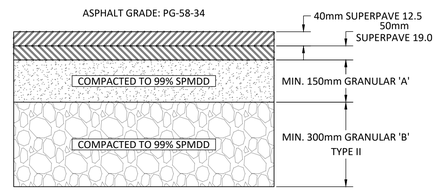
GROUND COVER	INSULATION THICKNESS (mm)
600 - 900mm	75
900 - 1200mm	100
1200 - 1500mm	125

NOTES:
1. INCREMENTS OF THICKNESS SHALL BE 25mm.
2. INSULATION TO BE STYROFOAM SM HI-40 OR EQUIVALENT.
3. TO BE USED WHEN GROUND COVER IS LESS THAN 1.5m FOR STORM SEWER, 1.7m FOR SANITARY SEWER AND 2.4m FOR WATER MAIN.
4. INSULATION TO BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARD DETAIL DRAWING S35 "INSULATINON FOR SHALLOW SEWERS".

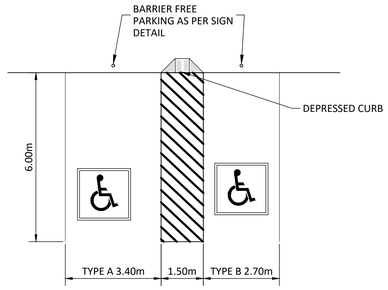
PIPE INSULATION DETAIL 2 C-3



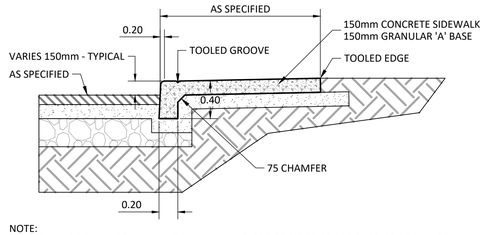
TYPICAL DUCT BANK 3 C-3



HEAVY DUTY PAVEMENT 4 C-3

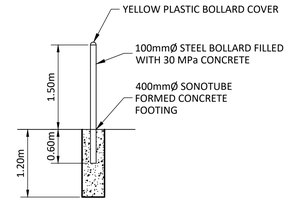


TYPICAL ACCESSIBILITY PARKING 5 C-3

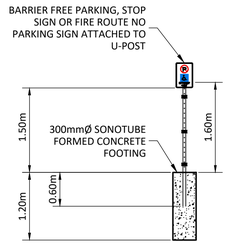


NOTE:
PEDESTRIAN SIDEWALKS SHALL HAVE A MAXIMUM SLOPE OF 5% OR BE DESIGNED AS A RAMP OR CURB RAMP AS PER O.B.C.

SIDEWALK WITH CURB DETAIL 6 C-3



TYPICAL TRAFFIC BOLLARD 7 C-3



TYPICAL DISABILITY TRAFFIC SIGN 8 C-3

GENERAL NOTES:

1. THE ORIGINAL TOPOGRAPHY AND GROUND ELEVATIONS, SERVICING AND SURVEY DATA SHOWN ON THIS PLAN ARE SUPPLIED FOR INFORMATION PURPOSES ONLY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE ACCURACY OF ALL INFORMATION OBTAINED FROM THESE PLANS. ALL DIMENSIONS AND INVERTS MUST BE VERIFIED PRIOR TO CONSTRUCTION. IF THERE IS ANY DISCREPANCY THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY.
2. ALL ELEVATIONS ARE GEODETIC AND UTILIZE METRIC UNITS UNLESS OTHERWISE NOTED.
3. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATIONS OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME ALL RESPONSIBILITY FOR EXISTING UTILITIES WHETHER OR NOT SHOWN ON THE DRAWINGS. IF THERE ARE ANY DISCREPANCIES THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY. GAS, HYDRO, CABLE, TELEPHONE, OR ANY OTHER UTILITY THAT MAY EXIST ON SITE MUST BE LOCATED BY ITS OWN UTILITIES AND VERIFIED.
4. ALL UNDERGROUND SERVICES, MATERIALS AND INSTALLATIONS TO BE IN ACCORDANCE WITH ONTARIO PROVINCIAL STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE STATED (OPSS).
5. ALL DISTURBED AREAS TO BE RESTORED TO ORIGINAL CONDITION OR BETTER UNLESS OTHERWISE SPECIFIED. ANY GRASSED AREAS DISTURBED ARE TO BE REINSTATED WITH MINIMUM 100mm TOPSOIL AND SEED. ROAD CUTS TO BE REINSTATED WITH TOPSOIL AND SEED.
6. THE CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT FOR CONSTRUCTION PURPOSES.
7. TREES DESIGNATED BY THE ENGINEER MUST BE PROTECTED AND MAINTAINED DURING CONSTRUCTION AS PER OPSD 220.010
8. CONTRACTOR TO OBTAIN AND PAY FOR ALL NECESSARY PERMITS FROM THE COUNTY, MUNICIPALITY AND/OR CONSERVATION AUTHORITY PRIOR TO COMMENCING CONSTRUCTION.
9. CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR REVIEW AND APPROVAL.
10. HOT MIX, HOT LAID ASPHALT CONCRETE AS PER OPSS 1150. MIX DESIGNS SHALL CONTAIN A MINIMUM OF 5.4% ASPHALT CEMENT WITH A PERFORMANCE GRADE OF PG58-34 AND 3.5% AIR VOIDS.
11. ALL SIDE WALKS SHALL BE A MIN OF 1.5M WIDTH OR AS SPECIFIED AND CONSTRUCTED AS PER OPSD 310.010.
12. ALL SIDEWALKS ADJACENT TO ASPHALT PAVING TO HAVE MINIMUM 150mm BURIED FACE
13. PAINT LINES FOR STANDARD PARKING SPACES TO BE CAN/CGSB-1.74-2001, ALKYD TRAFFIC PAINT, PAVEMENT SURFACE TO BE DRY, FREE FROM WEAR, FROST, ICE, DUST, OIL, GREASE AND OTHER FOREIGN MATERIALS PRIOR TO PAINTING. PAINT LINES TO BE UNIFORM COLOUR AND DENSITY WITH SHARP EDGES. PROTECT PAVEMENT MARKINGS UNTIL DRY.
14. ALL SIGNS INSTALLED AS PER ONTARIO TRAFFIC MANUAL BOOK 5 AND MUNICIPALITY STANDARDS.
15. GRADES TO MATCH ADJACENT PROPERTIES AT PROPERTY LINE.
16. SLOPES IN LANDSCAPED AREAS SHALL NOT EXCEED 3:1 (3 HORIZONTAL TO 1 VERTICAL).
17. BEDDING SHALL BE A MINIMUM 150MM OF GRANULAR "A", COMPACTED TO MINIMUM 98% STANDARD PROCTOR DRY DENSITY. CLEAR STONE BEDDING SHALL NOT BE PERMITTED.
18. SUB-BEDDING, IF REQUIRED SHALL BE AS PER THE DIRECTION OF GEOTECHNICAL ENGINEER
19. BACKFILL TO AT LEAST 300mm ABOVE TOP OF PIPE WITH GRANULAR "A".
20. TO MINIMIZE DIFFERENTIAL FROST HEAVING, TRENCH BACKFILL (FROM PAVEMENT SUBGRADE TO 2 METRES BELOW FINISHED GRADE) SHALL MATCH EXISTING SOIL CONDITIONS.
21. EXTERIOR LIGHT FIXTURES TO BE NIGHT SKY COMPLIANT WITH NO LIGHT SPILLING OFF PROPERTY.

ENVIRONMENTAL

22. EROSION AND SEDIMENT CONTROLS SHALL BE INSTALLED PRIOR TO CONSTRUCTION AND MONITORED AND MAINTAINED BY THE CONTRACTOR UNTIL COMPLETION. THE TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES MUST BE REMOVED ONCE THE SITE HAS BEEN STABILIZED AND SITE WORKS COMPLETED.
23. REGARDLESS OF SITE SPECIFIC ITEMS DETAILED ON THE PLANS, THE CONTRACTOR SHALL INSTALL EROSION CONTROL MEASURES TO SUIT THE PROPOSED WORK METHODS TO CONTROL SEDIMENT FROM RUNNING OFF THE SITE OR INTO WATER BEARING FEATURES PRIOR TO ANY DISTURBANCE. FOLLOWING CONSTRUCTION, DISTURBED AREAS, AS WELL AS PROPOSED GRASSED AND VEGETATED SURFACES SHALL BE REINSTATED.
24. IN THE EVENT THAT HUMAN REMAINS ARE ENCOUNTERED DURING CONSTRUCTION, THE MINISTRY OF CITIZENSHIP, CULTURE AND RECREATION SHALL BE NOTIFIED IMMEDIATELY AND THE REGISTRAR OR DEPUTY REGISTRAR OF THE CEMETERIES REGULATION UNIT OF THE MINISTRY OF CONSUMER AND COMMERCIAL RELATIONS (416) 362-8392, SHALL BE NOTIFIED IMMEDIATELY.
25. IN THE EVENT THAT BURIED ARCHEOLOGICAL REMAINS ARE FOUND DURING CONSTRUCTION ACTIVITIES, THE MINISTRY OF CITIZENSHIP, CULTURE AND RECREATION SHALL BE NOTIFIED IMMEDIATELY.
26. WHILE UNDERTAKING CLEARING, DEMOLITION, EXCAVATION OR CONSTRUCTION THE OWNER AND THEIR CONTRACTORS SHALL BE VIGILANT FOR THE POTENTIAL PRESENCE OF UNDERGROUND FUEL TANKS, CONTAMINATED SOIL OR GROUNDWATER, BURIED WASTE OR ABANDONED WATER WELLS. IF ANY OF THE ABOVE ARE ENCOUNTERED OR SUSPECTED, THE OWNER SHALL ENSURE THAT:
    - 26.A. THE CITY OF OTTAWA'S ENVIRONMENT DEPARTMENT IS TO BE ADVISED THAT CONTAMINANTS OR WASTES HAVE BEEN DISCOVERED OR ARE SUSPECTED.
    - 26.B. ANY SOIL OR GROUNDWATER CONTAMINATION ENCOUNTERED IS REMEDIATED TO APPLICABLE STANDARDS AS DEFINED WITHIN O.REG 153/04 OR AS REVISED;
    - 26.C. ANY WASTES GENERATED BY SITE CLEAN-UPS ARE MANAGED IN ACCORDANCE WITH APPLICABLE LAWS AND STANDARDS;
    - 26.D. ANY ABANDONED FUEL TANKS ENCOUNTERED ARE DECOMMISSIONED IN ACCORDANCE WITH APPLICABLE LAWS AND STANDARDS;
    - 26.E. ANY UNUSED WATER WELLS (DRILLED OR DUG) ARE PROPERLY ABANDONED IN ACCORDANCE WITH ONTARIO REGULATIONS 903 - WELLS OR AS ADVISED;
    - 26.F. IF IT APPEARS LIKELY THAT CONTAMINATION EXTENDS BEYOND THE BOUNDARIES OF THE SUBJECT PROPERTY, THE OWNER NOTIFIES THE LOCAL OFFICE OF THE MINISTRY OF ENVIRONMENT AND THE CITY OF OTTAWA'S ENVIRONMENT DEPARTMENT;
    - 26.G. CONSTRUCTION WASTES ARE NOT TO BE BURIED WITHIN THE PROPERTY THAT IS THE SUBJECT OF THIS AGREEMENT, AND
    - 26.H. THE OWNER AND THEIR CONTRACTORS REPORT ALL SPILLS TO THE MINISTRY OF THE ENVIRONMENT'S SPILLS ACTION CENTRE (1-800-268-6060) AND TO THE MUNICIPALITY FORTHWITH.

STORM

27. ALL TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO CONSTRUCTION. CONTRACTOR TO MAINTAIN SILT FENCE.
28. CBMH'S TO HAVE MINIMUM 600mm SUMPS
29. STORM PIPE TO BE PVC SDR35.
30. CBMH'S AS PER OPSD 701.010, FRAME AND GRATE AS PER OPSD 400.020
31. INSULATE ALL SEWERS/SERVICES THAT HAVE LESS THAN 1.5M OF COVER WITH THERMAL INSULATION AS PER THE CITY OF OTTAWA STANDARD DETAIL DRAWING S35 "INSULATION OF SHALLOW SEWERS".
32. STORM SEWERS TO BE FLUSHED AND CCTV STUDY COMPLETED.
33. LEAK TESTING SHALL BE AS PER OPSS AND CITY OF OTTAWA STANDARDS.

ELECTRICAL AND COMMUNICATIONS

34. ALL ELECTRICAL AND COMMUNICATION DUCTS TO HAVE A MIN OF 150mm OF SAND BEDDING AND COVER AS PER DETAIL.
35. MINIMUM OF 600mm COVER MUST BE PROVIDED ON ALL SERVICES.

FULL SPEED BUILDERS

No.	DATE	REVISIONS	BY
3	03/14/24	REVISED AS PER COMMENTS	DF
2	11/07/23	REVISED AS PER COMMENTS	DF
1	07/05/23	ISSUED FOR SPA	DF

Project:
CAPITAL DODGE
BUILDING ADDITION
2500 PALLADIUM DRIVE #1200
KANATA, ON

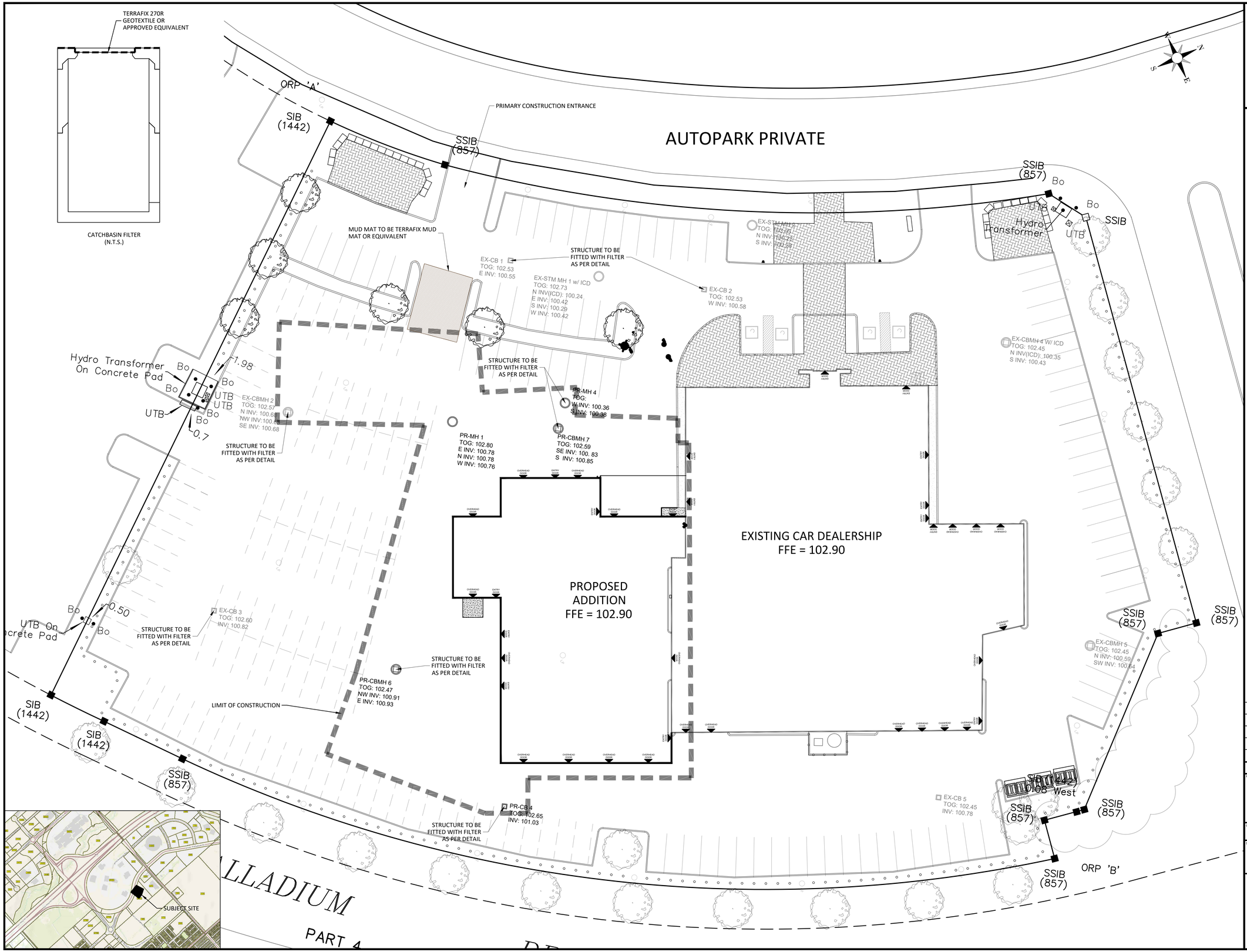
Client:
BUTLER AUTOMOTIVE GROUP

Drawing Title:
NOTES & DETAILS

LICENSED PROFESSIONAL ENGINEER
J.C. LOMBARD
2/14/24
PROVINCE OF ONTARIO

Client Project No.:	F1258	Date:	07/05/2023
Designed By:	J.L.	Drawn By:	D.F.
Scale:	As Shown		
Dwg. No.:	C-3		

CATCHBASIN FILTER
(N.T.S.)



NOTES:

1. MINIMIZE THE EXTENT OF DISTURBED AREAS AND THE DURATION OF EXPOSURE.
2. PROTECT DISTURBED AREAS FROM RUNOFF.
3. INSPECT CATCH BASIN FILTERS WEEKLY AND AFTER EVERY MAJOR STORM EVENT. CLEAN AND REPAIR AS NECESSARY.
4. PLAN TO BE REVIEWED AND REVISED AS REQUIRED DURING CONSTRUCTION.
5. DO NOT LOCATE TOPSOIL PILES AND EXCAVATION MATERIAL CLOSER THAN 2.5m FROM ANY PAVED SURFACE, OR ONE WHICH IS TO BE PAVED BEFORE THE PILE IS REMOVED.
6. ALL EROSION CONTROL MEASURES TO REMAIN IN PLACE UNTIL ALL DISTURBED GROUND SURFACES HAVE BEEN DESTABILIZED EITHER BY PAVING OR RESTORATION OF VEGETATIVE GROUND COVER.
7. CONTRACTOR IS RESPONSIBLE FOR CITY ROADWAY TO BE CLEANED OF ALL SEDIMENT FROM VEHICLE TRACKING AT THE END OF EACH DAY.
8. TAKE ALL NECESSARY STEPS TO PREVENT BUILDING MATERIAL, CONSTRUCTION DEBRIS OR WASTE BEING SPILLED OR TRACKED ONTO ABUTTING PROPERTIES OR PUBLIC STREETS DURING CONSTRUCTION.
9. CATCH BASIN FILTER TO BE PLACED IN EXISTING STORMWATER STRUCTURES ON-SITE.

No.	DATE	REVISIONS	BY
3	03/14/24	REVISED AS PER COMMENTS	DF
2	11/07/23	REVISED AS PER COMMENTS	DF
1	07/05/23	ISSUED FOR SPA	DF

Project:
CAPITAL DODGE
BUILDING ADDITION
2500 PALLADIUM DRIVE #1200
KANATA, ON

Client:
BUTLER AUTOMOTIVE GROUP

Drawing Title:
EROSION & SEDIMENT CONTROL PLAN

Licensed Professional Engineer
J.G. LOMBARD
5/17/24
PROVINCE OF ONTARIO

Client Project No.:	F1248	Date:	07/05/2023
Designed By:	J.L.	Drawn By:	D.F.
Scale:	1:250		

Dwg. No.:
ESC