



REPORT

SITE SERVICING REPORT

Herongate HG-5

2851 Baycrest Drive

Project: 135142-6.03.04



Prepared for Hazelview Investments
by IBI Group
February 3, 2023

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1 INTRODUCTION

1.1 Scope

The purpose of this report is to outline the required municipal services, including water supply, stormwater management and wastewater disposal, needed to support the redevelopment of the subject property. The property is approximately 1.19 hectares in area and is currently identified as 2851 Baycrest Drive.

The site is bound by future Herongate Developments phases to the west and south (previously existing residential developments have recently been demolished), Heron Road to the north, and Sandalwood Drive to the east.

This Site Servicing Study, which also includes the Stormwater Management Plan, Watermain Analysis and Erosion and Sedimentation Control Plans, is being completed in support of the Site Plan Application.

1.2 Subject Site

Hazelview Investments proposes to construct 3 residential towers, two at 7 stories and one at 6 stories with a total of 305 dwelling units. The proposed development also includes a common underground parking structure linking the three tower and spanning the full extent of the site limits. Vehicular access to the site will be from a new private drive linking Baycrest and Sandalwood Drives along the south limit of the site.

The site currently consists of vacant land. All existing structures within the subject property have been previously demolished to facilitate the proposed development.

1.3 Previous Studies

In May 2021 Hazelview Investments completed a Functional Servicing and Stormwater Management Report (FSR) for their Herongate Community. The subject lands of this report are identified as building 2 on the FSR. It should be noted that the lands subject of this report represents 50% of the total area of the Building 2 area of the FSR. Notes from the FSR will be included in each of the following water, sanitary and storm servicing sections within this report. In general, the recommendations contained within this report follow the recommendations of the approved FSR.

2 WATER DISTRIBUTION

2.1 Existing Conditions

Adjacent to the site there is an existing 305 mm diameter cast iron watermain, located within the Heron Road right of way and a 203 mm diameter cast iron watermain in the Sandalwood Drive right of way. These watermains fall within the City of Ottawa's pressure zone 2W2C which will provide the water supply to the site. The boundary conditions received from the City are included in **Appendix A**.

2.2 Design Criteria

2.2.1 Water Demands

The proposed development plan includes 305 residential units. The population for apartment buildings is assumed at 1.8 persons per unit as found in Table 4.1 of the Design Guidelines. Per unit population density and consumption rates are taken from Tables 4.1 and 4.2 at the Ottawa Design Guidelines – Water Distribution and are summarized as follows:

- Residential Average Day Demand 280 l/cap/day
- Residential Peak Daily Demand 700 l/cap/day
- Residential Peak Hour Demand 1540 l/cap/day

A watermain demand calculation sheet is included in **Appendix A** and the total water demands are summarized as follows:

	<u>Subject Site</u>
Average Day	1.78 l/s
Maximum Day	4.45 l/s
Peak Hour	9.79 l/s

The watermain demand calculation was forwarded to the city to determine the boundary conditions at the site, copy of the boundary conditions is included in **Appendix A** and summarized below.

	Sandalwood Connection
Minimum HGL	123.9
Maximum HGL	130.9
Max Day + FireFlow (233.3 L/s)	111.2
Max Day + FireFlow (216.7 L/s)	113.2

2.2.2 System Pressure

The Ottawa Design Guidelines – Water Distribution (WDG001), July 2010, City of Ottawa, Clause 4.2.2 states that the preferred practice for design of a new distribution system is to have normal operating pressures range between 345 kPa (50 psi) and 480 kPa (80 psi) under maximum daily flow conditions. Other pressure criteria identified in Clause 4.2.2 of the guidelines are as follows:

Minimum Pressure	Minimum system pressure under peak hour demand conditions shall not be less than 276 kPa (40 psi)
Fire Flow	During the period of maximum day demand, the system pressure shall not be less than 140 kPa (20 psi) during a fire flow event.
Maximum Pressure	In accordance with the Ontario Building/Plumbing Code, the maximum pressure should not exceed 552 kPa (80 psi). Pressure reduction controls will be required for buildings where it is not possible/feasible to maintain the system pressure below 552 kPa.

2.2.3 Fire Flow Rates

A calculation using the Fire Underwriting Survey (FUS) method was conducted on the largest building (Building A) to determine the fire flow requirement for the site. The building is considered non-combustible construction. Results of the analysis provides a maximum fire flow rate of 14,000 l/min or 233.3 l/s. A copy of the FUS calculation is included in **Appendix A**.

2.3 Proposed Water Plan

To service the property twin 200mm dia water services are proposed, both connections are proposed to the 203 mm watermain located within the Sandalwood Drive ROW. A new valve box separating the twin services is also proposed, see site servicing plan 135142-C-001 in **Appendix D**. The proposed 200mm dia services will provide adequate supply to the building to meet demands while twining the service will provide service redundancy for this building.

With 2 AA hydrants within 75m of the building the minimum number of hydrants, and another within 150m, the capacity needed to deliver the required fire flow to the structure is being provided in accordance with Technical Bulletin ISTB-2018-02 dated March 21, 2018. Furthermore, the fire dept. connection is located within 45m of a hydrant which is located on Heron Road at the north property line, as such a new hydrant is not needed.

BUILDING ID	FIRE FLOW DEMAND (L/MIN)	FIRE HYDRANT(S) WITHIN 75M (5,700 L/MIN)	FIRE HYDRANT(S) WITHIN 150M (3,800 L/MIN)	COMBINED FIRE FLOW (L/MIN)
HG-5	14,000	2	1	15,200

In order to be within range of the Siamese connection for Building B, a hydrant is proposed off of Sandalwood Drive. Despite the long lead, using the provided boundary conditions, there is enough pressure in the system to support this hydrant.

For the purposes of this report, assuming a minimal loss within the service connection the pressures within the site can be estimated as follows:

Minimum Pressure (Peak Hour) – The minimum peak hour pressure on the site can be estimated as HGL 123.9.7m – meter elevation of 90.5m = 33.4m or 327.7 kPa which exceeds the minimum requirement of 276 kPa. The pressure on the top floor can be estimated as 123.9m – 109.72m = 14.18m or 139.1 KPa which is below the minimum of 276 kPa and will require a water pump.

Fire Flow – The max day plus fire flow can be estimated as HGL 111.2 – ground floor elevation plus 0.4m 94.1 = 17.1m or 167.8 KPa which exceeds the minimum of 140kPa.

Max HGL (High Pressure Check) – The high-pressure check can be estimated as HGL 130.9 – (lowest level) 89.3 = 41.6m or 408.1 KPa which is below the maximum of 552 kPa, therefore a pressure reducing valve is not required.

The above results indicate the municipal infrastructure can support the proposed development.

3 WASTEWATER

3.1 Existing Conditions

Adjacent to the site is a 300mm concrete sanitary sewer located in the Heron Road ROW draining eastward. Additionally, there is a 250mm concrete sanitary sewer located in the Sandalwood Drive ROW draining southward. In keeping with the FSR prepared by DSEL all sanitary flows from the subject site will be directed to the Heron Road sanitary sewer. The boundary conditions set out by the FSR prepared by DSEL are included in **Appendix B**.

3.2 Design Criteria

The sanitary sewers for the subject site will be based on the City of Ottawa design criteria. It should be noted that the sanitary sewer design for this study incorporates the latest City of Ottawa design parameters identified in Technical Bulletin ISTB-2018-01. Some of the key criteria will include the following:

- Commercial/Institutional flow 28,000 l/ha/d
- Residential flow 280 l/c/d
- Peaking factor 1.5 if ICI in contributing area >20%
1.0 if ICI in contributing area <20%
- Infiltration allowance 0.33 l/s/ha
- Velocities 0.60 m/s min. to 3.0 m/s max.

Given the above criteria, total wastewater flow from the proposed development will be 6.48 l/s. The detailed sanitary sewer calculations are included in **Appendix B**. The detailed design peak flow noted above is less than the peak flow identified in the FSR and is therefore in keeping with the approved report.

3.3 Recommended Wastewater Plan

A 200mm dia sanitary service lateral is proposed to connect to the existing sanitary sewer in Heron Road to service this site. Please refer to the site servicing plan 135142-C-001 in **Appendix D** for connection location details. The sanitary sewer design sheet can also be found in **Appendix B**.

A second sanitary service lateral will be needed for the next phase as it is not possible to drain future buildings by gravity to Heron Road through proposed sanitary service (refer to Mechanical engineer's comments in **Appendix E**).

4 STORMWATER SYSTEM

4.1 Existing Conditions

Currently adjacent to the site is are two 750mm concrete storm sewers located in the Heron Road ROW and a 300mm concrete storm sewer located in the Sandalwood Drive ROW.

Further to the east within the Baycrest Drive ROW is a 450mm concrete storm sewer, the FSR has identified this sewer as the outlet for the subject lands.

4.2 Design Criteria

The approved FSR has established target release rates for the subject blocks of development. As noted above, the current application represents a fraction of the FSR Block 2 lands, as such the release rate for Block 2 will be taken at a pro-rated amount for the subject application.

FSR Block 2 100 Year Release Rate = 223.54 l/sec

Heron Gate 5 Phase Limits include 1.51 ha out of Block 2's 2.67 ha = 56.6%

Taken at 56.6% for subject application - 100 year release rate = 126.42 l/sec

The stormwater system was designed following the principles of dual drainage, making accommodations for both major and minor flow.

Some of the key criteria include the following:

- Design Storm
 - 1:2 year return (Ottawa)
 - 1:100 year return (External Areas)
- Rational Method Sewer Sizing
- Initial Time of Concentration
 - 10 minutes
- Runoff Coefficients
 - Landscaped Areas
 - C = 0.20
 - Asphalt/Concrete
 - C = 0.90
 - Roof
 - C = 0.90
- Pipe Velocities
 - 0.80 m/s to 6.0 m/s
- Minimum Pipe Size
 - 250 mm diameter
(200 mm CB Leads)

4.3 Proposed Minor System

Using the above-noted criteria, the proposed storm service lateral was sized accordingly. A conceptual storm sewer design sheet is included in **Appendix C**, while the associated conceptual storm sewer drainage area plan is included in **Appendix D**. Runoff coefficients for each storm drainage area were calculated individually by surface area and calculations can be found in **Appendix C**. The detailed design for this site shows a storm sewer connection through the proposed private road to the storm sewer at Baycrest Drive as noted in section 4.1.

A cistern, situated in the parking garage, has been sized to support stormwater retention. The cistern will be equipped with duplex storm pumps to control the flow rate of the storm water runoff

from the site directed to the municipal storm sewer system. The pumps will discharge to a storm sewer lateral which will also service as an outlet for the building foundation drain.

4.4 Stormwater Management

The subject site will be limited to a release rate established using the criteria described in section 4.2. This will be achieved through rooftop flow control devices, an inlet control device (ICD) at the outlet of the cistern, underground sewers, and an ICD at the outlet of MH102.

Flows generated that are in excess of the site's allowable release rate will be stored on road sags outside of the building garage footprint, within underground pipe storage, and within the building via rooftop storage and a cistern located at the parking garage structure for flows from on top of the building/garage areas.

At certain locations within the site, the opportunity to store runoff is limited due to grading constraints and building geometry. These locations are generally located at the perimeter of the site where it is necessary to tie into public boulevards and adjacent properties, and it is not always feasible to capture or store stormwater runoff.

In this case, a portion of the building frontage at the Heron Road and Sandalwood Drive intersection will discharge uncontrolled to the street CBs. This uncontrolled area, 0.23 hectares in total, have a C value of 0.66. Based on 1:100 year storm uncontrolled flows, the uncontrolled areas generate 75.35 l/s runoff (refer to Section 4.5 for calculation). The cistern/rooftops and underground pipe storage have been sized to control water generated during the 1:100-year event, with no overflow leaving the site. Please refer to the SWM calculations in **Appendix C**.

4.5 Inlet Controls

The allowable release rate for the 1.51 Ha site as established in section 4.2 is

$$Q_{\text{allowable}} = 126.42 \text{ L/sec}$$

As noted in Section 4.4, a portion of the site will be left to discharge to the surrounding boulevard at an uncontrolled rate.

Based on a 1:100 year event, the flow from the 0.23 Ha uncontrolled areas can be determined as:

$$Q_{\text{uncontrolled}} = 2.78 \times C \times i_{100\text{yr}} \times A \quad \text{where:}$$

$$C = \text{Average runoff coefficient of uncontrolled area} = 0.66$$

$$i_{100\text{yr}} = \text{Intensity of 100-year storm event (mm/hr)}$$

$$= 1735.688 \times (T_c + 6.014)^{0.820} = 178.56 \text{ mm/hr; where } T_c = 10 \text{ minutes}$$

$$A = \text{Uncontrolled Area} = 0.23 \text{ Ha}$$

Therefore, the uncontrolled release rate can be determined as:

$$Q_{\text{uncontrolled}} = 2.78 \times C \times i_{100\text{yr}} \times A$$

$$= 2.78 \times 0.66 \times 178.56 \times 0.23$$

$$= 75.35 \text{ L/s}$$

The maximum allowable release rate from the remainder of the site can then be determined as:

$$\begin{aligned}
 Q_{\text{max allowable}} &= Q_{\text{restricted}} - Q_{\text{uncontrolled}} \\
 &= 126.42 \text{ L/s} - 75.35 \text{ L/s} \\
 &= \mathbf{51.07 \text{ L/s}}
 \end{aligned}$$

4.6 On-Site Detention

As noted in section 4.4 any excess storm water up to the 100-year event is to be stored on-site on rooftops and within the building cistern in order to not surcharge the downstream municipal storm sewer system. As the roofs and cistern are located inside the building, coordination with the architect, structural and mechanical engineers will be needed to design the structure and associated pump release rate.

The architect and mechanical engineer have provided the usable rooftop storage area as well as a release rate of 20GPM per each roof (see correspondence in **Appendix E**). Water that has accumulated on the rooftops will be released into the cistern. A structural engineer has not yet been retained, but it is anticipated that the ultimate structural design will accommodate this level of retention. A cross-section of the cistern has been provided by the mechanical engineer and can be found in **Appendix E**.

The roof of Building A will have 11,026 sqft (0.1024 Ha) of usable area to collect and hold water, as well as four drains that restrict flow to 5 GPM each for a total release rate to the cistern of 20 GPM (1.26 L/s). Based on the 100-yr event, the peak volume for Rooftop A was determined as 60m³ (refer to calculations in **Appendix D**). The same exercise was repeated for Rooftops B and C and their peak 100-yr storm event volumes were determined as 90m³ and 94m³, respectively.

The peak flow for the remainder of the cistern catchment (ie the rainfall that would not fall on the capturable area of the rooftops and outside the building envelope) was calculated separately. A series of area drains will capture runoff before it leaves the catchment area. The release rate from the rooftops (1.26 L/s x 3) was added to the peak flow to determine the maximum volume that would be required to contain a 100-yr storm event at a release rate of 15 L/s. This volume was determined to be 298.2m³. Currently, the cistern has been sized to retain 318m³ (see correspondence in **Appendix E**), therefore, it can be accommodated if the future structural design requires a higher release rate from the rooftops to the cistern.

In addition, further storage is required downstream in the private road area. There is 77.61m³ of surface ponding available as well as an oversized underground sewer system that has been sized to store a further 32.63 m³ during a storm event. The underground storage will have an ICD to limit the release rate to 36 L/s. Calculations for the underground storage can be found in **Appendix C**, while location and sizing can be found on the servicing plan in **Appendix D**.

4.6.1 Site Inlet Control

The following Table summarizes the on-site storage requirements during both the 1:5-year and 1:100-year events.

ICD AREA	TRIBUTARY AREA	AVAILABLE STORAGE (M ³)	100-YEAR STORM		5-YEAR STORM	
			RESTRICTED FLOW (L/S)	REQUIRED STORAGE (M ³)	RESTRICTED FLOW (L/S)	REQUIRED STORAGE (M ³)
Cistern/Roof	0.98	562.00	15	541.29	15	210.00
Private Drive	0.30	110.24	36	92.39	36	29.18
TOTAL	1.28	672.24	51	633.68	51	239.18

In all instances the required storage is met. The cistern will be fitted with a mechanical constant flow pump set to release at 15 litres/second regardless of the elevation of the cistern. Detailed stormwater management calculations are included in **Appendix C**. ICD orifice calculation can also be found in **Appendix C**. Rooftop drain specification sheet can be found in **Appendix E**.

4.6.2 Overall Release Rate

As demonstrated above, the site uses an inlet control device and a flowrate-limited pump to restrict the 100 year storm event to the criteria approved by the City of Ottawa. Restricted stormwater will be contained onsite by surface ponding in the private drive, underground storage, rooftop storage and the building cistern. In the 100 year event, there will be no overflow off-site from restricted areas.

The sum of restrictions on the site is 51.0 l/s, which is less than the allowable release of 51.07 l/s noted in section 4.5.

5 SEDIMENT AND EROSION CONTROL PLAN

During construction, existing storm water conveyance systems can be exposed to significant sediment loadings. A number of construction techniques designed to reduce unnecessary construction sediment loadings may be used such as;

- Filter socks will remain on open surface structures such as manholes and catchbasins until these structures are commissioned and put into use;
- Installation of silt fence, where applicable, around the perimeter of the proposed work area.

During construction of the services, any trench dewatering using pumps will be fitted with a “filter sock.” Thus, any pumped groundwater will be filtered prior to release to the existing surface runoff. The contractor will inspect and maintain the filter sock as needed including sediment removal and disposal.

All catchbasins, and to a lesser degree manholes, convey surface water to sewers. Consequently, until the surrounding surface has been completed these structures will be protected with a sediment capture filter sock to prevent sediment from entering the minor storm sewer system. These will stay in place and be maintained during construction and build-out until it is appropriate to remove them.

The Sediment and Erosion Control Plan 135142-C-010 is included in **Appendix D**.

6 CONCLUSIONS

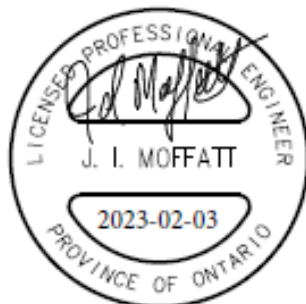
Municipal water, wastewater and stormwater systems required to accommodate the proposed development are available to service the proposed development. Prior to construction, existing sewers are to be CCTV inspected to assess sewer condition.

This report has demonstrated sanitary and storm flows from and water supply to the subject site can be accommodated by the existing infrastructure. Also, the proposed servicing has been designed in accordance with MECP and City of Ottawa current level of service requirements.

The use of lot level controls, conveyance controls and end of pipe controls outlined in the report will result in effective treatment of surface stormwater runoff from the site. Adherence to the sediment and erosion control plan during construction will minimize harmful impacts on surface water.

Based on the information provided herein, the development can be serviced to meet City of Ottawa requirements.

Report prepared by:



Jim Moffatt P. Eng.
Associate



Sam Labadie P.Eng.
Civil Engineer

Appendix A

Doug Cave

From: Sevigny, John <John.Sevigny@ottawa.ca>
Sent: Friday, April 8, 2022 10:47 AM
To: Doug Cave
Cc: Jim Moffatt; Lance Erion
Subject: RE: Heron Gate 5 - Request for Watermain Boundary Conditions
Attachments: Heron Gate 5 April 2022.pdf

Hi Doug,

Please find attached and below the requested boundary conditions.

******The following information may be passed on to the consultant, but do NOT forward this e-mail directly.******

The following are boundary conditions, HGL, for hydraulic analysis at Heron Gate 5 (zone 2W2C) assumed to be a dual connection to the 203 mm on Sandalwood Drive (see attached PDF for location).

Minimum HGL: 123.9 m

Maximum HGL: 130.9 m

Max Day + Fire Flow (233.3 L/s): 111.2 m

Max Day + Fire Flow (216.7 L/s): 113.2 m

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

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

Regards

John Sevigny, C.E.T.

Senior Project Manager

Development Review, Suburban Services | *Examen des projets d'aménagement, Services suburbains*

Planning, Real Estate and Economic Development Department | Direction générale de la planification, des biens immobiliers et du développement économique

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613.580.2424 ext./poste **14388**, fax/télé: 613-580-2576, john.sevigny@ottawa.ca

From: Doug Cave <doug.cave@ibigroup.com>

Sent: April 04, 2022 8:56 AM

To: Sevigny, John <John.Sevigny@ottawa.ca>; Lance Erion <lerion@ibigroup.com>

Cc: Jim Moffatt <jmoffatt@ibigroup.com>

Subject: RE: Heron Gate 5 - Request for Watermain Boundary Conditions

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Hi John,

Here are the location plan and servicing plan.

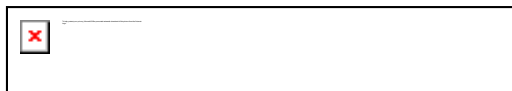
Doug

Douglas Cave, C.E.T.
(he/him/his)

Senior Project Manager

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From: Sevigny, John <John.Sevigny@ottawa.ca>
Sent: Monday, April 4, 2022 8:49 AM
To: Lance Erion <lerion@ibigroup.com>
Cc: Jim Moffatt <jmoffatt@ibigroup.com>; Doug Cave <doug.cave@ibigroup.com>
Subject: RE: Heron Gate 5 - Request for Watermain Boundary Conditions

Hi Lance,
I think you forgot to attached the general plan of services with the connection location. Can you please send it to me?
Thanks.

John Sevigny, C.E.T.
Senior Project Manager
Development Review, Suburban Services | *Examen des projets d'aménagement, Services suburbains*
Planning, Real Estate and Economic Development Department | Direction générale de la planification, des biens immobiliers et du développement économique
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613.580.2424 ext./poste **14388**, fax/téléc:613-580-2576, john.sevigny@ottawa.ca

From: Lance Erion <lerion@IBIGroup.com>
Sent: April 01, 2022 3:46 PM
To: Sevigny, John <John.Sevigny@ottawa.ca>
Cc: Jim Moffatt <jmoffatt@ibigroup.com>; Doug Cave <doug.cave@ibigroup.com>
Subject: Heron Gate 5 - Request for Watermain Boundary Conditions

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Good afternoon, we are requesting watermain hydraulic boundary conditions for the proposed residential development located at the southeast corner of Heron Road and Sandalwood Drive. As shown on the attached general plan of services a water connection to the complex of three buildings is proposed off of the Sandalwood Drive main. Water demands for the 303 unit development is as follows

Basic Day	1.77 l/s
Max Day	4.42
Peak Hour	9.72 l/s

Fire flow requirements have been calculated using the FUS method with Building A and B having a 14,000 l/min requirement and Building C with 13,000 l/min.

Copies of the water demand and FUS calculations are attached. Please let us know if you have any questions or require further information.

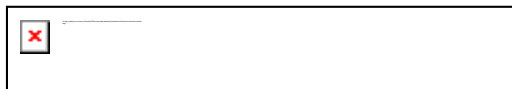
Thank you

Lance Erion P.ENG

Associate

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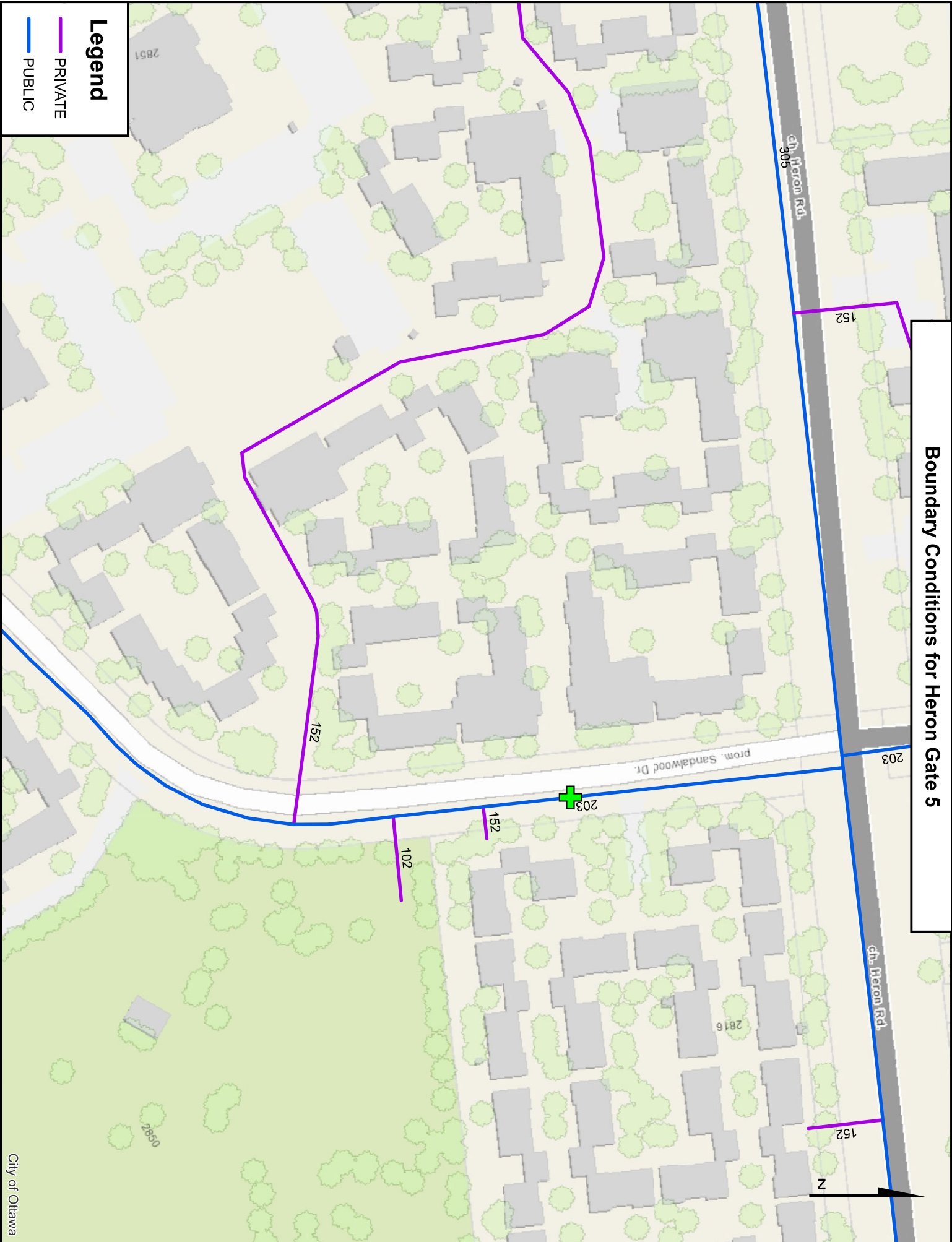
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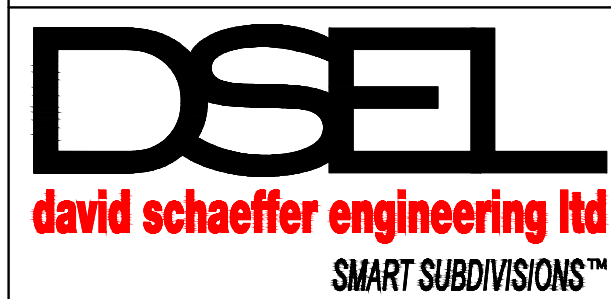
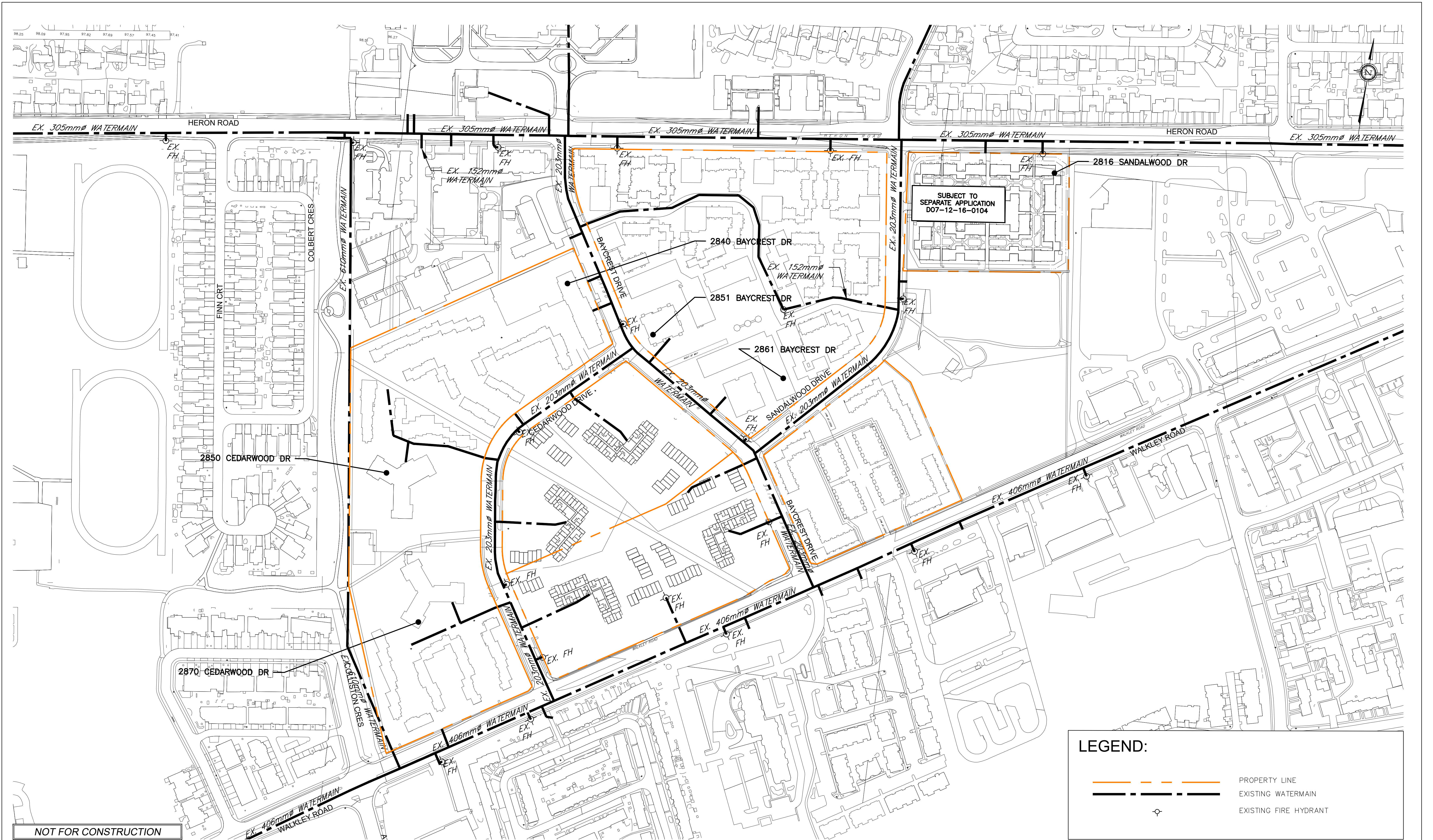
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Boundary Conditions for Heron Gate 5



Legend

- PRIVATE
- PUBLIC



120 Iber Road Unit 103
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www.DSEL.ca

HERON GATE COMMUNITY EXISTING WATER SERVICING

PROJ NO.:	18-1080
DRAWN BY:	AWT
DATE:	2021-05-07
SCALE:	1:1500
FIGURE NO.:	EX-WTR



IBI GROUP
333 PRESTON STREET
OTTAWA, ON
K1S 5N4

WATERMAIN DEMAND CALCULATION SHEET

PROJECT : HERON GATE 5
LOCATION : 2851 BAYCREST DRIVE. OTTAWA
DEVELOPER : HAZELVIEW INVESTMENTS

FILE: 135142-6.04.04
DATE PRINTED: 12-Aug-22
DESIGN: LE
PAGE : 1 OF 1

NODE	RESIDENTIAL				NON-RESIDENTIAL			AVERAGE DAILY DEMAND (l/s)			MAXIMUM DAILY DEMAND (l/s)			MAXIMUM HOURLY DEMAND (l/s)			FIRE DEMAND
	UNITS			POP'N	INDTRL	COMM.	INST.	Res.	Non-res.	Total	Res.	Non-res.	Total	Res.	Non-res.	Total	(l/min)
	SF	SD & TH	APT		(ha.)	(ha.)	(ha.)										
BLDG A			105	189				0.61	0.00	0.61	1.53	0.00	1.53	3.37	0.00	3.37	14,000
BLDG B			109	196				0.64	0.00	0.64	1.59	0.00	1.59	3.50	0.00	3.50	14,000
BLDG C			91	164				0.53	0.00	0.53	1.33	0.00	1.33	2.92	0.00	2.92	13,000
TOTALS			305	549						1.78			4.45			9.79	

ASSUMPTIONS

RESIDENTIAL DENSITIES

- Single Family (SF) 3.4 p / p / u
- Semi Detached (SD) & Townhouse (TH) 2.7 p / p / u
- Apartment (APT) 1.8 p / p / u

AVG. DAILY DEMAND

- Residential 280 l / cap / day
- ICI 50.000 l / ha / day

MAX. HOURLY DEMAND

- Residential 1.540 l / cap / day
- ICI 135.000 l / ha / day

FIRE FLOW

- Refer to FUS Calculations

MAX. DAILY DEMAND

- Residential 700 l / cap / day
- 75.000 l / ha / day

Fire Flow Requirement from Fire Underwriters Survey

2851 Baycrest Drive - Building A

Total Floor Area 10,268 m²

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

C	0.8	C =	1.5 wood frame
A	10,268 m ²		1.0 ordinary
			0.8 non-combustible
F	17,834 l/min		0.6 fire-resistive
use	18,000 l/min		

Floor	Area (m ²)
1	1743
2	1718
3	1440
4	1440
5	1431
6	1431
7	1065
Total	10268

Occupancy Adjustment

		-25% non-combustible
		-15% limited combustible
Use	-15%	0% combustible
		+15% free burning
Adjustment	-2700 l/min	+25% rapid burning
Fire flow	15,300 l/min	

Sprinkler Adjustment

		-30% system conforming to NFPA 13
		-50% complete automatic system
Use	-30%	
Adjustment	-4590 l/min	

Exposure Adjustment

Building Face	Separation (m)	Adjacent Exposed Wall			Exposure Charge *
		Length	Stories	L*H Factor	
north	> 45				0%
east	25	22	5	110	9%
south	>45				0%
west	23	25	7	175	10%

Total 19%

Adjustment 2,907 l/min

Total adjustments (1,683) l/min

Fire flow 13,617 l/min

Use 14,000 l/min
233 l/s

2851 Baycrest Drive - Building B

Floor	Area (m ²)
1	1498
2	1587
3	1602
4	1602
5	1481
6	1481
7	1481
Total	10732

Total Floor Area	10,732 m ²
------------------	-----------------------

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

C	0.8	C =	1.5 wood frame
A	10,732 m ²		1.0 ordinary
			0.8 non-combustible
F	18,233 l/min		0.6 fire-resistive
use	18,000 l/min		

Occupancy Adjustment

<u>Occupancy Adjustment</u>		-25% non-combustible
		-15% limited combustible
Use	-15%	0% combustible
		+15% free burning
Adjustment	-2700 l/min	+25% rapid burning
Fire flow	15,300 l/min	

Sprinkler Adjustment

<u>Sprinkler Adjustment</u>	-30% system conforming to NFPA 13
	-50% complete automatic system
Use	-30%
Adjustment	-4590 l/min

Exposure Adjustment

Building Face	Separation (m)	Adjacent Exposed Wall			Exposure Charge *
		Length	Stories	*H Factor	
north	23	75	6	450	10%
east	23	50	7	350	10%
south	> 45				0%
west	> 45				0%

Total	20%
-------	-----

Adjustment 3,060 l/min

Total adjustments (1,530) l/min

Fire flow	13,770 l/min
-----------	--------------

Use	14,000 l/min
	233 l/s

Fire Flow Requirement from Fire Underwriters Survey

2851 Baycrest Drive - Building C

Floor	Area (m ²)
1	1503
2	1511
3	1563
4	1563
5	1546
6	1546
Total	9232

Total Floor Area 9,232 m²

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

C	0.8	C =	1.5 wood frame
A	9,232 m ²		1.0 ordinary
			0.8 non-combustible
F	16,911 l/min		0.6 fire-resistive
use	17,000 l/min		

Occupancy Adjustment

		-25% non-combustible
		-15% limited combustible
Use	-15%	0% combustible
		+15% free burning
Adjustment	-2550 l/min	+25% rapid burning
Fire flow	14,450 l/min	

Sprinkler Adjustment

		-30% system conforming to NFPA 13
		-50% complete automatic system
Use	-30%	
Adjustment	-4335 l/min	

Exposure Adjustment

Building Face	Separation (m)	Adjacent Exposed Wall			Exposure Charge *
		Length	Stories	L*H Factor	
north	> 45				0%
east	21	21	7	147	10%
south	23	71	7	497	10%
west	> 45				0%

Total 20%

Adjustment 2,890 l/min

Total adjustments (1,445) l/min

Fire flow 13,005 l/min

Use 13,000 l/min

217 l/s

Appendix B

4.2.1 Wastewater Design – Phase I

The proposed Phase I development includes the construction of Block 1. As indicated by the Site Servicing Report (**Block 1 Servicing Report**), prepared by MMM Group and dated March 2017, the Block 1 development is proposed to be serviced via the existing 300 mm diameter sanitary sewer within the Heron Road right-of-way. The peak wet weather flow rate for the Block 1 development was estimated to be **10.75 L/s**. Refer to **Drawings/Figures** for drawing **SAN-1** for the Phase I sanitary servicing layout.

Phase 1 also included the removal of the existing townhomes contained within the existing Block 2 and Block 3 area. It is anticipated that these blocks are currently served by the existing sanitary sewers within Cedarwood and Baycrest avenue, ultimately tributary to Walkley road. Based on the removal it is estimated that Phase I will increase to the available capacity within Walkley Road by **2.58 L/s** increasing the available capacity to **22.58 L/s**.

4.2.2 Wastewater Design – Phase II

The contemplated Phase II development includes the construction of Block 2. It is contemplated that Block 2 will be serviced via the existing 300 mm diameter sanitary sewer within the Heron Road right-of-way. As indicated by **Table 10**, below, the estimated peak wet weather flow rate for Block 2 is **12.65 L/s**. Refer to **Appendix C** for detailed calculations and **Drawings/Figures** for drawing **SAN-2** for the Phase II sanitary servicing layout.

It is anticipated that no modifications to the existing sanitary sewers within Baycrest Drive, Cedarwood Drive, Sandalwood Drive, Heron Road, and Walkley Road will be required to support the Phase II development. The apartment buildings to be retained will continue to be serviced via the sanitary sewers within Baycrest Drive and Cedarwood Drive, which are ultimately tributary to the Walkley Road sanitary sewer. The estimated available capacity in Heron road is **13.34 L/s** once Phase II is completed.

Table 10, below, demonstrates the anticipated peak flow from the Phase II development. See **Appendix C** for associated calculations.

Table 10
Summary of Estimated Peak Wastewater Flow – Phase II

Development Block	Outlet	Design Parameter		
		Estimated Average Dry Weather Flow (L/s)	Estimated Peak Dry Weather Flow (L/s)	Estimated Peak Wet Weather Flow (L/s)
Block 1*	Heron Road	-	-	10.75
Block 2	Heron Road	4.74	11.76	12.65
Total Remaining Capacity	Heron Road	-	-	13.34
Total Existing Site Flow	Walkley Road			39.51
Total Remaining Capacity	Walkley Road	-	-	22.21

*As indicated by the *Block 1 Servicing Report* prepared by MMM Group Limited

As summarized by **Table 10**, above, the total estimated sanitary flow, based on the Concept Plan provided in **Drawings/Figures**, anticipates a peak wet weather flow of **23.4 L/s** to the Heron Road sanitary sewer. Based on consultation with City staff, the available capacity within the Heron Road sanitary sewer is **35 L/s**; the residual capacity after the Phase II development is estimated to be **13.34 L/s**.

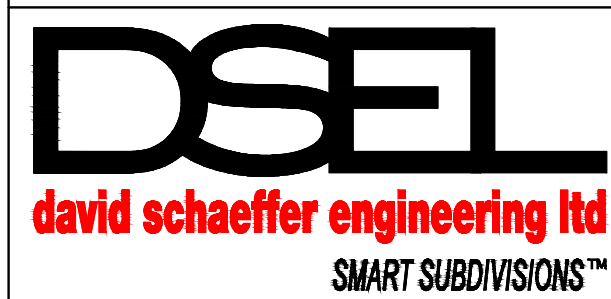
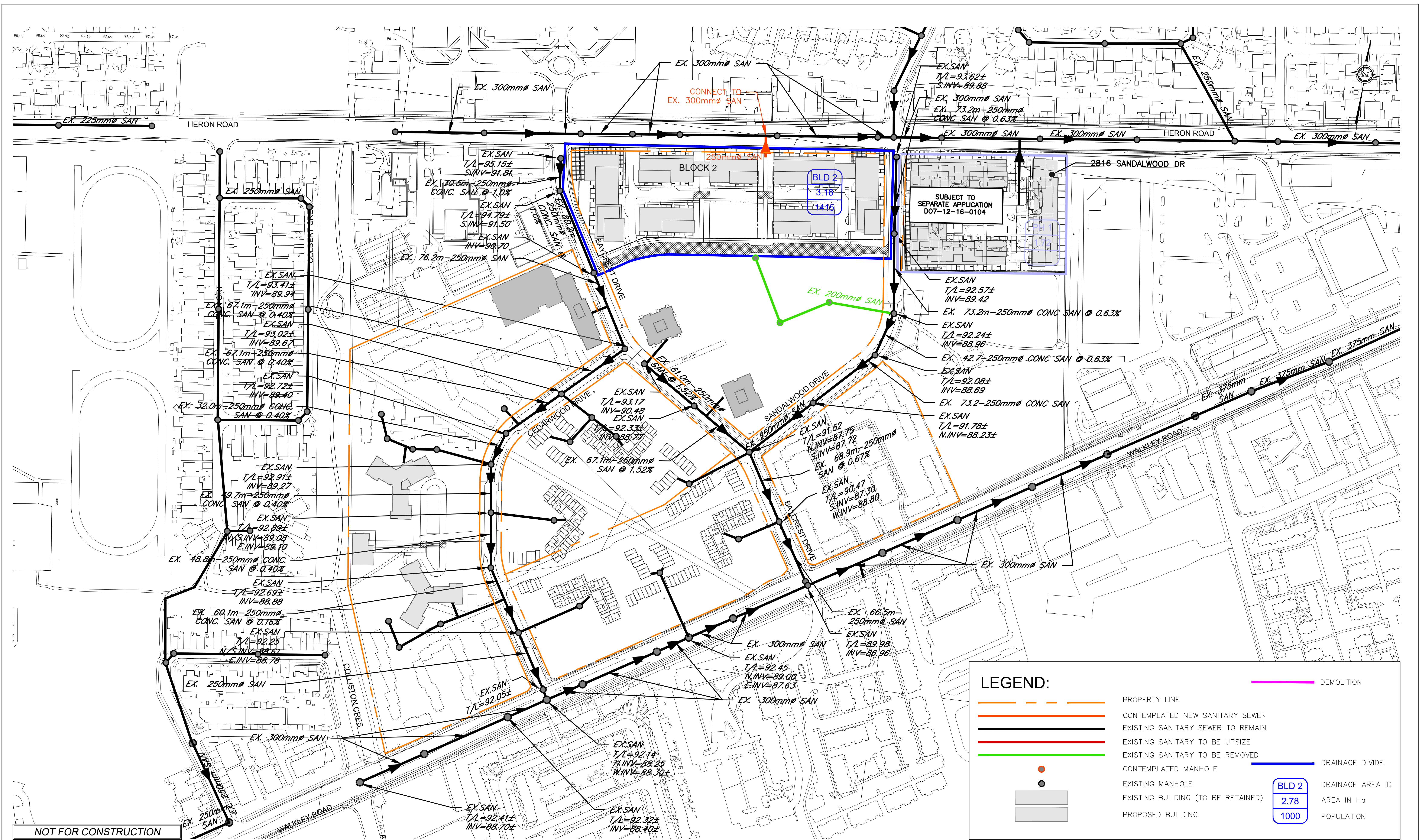
As summarized by **Table 10**, above, the total estimated peak wet weather sanitary flow tributary to the existing sanitary sewer within Walkley Road is **39.51 L/s**. Based on consultation with City staff, the available capacity within the Walkley Road is **62.09 L/s**; the residual capacity after the Phase II development is estimated to be **22.21 L/s**.

4.2.3 Wastewater Design – Phase III

The contemplated Phase III development includes the construction of Block 3. It is contemplated that Block 3 will be serviced via the existing 250 mm diameter sanitary sewer within the Sandalwood Drive right-of-way. As indicated by **Table 11**, below, the estimated peak wet weather flow rate for Block 3 is **15.26 L/s**. Refer to **Appendix C** for detailed calculations and **Drawings/Figures** for drawing **SAN-3** for the Phase III sanitary servicing layout.

The contemplated Phase III development includes the construction of Block 5 Townhomes. It is contemplated that Block 5 townhomes will be serviced via the existing 250 mm diameter sanitary sewer within the Cedarwood Drive right-of-way. As indicated by **Table 11**, below, the estimated peak dry weather flow rate for Block 5 Townhomes is **0.98 L/s**.

The contemplated Phase III development includes the removal of the Block 9 Townhomes. It is contemplated that Block 9 is serviced via the existing 250 mm diameter sanitary sewer within the Baycrest Drive right-of-way. As indicated by **Table 11**, below, the estimated peak domestic flow rate for existing Block 9 is **1.50 L/s**.



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HERON GATE COMMUNITY SANITARY SERVICING - PHASE 2

PROJ NO.:	18-1080
DRAWN BY:	AWT
DATE:	2021-05-07
SCALE:	1:1500
FIGURE NO.:	SAN-2



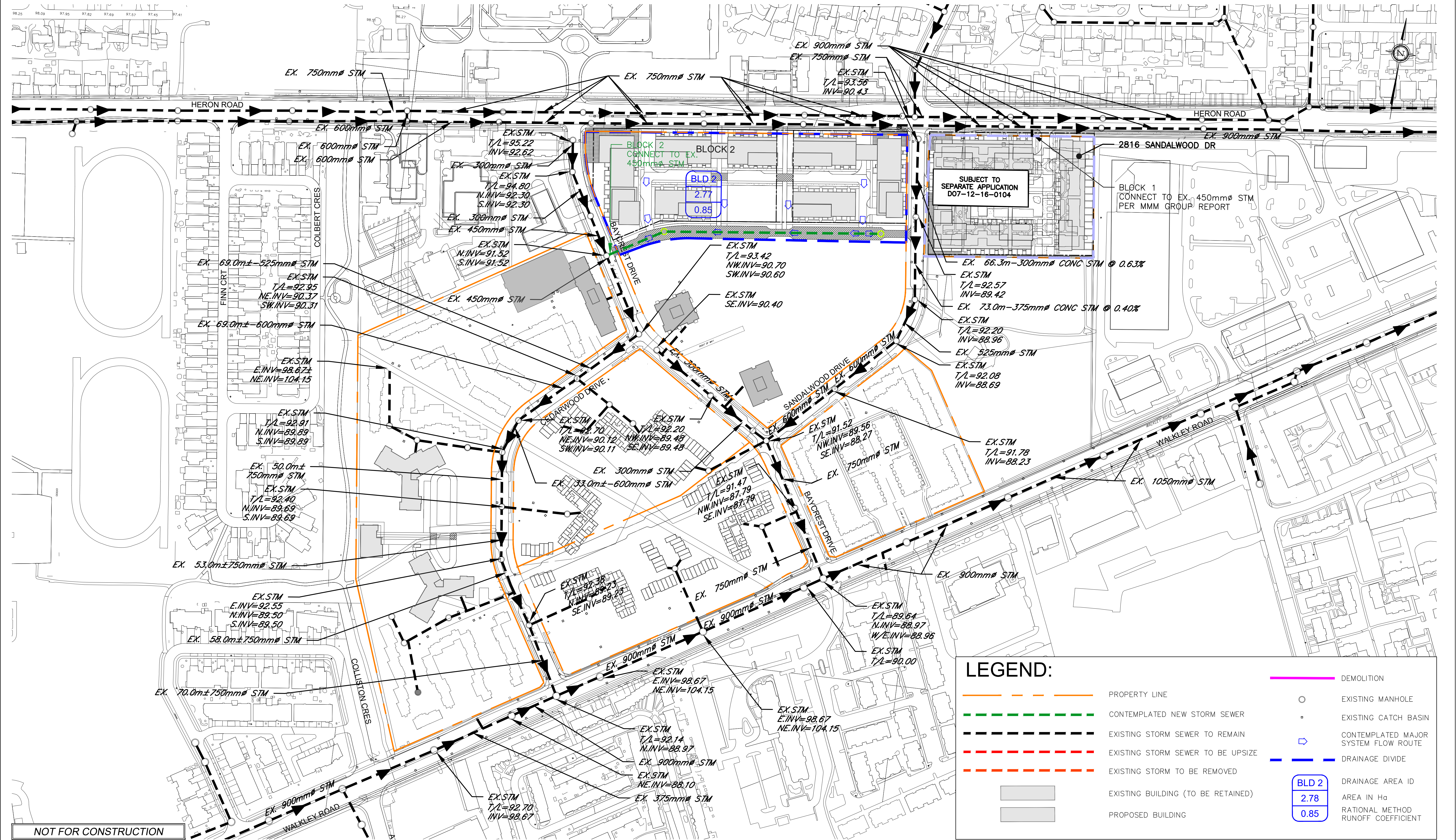
IBI GROUP
400-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

SANITARY SEWER DESIGN SHEET

Herongate Phase 5
CITY OF OTTAWA
Hazelview Investments

LOCATION				RESIDENTIAL								ICI AREAS										INFILTRATION ALLOWANCE			FIXED FLOW (L/s)		TOTAL FLOW	CAPACITY	LENGTH	PROPOSED SEWER DESIGN				AVAILABLE CAPACITY					
STREET	AREA ID	FROM MH	TO MH	AREA w/ Units (Ha)	UNIT TYPES				AREA w/o Units (Ha)	POPULATION		RES PEAK FACTOR	PEAK FLOW (L/s)	AREA (Ha)				ICI PEAK FACTOR	PEAK FLOW (L/s)	AREA (Ha)		FLOW (L/s)	IND	CUM	IND	CUM	IND	CUM	(L/s)	IND	CUM	(L/s)	(L/s)	(m)	DIA (mm)	SLOPE (%)	VELOCITY (full) (m/s)	L/s	(%)
					SF	SD	TH	APT		IND	CUM			IND	CUM	IND	CUM			IND	CUM																	IND	CUM
2851 Baycrest Drive		BLDG	MH1A	1.51				305		549.0	549.0	3.36	5.98			0.00	0.00					1.51	1.51	0.50					6.48	66.53	4.35	250	1.15	1.313	60.05	90.26%			
2851 Baycrest Drive		MH1A	MH99A							0.0	549.0	3.36	5.98			0.00	0.00					0.00	1.51	0.50					6.48	62.04	16.20	250	1.00	1.224	55.56	89.55%			
Design Parameters:				Notes:								Designed:				No.	Revision										Date												
Residential				1. Mannings coefficient (n) = 0.013								SEL				1.	Issued for Site Plan Application										2021-12-23												
				2. Demand (per capita): 280 L/day 200 L/day												2.	Revised per Client Comments										2022-08-12												
				3. Infiltration allowance: 0.33 L/s/Ha								Checked:				3.	Revised per City Comments										2022-09-28												
				4. Residential Peaking Factor: Harmon Formula = 1+(14/(4+(P/1000)^0.5))0.8 where K = 0.8 Correction Factor								JIM				4.	Revised to add MH99A										2023-01-19												
				5. Commercial and Institutional Peak Factors based on total area, 1.5 if greater than 20%, otherwise 1.0								Dwg. Reference:				File Reference:										Date:													
												135142-C-001				135142.6.04										2023-01-19							Sheet No:						
																										1 of 1													

Appendix C



HERON GATE COMMUNITY STORM SERVICING - PHASE 2

STORMWATER MANAGEMENT

Formulas and Descriptions

$I_{tp} = 1.2 \text{ year Intensity} = 732.951 / (T+6.199)^{0.22}$
 $I_{tp} = 1.5 \text{ year Intensity} = 998.071 / (T+6.053)^{0.14}$
 $I_{tp} = 1.100 \text{ year Intensity} = 1735.668 / (T+6.014)^{0.05}$
 $T_c = \text{Time of Concentration (min)}$
 $C = \text{Average Runoff Coefficient}$
 $A = \text{Area (Ha)}$
 $Q = \text{Flow} = 2.78CIA \text{ (L/s)}$

Maximum Allowable Release Rate

Flow Allocation

Taken from Functional Servicing and Stormwater Report Table 11

100 Year Flow Block 2 223.54 L/sec
Area of subject application 56.554% of FSR block 2 (1.51 ha out of 2.67 ha)

$Q_{TOTAL} = 126.42 \text{ L/s}$

Uncontrolled Release ($Q_{uncontrolled} = 2.78C^2I_{tp}A_{uncontrolled}$)

$C = 0.66$
 $T_c = 10 \text{ min}$
 $I_{tp} = 178.56 \text{ mm/hr}$
 $A_{uncontrolled} = 0.23 \text{ Ha}$

$Q_{uncontrolled} = 75.35 \text{ L/s}$

Maximum Allowable Release Rate ($Q_{max \text{ allowable}} = Q_{uncontrolled} - Q_{uncontrolled}$)

$Q_{max \text{ allowable}} = 51.07 \text{ L/s}$

MODIFIED RATIONAL METHOD (100-Year & 5-Year Ponding)

Drainage Area									
Roof of Building A									
Area (Ha)		0.1024		11026 sqft					
C =		1.00		Restricted Flow Q _r (L/s) = 1.260					
100-Year Ponding									
T _c Variable (min)	I _{tp} (mm/hour)	Peak Flow Q _p +2.78C _r I _{tp} A (L/s)	Q _r (L/s)	Q _p -Q _r (L/s)	Volume 100yr (m ³)	100YRQp 20% (L/s)	Q _p - Q _r (L/s)	Volume 100+20 (m ³)	
197	22.25	6.33	1.26	5.07	59.97				
199	22.07	6.26	1.26	5.02	59.97				
200	21.98	6.23	1.26	5.00	59.97	7.51	6.25	74.99	
201	21.90	6.23	1.26	4.97	59.97				
203	21.72	6.18	1.26	4.92	59.97				
Storage (m ³)									
Overflow		Required	Roof	Cistern	Balance	Overflow	Required	Balance	
0.00		59.97	60.00	318.00	0.00	0.00	74.99	0.00	
Depth on Roof (m) 0.059									

Drainage Area									
Roof of Building B									
Area (Ha)	0.1411	15177 sqft							
C =	1.00	Restricted Flow Q _r (L/s) = 1.260						1200 GPM	
100-Year Ponding									
T _c Variable (min)	I _{tp} (mm/hour)	Peark Flow Q _p +2.78C _r I _{tp} A (L/s)	Q _r (L/s)	Q _p -Q _r (L/s)	Volume 100yr (m ³)	100YRQp 20% (L/s)	Q _p - Q _r (L/s)	Volume 100+20 (m ³)	
285	16.56	6.45	1.26	5.23	89.45				
287	16.47	6.45	1.26	5.19	89.46				
288	16.42	6.44	1.26	5.18	89.46				
289	16.38	6.42	1.26	5.16	89.46				
291	16.29	6.38	1.26	5.12	89.46				
Storage (m ³)									
Overflow	Required		Roof	Cistern	Balance	Overflow	Required	Balance	
0.00	89.46		90.00	318.00	0.00	0.00	111.70	0.00	
Depth on Roof (m) 0.064									

Drainage Area									
Roof of Building C									
Area (Ha)	0.1463	15750 sqft							
C =	1.00	Restricted Flow Q _r (L/s) = 1.260 @ GPM							
100-Year Ponding									
T _c Variable (min)	I _{tp} (mm/hour)	Peark Flow Q _p +2.78C _r I _{tp} A (L/s)	Q _r (L/s)	Q _p -Q _r (L/s)	Volume 100yr (m ³)	100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m ³)	
300	15.89	6.46	1.26	5.20	93.66				
302	15.81	6.43	1.26	5.17	93.66				
303	15.76	6.41	1.26	5.15	93.66				
304	15.72	6.39	1.26	5.13	93.66				
306	15.64	6.36	1.26	5.10	93.66				
Storage (m ³)									
Overflow	Required		Roof	Cistern	Balance	Overflow	Required	Balance	
0.00	93.66		94.00	318.00	0.00	0.00	116.97	0.00	
Depth on Roof (m) 0.064									

Drainage Area		Remainder of Cistern Catchment							
Area (Ha)	0.5903							0.98 Ha less Roof Storage Area	
C	0.68	Restricted Flow Q _r (L/s)		15.00					
100-Year Ponding									
T _c (min)	I _{tpy} (mm/hour)	Peark Flow Q _p +2.78C _r I _{tpy} A (L/s)	Peark Flow + Roof Flows Q _{pr} (L/s)	Q _r (L/s)	Q _p -Q _r (L/s)	Volume 100yr (m ³)	100YRQp 20% (L/s)	Q _p - Q _r (L/s)	Volume 100+20 (m ³)
121	32.68	52.29	66.07	15.00	41.07	298.18			
123	32.27	51.63	55.41	15.00	40.41	298.20			
124	32.06	51.30	55.08	15.00	40.08	298.20	65.34	50.34	374.53
125	31.86	50.98	54.76	15.00	39.76	298.19			
127	31.47	50.35	54.13	15.00	39.13	298.17			
Storage (m ³)									
Overflow		Required		Roof	Cistern	Balance	Overflow	Required	Balance
0.00		298.20		0.00	318.00	0.00	0.00	374.53	56.53

Drainage Area		Private Road						
Area (Ha)	0.30	ICD Restricted Flow Q _r (L/s)						
		36.00						
C =	0.98	Effective Restricted Flow Q _r (L/s)						
		18.00						
100-Year Ponding								
T _c Variable (min)	I _{tp} (mm/hour)	Peak Flow Q _p +2.78C _r I _{tp} A (L/s)	Q _r (L/s)	Q _p -Q _r (L/s)	Volume 100yr (m ³)	100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m ³)
33	66.03	64.58	18.00	46.58	52.22			
35	62.58	61.99	18.00	43.99	52.37			
36	60.86	60.77	18.00	42.77	52.38	72.93	54.93	116.64
37	59.42	59.61	18.00	41.61	52.37			
39	57.51	57.43	18.00	39.43	52.27			
Storage (m ³)								
Overflow	Required	Surface	Underground	Balance	Overflow	Required	Surface	Balance
0.00	92.39	77.61	32.63	0.00	56.53	175.17	64.93	
overflows 1OUT								

overflows IPRIV ROAD			
Elevation of Ponded Water	Storage Volume from CAD	Volume for 100yr Underground	Volume for 100+20 Underground
94.11	25.98	32.63	175.17
94.12	31.22	59.76	142.54
94.13	37.11	94.16	
94.14	43.70		
94.15	51.02		
94.16	59.10		
94.17	67.95		
94.18	77.61		

Drainage Area						
Roof of Building A						
Area (Ha)	0.1024	11026 sqft				
C =	0.98	Restricted Flow Q _r (L/s) = 1.260				
5-Year Ponding						
T _c Variable (min)	I _{tp} (mm/hour)	Peark Flow Q _p +2.78C _r I _{tp} A (L/s)	Q _r (L/s)	Q _p -Q _r (L/s)	Volume 5yr (m ³)	
105	21.58	5.53	1.26	4.27	26.90	
107	21.27	5.45	1.26	4.19	26.90	
108	21.12	5.41	1.26	4.15	26.90	
109	20.97	5.37	1.26	4.11	26.90	
111	20.68	5.30	1.26	4.04	26.89	
Storage (m ³)						
Overflow	Roof Required	Roof	Cistern	Balance	0.00	
0.00	26.90	60.00	318.00	0.00		

Drainage Area		Roof of Building B				
Area (Ha)	0.1410	15177 sqft				
C =	0.98	Restricted Flow Q _r (L/s) = 1.260				
5-Year Ponding						
T _c (min)	I _{tp} (mm/hour)	Peark Flow Q _p +2.78C _r I _{tp} A (L/s)	Q _r (L/s)	Q _p -Q _r (L/s)	Volume 5yr (m ³)	
150	16.36	5.77	1.26	4.51	40.61	
152	16.19	5.71	1.26	4.45	40.61	
153	16.11	5.68	1.26	4.42	40.61	
154	16.03	5.65	1.26	4.39	40.61	
156	15.87	5.60	1.26	4.34	40.60	
Storage (m ³)						
Overflow	Required	Roof	Cistern	Balance		
0.00	40.61	90.00	318.00	0.00		

Drainage Area		Roof of Building C				
Area (Ha)	0.1463	15750 sqft				
C =	0.98	Restricted Flow Q _r (L/s) = 1.260				
5-Year Ponding						
T _c Variable (min)	i _{tp} (mm/hour)	Peark Flow Q _p +2.78C _r I _{tp} A (L/s)	Q _r (L/s)	Q _p -Q _r (L/s)	Volume 5yr (m ³)	
155	15.95	5.84	1.26	4.58	42.57	
157	15.79	5.78	1.26	4.52	42.57	
158	15.71	5.75	1.26	4.49	42.57	
159	15.63	5.72	1.26	4.46	42.57	
161	15.48	5.67	1.26	4.41	42.56	
Storage (m ³)						
Overflow	Required		Roof	Cistern	Balance	
0.00	42.57		94.00	318.00	0.00	

Drainage Area		Remainder of Cistern Catchment				
Area (Ha)	0.5903	0.98 Ha less Roof Storage Area				
C =	0.78	Restricted Flow Q _r (L/s) = 15.000				
5-Year Ponding						
T _c (min)	I _{tp} (mm/hour)	Peark Flow Q _p +2.78C _r I _{tp} A (L/s)	Q _r (L/s)	Q _p -Q _r (L/s)	Volume Syr (m ³)	
43	43.42	51.58	15.00	40.58	99.12	
44	41.87	53.72	15.00	38.72	99.51	
44	41.29	52.85	15.00	37.85	99.92	
45	40.63	52.00	15.00	37.00	99.91	
47	39.38	50.40	15.00	35.40	99.64	
Storage (m ³)						
Overflow	Roof	Cistern	Balance			
0.00	99.92	0.00	318.00	0.00		

RUNOFF COEFFICIENT CALCULATION SHEET

RESTRICTED

A2	Area (m ²)	C
Softscape	629	0.20
Hardscape	1191	0.90
Total	1820	0.66

A3	Area (m ²)	C
Softscape	40	0.20
Hardscape	398	0.90
Total	438	0.84

A4	Area (m ²)	C
Softscape	92	0.20
Hardscape	668	0.90
Total	760	0.82

Total Restricted	Area (m ²)	C
A2	1820	0.66
A3	438	0.84
A4	760	0.82
Total	3018	0.72

UNCONTROLLED

B1	Area (m ²)	C
Softscape	129	0.20
Hardscape	214	0.90
Total	343	0.64

B2	Area (m ²)	C
Softscape	25	0.20
Hardscape	85	0.90
Total	110	0.74

B3	Area (m ²)	C
Softscape	590	0.20
Hardscape	1066	0.90
Total	1656	0.65

B4	Area (m ²)	C
Softscape	46	0.20
Hardscape	184	0.90
Total	230	0.76

Total Unrestricted	Area (m ²)	C
B1	343	0.64
B2	110	0.74
B3	1656	0.65
B4	230	0.76
Total	2339	0.66

CISTERN

C1	Area (m ²)	C
Softscape	1710	0.20
Hardscape	8042	0.90
Total	9752	0.78

Total Cistern	Area (m ²)	C
C1	9752	0.78
Total	9752	0.78

LOCATION				AREA (Ha)										RATIONAL DESIGN FLOW														SEWER DATA													
STREET	AREA ID	FROM	TO	C=	C=	C=	C=				C=	C=	C=	C=	IND	CUM	INLET (min)	TIME IN PIPE	TOTAL (min)	i (2) (mm/hr)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	2yr PEAK FLOW (L/s)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW		DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm)			SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (2yr)			
				0.20	0.30	0.61	0.64	0.67	0.69	0.82	0.84	0.85	0.90	2.78AC														2.78AC	IND				CUM	IND	CUM			DIA	W	H	(L/s)
	C1	Bldg	MH104	CISTERN - RESTRICTED FLOW (PUMP)												10.00	0.11	10.11												15.00	15.00	15.00	100.88	9.50	300			1.00	1.383	85.88	85.13%
		MH104	MH103											0.00	0.00	10.11	1.85	11.96	76.37	103.59	121.43	177.52	0.00	0.00	0.00	0.00	0.00	15.00	15.00	59.83	90.87	300			0.35	0.820	44.83	74.93%			
	A2	MH100	MH101					0.18						0.34	0.34	10.00	1.13	11.13	76.81	104.19	122.14	178.56	25.75	34.93	40.95	59.87	0.00	0.00	25.75	100.32	59.84	375			0.30	0.880	74.57	74.33%			
	A3, A4	MH101	MH102								0.08	0.04		0.28	0.61	11.13	2.12	13.26	72.71	98.56	115.51	168.82	44.43	60.23	70.58	103.16	0.00	0.00	44.43	251.90	109.93	600			0.15	0.863	207.47	82.36%			
		MH102	MH103											0.00	0.61	13.26	0.08	13.34	66.21	89.65	105.02	153.41	40.46	54.78	64.17	93.74	0.00	0.00	40.46	100.57	4.30	375			0.30	0.882	60.11	59.77%			
	Future EXT-Ph 2	MH103	Ex MH											0.00	0.61	13.34	0.63	13.97	65.99	89.34	104.66	152.89	40.32	54.59	63.95	93.42	97.12	112.12	152.44	245.74	41.81	525			0.30	1.100	93.30	37.97%			
Definitions:				Notes:										Designed: SEL								No.		Revision						Date											
Q = 2.78CIA, where:				1. Mannings coefficient (n) = 0.013																		1.		Issued for Site Plan Application						2021-11-24											
Q = Peak Flow in Litres per Second (L/s)																						2.		Revised per City Comments						2022-05-27											
A = Area in Hectares (Ha)																						Checked: JIM		3.		Revised per Client Comments						2022-08-10									
i = Rainfall intensity in millimeters per hour (mm/hr)																								4.		Revised per City Comments						2022-10-14									
[i = 732.951 / (TC+6.199)*0.810] 2 YEAR																								5.		Revised per City Comments						2023-01-19									
[i = 998.071 / (TC+6.053)*0.814] 5 YEAR																																									
[i = 1174.184 / (TC+6.014)*0.816] 10 YEAR																																									
[i = 1735.688 / (TC+6.014)*0.820] 100 YEAR																																									
																						Dwg. Reference: 135142-500		File Reference: 135142.6.04		Date: 2023-01-19						Sheet No: 1 of 1									



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PROJECT: Heron Gate 5
DATE: 2023-01-19
FILE: 135142.6.04
REV #: 2
DESIGNED BY: SEL

UNDERGROUND STORAGE CALCULATIONS - HERONGATE 5

Pipe Storage Private Road

From	To	Length	Diameter	X-sec Area	Volume
CB6	MAIN	2.00	200	0.031	0.06
CB7	MAIN	2.80	200	0.031	0.09
MH101	MH102	109.93	525	0.216	23.80
CB3	MAIN	2.00	200	0.031	0.06
CB4	MAIN	2.80	200	0.031	0.09
CB1	MAIN	2.00	200	0.031	0.06
CB2	MAIN	2.80	200	0.031	0.09
Total					24.25

Structure Storage Private Road

	Base	Top	Height	diameter	X-sec Area	Volume
CB6	92.550	93.95	1.40	600	0.360	0.50
CB7	92.550	93.95	1.40	600	0.360	0.50
MH101	91.930	94.06	2.13	1200	1.131	2.41
CB5	92.600	94.00	1.40	600	0.360	0.50
CB4	92.600	94.00	1.40	600	0.360	0.50
CB1	92.700	94.10	1.40	600	0.360	0.50
CB2	92.700	94.10	1.40	600	0.360	0.50
MH102	91.675	94.28	2.61	1200	1.131	2.95
Total						8.38

TOTAL PRIVATE ROAD 32.63

ORIFICE SIZING

Orifice coefficients	
Cv =	0.60

	Invert (m)	Diameter (mm)	Centre ICD (m)	Max. Pond Elevation (m)	Hydraulic Slope (m)	Target Flow (l/s)	Theoretical Orifice (m) Actual Flow (l/s)	Recommended Orifice (m) Actual Flow (l/s)
Area 1	91.858	375	92.046	94.18	2.135	36.00	0.0963 36.00	0.0963 36.00
						36.00		36.00

rational method coefficients will need to be reviewed at the design stage for each development block to confirm.

A runoff coefficient of 0.85 has been assumed for the Block 2, 3, 4, 5, 6, 7, 8, and 9 stormwater calculations to provide a conservative storage volume estimate. Actual runoff coefficients to be reviewed during detailed design for each individual block. A runoff coefficient of 0.40 has been applied to Block 10 for the community park.

5.3.1 Proposed Stormwater Management System – Phase I

The Phase I development includes the construction of Block 1. As indicated by the Site Servicing Report (**Block 1 SWM Report**), prepared by MMM Group and dated March 2017, the Block 1 development is proposed to be serviced via the existing 900 mm diameter storm sewer within the Heron Road right-of-way. Refer to the **Block 1 SWM Report** for further details. As noted by **Table 15**, above, the allowable release rate from the Block 1 development is **158.8 L/s**.

5.3.2 Proposed Stormwater Management System – Phase II

To meet the stormwater objectives the contemplated development may contain a combination of roof top flow attenuation along with surface and subsurface storage.

The contemplated Phase II development includes the construction of Block 2. It is contemplated that Block 2 will be serviced via the existing 450 mm diameter storm sewer within the Baycrest Drive right-of-way. Refer to **Drawings/Figures** for both the detailed calculations and drawing **STM-2** for a conceptual Phase II servicing layout.

Table 16, summarizes post-development flow rates. The following storage requirement estimate assumes that approximately 10% of the development area will be directed to the outlet without flow attenuation. These areas will be compensated for in areas with flow attenuation controls.

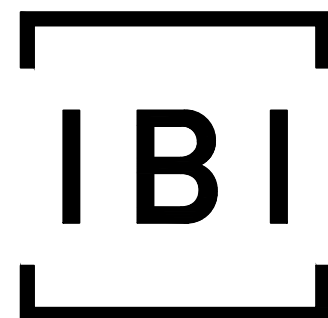
Table 16
Stormwater Flow Rate Summary – Phase II

Control Area	5-Year Release Rate (L/s)	5-Year Storage (m ³)	100-Year Release Rate (L/s)	100-Year Storage (m ³)
Block 2	111.5	484.53	223.54	968.2

As summarized by **Table 16**, above, approximately **968.2 m³** of storage will be required for Block 2 in order to meet the target release rate established in **Section 5.2**. Actual storage volumes will need to be confirmed at the detailed design stage based on a number of factors including grading constraints.

Appendix D

HERON GATE 5



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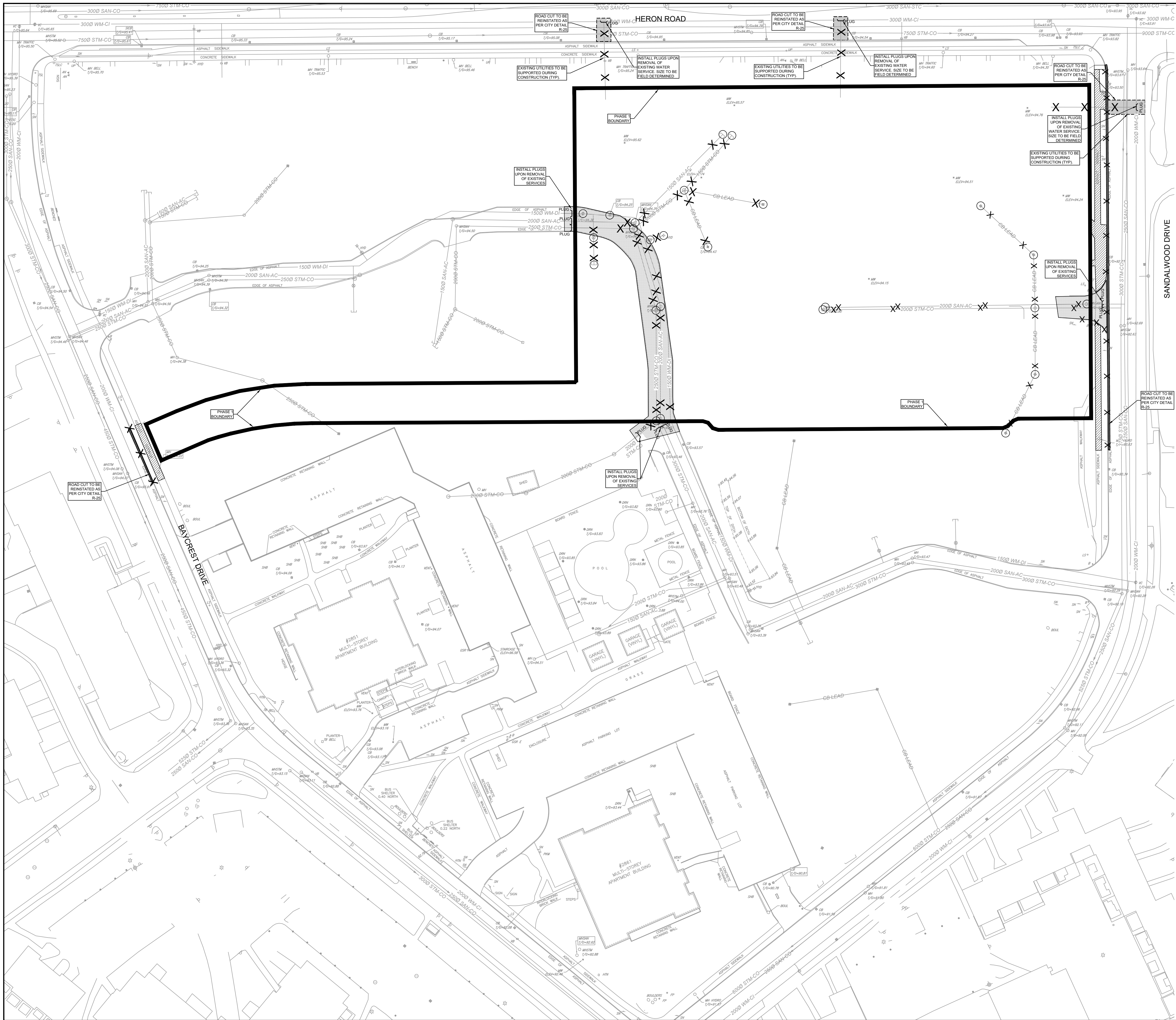


Sheet List Table	
Sheet Number	Sheet Title
--	Cover
C-REM	REMOVALS
C-001	GENERAL PLAN OF SERVICES
C-010	NOTES-LEGEND-CB DATA
C-200	GRADING PLAN
C-201	GRADING PLAN
C-400	SANITARY DRAINAGE AREA
C-500	STORM DRAINAGE AREA
C-600	PONDING PLAN
C-900	EROSION AND SEDIMENT CONTROL PLAN

HAZELVIEW INVESTMENTS



CONTRACT NO. 135142



REMOVAL

- REMOVAL
- ADJUST MANHOLE VALVES
- ADJUST CATCH BASIN
- ADJUSTMENT BY BELL OR HYDRO-APPROVED CONTRACTOR
- REMOVE OR ABANDON SEWER, WATERMAIN, UTILITY, CURB RETURN
- PLUG

REMOVAL

- DRY GRIND EXISTING ASPHALT, AVERAGE DEPTH 50mm
- FULL DEPTH ASPHALT REMOVAL, 100mm CURB REMOVAL
- AREA TO BE CLEARED AND GRUBBED
- REMOVAL OF BUILDINGS, FOUNDATIONS, SEPTIC SYSTEM AND WELL
- REMOVALS OF CONCRETE/ ASPHALT SIDEWALK

LEGEND (IF APPLICABLE)

ANCHOR
ANCHOR
BENCH
BOULDER
CATCH BASIN
DOUBLE CB
CB MANHOLE
DOUBLE CB MANHOLE
SIDE INLET CB
DRAIN
FLAG POLE
POLE GUYWIRE
GAS SERVICE REGULATOR
GAS VALVE
HYDRO LIGHT STANDARD
HYDRO METER
HYDRO TRANSFORMER
HAND WELL
FIRE HYDRANT
JUNCTION BOX
LIGHT STANDARD
MAINTENANCE HOLE UNIDENTIFIED
MAINTENANCE HOLE FIBRE OPTIC
MAINTENANCE HOLE HYDRO
MAINTENANCE HOLE SANITARY
MAINTENANCE HOLE STORM
MONITORING WELL
PARKING METER
SIAMENSE CONNECTION
SIGN
TERMINAL BOX - BELL
TERMINAL BOX - CABLE
TRAFFIC CONTROL BOX
TEST PIT
TRAFFIC SIGNAL LIGHT
UTILITY POLE
VALVE BOX
VALVE CHAMBER
WATER VALVE
TREE STUMP

TREE CONIFEROUS
TREE DECIDUOUS

WATERMAIN (CI Cast Iron - DI Duct Tile Iron)

STORM SEWER (CO Concrete)

SANITARY SEWER (STC - AC Asbestos Concrete)

UNDERGROUND HYDRO

UNDERGROUND TELEPHONE

GASMAIN

CLIENT

HAZELVIEW INVESTMENTS

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ISSUES		
No.	DESCRIPTION	DATE
1	ISSUED FOR COORDINATION	2021-12-15
2	RE-ISSUED FOR COORDINATION	2021-12-23
3	ISSUED FOR SPA	2021-12-23
4	REVISED PER CLIENT COMMENTS	2022-04-27
5	REVISED PER CLIENT COMMENTS	2022-05-31
6	REVISED PER CLIENT COMMENTS	2022-08-12
7	REVISED PER CITY COMMENTS	2022-10-26
8	REVISED PER NEW SITE PLAN	2023-02-03

SECTION FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS

SITE

CONSULTANTS

SEAL

PROFESSIONAL ENGINEER
J. I. MOFFATT
2023/02/03
PROVINCE OF ONTARIO

hazerview INVESTMENTS

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PROJECT

Heron Gate 5

PROJECT NO:
135142

DRAWN BY:
D.D./S.L.

CHECKED BY:
D.C.

PROJECT MGR:
J.I.M.

APPROVED BY:
J.I.M.

SHEET TITLE

REMOVALS

SHEET NUMBER

C-REM

ISSUE

8

UTILITY LEGEND

	TRANSFORMER
	TRANSFORMER C/W CONCRETE WINGS
	HYDRO SWITCHGEAR
	HYDRO MANHOLE
	BELL PEDESTAL
	BELL GRADE LEVEL BOX (l=600mm, w=1200mm, d=750mm) C/W 1.5 x 3.0m easement
	BELL FIBER CABINET (l=1200mm, w=750mm, d=500mm)
	BELL CENTRAL SPLITTING POINTS (l=1175mm, w=1200mm, d=500mm)
	ROGERS PEDESTAL
	ROGERS VAULT (l=1000mm, w=1000mm, d=1200mm) C/W 1m x 2m easement
	STREET LIGHT
	STREET LIGHT DISCONNECT
	STREET LIGHT GROUNDING
	JOINT UTILITY TRENCH
	HYDRO CABLE AND DUCTS
	BELL CABLE
	BELL DUCTS
	ROGERS CABLE
	ROGERS DUCTS
	GAS
	STREET LIGHT CABLE
	UTILITY DROP LOCATIONS
	CONCRETE ENCASED DUCT BANK C/W NUMBER OF DUCTS
	COMMUNITY MAILBOX
	PROPOSED TREE LOCATION
	ROOT MANAGEMENT BARRIER

SEDIMENT EROSION LEGEND

	HEAVY DUTY SILT FENCE
	SNOW FENCE
	STRAW BALE CHECK DAM
	STRAW BALE CHECK DAM WITH FILTER CLOTH
	ROCK CHECK DAM
	SEDIMENT SACK PLACED UNDER EXISTING CB COVER
	TEMPORARY MUD MAT 0.15m THICK 50mm CLEAR STONE ON NON WOVEN FILTER CLOTH

GENERAL LEGEND

	LIMIT OF CONSTRUCTION
	PHASING LINE
	BARRIER CURB
	MOUNTABLE CURB
	DEPRESSED BARRIER CURB
	CONCRETE SIDEWALK
	TACTILE WALKING SURFACE INDICATOR
	ASPHALT SIDEWALK / PATHWAY
	BUS STOP CONCRETE / ASPHALT

SERVICING LEGEND

	MH118A	SANITARY MANHOLE
	200mmØ SAN	SANITARY SEWER
	MH109	STORM MANHOLE
	825mmØ STM	STORM SEWER - LESS THAN 900Ø
	900mmØ STM	STORM SEWER - 900Ø AND GREATER
	200Ø WATERMAIN	WATERMAIN
	CB100	STREET CATCHBASIN C/W TOP OF GRATE
	CICB101	CURB INLET CATCHBASIN C/W GUTTER GRADE
	DCB100	DOUBLE CATCHBASIN C/W TOP OF GRATE
	DCICB101	DITCH INLET CATCHBASIN C/W GUTTER GRADE
	CBMH100	CATCHBASIN MANHOLE C/W TOP OF GRATE
	CBMH101	DITCH INLET MANHOLE C/W TOP OF GRATE
	ICB100	ICD LOCATION
	RYCB	REAR YARD CATCHBASIN IN ROAD CONNECTING STRUCTURE C/W SOLID GRATE
	AD4	AREA DRAIN OVER UNDERGROUND PARKING LEVEL
	TIG 104.35	REAR YARD "TEE" CATCHBASIN (300Ø) C/W TOP OF GRATE AND INVERT OUT
	TIG 104.50	REAR YARD "END" CATCHBASIN (300Ø) C/W TOP OF GRATE AND INVERT OUT
	TIG 104.35	REAR YARD "CUSTOM ANGLED" CATCHBASIN (450Ø) C/W TOP OF GRATE AND INVERT OUT
	TIG 104.35	REAR YARD "THREE WAY" CATCHBASIN (450Ø) C/W TOP OF GRATE AND INVERT OUT
	300mmØ CSP	PERFORATED REAR YARD SUBDRAIN
	V&VB	CSP CULVERT C/W DIAMETER
	V&VC	VALVE AND VALVE BOX
	HYD	VALVE AND VALVE CHAMBER
	RED	FIRE HYDRANT C/W BOTTOM OF FLANGE ELEVATION
	2 BENDS	WATERMAIN REDUCER
	BH 12	VERTICAL BEND LOCATION
	101.79	SINGLE SERVICE LOCATION
	108	DOUBLE SERVICE LOCATION
	102.00	INFERRED BEDROCK (SEE GEOTECHNICAL REPORT)
	101.79	100 YEAR STORM HYDRAULIC GRADE LINE AT MANHOLE
	108	STRESS TEST STORM HYDRAULIC GRADE LINE AT MANHOLE
	102.40	UNDERSIDE OF FOOTING ELEVATION (WITH LOT #)
		CLAY SEAL IN SEWER / WATERMAIN TRENCH

GRADING LEGEND

	PROPOSED SWALE C/W FLOW DIRECTION
	PROPOSED DITCH C/W FLOW DIRECTION AND SLOPE
	SLOPE C/W FLOW DIRECTION
	MAJOR OVERLAND FLOW ROUTE
	PROPOSED SPOT GRADE
	PROPOSED SWALE GRADE
	PROPOSED SWALE HIGH POINT GRADE
	LOT CORNER GRADE C/W EXISTING GRADE
	TIE INTO EXISTING GRADE
	FULL STATIC PONDING GRADE
	RETAINING WALL C/W TOP OF WALL AND GRASS GRADE
	TERRACING 3:1 MAXIMUM UNLESS NOTED OTHERWISE
	PRESSURE REDUCING VALVE
	FINISHED FLOOR ELEVATION
	NUMBER OF ADDITIONAL RISERS
	NOISE FENCE LOCATION
	NOISE FENCE GATE

NOTES :

- ALL MATERIALS AND CONSTRUCTION IS TO BE IN ACCORDANCE WITH THE CURRENT CITY OF OTTAWA STANDARD DRAWINGS & SPECIFICATIONS OR OPSD/OPSS IF CITY DRAWINGS AND SPECIFICATIONS DO NOT APPLY.
- THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING SERVICES AND UTILITIES PRIOR TO CONSTRUCTION AND SHALL PROTECT AND ASSUME RESPONSIBILITY FOR ALL UTILITIES WHETHER OR NOT SHOWN ON THESE DRAWINGS.
- FOR GEOTECHNICAL INFORMATION REFER TO GEOTECHNICAL REPORT
- FOR GEODETIC BENCHMARK AND GEOMETRIC LAYOUT OF STREET AND LOTS, REFER TO TOPOGRAPHICAL SURVEY AND PLAN OF SUBDIVISION PREPARED BY LEGAL SURVEYOR BENCHMARK BASED ON CAN-NET VIRTUAL REFERENCE SYSTEM NETWORK. SITE BENCHMARK ELEVATION 95.46m ON TOP OF HYDRANT SPINDLE ON SOUTH SIDE OF HERON ROAD APPROXIMATELY 65m WEST OF THE C/L OF SANDLEWOOD DRIVE.
- ROADWAY SECTIONS REQUIRING GRADE RAISE TO PROPOSED SUB GRADE LEVEL TO BE FILLED WITH ACCEPTABLE NATIVE EARTH BORROW OR IMPORTED OPSS SELECTED SUBGRADE MATERIAL IF NATIVE MATERIAL IS DEFICIENT AS PER RECOMMENDATION OF GEOTECHNICAL ENGINEER.
- IN AREAS WHERE EXISTING GROUND IS BELOW THE PROPOSED ELEVATION OF SEWER AND WATERMANS, GRADE RAISING AND FILLING IS TO BE IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE GEOTECHNICAL REPORT. AS PER CITY GUIDELINES ALL WATERMANS IN FILL AREAS ARE TO BE TIED WITH RESTRAINING JOINTS AND THRUST BLOCKS.
- CONTRACTORS SHALL BE RESPONSIBLE FOR KEEPING CLEAN ALL ROADS WHICH BECOME COVERED IN DUST, DEBRIS AND/OR MUD AS A RESULT OF ITS CONSTRUCTION OPERATIONS.
- SILT FENCE TO BE ERRECTED PRIOR TO EARTH WORKS BEING COMMENCED. SILT FENCE TO BE MAINTAINED UNTIL VEGETATION IS ESTABLISHED OR UNTIL START OF SUBSEQUENT PHASE.
- STRAW BALE SEDIMENT TRAPS TO BE PLACED AND MAINTAINED IN EXISTING AND CONSTRUCTED ROADSIDE DITCHES. TRAPS TO REMAIN AND BE MAINTAINED UNTIL VEGETATION IS ESTABLISHED (IF APPLICABLE).
- SILT SACK TO BE PLACED AND MAINTAINED UNDER COVER OF ALL CATCHBASINS. GEOTEXTILE SILT SACK IN STREET CBs TO REMAIN UNTIL ALL CURBS ARE CONSTRUCTED. GEOTEXTILE FABRIC IN RYCBs TO REMAIN UNTIL VEGETATION IS ESTABLISHED. ALL CATCHBASINS TO BE REGULARLY INSPECTED AND CLEANED, AS NECESSARY, UNTIL SOD AND CURBS ARE CONSTRUCTED.
- ALL CONNECTIONS TO EXISTING WATERMANS ARE TO BE COMPLETED BY CITY FORCES. CONTRACTOR IS TO EXCAVATE, BACKFILL, COMPACT AND REINSTATE.
- ANY WATERMAIN WITH LESS THAN 2.4M DEPTH OF COVER REQUIRES THERMAL INSULATION AS PER CITY OF OTTAWA STANDARD W22, OR AS APPROVED BY THE ENGINEER.
- ALL LEADS FOR STREET CB's TO AND CICB's CONNECTED TO MAIN SHALL BE 200mmØ PVC DR35 @ MIN 2% SLOPE UNLESS NOTED OTHERWISE. ALL LEADS FOR RYCB's CONNECTED TO MAIN SHALL BE 200mmØ PVC DR35 @ MIN 1% SLOPE UNLESS NOTED OTHERWISE.
- EACH BUILDING SHALL BE EQUIPPED WITH A SANITARY AND STORM SEWER BACKWATER VALVE AND CLEAN-OUT ON ITS PRIMARY SERVICE, AS PER ONTARIO BUILDING CODE REQUIREMENTS (BY OTHERS).
- THESE DRAWINGS ARE NOT TO BE SCALED OR USED FOR LAYOUT PURPOSES.
- THE COMPOSITE UTILITY PLAN HAS BEEN REVIEWED BY IBI GROUP FOR CONFORMITY TO THE DESIGN CONCEPT FOR THE DEVELOPMENT AND FOR GENERAL ARRANGEMENT ONLY AND AS SUCH SHALL NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR ERRORS OR OMISSIONS IN EITHER LAYOUT OR WORKMANSHIP.
- ALL UTILITY BOXES (I.E. PEDESTALS, TRANSFORMERS, ETS) ARE TO BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE CITY OF OTTAWA'S "GUIDELINES FOR UTILITY PEDESTALS WITHIN THE ROAD RIGHT OF WAY"
- THIS DRAWING IS A COMPILATION OF OTHER UTILITY DESIGNS AND DOES NOT INDICATE IN ANY WAY THAT THE PARTY SIGNING THIS DRAWING HAS DESIGNED OR APPROVED THE RESPECTIVE UTILITY PLANTS INDICATED ON THIS DRAWING. THE DRAWING WAS PREPARED TO BE USED AS REFERENCE ONLY AS PER REQUIREMENTS OF THE CITY OF OTTAWA. IT IS THE CONTRACTORS RESPONSIBILITY TO ENSURE IT HAS REVIEWED THE CURRENT AND EXISTING DESIGNS BY HYDRO, STREET LIGHTING, BELL, CANADA POST, O.C. TRANSP, CABLE TV AND ANY OTHER PARTIES INCLUDED BUT NOT MENTIONED AND COMPLETE THE INSTALLATION IN ACCORDANCE WITH THE REQUIREMENTS OF THE STAKEHOLDER UTILITY DESIGNS.

CLIENT

HAZELVIEW INVESTMENTS

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5	REVISED PER CLIENT COMMENTS	2022-05-31
6	REVISED PER CLIENT COMMENTS	2022-08-12
7	REVISED PER CITY COMMENTS	2022-10-26
8	REVISED PER NEW SITE PLAN	2023-02-03

SEE 010 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS

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

PROJECT

Heron Gate 5

PROJECT NO:
135142

DRAWN BY:
D.D./S.L.

PROJECT MGR:
J.I.M.

CHECKED BY:
D.C.

APPROVED BY:
J.I.M.

SHEET TITLE

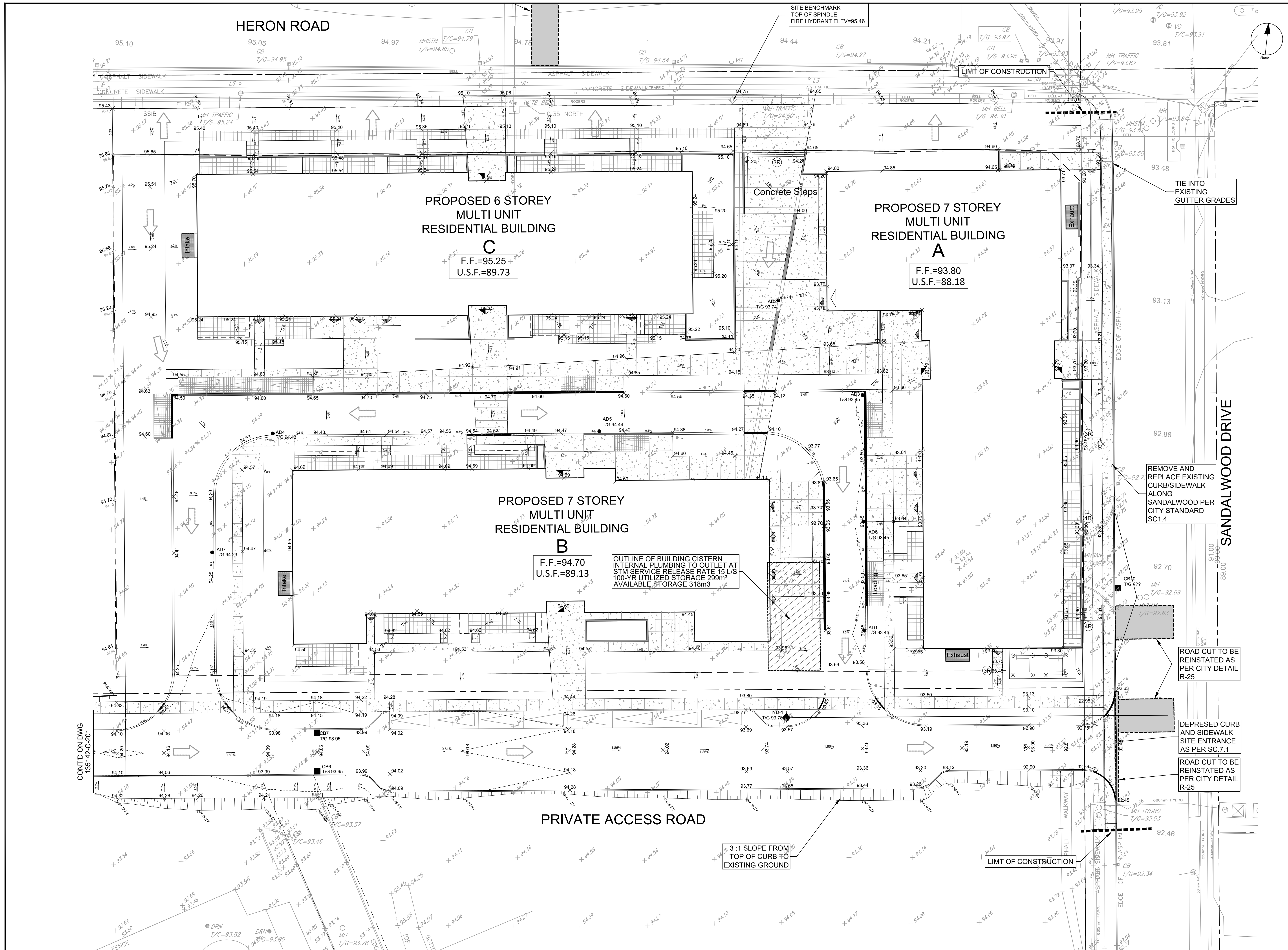
GENERAL NOTES, LEGEND AND CB DATA TABLE

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C-010

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135142

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D.D./S.L.

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J.I.M.

CHECKED BY:
D.C.

APPROVED BY:
J.I.M.

SHEET TITLE

GRADING PLAN

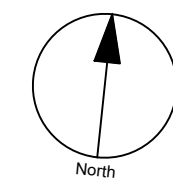
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C-200

ISSUE

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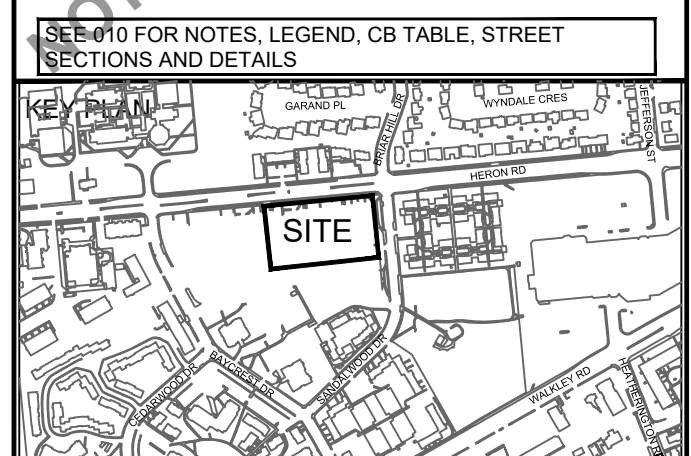
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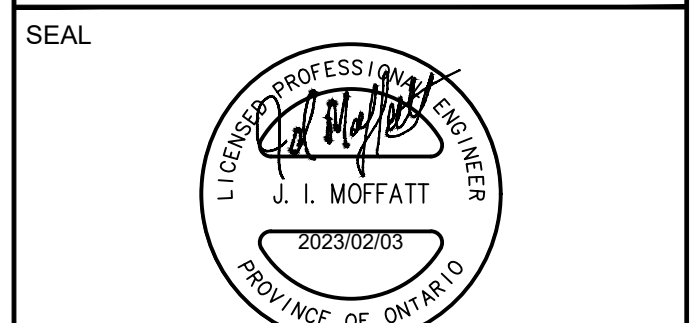
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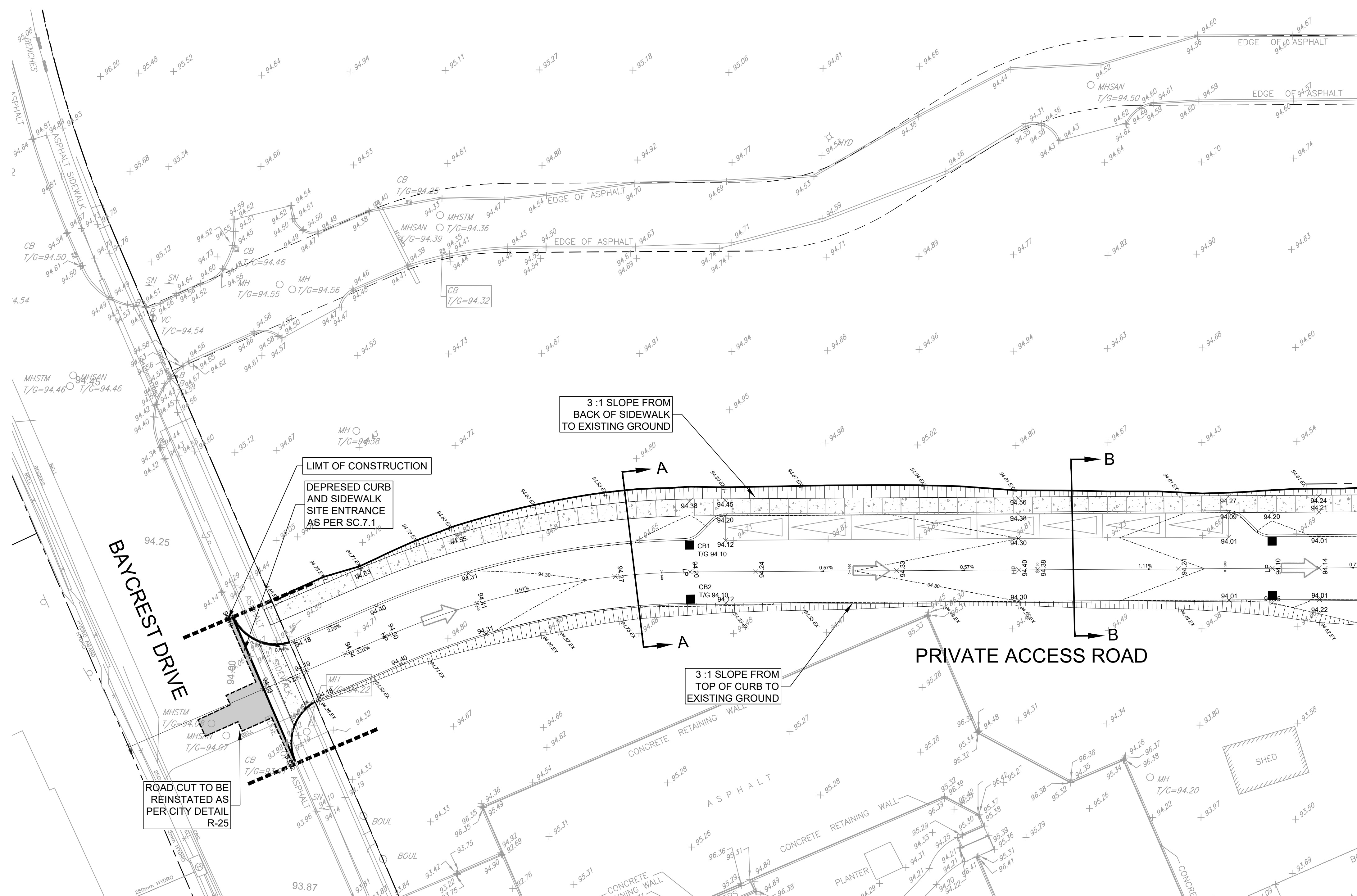
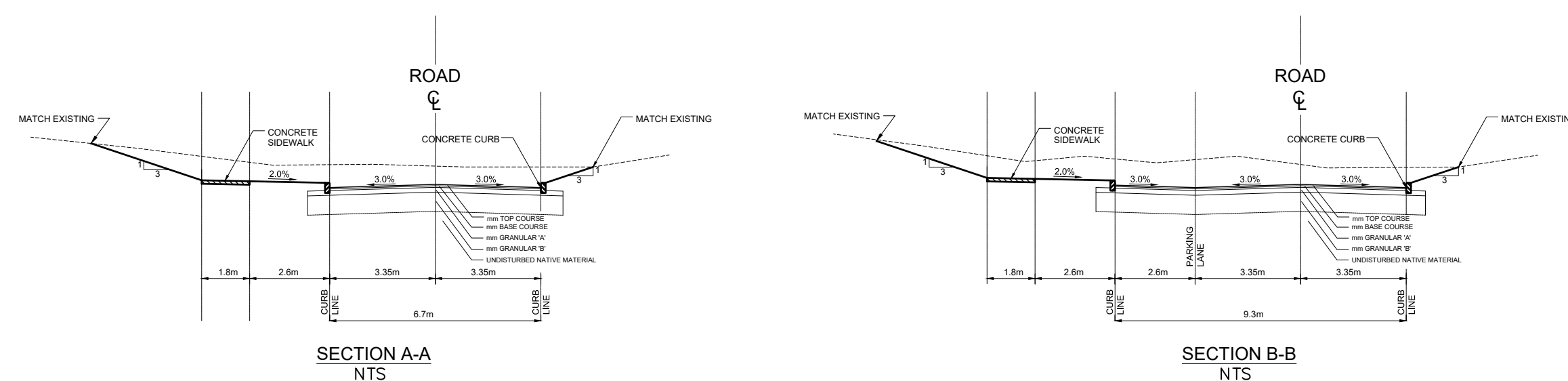
PROJECT
Heron Gate 5

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PROJECT MGR:
J.I.M.
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J.I.M.

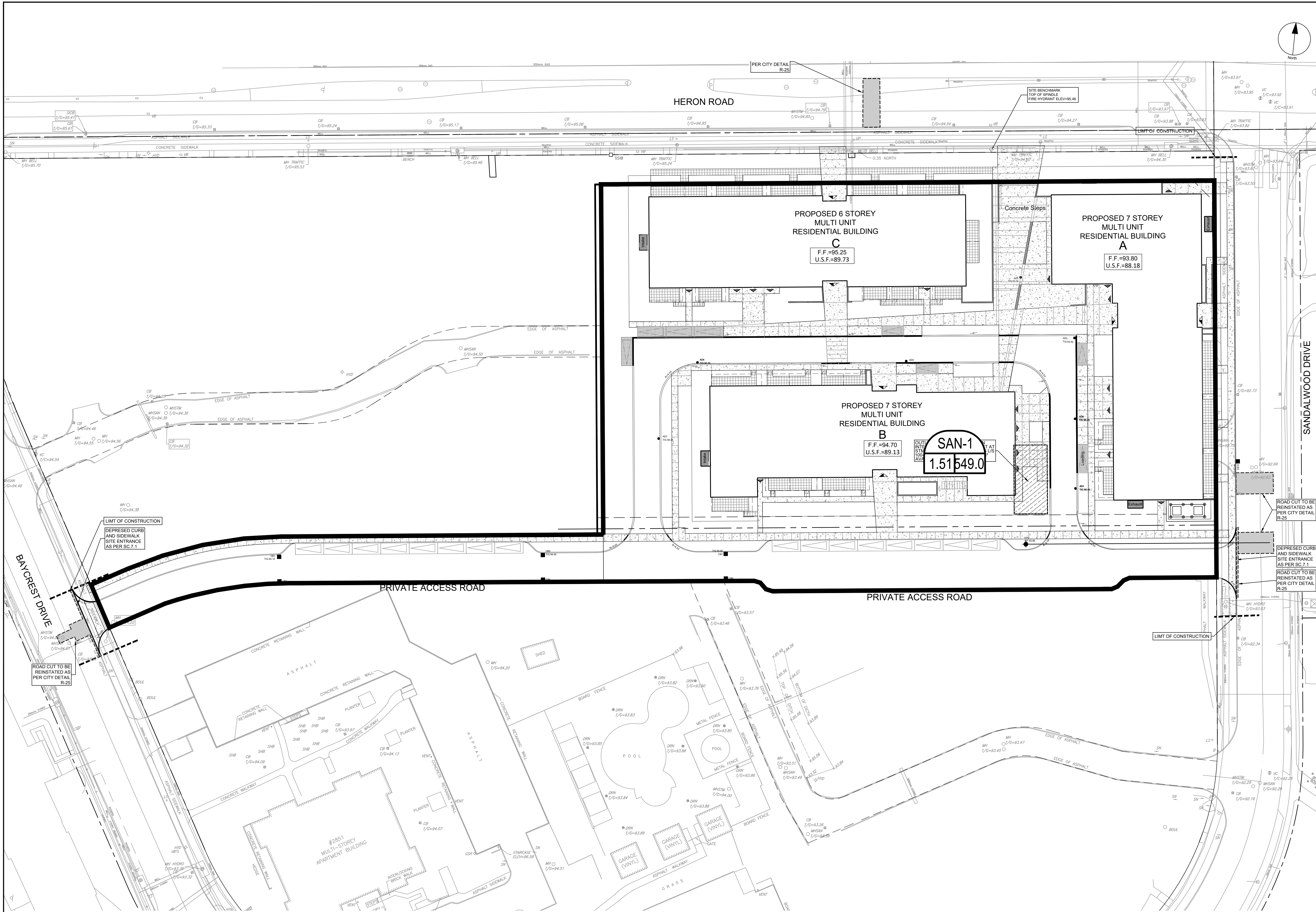
SHEET TITLE
GRADING PLAN

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C-201
ISSUE
8

CITY PLAN No. 18650



City File No. D07-12-21-0238
Last Saved: August 12, 2022, by Elmerie
Printed: Friday, February 3, 2023 10:17:52 AM by Diane Dore
File Location: J:\135142_Heron_Gate5\7.0_Production\7.03_Design\04_Civil\Sheets\C-201 GRADING PLAN.dwg



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ibigroup.com

PROJECT

Heron Gate 5

PROJECT NO:
135142

DRAWN BY:
D.D./S.L.

PROJECT MGR:
J.I.M.

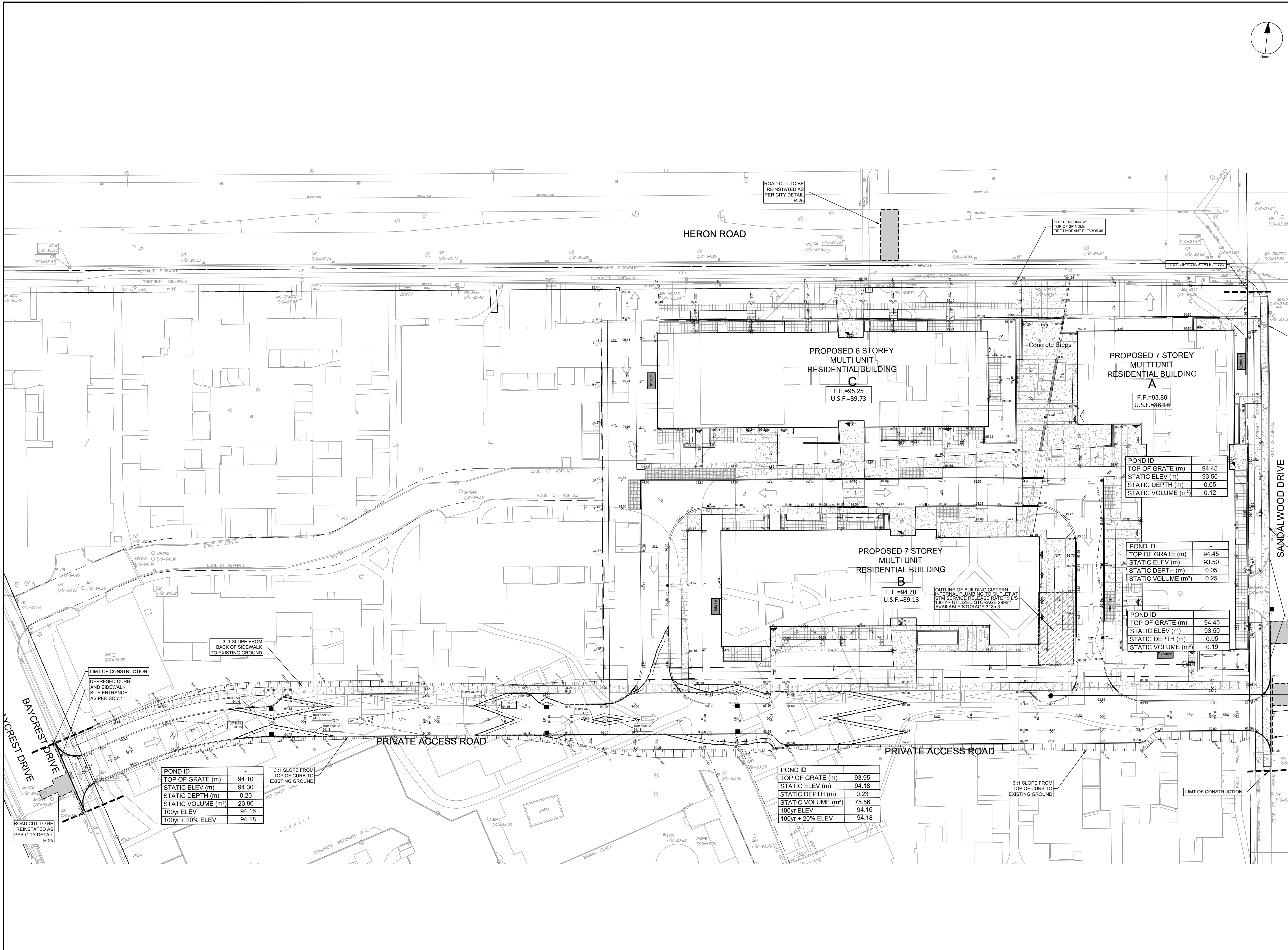
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SANITARY DRAINAGE AREA

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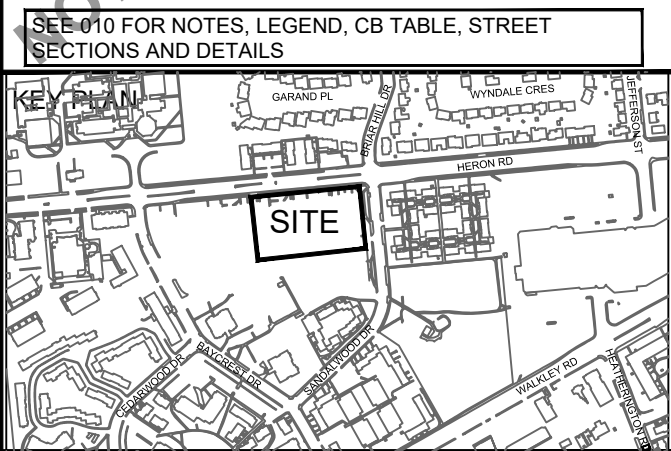
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ibigroup.com

PROJECT
Heron Gate 5

PROJECT NO:
135142

DRAWN BY:
D.D./S.L.

PROJECT MGR:
J.I.M.

CHECKED BY:
D.C.

APPROVED BY:
J.I.M.

SHEET TITLE
PONDING PLAN

SHEET NUMBER
C-600

ISSUE
8

Appendix E



THE MITCHELL PARTNERSHIP INC.
CONSULTING ENGINEERS

285 YORKLAND BOULEVARD
TORONTO, ON CANADA M2J 1S5
E tmp@tmptoronto.com
P 416-499-8000

tmptoronto.com

October 9, 2022

IBI GROUP

Suite 400, 333 Preston Street
Ottawa ON K1S 5N4

ATTN: DOUG CAVE

RE: HERON GATE - FUTURE SANITARY DRAINAGE

TMP FILE NO. 21-1060-000

Dear Doug,

As requested we are pleased to provide an opinion on the viability of connecting future sanitary drainage to the proposed connection for this phase of construction. Note that we are not involved with the design of this future construction and there is no structural engineer engaged so we have made some assumptions.

The sketch below has a proposed sanitary drain location shown in yellow. The sketch shows what we anticipate to be the longest sanitary pipe run going north to the future foundation wall and east to the sanitary drain connection being provided for the current project.

IBI has given a ground floor elevation for the future building of 95 Meters. We made an assumption that the ground floor slab will be 300 mm thick. Based on that we estimate that the best possible case scenario has a sanitary pipe elevation of 90.4 by the time it gets to the outgoing sanitary location. That is half of a meter lower than the capped pipe you provided. We also have not accounted for any deep beams anywhere along the internal pipe run. We would expect that there will be structural interferences along that route. There will be internal roads and significant structure will be required to support them. We would expect a realistic pipe elevation in the range of 89.5 Meters at the end of the yellow run shown below.



In our opinion when the next phase of construction is designed a second sanitary connection to the main in Heron Road will be required. There is no chance whatsoever that future buildings can connect to the sanitary drain being installed under this project.

Yours very truly,

THE MITCHELL PARTNERSHIP INC.

Reg Callaghan, P.Eng.
Partner

Samantha Labadie

From: Reg Callaghan <rcallaghan@tmptoronto.com>
Sent: Friday, October 14, 2022 11:55 AM
To: Samantha Labadie; Doug Cave; 'Melissa Du Plessis'
Cc: Damien Boylan; Harseerat Khaira
Subject: RE: Heron Gate 5-1 - Coordination Meeting

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Thank you Samantha. We can specify a drain that restricts to 5 GPM. The caution I would put out there is that the structural design has not started. As mechanical engineers we don't specify the number of drains. The structural design dictates roof low points. That in turn dictates the number of drains. It's a bit more complicated than that in that there are rules we need to ensure are followed but in its most basic form that's how it works. If weeks from now when the roof structure and slope is designed there are more drains then we will have more flow.

I say we keep the footprint and size of the cistern as is. We don't lower the floor. Based on that the cistern volume you rely on is this and just say the roof stores the difference

Cistern

The cistern volume is 448,000 litres (refer to our attached drawing M2-101). The usable volume though is less than that. Water can only be stored up to the level of the lowest pipe entering the cistern. The elevation of that pipe is 2.5 meters above the floor and thus the usable volume is 318,000 litres. The cistern is pumped out at a rate of 45 l/s.

~~Message removed for privacy~~

Our calculation of the total number of drains we see on the preliminary plans was this: (again may end up being more in the end)

Roof Drains

The smallest output control flow roof drain produces 5 gallons per minute. We will specify that drain (weir cut sheet attached). There are a total of 23 roof drains in the current design therefore the maximum rooftop outflow is x 115 GPM (8.7 l/s). That water all is directed to the cistern. No roof retention water goes directly to storm.

From: Samantha Labadie <samantha.labadie@ibigroup.com>
Sent: Friday, October 14, 2022 11:29 AM
To: Reg Callaghan <rcallaghan@tmptoronto.com>; Doug Cave <doug.cave@ibigroup.com>; 'Melissa Du Plessis' <mduplessis@figurr.ca>
Cc: Damien Boylan <dboylan@tmptoronto.com>; Harseerat Khaira <hkhaira@tmptoronto.com>
Subject: RE: Heron Gate 5-1 - Coordination Meeting

Hi Reg,

I've recalculated with your roof size and flow rate and determined the maximum volume each roof would need to store to retain a 100yr storm. Can you confirm the following:

- Roof A can hold 60m³ (5.9cm or 2.32" avg depth)
- Roof B can hold 90m³ (6.4cm or 2.52" avg depth)
- Roof C can hold 94m³ (6.4cm or 2.52" avg depth)

If each roof can store the above volumes, then the restricted flowrate of 20GPM per roof works and the cistern would only need to hold 260m³.

If a roof cannot hold that volume, we can increase the GPM to reduce it.

Thanks,

Sam

From: Reg Callaghan <rcallaghan@tmptoronto.com>

Sent: Thursday, October 13, 2022 1:25 PM

To: Doug Cave <doug.cave@ibigroup.com>; 'Melissa Du Plessis' <mduplessis@figurr.ca>

Cc: Samantha Labadie <samantha.labadie@ibigroup.com>; Damien Boylan <dboylyan@tmptoronto.com>; Harseerat Khaira <hkhaira@tmptoronto.com>

Subject: RE: Heron Gate 5-1 - Coordination Meeting

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The thing is, we don't know how to calculate storage. I can say this. The drains can back up water to as much as 5" from the low points. That roughly equates to an average of 2.5" across the roof. They will only do that in heavy rain. In light rain they really don't hold anything back.

Total roof area = 42,000 SF.

2.5" = .2 Ft.

therefore volume stored is 8,390 cubic feet = 52,300 Imp Gal = 692 Cubic Meters.

That happens only on the heaviest possible storm. It exists instantaneously and as soon as rain slows we store less.

I have no idea what all of this means and how it does or doesn't affect the cistern. We do not calculate storage of anything and I can't give you a number.

If control flow helps you we can do it. If not we can go with conventional drains (meaning zero rooftop storage) and drop the bottom of the tank below the floor. You tell me what you want.

From: Doug Cave <doug.cave@ibigroup.com>

Sent: Thursday, October 13, 2022 1:01 PM

To: Reg Callaghan <rcallaghan@tmptoronto.com>; 'Melissa Du Plessis' <mduplessis@figurr.ca>

Cc: Samantha Labadie <samantha.labadie@ibigroup.com>; Damien Boylan <dboylyan@tmptoronto.com>; Harseerat Khaira <hkhaira@tmptoronto.com>

Subject: RE: Heron Gate 5-1 - Coordination Meeting

Thank you Reg,

How much storage will there be on the roofs? As per your email on October 10th the cistern can accommodate 318 cu.m. of storage therefore the roofs will need to accommodate at least 134 cu.m. to get to the total of 452 cu.m. required.

Doug Cave C.E.T.
(he/him/his)

Sr. Project Manager
mob 613 402 9677

Suite 500, 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel +1 613 225 1311 ext 64062



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From: Reg Callaghan <rcallaghan@tmptoronto.com>

Sent: Thursday, October 13, 2022 12:41 PM

To: Doug Cave <doug.cave@ibigroup.com>; 'Melissa Du Plessis' <mduplessis@figurr.ca>

Cc: Samantha Labadie <samantha.labadie@ibigroup.com>; Damien Boylan <dboylian@tmptoronto.com>; Harseerat Khaira <hkhaira@tmptoronto.com>

Subject: RE: Heron Gate 5-1 - Coordination Meeting

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Here is what we got on the roof issue

Building A:

Roof Area: 11,026sq.ft.

Rainfall Ottawa: 384GPM

Roof Drains: 4 @ 5GPM each = 20GPM

Drain Down Time: 19.25hours.

Building B:

Roof Area: 15,177sq.ft.

Rainfall Ottawa: 528GPM

Roof Drains: 4 @ 5GPM each = 20GPM

Drain Down Time: 26.4hours

Building C:

Roof Area: 15,750sq.ft.

Rainfall Ottawa: 548GPM

Roof Drains: 4 @ 5GPM each = 20GPM

Drain Down Time: 27.4hours

From: Doug Cave <doug.cave@ibigroup.com>

Sent: Thursday, October 13, 2022 11:43 AM

To: Reg Callaghan <rcallaghan@tmptoronto.com>; 'Melissa Du Plessis' <mduplessis@figurr.ca>

Cc: Samantha Labadie <samantha.labadie@ibigroup.com>; Damien Boylan <dboylian@tmptoronto.com>; Harseerat Khaira <hkhaira@tmptoronto.com>

Subject: RE: Heron Gate 5-1 - Coordination Meeting

Just to confirm the total storage that is required from the cistern/roof is 452 cu.m.

Doug Cave C.E.T.
(he/him/his)

Sr. Project Manager
mob 613 402 9677
Suite 500, 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel +1 613 225 1311 ext 64062



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From: Reg Callaghan <rcallaghan@tmptoronto.com>

Sent: Wednesday, October 12, 2022 8:18 PM

To: Doug Cave <doug.cave@ibigroup.com>; 'Melissa Du Plessis' <mduplessis@figurr.ca>

Cc: Samantha Labadie <samantha.labadie@ibigroup.com>; Damien Boylan <dboylan@tmptoronto.com>; Harseerat Khaira <hkhaira@tmptoronto.com>

Subject: Re: Heron Gate 5-1 - Coordination Meeting

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Sorry, the relief we will detail as well

Reg Callaghan P Eng
Partner
The Mitchell Partnership
416 578 0449

From: Reg Callaghan <rcallaghan@tmptoronto.com>

Sent: Wednesday, October 12, 2022 8:11:11 PM

To: Doug Cave <doug.cave@ibigroup.com>; 'Melissa Du Plessis' <mduplessis@figurr.ca>

Cc: Samantha Labadie <samantha.labadie@ibigroup.com>; Damien Boylan <dboylan@tmptoronto.com>; Harseerat Khaira <hkhaira@tmptoronto.com>

Subject: Re: Heron Gate 5-1 - Coordination Meeting

Typically Melissa is showing where pipes are. I think we keep doing that and she updates her plan. We submit no drawings as part of this.

We reverse engineered a control flow system to send the lowest flow possible to the cistern in an attempt to make it as small as possible so that we can hopefully not have to excavate. Normally all drains into a cistern are free flow.

What we can do is say what the drain down time will be with those drains at the flow I already stated. That's all.

I have no idea what that means for your overall storage calculations or how much roof storage credit there might be. If it doesn't help downsize the cistern then we will revert back to the normal free flow design.

Reg Callaghan P Eng
Partner
The Mitchell Partnership
416 578 0449

From: Doug Cave <doug.cave@ibigroup.com>

Sent: Wednesday, October 12, 2022 4:18 PM

To: Reg Callaghan <rcallaghan@tmptoronto.com>; 'Melissa Du Plessis' <mduplessis@figurr.ca>

Cc: Samantha Labadie <samantha.labadie@ibigroup.com>; Damien Boylan <dboylyan@tmptoronto.com>; Harseerat Khaira <hkhaira@tmptoronto.com>

Subject: RE: Heron Gate 5-1 - Coordination Meeting

Hi Reg,

Can you please tweak the letter you wrote with the mark-ups I provided and re-send.

The still require the following items:

- The location and details for the emergency overflow for the cistern.
- The details and storage calculations for the roof top storage.

Thank you

Doug

Doug Cave C.E.T.
(he/him/his)

Sr. Project Manager
mob 613 402 9677
Suite 500, 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel +1 613 225 1311 ext 64062



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From: Reg Callaghan <rcallaghan@tmptoronto.com>

Sent: Tuesday, October 11, 2022 5:27 PM

To: 'Melissa Du Plessis' <mduplessis@figurr.ca>; Doug Cave <doug.cave@ibigroup.com>

Cc: Samantha Labadie <samantha.labadie@ibigroup.com>; Damien Boylan <dboylyan@tmptoronto.com>; Harseerat Khaira <hkhaira@tmptoronto.com>

Subject: RE: Heron Gate 5-1 - Coordination Meeting

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Please find attached the final letter. I kept the same date for consistency.

Can you please forward the SWM report? I can't find a copy although I'm sure I have seen it.

From: Reg Callaghan

Sent: Monday, October 10, 2022 8:14 AM

To: Melissa Du Plessis <mduplessis@figurr.ca>; Doug Cave <doug.cave@ibigroup.com>

Cc: Samantha Labadie <samantha.labadie@ibigroup.com>; Damien Boylan <dboylyan@tmptoronto.com>; Harseerat Khaira <hkhaira@tmptoronto.com>

Subject: RE: Heron Gate 5-1 - Coordination Meeting

Please find attached three letters. One was issued in response to City comments a while ago but it has some pertinent information so I'm resending it. The second deals with rooftop control flow drains and the cistern. The third is the letter on the impossibility of connecting future build sanitary drainage to our current outgoing sanitary.

From: Melissa Du Plessis <mduplessis@figurr.ca>

Sent: Friday, October 7, 2022 7:47 PM

To: Doug Cave <doug.cave@ibigroup.com>; Reg Callaghan <rcallaghan@tmptoronto.com>

Cc: Samantha Labadie <samantha.labadie@ibigroup.com>; Damien Boylan <dboylyan@tmptoronto.com>; Harseerat Khaira <hkhaira@tmptoronto.com>

Subject: Re: Heron Gate 5-1 - Coordination Meeting

Doug,

See attached for the floor plans with the rooftop areas noted.
I will be sending an updated site plan with the inverts shown as well.

Thanks,

Melissa Du Plessis OAA M.Arch B.A.S. ORSA CPHD

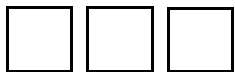
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FIG. 1

190 Somerset St W #206

Ottawa ON K2P 0J4

T 613 695-6122 x 135

M 613 618-3290

FIG. 2

3550, Saint-Antoine O.

Montréal QC H4C 1A9

T 514 861-5122

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From: Doug Cave <doug.cave@ibigroup.com>
Sent: October 6, 2022 8:19 AM
To: Melissa Du Plessis <mduplessis@figurr.ca>; rcallaghan@tmptoronto.com <rcallaghan@tmptoronto.com>
Cc: Samantha Labadie <samantha.labadie@ibigroup.com>; Damien Boylan <dboyman@tmptoronto.com>; Harseerat Khaira <hkhaira@tmptoronto.com>
Subject: RE: Heron Gate 5-1 - Coordination Meeting

Good morning Melissa,

Thank you for the drawing. Can you please show on the attached plan the storm pipe leaving the building similar to how the sanitary pipe leaving the building is shown.

Thank you

Doug

Doug Cave C.E.T.
(he/him/his)

Sr. Project Manager
mob 613 402 9677
Suite 500, 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel +1 613 225 1311 ext 64062



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From: Melissa Du Plessis <mduplessis@figurr.ca>
Sent: Thursday, October 6, 2022 8:13 AM
To: Doug Cave <doug.cave@ibigroup.com>; rcallaghan@tmptoronto.com
Cc: Samantha Labadie <samantha.labadie@ibigroup.com>; Damien Boylan <dboyman@tmptoronto.com>; Harseerat Khaira <hkhaira@tmptoronto.com>
Subject: Re: Heron Gate 5-1 - Coordination Meeting

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Doug,

To get the cistern to work we have relocated it to the center of the building on the south. Attached is a sketch from Reg for the piping runs.

Our team is updating the parking layout and I should be able to send this to you shortly.

As we discussed, the 451.72 m3 represents the entire stormwater retention we need to maintain for the project (cistern + rooftop) and I think we can now confirm that we do meet this requirement.

Other than the P1 layout, let me know if there is anything else you need.

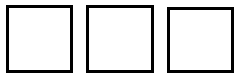
Thanks,

Figurr

collectif d'architectes

figurr.ca

-



-

FIG. 1

190 Somerset St W #206

Ottawa ON K2P 0J4

T 613 695-6122 x 135

M 613 618-3290

FIG. 2

3550, Saint-Antoine O.

Montréal QC H4C 1A9

T 514 861-5122

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From: Doug Cave <doug.cave@ibigroup.com>

Sent: September 12, 2022 10:15 AM

To: Reg Callaghan <rcallaghan@tmptoronto.com>

Cc: Melissa Du Plessis <mduplessis@figurr.ca>; Samantha Labadie <samantha.labadie@ibigroup.com>

Subject: Heron Gate 5-1 - Coordination Meeting

Reg,

Further to the coordination meeting that we had last weekend here is the list of information we are looking for:

1. The City have requested that we provide the following Cistern details on our site servicing plan:
 - a. Location.
 - b. Inverts.
 - c. Dimensions.
 - d. Emergency overflow.
2. The City have asked us to prove that we cannot use the sanitary connection to Heron Road shown on the Master Servicing Report. We need to know what the sanitary service invert would be if you have to bring it to the northwest corner of the parking garage.
3. For inclusion in our servicing report we require the following details:

- a. Calculations for the capacity of the cistern.
- b. We need the spec sheets for the roof drains and inlet controls.
- c. We need the spec sheet for the constant flow pump.

Thank you

Doug

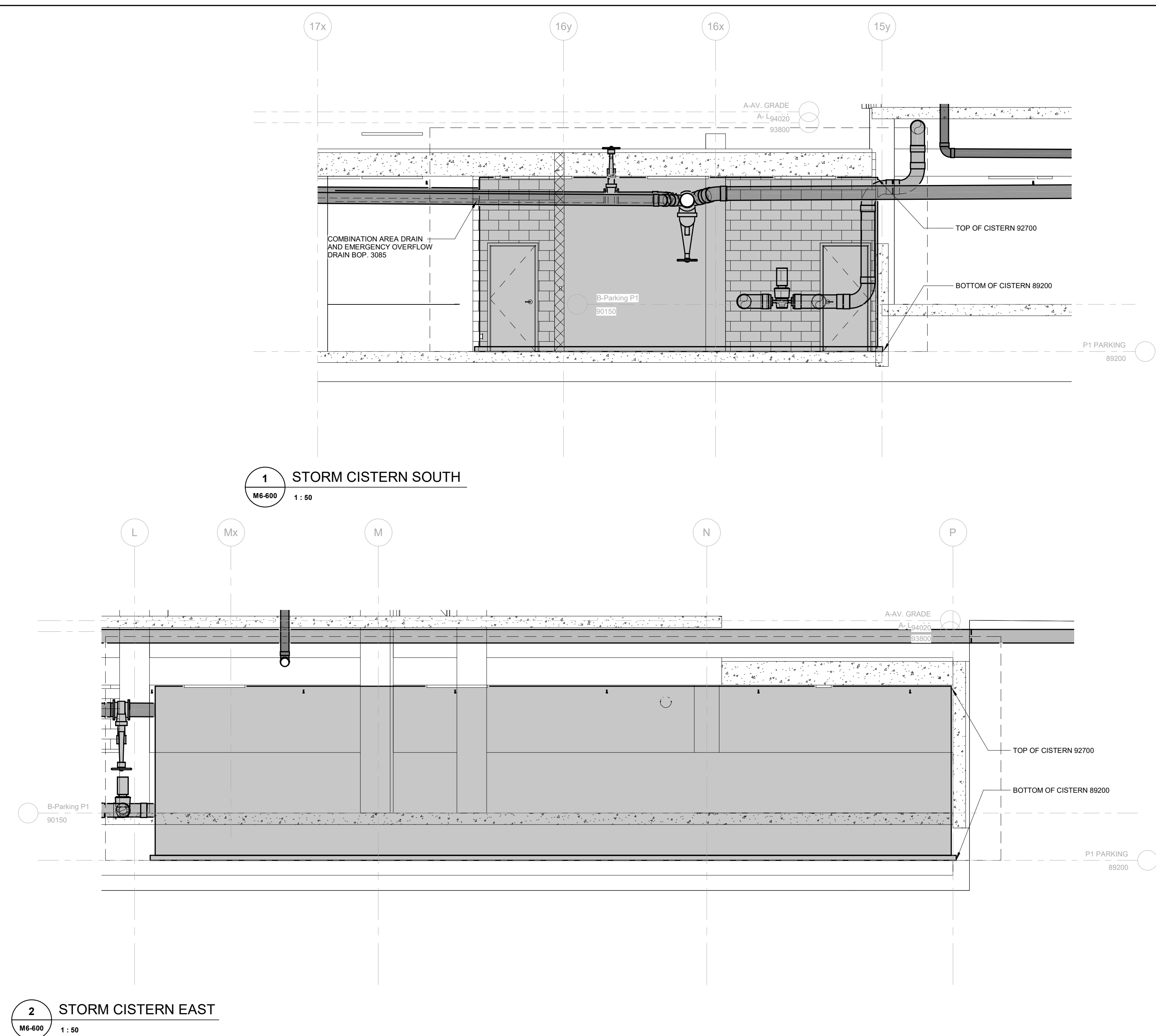
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(he/him/his)

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[illegible]

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Structure / Structural

Client / Client



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L'entrepreneur doit vérifier toutes les dimensions et informations sur le site et aviser immédiatement l'architecte de toutes erreurs ou omissions.

Contractor shall verify all information and dimensions on site and immediately report any errors or omissions to the architect.

Project / Project

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Vérifié par / Verified by	No. dessin / Drawing number	Révision / Revision
Échelle / Scale		

Date de création du dessin /
Drawing creation date
01/25/23

M6-600