

DESIGN BRIEF

FOR

MINTO COMMUNITIES–CANADA
BARRHAVEN TOWN CENTRE–STAGE 1
3265 JOCKVALE ROAD

CITY OF OTTAWA

PROJECT NO.: 15-816

JUNE 2023
REVISION 2
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**DESIGN BRIEF
FOR 3265 JOCKVALE ROAD
MINTO COMMUNITIES**

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1.0 INTRODUCTION & BACKGROUND

David Schaeffer Engineering Limited (DSEL) has prepared this Design Brief in support of development of 3265 Jockvale Road on behalf of Minto Communities.

The study area is located within 3265 Jockvale Road in the City of Ottawa urban boundary, in the Ward 22 – Gloucester-South Nepean as illustrated in **Figure 1.1**, the study area is bounded by Longfields Drive to the east, future Chapman Mills Drive to the south, an extension of Riocan Avenue to be completed as part of these works in the west, and a mix of existing commercial and residential to the north which is crossed by Glenroy Gilbert Drive which will also be extended as part of these works. The site is a 5.21-hectar parcel located within South Nepean Town Centre Community Design Plan (CDP (City of Ottawa, 2006)).

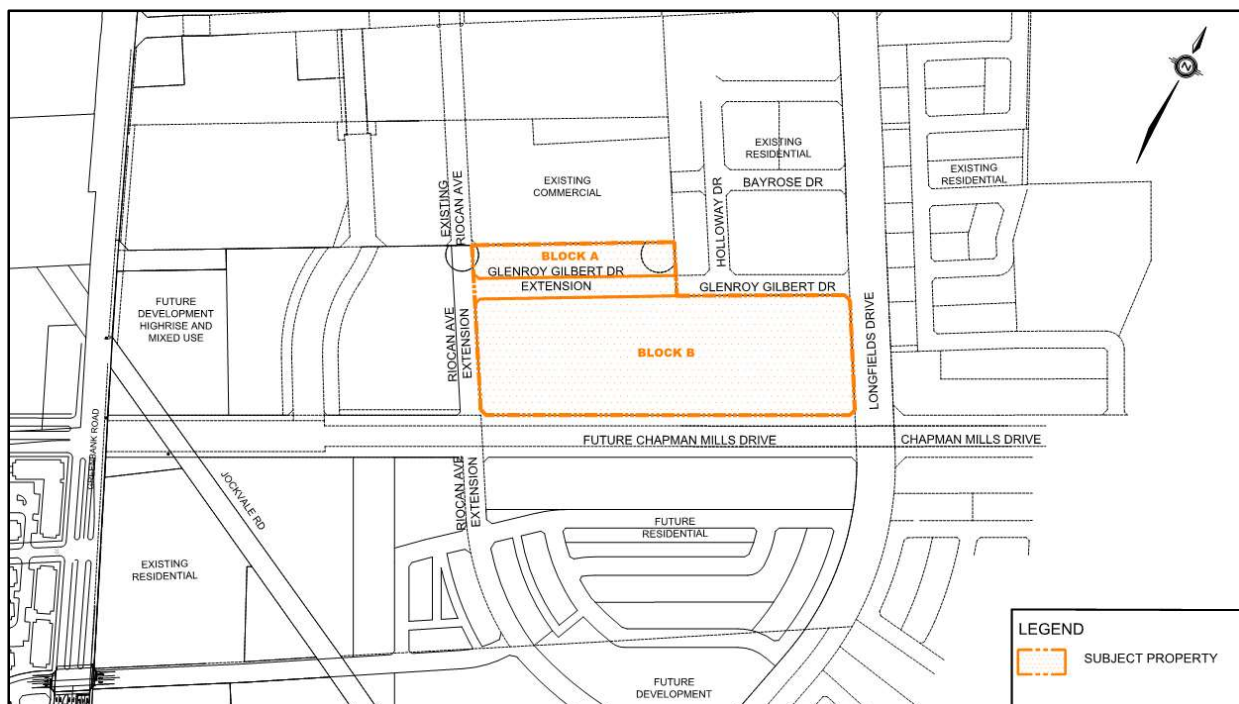


Figure 1.1: Site Location

The study area is governed by the broader *South Nepean Town Centre Community Design Plan* (CDP) (City of Ottawa, 2006) and its *Appendix I, South Nepean Town Centre Community Design Plan Preliminary Serviceability Report* (CCL, December 2005). The design plan and preliminary serviceability report were completed to prepare a preferred servicing strategy and cohesive development concept for the core of the South Nepean Town Centre Community (SNTC) development area (165 ha.). The reports identify existing infrastructure and environmental constraints, describe the neighborhood-level trunk services that will service all properties within the study area, establish targets for future site-specific stormwater management plans, and identify required infrastructure upgrades to support the proposed development of the SNTC area.

Since the completion of the reports, many of the identified neighbourhood-level infrastructure projects have been completed, including the Nepean-South Chapman Mills stormwater management pond and associated trunk storm sewers, sanitary trunk sewers, and trunk watermain connections. Furthermore, the planning and design of Chapman Mills Drive have been recently completed via the Municipal Class Environmental Assessment (October 2000, as amended 2007 and 2011) Schedule C process, with the Environmental Study Report filed on 18 November 2016.

This Design Brief is provided to demonstrate conformance with the design criteria of the City of Ottawa, the Community Design Plan, background studies including the *MSS*, and general industry practice. It provides detailed water, sanitary sewer, stormwater management and grading design information to support the development of the study area. This report should be read in conjunction with the Engineering Drawings (DSEL, June 30, 2023).

This Design Brief and detailed engineering submission have been prepared by **David Schaeffer Engineering Ltd.**, with site boundary conditions for the municipal water supply provided by the City of Ottawa, and geotechnical analysis prepared by **Paterson Group Inc.**

1.1 Development Concept

The site plan for the proposed development concept at 3265 Jockvale Road is presented in **Appendix A**. The proposed development consists of a total of 604 stacked townhouse units. **Table 1.1** presented below provides a projected population count for the site. The site is comprised of two private blocks bounded by municipal right-of-ways (ROW). The north block, referred to as Block A, is located north of Glenroy Gilbert Drive between Riocan Ave and Sue Holloway Way. The south block, referred to as Block B, is located south of Glenroy Gilbert Drive between Riocan and Longfields Drive. DSEL has also been retained by Minto Group to undertake detailed design of Glenroy Gilbert Drive and Riocan Avenue. Detailed designs for both of these municipal ROWs are being submitted to the City in parallel with the site plan application for the private lands.

Table 1.1: Development Statistic Projections

Land Use	Total Area (ha)	Projected Residential Units	Residential Population per Unit *	Projected Population *
Block A (North) Stacked Townhouse Units	0.64	60	2.1	126
Block B (South) Stacked Townhouse Units	4.19	544	2.1	1142
Glenroy Gilbert Drive Extension	0.39	-	-	-
TOTAL	5.21	604		1268

** NOTE: Population projections may differ from population estimates used in background Transportation Studies, Planning Rationale, and other studies. Population projection and residential population per unit values are based on Ministry of Environment, Conservation and Parks guidelines for servicing demand calculations. Local Roads are included in Total Area estimates above.*

1.2 Existing Conditions

Under existing conditions, the study area consists of undeveloped vacant lands. The existing elevations within the study area generally range from 101.8 m in the northwest corner of the study area to 95 m where Chapman Mills Drive meets Longfields Drive.

Paterson Group conducted a geotechnical investigation for the entirety of the Barrhaven Town Centre which is summarized in the *Geotechnical Investigation – Proposed Mixed-Use Commercial and Residential Development – 3265 Jockvale Road* (Paterson Group, August 27, 2021). The investigation explains a layer of topsoil was found overlying stiff silty clay and dense glacial till. The bedrock and groundwater depths for the study area were reported to be roughly 5-15 m and 3-6 m below existing ground respectively.

1.3 Required Permits / Approvals

Development of the study area is expected to be subject to the following permits and approvals presented in **Table 1.2**.

Table 1.2: Anticipated Permit/Approval Requirements

Agency	Permit/Approval Required	Trigger	Remarks
MECP/City of Ottawa	Environmental Compliance Approval	Construction of new sanitary sewers, storm sewers, and stormwater management works.	The City of Ottawa is expected to review all stormwater collection system, stormwater management, and wastewater collection system on behalf of the MECP by transfer of review authority.
MECP	Permit to Take Water (PTTW)	Construction of proposed land uses (e.g. basements for residential homes) and services.	Pumping of groundwater or surface water may be required during construction, given site conditions, proposed land uses, and on-site/off-site municipal infrastructure.
MECP/City of Ottawa	MECP Form 1 – Record of Watermains Authorized as a Future Alteration.	Construction of watermains.	The City of Ottawa is expected to review the watermains on behalf of the MECP through the Form 1 – Record of Watermains Authorized as a Future Alteration.
City of Ottawa	MOE Form 1 – Record of Watermains Authorized as a Future Alteration.	Construction of watermains.	The City of Ottawa is expected to review the watermains on behalf of the MECP through the Form 1 – Record of Watermains Authorized as a Future Alteration.
City of Ottawa	Commence Work Notification (CWN)	Construction of new sanitary and storm sewer throughout the subdivision.	The City of Ottawa will issue a commence work notification for construction of the sanitary and storm sewers once an ECA is issued by the MECP.

1.4 Pre-Consultation

Pre-application consultation was conducted on October 22, 2020, between the City of Ottawa and the developers as part of the Plan of Subdivision Application process. Various stakeholders provided written comments that were recorded and formalized in meeting minutes.

Per the City of Ottawa Transfer of Review Agreement No. TOR-OTT-E-2019-01, it is assumed that MECP pre-consultation is not required, as the City of Ottawa is expected to agree that the proposed works fall under Schedule A of the agreement. As such, the City of Ottawa is expected to review the proposed infrastructure on behalf of MECP as part of issuing Environmental Compliance Approval for the appropriate works.

2.0 GUIDELINES, PREVIOUS STUDIES, AND REPORTS

2.1 Existing Studies, Guidelines, and Reports

The following key studies were utilized in the preparation of this report:

- **Ottawa Sewer Design Guidelines**, City of Ottawa, *SDG002*, October 2012
(*Sewer Design Guidelines*)
- **Technical Bulletin ISDTB-2014-01**, Revisions to Ottawa Design Guidelines – Sewer, City of Ottawa, February 5, 2014.
(ISDTB-2014-01)
- **Technical Bulletin PIEDTB-2016-01**, Revisions to Ottawa Design Guidelines – Sewer, City of Ottawa, September 6, 2016.
(PIEDTB-2016-01)
- **Technical Bulletin ISTB-2018-01**, Revisions to Ottawa Design Guidelines – Sewer, City of Ottawa, March 21, 2018
(ISTB-2018-01)
- **Technical Bulletin ISTB-2019-02**, Revisions to Ottawa Design Guidelines – Sewer, City of Ottawa, July 8, 2019.
(ISTB-2019-02)
- **Ottawa Design Guidelines – Water Distribution**, City of Ottawa, July 2010.
(*Water Supply Guidelines*)
- **Technical Bulletin ISD-2010-2** City of Ottawa, December 15, 2010.
(ISDTB-2010-2)
- **Technical Bulletin ISDTB-2014-02** City of Ottawa, May 27, 2014.
(ISDTB-2014-02)
- **Technical Bulletin ISTB-2018-02** City of Ottawa, March 21, 2018
(ISDTB-2018-02)
- **Technical Bulletin ISTB-2021-03** City of Ottawa, August 18, 2021
(ISDTB-2021-03)
- **Fire Underwriters Survey**, 1999.
(*FUS*)
- **Design Guidelines for Drinking-Water Systems**, Ministry of the Environment, 2008. (*MECP Water Guidelines*)

- **Design Guidelines for Sewage Works**, Ministry of the Environment, 2008.
(*MECP Design Guidelines*)
- **Stormwater Planning and Design Manual**, Ministry of the Environment, 2003.
(*SWMP Design Manual*)
- **Ontario Building Code Compendium**,
Ministry of Municipal Affairs and Housing Building Development Branch, 2012
and as updated from time to time.
(*OBC*)
- **Ontario Building Code Compendium**,
Ministry of Municipal Affairs and Housing Building Development Branch, 2012
and as updated from time to time.
(*OBC*)
- **South Nepean Town Centre Community Design Plan**
City of Ottawa, July 2006. (CDP)
- **Kennedy Burnett Potable Water Master Servicing Study**
Stantec Consulting Ltd, April 29, 2014.
- **South Nepean Collector: Phase 2, Hydraulics Review**, Technical
Memorandum
Novatech, August 20, 2015.
- **Kennedy-Burnett Stormwater Management Facility Functional Design
Report**
CH2M, February 17, 2017.
- **Nepean South Chapman Mills Stormwater Management Servicing**, Fourth
Addendum, IBI Group, February 16, 2018.
- **Geotechnical Investigation** – Proposed Mixed-Use Commercial and Residential
Development – 3265 Jockvale Road, Paterson Group, August 27, 2021

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The subject property lies within the existing City of Ottawa 3SW pressure zone. To the northeast of the subject property, a 200mm diameter watermain exists within the Glenroy Gilbert Drive ROW, as well as a 300mm diameter watermain in the Chapman Mills Drive ROW which is capped at the study area boundary. To the northwest, a 200mm watermain is capped at the study area boundary running from the Chapman Mills Marketplace retail development and existing infrastructure on Riocan Avenue.

3.2 Water Supply Servicing Design

Per the 2006 *CDP* and *Kennedy Burnett Potable Water Master Servicing Study* (Stantec 2014), the subject lands were considered to be serviced a local network of watermains connecting to trunk watermains running within Longfields Drive and through the SNTC.

The study area is proposed to be serviced by a 150 mm diameter internal watermain network with three connections to the existing watermains within Glenroy Gilbert Drive, Chapman Mills Drive, and Riocan Avenue. Block A, to the north of Glenroy Gilbert, is serviced by a 150 mm watermain system with two connections to the 200 mm watermain being extended along Glenroy Gilbert Drive. 50mm services are extended from this 150mm system. The proposed watermain network is shown in **Drawings 3-4**. The units in Blocks A and B that do not have an underground garage will be equipped with individual water meters and have their own water service. The sizing of the proposed watermain network is based on the *Water Supply Guidelines* summarized in **Table 3.1** below.

Table 3.1: Water Supply Design Criteria

Design Parameter	Value
Residential – Stacked Townhouse	2.1 p/unit
Residential Average Daily Demand	280 L/d/p
Residential – Maximum Daily Demand	2.5 x Average Daily Demand 4.9 x Average Day Demand
Residential – Maximum Hourly Demand	5.5 x Maximum Daily Demand 7.4 x Average Day Demand
Minimum Watermain Size	150 mm diameter
Minimum Depth of Cover	2.4 m from top of watermain to finished grade
During normal operating conditions desired operating pressure is within	350 kPa and 480kPa
During normal operating conditions pressure must not drop below	275 kPa
During normal operating conditions pressure must not exceed	552 kPa
During fire flow operating pressure must not drop below	140 kPa
Notes: <ul style="list-style-type: none"> • Block A Peaking Factors based on MOE (MECP) Table 3-3 Design Guidelines For Drinking-Water Systems (2008) • Block B Peaking Factors based on Section 4: Ottawa Design Guidelines, Water Distribution (July 2010), Table 4.1 – Per Unit Populations and Table 4.2 – Consumption Rates for Subdivisions of 501 to 3,000 Persons. • No Outdoor Water Demand considered for residential uses. • Residential Average Daily Demand assumed to be 280 L/d/P in accordance with 2018 changes to Sanitary Design Guidelines, see Section 4.0. 	

A summary of the anticipated water demands for the study area are summarized in **Table 3.2**. Boundary conditions have been provided by the City of Ottawa based on these demands, and can be found in **Appendix B**.

Table 3.4: Summary of Water Demands

Dwelling Type	Number of Units	Population per unit	Allocated Demand	Avg Day (L/min)	Max Day 2.5 x Avg Day (L/min)	Peak Hour 5.5 x Max Day (L/min)	Fire Flow Demand (L/min)
Block B	544	2.1	280 L/d/P	222.3	555.6	1222.7	17000.0

Dwelling Type	Number of Units	Population per unit	Allocated Demand	Avg Day (L/min)	Max Day 4.9 x Avg Day (L/min)	Peak Hour 7.4 x Avg Day (L/min)	Fire Flow Demand (L/min)
Block A	60	2.1	280 L/d/P	24.5	120.1	181.3	17000.0

The fire flows are calculated in accordance with the Fire Underwriters Survey's Water Supply for Public Fire Protection Guideline (1999) as amended by ISTB-2014-02 & ISTB-2018-02.

- Type of construction: Wood Frame Construction;
- Sprinkler protection: Non-Sprinklered

The result of these parameters is an estimated fire flow of approximately 17,000 L/min. Detailed calculations are presented in **Appendix B**.

The boundary conditions provided by the City of Ottawa for use in the hydraulic analysis related to the subject site are summarized in **Table 3.3**. Correspondence with the City of Ottawa related to boundary conditions is included in **Appendix B**.

Table 3.5: Boundary Conditions

Condition	Connection 1 (Riocan Ave.) 102.2m Ground Elev.		Connection 2 (Glenroy Gilbert Drive) 99.3m Ground Elev		Connection 3 (Chapman Mills Drive) 94.7m Ground Elev	
	HGL (m)	Pressure (psi)	HGL (m)	Pressure (psi)	HGL (m)	Pressure (psi)
Max HGL	147.9	64.9	147.9	69.1	147.9	69.1
Peak Hour	145.4	61.3	145.4	65.5	145.4	65.5
Max Day + Fire 1 (283.33 L/s)	129.0	38.1	138.7	56.0	144.9	71.2

3.2.1 Watermain Modelling

A hydraulic analysis was completed for the study area. The analysis, including the watermain network configuration and sizing, is provided in **Appendix B**.

Modelling was carried out for minimum hour, peak hour and maximum day plus fire flow. Modelling results shown in **Table 3.4** indicate that the development can be adequately serviced for minimum hour and peak hour criteria.

Table 3.6: Summary of Available Service Pressures

Average Day Demand Maximum Pressure	Peak Hour Demand Minimum Pressure
55.36 m (543 kPa)	46.93 m (431kPa)

The results presented in the table above indicate that the pressures during average day demand are not quite within the OSDG best practices for new water distribution systems to operate between 350 kPa and 480 kPa however, they are below the maximum allowable pressure of 552 kPa. The use of pressure reducing valves may be recommended during construction should the actual pressure in the watermain exceed what has been used for the boundary conditions.

Per **Table 3.1**, the minimum allowable pressure under fire flow conditions is 140 kPa (20 psi) at the location of the fire. A summary of available fire is shown below in **Table 3.5**. Further details can be found in **Appendix B**.

Table 3.7: Summary of Available Fire Flows

Required Fire Flow	Minimum Pressure
17000 (L/min)	14.64m (143.57kPa)

3.3 Fire Hydrant location

Fire Hydrant location were provided by a fire consultant Vortex Fire Protection Inc. The Hydraulic analysis presented above is based on the fire hydrant locations provided by Vortex Fire Inc. The Hydrants were laid out by Vortex Fire Protection Inc. to ensure a minimum distance of 45m between any opening and the nearest fire hydrant. Our understanding is that this requirement is not conformant to Section 3.10.3.4 of the Ontario Building code. The acceptability of this should be verified by the City and/or fire services to ensure conformance. The layout provided to DSEL by Vortex Fire Protection Inc. has been added to **Appendix B**.

3.4 Water Supply Conclusion

The proposed watermain network conforms to all relevant City and MECP *Water Supply Guidelines*. The hydraulic analysis of the proposed watermain network, concludes that all required domestic and fire flows can be met throughout the study area upon full buildout of the development. Anticipated fire flow requirements can be met throughout the development lands according to City Guidelines and ISTB-2018-02.

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The study area lies within the South Nepean Collector Sewer (SNC) catchment. The SNC sewer operates at the intersection of Jockvale Road and Longfields Drive before conveying wastewater under the Jock River. A 200 mm diameter sanitary sewer exists within the Glenroy Gilbert Drive ROW and a 250 mm diameter sanitary sewer exists in the Longfields Drive ROW.

4.2 Wastewater Design

The *South Nepean Town Centre Community Design Plan Preliminary Serviceability Report* (CCL, December 2005) and the *South Nepean Collector: Phase 2, Hydraulics Review, Technical Memorandum* (Novatech, August 2015) identify the outlet for the development area as the South Nepean Collector Trunk sanitary sewer.

In March 2018, the City of Ottawa provided DSEL with the latest sanitary drainage information for the Longfields Drive sanitary sewer. This information includes conceptual drainage area plans for the Barrhaven Town Centre prepared by David McManus Engineering in February 2010 and a sanitary design sheet prepared by the City of Ottawa in October 2016. We have since been made aware of updates to the March 2018 sanitary drainage areas as zoning by-law amendments have been updated to reflect higher density developments. An amalgamated design sheet has been therefore been provided in **Appendix C** to include the new drainage plans and updated population count. The spreadsheet indicates that there is still sufficient in the existing Longfields sanitary sewer to accept the projected peak flows from the Barrhaven Town Centre development.

The proposed development area is to be serviced by two internal gravity sewer systems directing flows to the existing Longfields Drive sanitary sewer. The block to the north will be serviced by 200 mm dia. sewers directed to the extended Glenroy Gilbert Drive and connecting to the existing sewer that connects to Longfields Drive. The block to the south will be serviced by 250 m dia. sewers directed to the future Chapman Mills Drive (CMD) and connecting to existing sewers on future CMD. The proposed sanitary sewer network is presented in **Drawings 3-4**.

The sanitary sewer network was designed in accordance with the wastewater design parameters from ISTB-2018-01 and the *Sewer Design Guidelines*, summarized in **Table 4.1** below.

Table 4.1: Wastewater Design Criteria

Design Parameter	Value
Residential Stacked Townhouse	2.1 p/unit
Average Daily Demand	280 L/d/per
Peaking Factor	Harmon's Peaking Factor. Max 4.0, Min 2.0 Harmon Correction Factor 0.8
Infiltration and Inflow Allowance	0.33 L/s/ha
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{2/3} S^{1/2}$
Minimum Sewer Size	200 mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5 m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6 m/s
Maximum Full Flowing Velocity	3.0 m/s
<i>Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012, Technical Bulletins, and recent residential subdivisions in the City of Ottawa.</i>	

A flow allocation of 1.71 L/s was allocated for the Glenroy Gilbert Drive extension and 18.54 L/s at the Longfields Drive Intersection with future Chapman Mills as per the Longfields drive sewer design sheet provided by the City and included in Appendix C.

Table 4.2: Wastewater Peak Flow

Area (Ha.)		Number of Units	Population		Allocated Demand (L/c/d)	Avg Day (L/s)	I/I (L/s)	Peak Factor	Peak Flow (L/s)
			Persons per unit	Population					
Block A & Glenroy Gilbert Extension	0.64	60	2.1	126	280 L/c/d	0.41	0.21	3.57	1.67
Block B	4.19	544	2.1	1142	280 L/c/d	3.70	1.38	3.21	13.26
Total	5.21	604							14.93

A wastewater peak flow for the proposed development 14.93 L/s was calculated based on the parameters presented in **Table 4.1**. The peak flow is less than the allocated flow for the BTC Phase 1 lands based on the Longfields Drive sanitary design sheet. Based on the sanitary design sheet for Longfields Drive presented in **Appendix C** there is sufficient residual capacity in the receiving sewer system to accommodate the development.

4.3 Wastewater Servicing Conclusions

The proposed wastewater system for the development area is designed to conform to all relevant City Standards and MECP Guidelines. Two networks of local sanitary sewers are proposed to serve the study area directing flows towards the existing sanitary sewer in the Longfields Drive ROW. The South Nepean Collector sanitary sewer has been sized for the long-term development of the SNTC lands, which includes the study area.

5.0 STORMWATER MANAGEMENT

5.1 Existing Stormwater Drainage

The study area is considered to be within the planned catchment of the existing stormwater management facility (SWMF) east of Longfields Drive and south of Paul Metivier Drive. The existing storm sewers surrounding the study area are depicted in **Drawings 3-4** and can be summarized as:

- 600 mm diameter storm sewer within the Glenroy Gilbert Drive ROW,
- 1650 mm diameter trunk storm sewer within the future extension of the Riocan Avenue ROW,
- 1500 mm diameter trunk sewer within the Longfields Drive ROW running south of Glenroy Gilbert Drive, and,
- 750 mm diameter storm sewer at future Chapman Mills Drive.

5.2 Stormwater Management Criteria

Consistent with *Nepean South Chapman Mills Stormwater Management Servicing* (IBI Group, February 16, 2018), the study has been considered to be part of the tributary area of the existing SWMF east of Longfields Drive. Flows from the study area were considered to drain to the SWMF via existing sewers on Glenroy Gilbert Drive and Longfields Drive. Excerpts from the report can be found in **Appendix D**.

The following criteria was considered as part of the stormwater management strategy within the study area and conveyance to the existing SWMF east of Longfields Drive, among other requirements:

Storm sewers on local roads are designed to provide a minimum 2-year level of service per the City's latest Technical Bulletin PIEDTB-2016-01. Collector and arterial roads are to provide a 5-year and 10-year level of service respectively.

Under full flow conditions, the allowable velocity in storm sewers is to be no less than 0.80 m/s and no greater than 6.0 m/s.

For the 100-year storm and for local and collector roads, the maximum depth of water (static and/or dynamic) on streets, rear yards, public space, and parking areas shall not exceed 0.35 m at the gutter. For arterial roads, no barrier curb overtopping is permitted.

No surface ponding on the subject site, or local roads, during the 2-year event.

The major system is designed with sufficient capacity to allow the excess runoff from storms above the 100-year storm to be conveyed within the public ROW or adjacent to the right-of-way provided that the water level must not touch any part of the building envelope, and must maintain 15 cm vertical clearance between spill elevation on the street and the ground elevation at the nearest building envelope.

The proposed stormwater management strategy for the study area is to respect the 100-year storm sewer capture rate of 784 L/s from the development area that is set out in the *Nepean South Chapman Mills Stormwater Management Servicing* (IBI Group, February 16, 2018) and summarized below.

- Block A & Glenroy Gilbert Drive: 147.0 L/s 100-year release rate to the proposed storm sewer in the Glenroy Gilbert Drive ROW
- Block B: 637 L/s 100-year release rate to the proposed storm sewer in the Chapman Mills Drive ROW

5.3 Stormwater Management Strategy

Stormwater runoff will be directed to a series of catch basins located at sags that will collect the runoff and discharge to the minor system. Underground storage tanks will be utilized to store excess runoff generated by larger storm events in order to respect the allocated release rate for the site set out by the Nepean South Chapman Mills Stormwater Management Servicing design brief.

5.3.1 Minor System

The study area is to be serviced by a storm sewer system designed in accordance with the amendment to the storm sewer and stormwater management elements of *PIETB-2016-01*. As described in **Section 5.2**, the minor storm system is proposed to be designed for a minimum of the 5-year event as the site is comprised of private parking areas.

The proposed gravity storm sewer network within the private site ranges from 250 mm to 675 mm dia. To service the block B, a 750 mm dia. storm sewer will be installed and connected to the existing 750mm dia. storm sewer within the future Chapman Mills Drive ROW. Similarly, a 450 mm and 525 mm dia. storm sewer will be extended along the Glenroy Gilbert Drive extension ROW to service the Block B. The proposed sewers collect stormwater runoff from the Minto Barrhaven Town Centre – Stage 1 development and directs stormwater to Longfields Drive. There is an existing 1500 mm dia. storm sewer located in the Longfields Drive ROW, this sewer directs flow south to the existing SWMF east of Longfields Drive and north of the Jock River.

The South Nepean Chapman Mills hydraulic model was reviewed to establish 100-year HGL levels on the 1500 dia. storm sewer on Longfields drive near the BTC Stage 1 outlet locations. The review determined that the HGL levels are below the obvert at the connection locations of this site and a flow allocation was given to BTC stage 1. As the allocated release rate is being respected, the receiving sewer system is expected to remain free-flowing. Therefore, an on-site HGL analysis was not undertaken.

Table 5.1 summarizes the standards that have been employed in the detailed design of the storm sewer network, meeting the criteria described in **Section 5.2**.

Table 5.1: Storm Sewer Design Criteria

Design Parameter	Value
Minor System Design Return Period	Per requirements in the <i>Nepean South Chapman Mills Stormwater Management Servicing</i> (IBI Group, February 16, 2018). Sewers to be sized per 2-Year (Local Streets), 5-Year (Collector Streets), 10-Year (Arterial Streets) – PIEDTB-2016-01
Major System Design Return Period	100-Year
Intensity Duration Frequency Curve (IDF) 2-year storm event: A = 723.951, B = 6.199, C = 0.810 5-year storm event: A = 998.071, B = 6.053, C = 0.814	$i = \frac{A}{(t_c + B)^C}$
Minimum Time of Concentration	10 minutes
Rational Method	$Q = CiA$
Runoff coefficient for paved and roof areas	0.90
Runoff coefficient for landscaped areas	0.20
Storm sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{2/3} S^{1/2}$
Minimum Sewer Size	250 mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2 m from crown of sewer to grade
Minimum Full Flowing Velocity	0.8 m/s
Maximum Full Flowing Velocity	6.0 m/s
<i>Extracted from City of Ottawa Sewer Design Guidelines, October 2012, as amended by PIEDTB-2016-01, and based on recently approved residential subdivision designs in City of Ottawa.</i>	

5.3.2 Quality Control

The storm outlets are tributary to the existing SWMF east of Longfields Drive and south of Paul Metivier Drive. This facility provides end of pipe quality control and as such, no quality control is provided on-site.

5.3.3 Quantity Control

Minor system allowable release rates were established for both outlets based the existing reports as described in **Section 5.3**. Excess runoff during larger storm events will be stored in underground tanks where the flow will be directed to the minor system at a controlled rate.

Stormtech Chambers are being proposed to accomplish the required storage volumes. Street drainage will be directed towards catch basins that outlet to the storage chambers. The chambers will be connected upstream of maintenance holes that will be equipped with ICDs which will restrict the flow to the allowable release rates established in section 5.3. These storage chambers are “offline” to the network that collects the foundation drainage. As the storm sewer system that conveys foundation drainage is not upstream of any inlet control devices, basements will remain protected should the tank outlets become obstructed or plugged.

5.4 Stormwater Management Calculations

The modified rational method (MRM) was used to size the storage tanks and at-grade ponding to ensure that allowable release rates are respected. Any uncontrolled flow was subtracted to the total controlled flow rate to ensure the sum of the controlled and uncontrolled peak runoffs respect the allowable release rates. The tables below provide a summary of the MRM calculations, detailed calculations are provided in Appendix D.

Table 5.2: Stormwater Storage Requirements for Block A

Control Area	5-year Release Rate (L/s)	5-year Required Storage (m3)	100-Year Release Rate (L/s)	100-Year Required Storage (m3)	100-Year Available Storage (m3)
Unattenuated Areas (CB9 - CB14)	61.6	0.0	61.6	0.0	0.0
DCB 15	20.1	0.0	24.3	24.1	25.1
DCB 16	16.0	0.0	31.8	18.0	21.2
STM108	6.8	21.8	10.0	60.1	60.1
STM105	5.0	45.4	7.6	117.2	117.9
STM101	6.7	14.5	10.7	40.6	40.6
Total	116.8	81.7	146.3	259.9	264.9

As indicated in **Table 5.2** the allowable release rate of 147 L/s prescribed under the Nepean South Chapman Mills SWM servicing report has been respected. In order to achieve the allowable release a total storage volume of 259.9m³ will be required. Three Stormtech chambers are being proposed in addition to surface storage to achieve this requirement as shown in **Drawings 3 and 4**.

Table 5.3: Stormwater Storage Requirements for Block B

Control Area	5-year Release Rate (L/s)	5-year Required Storage (m3)	100-Year Release Rate (L/s)	100-Year Required Storage (m3)	100-Year Available Storage (m3)
Unattenuated Areas					
Glenroy Gilbert	29.7	0.0	50.8	0.0	0.0
Riocan	25.6	0.0	43.8	0.0	0.0
Chapman Mills	65.4	0.0	111.9	0.0	0.0
Longfields	26.0	0.0	44.5	0.0	0.0
Attenuated Areas					
STM115	46.6	41.4	69.5	134.6	135.1
STM126	10.9	38.2	21.7	103.2	105.5
STM124	7.6	104.8	9.5	272.7	275.1
STM134	86.5	6.9	141.3	76.2	79.7
STM164	6.5	78.3	11.3	200.0	203.5
STM159	6.7	81.5	13.0	206.4	210.3
STM149	54.3	19.0	119.1	74.4	74.8
Total	365.9	370.1	636.6	1067.6	1084.1

As indicated in **Table 5.3** the allowable release rate of 637 L/s prescribed under the Nepean South Chapman Mills SWM servicing report has been respected. In order to achieve the allowable release a total storage volume of 1067m³ will be required. A number of Stormtech chambers are being proposed in order to achieve this requirement as shown in **Drawings 3 and 4**.

The Modified Rational Method was originally intended to be used for above grade storage where the change in head applied through the orifice equation had little variation. As the release rates fluctuate from maximum peak flow for underground storage due to the varying head, the variation in head has been accounted for in the storage volume calculations. Average release rate calculated using the orifice equation were used to size the tanks. Maximum release rates were verified (maximum head) to ensure the maximum allowable was respected. Complete stormwater management calculations are presented in **Appendix D**.

5.5 Grading & Drainage

The elevations drop significantly between Glenroy Gilbert and the future Chapman Mills. As such, terracing and retaining walls are being proposed at strategic locations across the site. The grading plan has been developed to provide adequate drainage and allow landscape features to be incorporated within the site. Detailed grading design is presented in **Drawings 5 and 6**. Major overland flow routes have been designed to safely convey water to municipal ROWs should there be any blockages in drainage structures.

5.6 Stormwater Servicing Conclusions

A network of local gravity sewers is proposed within the study area to capture stormwater and convey the flows to the proposed trunk storm sewer network. The storm sewers have been sized by the rational method and inlet control devices and orifices are used to maintain the allowable release to the existing minor system. Quality control will be achieved via existing stormwater management facilities.

6.0 EROSION AND SEDIMENT CONTROL

Soil erosion occurs naturally and is a function of soil type, climate, and topography. The extent of erosion losses is exaggerated where vegetation has been removed during construction and the top layer of soil becomes agitated, and where increased stormwater runoff is directed to natural areas.

Prior to earthworks or underground construction, erosion and sediment controls will be implemented and will be maintained throughout construction.

The erosion and sediment controls will include (but are not limited to):

Minimize the area to be cleared and grubbed.

Plan construction at proper time to avoid flooding.

Provide sediment traps and basins during dewatering.

Silt fence to be installed around the perimeter of the site and to be cleaned and maintained throughout construction. Silt fence to remain in place until the working areas have been stabilized and re-vegetated. See **Drawings 11 & 12**.

A mud mat to be installed at the construction access in order to prevent mud tracking onto adjacent roads.

Catch basins to have inserts installed under the grate during construction to protect from silt entering the storm sewer system.

Extent of exposed soils to be limited at any given time, and exposed areas will be re-vegetated as soon as possible.

Exposed slopes to be protected with plastic or synthetic mulches.

Stockpiles of cleared materials as well as equipment fueling and maintenance areas to be located away from swales, watercourses, and other conveyance routes.

Seepage barriers such as silt fencing, straw bale check dams and other sediment and erosion control measures to be installed in any temporary drainage stormwater conveyance channels and around disturbed areas during construction and stockpiles of fine material.

Filter inserts to remain on open surface structures such as manholes and catch basins until these structures are commissioned and put into use, streets are asphalted and curbed, and the surrounding landscape is stabilized.

The contractor will, at every rainfall, complete inspections and guarantee proper performance. The inspection is to include:

- Verification that water is not flowing under silt barriers.
- Clean and change inserts at catch basins.

A qualified Inspector will give recommendations related to the mitigation measures that are being implemented and maintained. Bulkhead barriers, filter clothes on open surface structures, silt fencing, and other E&SC measures may require removal of sediment and repairs. The City of Ottawa's Protocol for Wildlife Protection is to be followed during construction.

After build-out of the development, applicable sewers will be inspected and cleaned. All sediment and construction fencing should be removed following construction, providing there is no exposed soil or other potential sources of sedimentation.

7.0 CONCLUSIONS AND RECOMMENDATIONS

This Design Brief has been prepared on behalf of Minto Communities - Canada.

This Design Brief is to be read in conjunction with the first submission of the Minto Barrhaven Town Centre – Stage 1 detailed engineering drawing package, dated June 30, 2023

The key features of the detailed design of the proposed development are as follows:

- Three connections will be made to the existing watermains located on Riocan Avenue, Glenroy Gilbert Drive, and Chapman Mills Drive. The proposed watermain network conforms to all relevant City and MECP *Water Supply Guidelines*.
- Wastewater service will be provided through gravity sewers that have generally been designed in conformance with all relevant City of Ottawa and MECP Guidelines and Policies. A series of gravity sewers will direct wastewater to an existing sewer on Longfields Drive.
- Stormwater management will be achieved using a series of local storm sewers and retention tanks that collect surface water. Two connections to the existing Longfields Drive storm sewer will be made and established release rates for the system will be respected.

The infrastructure identified in this Design Brief is expected to require approval from the City of Ottawa, Ontario Ministry of the Environment, Conservation and Parks prior to construction.

Prepared by,
David Schaeffer Engineering Ltd.



Per: Alexandre Tourigny, P.Eng.

Reviewed by,
David Schaeffer Engineering Ltd.

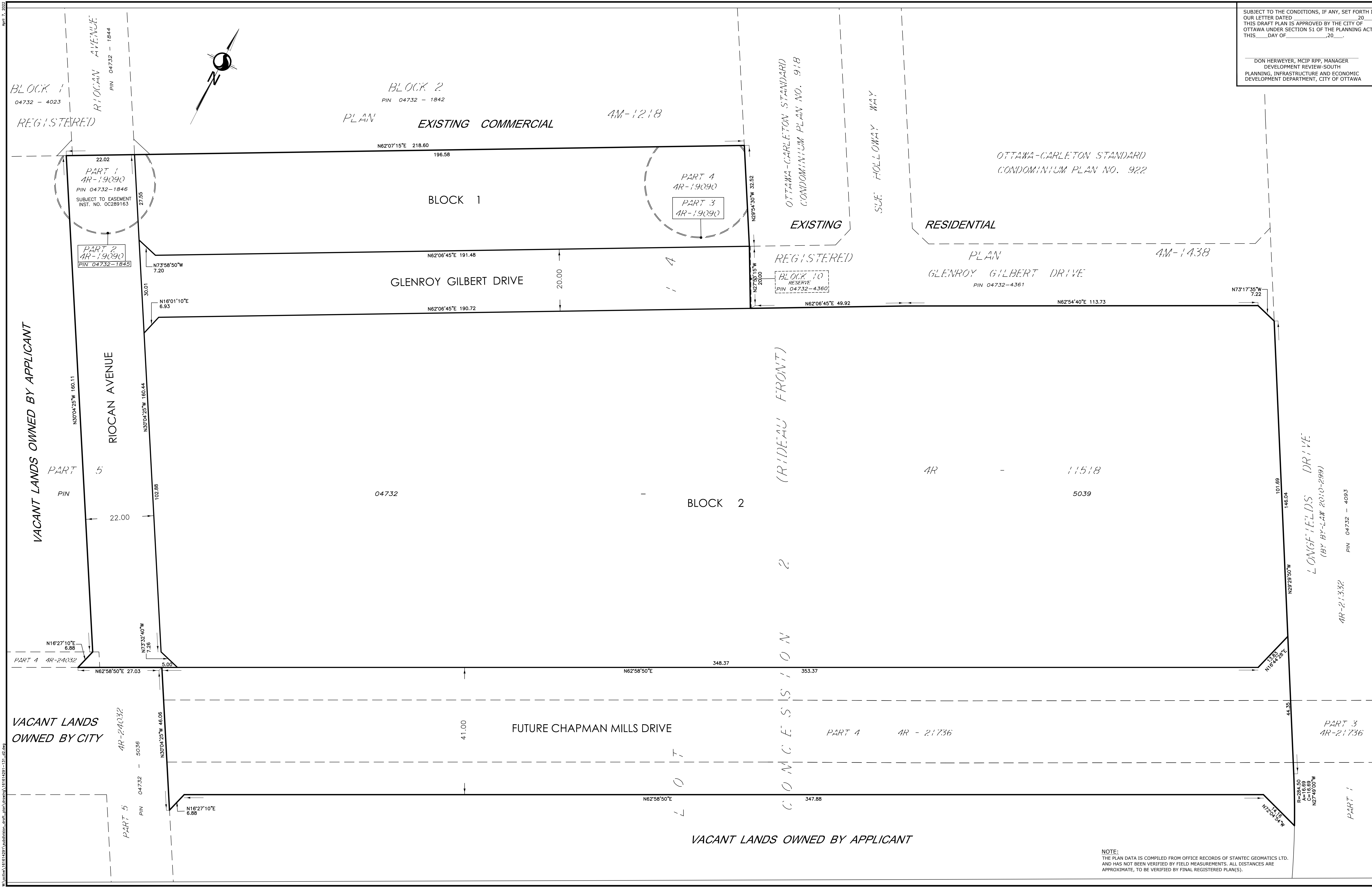


Per: Laurence Coulson, P.Eng.

APPENDIX A

**Legal Plan and Site Plan
City of Ottawa Correspondence**

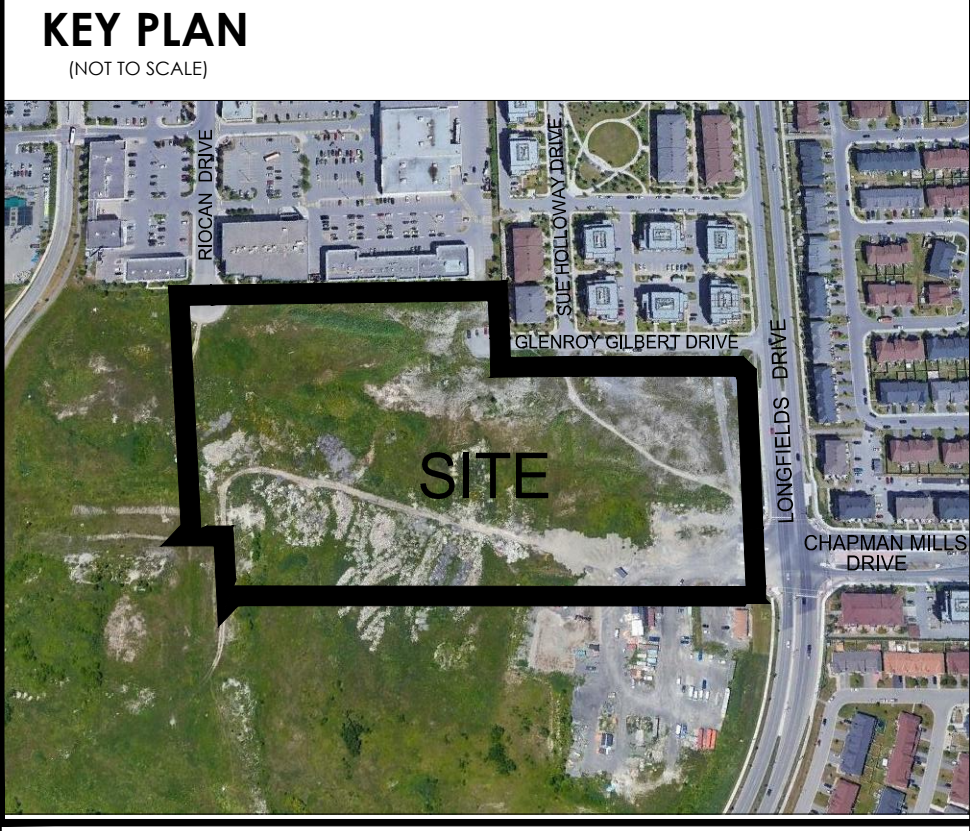
April 7, 2022
W:\Projects\161614291\Subdivision_draft_plan\plan\161614291-131-02.dwg



SUBJECT TO THE CONDITIONS, IF ANY, SET FORTH IN OUR LETTER DATED 20____.

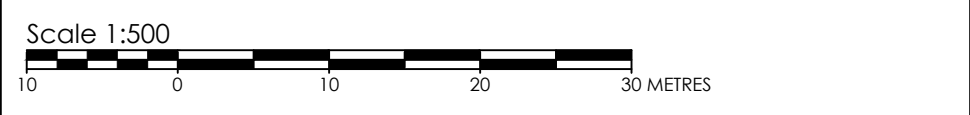
THIS DRAFT PLAN IS APPROVED BY THE CITY OF OTTAWA UNDER SECTION 51 OF THE PLANNING ACT. THIS DAY OF _____ 20____.

DON HERWEYER, MCIP RPP, MANAGER
DEVELOPMENT REVIEW-SOUTH
PLANNING, INFRASTRUCTURE AND ECONOMIC
DEVELOPMENT DEPARTMENT, CITY OF OTTAWA



DRAFT PLAN OF SUBDIVISION

**PART OF LOT 14
CONCESSION 2 (RIDEAU FRONT)**
(GEOGRAPHIC TOWNSHIP OF NEPEAN)
CITY OF OTTAWA



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

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51 OF THE PLANNING ACT.

- (A)-AS SHOWN ON DRAFT PLAN
- (B)-AS SHOWN ON DRAFT PLAN
- (C)-AS SHOWN ON DRAFT AND KEY PLANS
- (D)-SEE PROPOSED LAND USE SCHEDULE (BELOW)
- (E)-AS SHOWN ON DRAFT PLAN
- (F)-AS SHOWN ON DRAFT PLAN
- (G)-AS SHOWN ON DRAFT PLAN
- (H)-CITY WATER AVAILABLE
- (I)-SEE SOIL REPORT
- (J)-SEE TOPOGRAPHICAL INFORMATION
- (K)-ALL CITY SERVICES AVAILABLE
- (L)-AS SHOWN ON DRAFT PLAN

SCHEDULE OF LAND USE			
LOT/BLOCK	USE	UNITS	AREA (Ha/ac)
1	TERRACE UNITS (CONDO)	56	0.637/1.57
2	TERRACE UNITS (CONDO)	544	4.188/10.35
GLENROY GILBERT DRIVE	STREET		0.395/0.98
RIOCAN AVENUE	STREET		0.366/0.90
CHAPMAN MILLS DRIVE	STREET		1.493/3.69
TOTAL		600	7.079/17.49

OWNER'S CERTIFICATE

I HEREBY AUTHORIZE STANTEC GEOMATICS LTD. TO SUBMIT THIS DRAFT PLAN OF SUBDIVISION ON MY BEHALF.

DATE _____ BRONWYN ANDERSON
VICE-PRESIDENT, LAND DEVELOPMENT
MINTO COMMUNITIES INC.
I HAVE THE AUTHORITY TO BIND THE CORPORATION

DATE _____ BRENT STRACHAN
DIVISION PRESIDENT, LAND DEVELOPMENT
MINTO COMMUNITIES INC.
I HAVE THE AUTHORITY TO BIND THE CORPORATION

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE SUBJECT LANDS AND THEIR RELATIONSHIP TO ADJOINING LANDS HAVE BEEN ACCURATELY AND CORRECTLY SHOWN.

DATE _____ FRANCIS LAU
ONTARIO LAND SURVEYOR

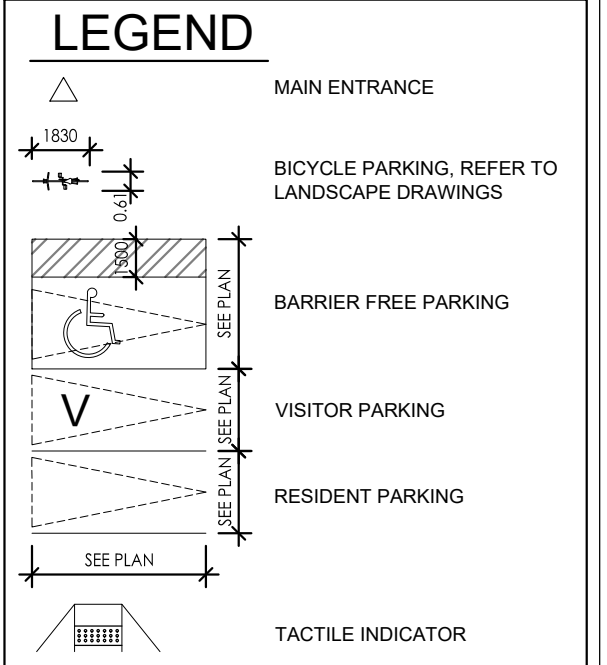
Stantec Geomatics Ltd.
CANADA LAND SURVEYORS
ONTARIO LAND SURVEYORS
1331 CLYDE AVENUE, SUITE 400
OTTAWA, ONTARIO, K2C 3G4
TEL. 613.722.4420 FAX. 613.722.2799
stantec.com

NOTE:
THE PLAN DATA IS COMPILED FROM OFFICE RECORDS OF STANTEC GEOMATICS LTD. AND HAS NOT BEEN VERIFIED BY FIELD MEASUREMENTS. ALL DISTANCES ARE APPROXIMATE, TO BE VERIFIED BY FINAL REGISTERED PLANS(S).

THESE DRAWINGS ARE NOT TO BE SCALED. ALL DIMENSIONS MUST BE VERIFIED BY CONTRACTOR PRIOR TO COMMENCEMENT OF ANY WORK. ANY DISCREPANCIES MUST BE REPORTED DIRECTLY TO SRN ARCHITECTS INC.

NO.	DATE	ISSUED FOR:
10	17-JUN-22	ISSUED FOR SPA
11	07-SEP-22	REV. PER CLIENT
12	16-SEP-22	REV. PER CLIENT
13	11-OCT-22	REV. PER CLIENT
14	25-OCT-22	REV. PER SPA
15	14-DEC-22	REV. PER CLIENT
16	01-MAY-23	REV. PER CLIENT
17	17-MAY-23	REV. PER CLIENT
18	23-MAY-23	RE-ISSUED FOR SPA
19	26-JUN-23	REV. PER CLIENT

ADDITIONAL NOTES:
PART OF LOT 14
CONCESSION 2 (RIEBAU FRONT)
GEOGRAPHIC TOWNSHIP OF NEPEAN
CITY OF OTTAWA
STANTEC GEOMATICS, 2021

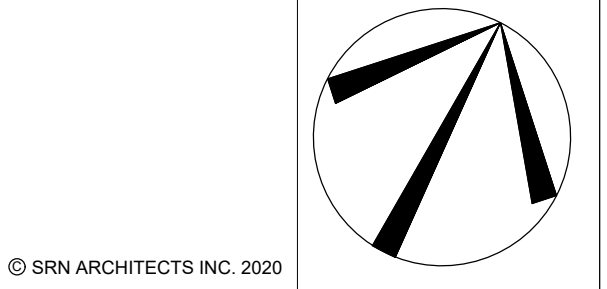


FOR SITE GRADING AND SERVING REFER TO CIVIL DRAWINGS

PRELIMINARY, NOT FOR CONSTRUCTION
ALL AREA CALCULATIONS ARE PRELIMINARY

NO.	DATE	REVISION COMMENT:

SRN ARCHITECTS
8395 JANE STREET, SUITE 203
VAUGHAN, ONTARIO, L4K 5Y2
PHONE: 905.417.5515 FAX: 905.417.5517



CLIENT:
Minto Communities Canada
200-180 Kent Street
Ottawa, Ontario K1P 0B6

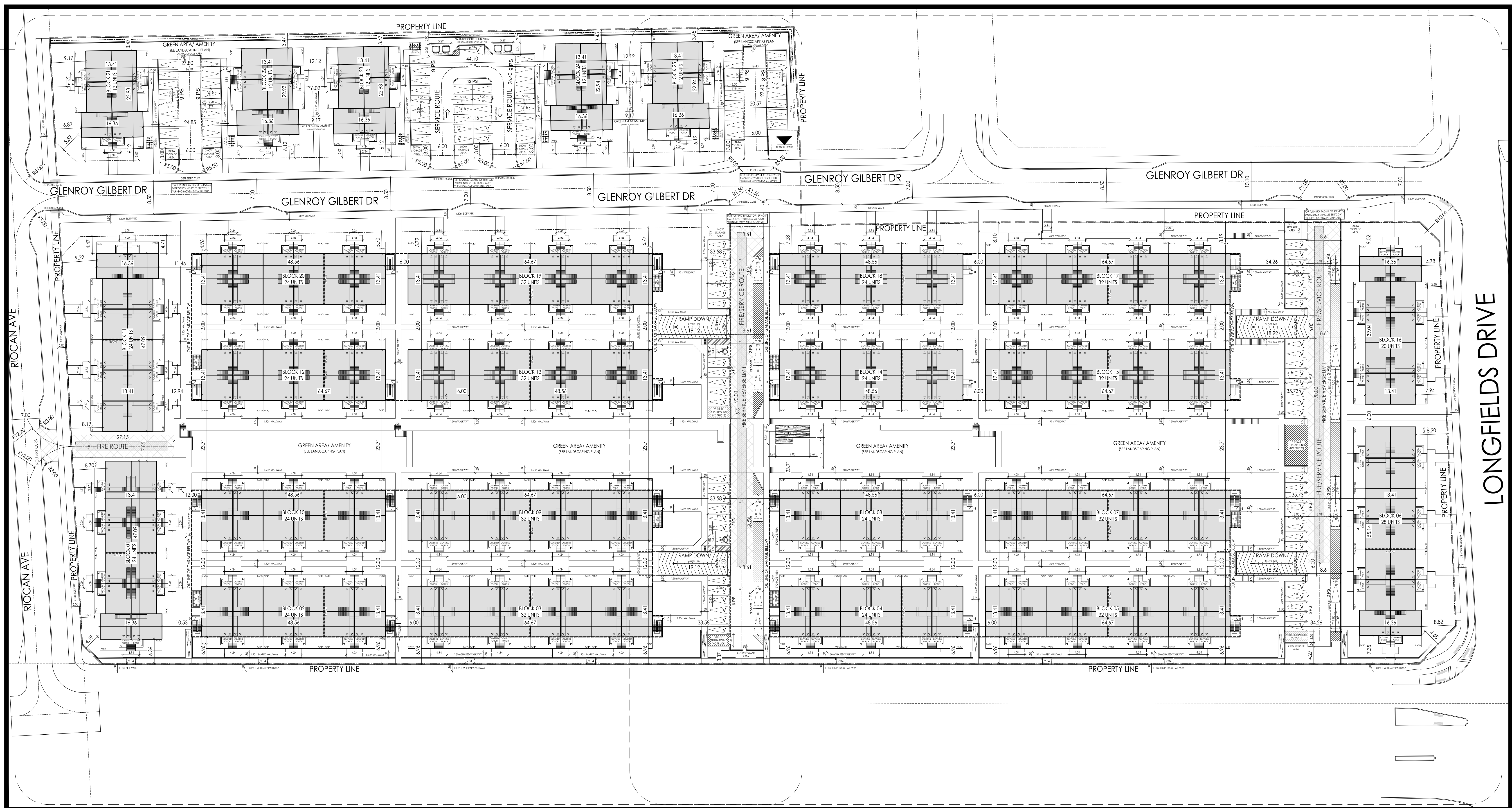
PROJECT:
Barrhaven Town Centre - Anthem
Ottawa, Ontario

DRAWING TITLE:
SITE PLAN

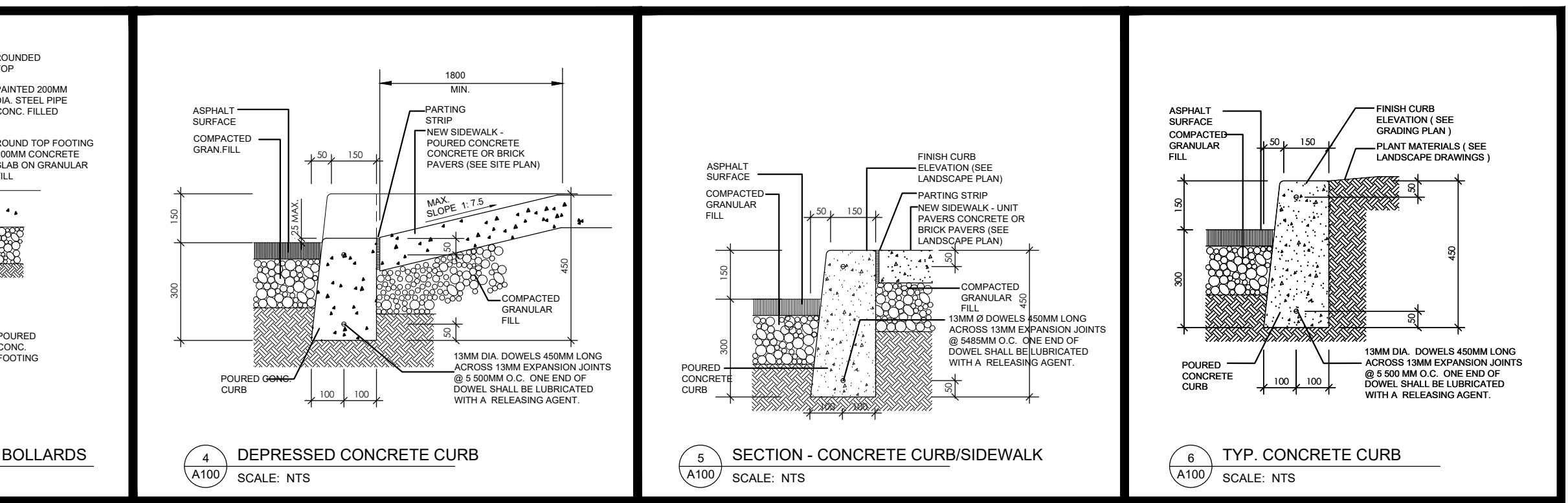
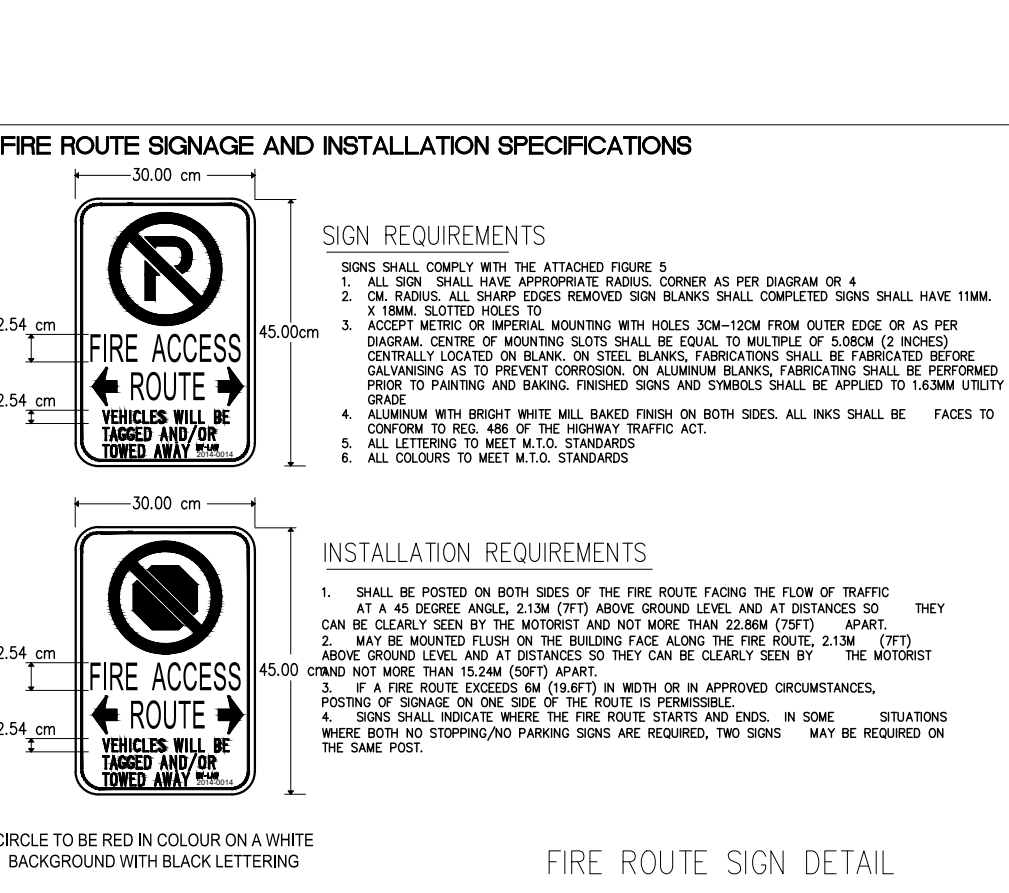
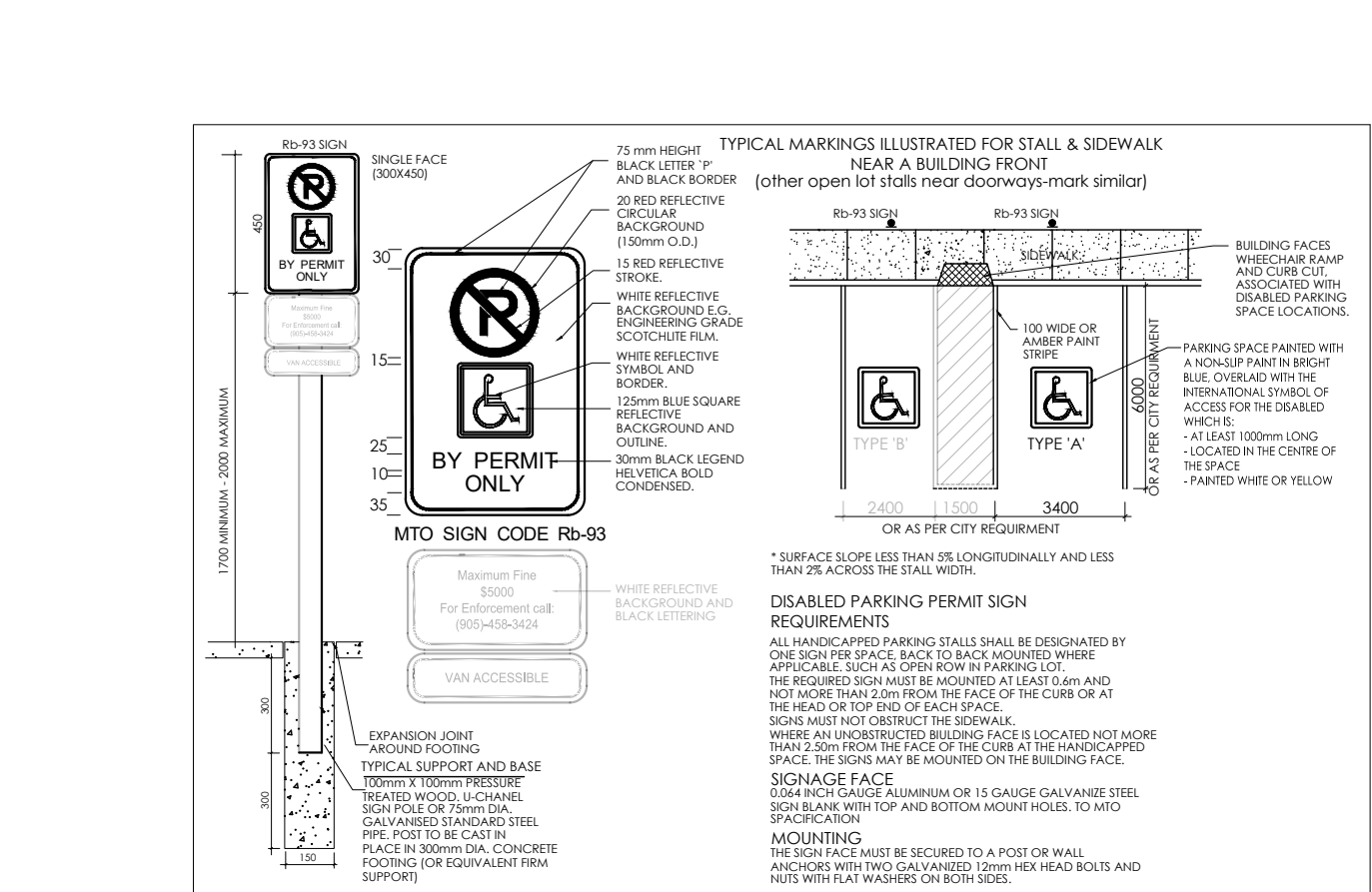
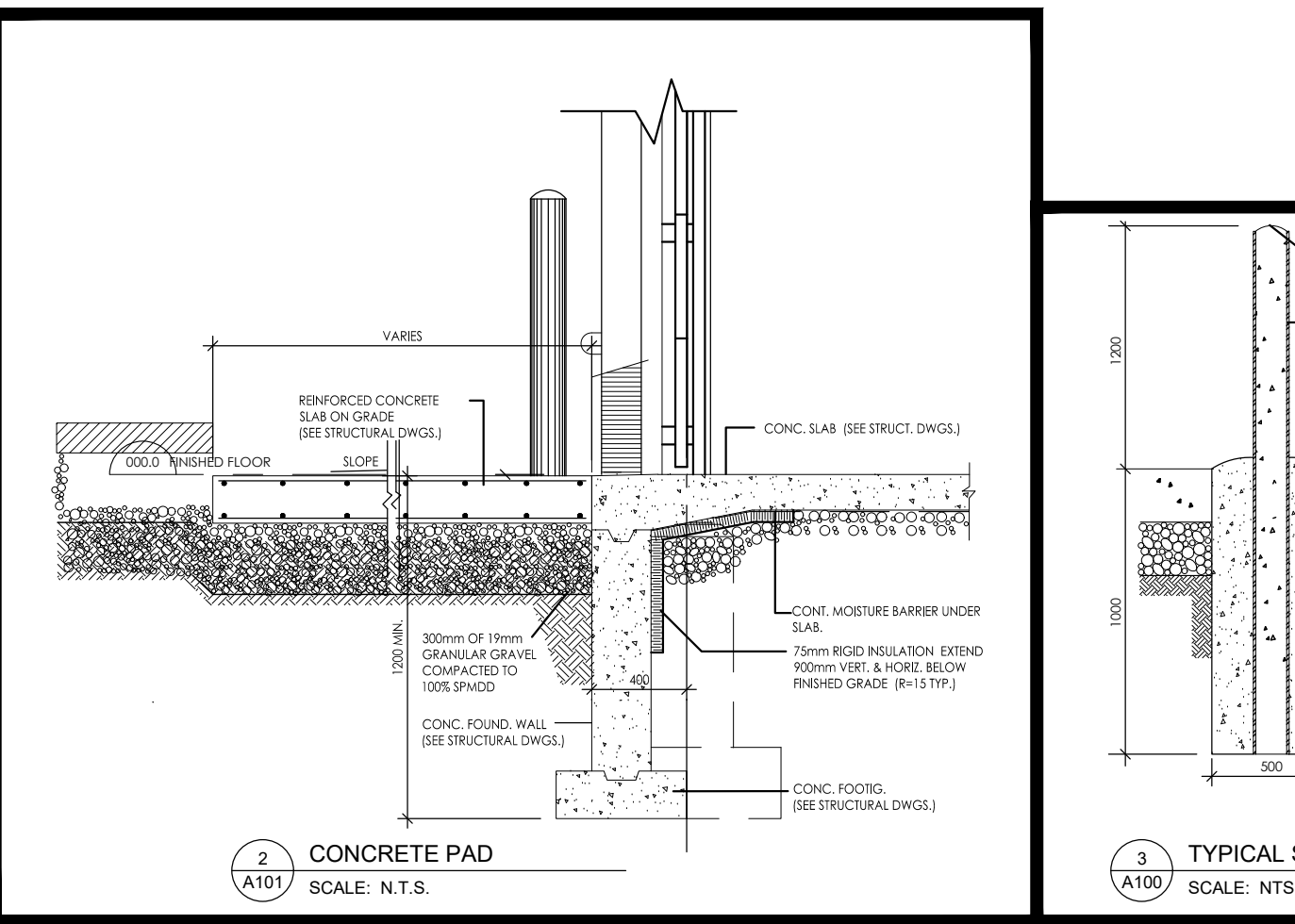
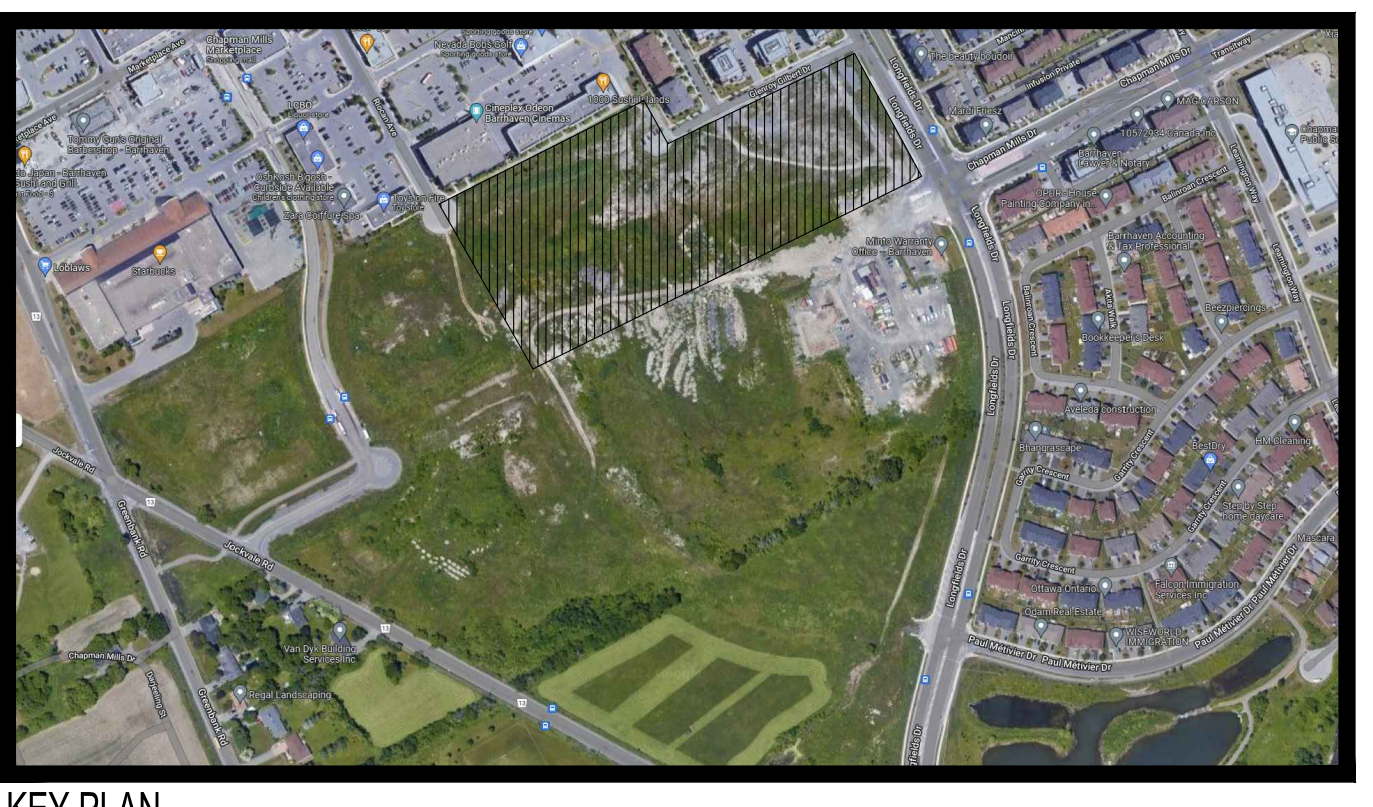
DATE: 2022-03-03
SCALE: 1:500

DRAWN BY: AB
CHECKED BY: GR

PROJECT NUMBER: S21001
DRAWING NUMBER: A101



1 SITE PLAN
100 SCALE: 1:450



ITEMS	REQUIRED	PROPOSED - NORTH LOT		PROPOSED - SOUTH LOT	
		60 SUITES	RATIO	544 SUITES	RATIO
LOT AREA :	NO MINIMUM	6377.55 SM (69847.37 SF)		4184.63 SM (450379.59 SF)	
BUILDING AREA	NO MINIMUM	1636.78 SM (17618.15 SF)		14753.99 SM (158810.67 SF)	
LOT COVERAGE (lot area/building area) :	NO MINIMUM	25.53 %		35.26 %	
GROSS FLOOR AREA	NO MINIMUM	4884.84 SM (52579.98 SF)		44261.97 SM (476432.01 SF)	
F.S.I. (gross floor area/lot area) :	NO MINIMUM	0.77		1.06	
SETBACKS :					
MIN. FRONT YARD:	NO MINIMUM	6.80 M (Riocan)		4.7 M (Riocan)	
MIN. CORNER SIDE YARD:	NO MINIMUM	5.50 M (Glenroy Gilberly)		4.10 M (Chapman Mills)	
MIN. INTERIOR SIDE YARD:	NO MINIMUM	3.40 M		4.4 M (Glenroy Gilbert)	
MIN. REAR YARD:	NO MINIMUM	23.50 M		N/A	
NUMBER OF TOWNHOUSE UNITS :					
2 BED:		60 SUITES		544 SUITES	
TOTAL NUMBER OF UNITS :					
TOTAL PARKING SPACES :		66 PS		598 PS	
RESIDENT PARKING SPACES:	0.5 SPACES/UNIT	SURFACE: 60	1:1	SURFACE: 0	
VISITOR PARKING SPACES:	0.1 SPACES/UNIT	UG: 0		UG: 0	0:11
BARRIER FREE PARKING SPACES DEDICATED FOR VISITORS :	NORTH LOT=0 SOUTH LOT=2	SURFACE: 0	NA	SURFACE: 2	NA
BICYCLE SPACES :					
LONG-TERM BICYCLE SPACES :	0.5 SPACES/UNIT	30		272	
TOTAL LANDSCAPE :					
LANDSCAPE OPEN SPACE AREA :		2079.38 SM (22382.25 SF)		16264.78 SM (175072.61 SF)	
SOFT LANDSCAPE AREA :	NA	1672.15 SM (18922.52 SF)		11706.43 SM (126006.88 SF)	
HARD LANDSCAPE AREA :	NA	507.23 SM (5459.73 SF)		4558.35 SM (49065.63 SF)	
LOCKER SPACES :					
AMENITY AREA (TOTAL) :	6 SMI/UNIT	1001.33 SM (MIN 360 SM)		9388.66 SM (MIN 3624 SM)	
AMENITY AREA (COMMUNAL) :	3 SMI/UNIT	296.33 SM (MIN 180 SM)		3023.66 SM (MIN 1812 SM)	
PLANNED UNIT DEVELOPMENT:					
MIN. WIDTH OF PRIVATE WAY (WITHIN A PUD):	6M	6M		8.8M	
MIN. SEPARATION BETWEEN BUILDINGS (WITHIN A PUD):	3M	9.1M		6M	

Braden Kaminski

From: Moore, Sean <Sean.Moore@ottawa.ca>
Sent: Thursday, November 5, 2020 12:07 PM
To: Carl Furney; Bronwyn Anderson
Cc: Shillington, Jeffrey; Krabicka, Jeannette; Young, Mark; Rehman, Sami; Gervais, Josiane; Neermul, Dhaneshwar; Richardson, Mark; Siddique, Jabbar
Subject: Minto Barrhaven Town Centre preconsult
Attachments: 201023_BTC-Minto_PFP preconsult comments.pdf; SNTC - Minto Pre-Consult - Illustration.pdf; SNC-Sanitary Drainage Areas.pdf; SWM-DrainagePlan.pdf; Minto_BTC_design_brief_submission requirements.pdf

Carl and Bronwyn,

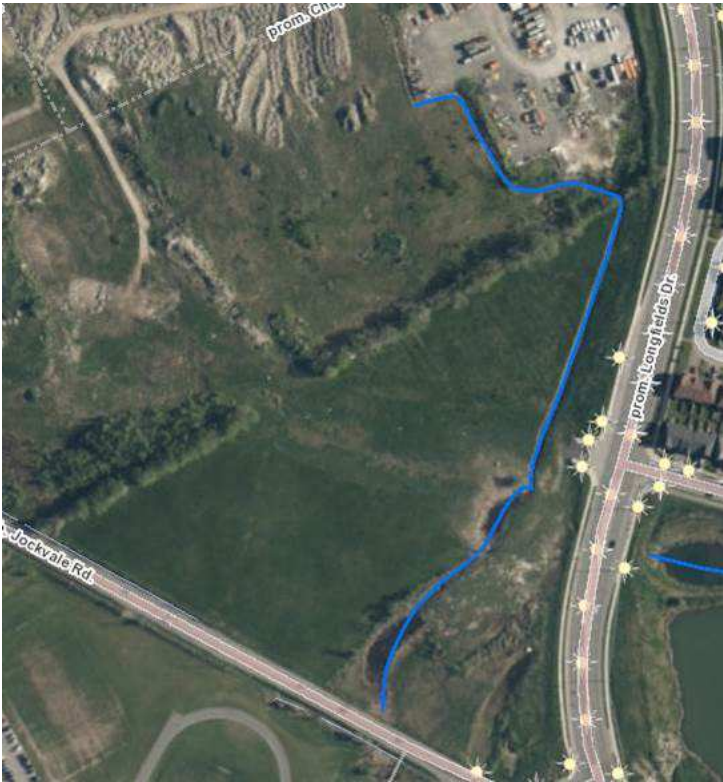
Regarding our pre-consultation meeting on October 22, 2020 for a plan of subdivision and rezoning on our lands in the Barrhaven Town Centre please find the submission requirements and preliminary comments below:

List of required Plans/Reports with your Plan of Subdivision and Zoning By-law Amendment applications:

Required Plans/Studies:

- Draft Plan of Subdivision
- Survey Plan
- Planning Rationale, with Integrated Environmental Review – please include a Parks rationale for the park location, size, configuration and how it meets the parks policies / guidelines of the City of Ottawa
- Urban Design Brief – see ToR attached
- Stormwater Management Report / Brief
- Serviceability Study
- Transportation Impact Assessment
- Noise Feasibility Study - should also address proximity of residential to the LRT tail track south of Chapman Mills Drive
- Vibration Study – should address the proximity of residential to the LRT tail track south of Chapman Mills Drive
- Geotechnical Study
- Phase 1 ESA – to conformity with OReg 153/04 (and subsequent Phase 2 and or 3 ESA's – if required)
- Tree Conservation Report
- Archaeological Resource Assessment
- Roadway Modification Plan – for functional design of any road mods / intersections / medians etc
- Concept Plan – ultimate use of lands
- Environmental Impact Statement – please address the water course shown below and butternut trees in your EIS

Watercourse to address in EIS:



All required plans & reports are to be provided in digital format (.pdf through an FTP site) at application submission and sent to planningcirculations@ottawa.ca and cc'd to myself. Please ensure the application forms for plan of subdivision and zoning are also scanned and sent as a pdf to this email. Once received we will create the file numbers for you and advise of them, so you can make payment at a Client Service Centre.

Link to Planning Application process

<https://ottawa.ca/en/planning-development-and-construction/developing-property/development-application-review-process>

Link to development application forms:

<https://ottawa.ca/en/planning-development-and-construction/developing-property/development-application-review-process/development-application-submission/development-application-forms>

Preliminary Staff Comments:

Parks Planning

1. See attached comments entitled 'BTC Minto PFP preconsult comments'

Urban Design:

2. Proposed units facing Riocan Avenue should be designed to allow for additional at grade uses in the future (home based business) or local scale commercial given the "active frontage" designation in the Secondary Plan.
3. Consider re-aligning the access street from Riocan Avenue to allow for a larger multi-residential block at the north end of the subject site.
4. Sidewalks should be provided on local streets as directed in the Secondary Plan. Please review cross-section widths to ensure that adequate space is provided for sidewalks and tree planting.
5. Please ensure building setbacks allow for tree planting in accordance with the 2017 Sensitive Clay Soils direction.

6. PRUD supports the comments provided by Parks and Facilities Planning as it relates to the size and contiguous shape for the Linear Park proposed on the western end of the lands.
7. Additional analysis should be undertaken to ensure that the design for a bus-loop and park and ride do not hinder future development opportunities on Minto's abutting lands. It is suggested that a public or "private" north/south street be introduced as a division between the proposed park and ride and the future development block to the west. This new street could also serve as access to the bus-loop which could be located along the northern edge of the site (mid-block)
8. Illustration provided in attachment entitled 'SNTC Minto Pre-Consult – illustration'

Engineering:

9. For SWM the latest document produced was the Nepean South-Chapman Mills SWM Servicing Addendum. See the excerpt showing the Drainage Area Plan for the area. It shows an existing trunk storm sewer within future Riocan Drive just north of the existing pond. This storm sewer will need to be extended into their subdivision. Major Overland Flow is be conveyed through the City owned lands just south of the subject lands and continue through the Minto built Riverbend subdivision and Major Overland Flow outfall to the Jock River.
10. For Sanitary, South Nepean Collector: Phase 2 Hydraulic Review/Assessment completed by Novatech was completed in August 2015. I've attached an excerpt that shows the South Nepean Collector extending just north of the Jock River. There is a 1050 mm on Longfields that extends from the SNC up to the future RioCan ROW. Minto can connect to the 1050 mm dia. at Longfield's and future Riocan (capacity subject to review by Infrastructure Policy).
11. For water, Minto is to construct a 305 mm dia. watermain within the Chapman Mills Road corridor.

General Planning comments:

1. Please ensure a signalized intersection is planned for Riocan Ave and Chapman Mills Drive and removed from Sue Holloway Drive and Chapman Mills.
2. On your concept plan please illustrate a park on the 'civic block' lands, representing the urban public square
3. On your concept plan please illustrate the park and ride on the lands west of the civic block
4. Please follow the Barrhaven Downtown Secondary Plan on the general placement of Park #6 – do not create any road patterns that force its location along Longfields Drive
5. The City will be looking for the dedication of the re-aligned BRT/LRT corridor as per the EA that went to Committee on Nov 2nd 2020
6. The City will engage Minto on discussions concerning the proposed park and ride lot, and the civic block.
7. We need to assess the viability of tree planting with soil types, proposed zoning setbacks, and street cross sections (please speak to soils in this Geotech as it relates to tree planting and make recommendations in the Planning Rationale concerning this)

Transportation:

- Follow Traffic Impact Assessment Guidelines
 - o Traffic Impact Assessment will be required. Please proceed to submitting Screening/Scoping at your earliest convenience.
 - o Start this process asap. The application will not be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package (if applicable), draft functional plans (if applicable) and/or monitoring report (if applicable).
 - o Request base mapping asap if RMA is required. Contact Engineering Services (<https://ottawa.ca/en/city-hall/planning-and-development/engineering-services>)

- All new collector streets within the subdivision should be designed following the City’s Collector Guidelines (desired 26m ROW for collector Roads).
- All new local residential streets should be designed with a target operating speed of 30km/h per the new Strategic Road Safety Action Plan Update. A 30 km/h Design Guideline with further guidance on how to achieve a 30km/h target for new roadways is being developed. TES may be contacted for interim guidance on how to achieve a 30km/h design speed on local streets.
- Corner triangles as per OP Annex 1 - Road Classification and Rights-of-Way at the following locations on the final plan will be required:
 - o Local Road to Local Road: 3 m x 3 m
 - o Local Road to Collector Road: 5 m x 5 m
 - o Collector Road to Collector Road: 5 m x 5 m
 - o Collector Road to Arterial Road: 5 m x 5 m
- ROW protection on Greenbank between Strandherd and Chapman Mills is 37.5m even and from Chapman Mills to Cambrian is 41.5m (Subject to varying widening requirements of Greenbank Road ESR).
- ROW on Longfields between Strandherd and Jockvale is 37.5m even.
- The Greenbank Road realignment construction is anticipated for post-2031.
- RMA is underway at the Greenbank Rd/Street E intersection.
- Geometric Road Design drawings will be required with the first submission of underground infrastructure and grading drawings.
- Noise Impact Studies are required. Feasibility Study required before draft approval and Detailed Study required before registration. Both studies must assess:
 - o Road
 - o Rail, due to the proximity to the future LRT.
 - o Aircraft, site falls within Airport Vicinity Development Zone.
 - o Stationary (due to the proximity to neighbouring exposed mechanical equipment) or (if there will be any exposed mechanical equipment due to the proximity to neighbouring noise sensitive land uses)

Forestry

1. a Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City; an approved TCR is a requirement for Plan of Subdivision approval.
2. any removal of privately-owned trees 10cm or larger in diameter requires a tree permit issued under the Urban Tree Conservation Bylaw; the permit is based on the approved TCR
3. any removal of City-owned trees will require the permission of Forestry Services who will also review the submitted TCR
4. the TCR must list all trees on site by species, diameter and health condition
5. the TCR must list all trees on adjacent sites if they have a critical root zone that extends onto the development site
6. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained
7. the City encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees that will contribute to the design/function of the site.
8. Please ensure newly planted trees have an adequate soil volume for their size at maturity. Here are the recommended soil volumes:

Tree Type/Size	Single Tree Soil Volume (m3)	Multiple Tree Soil Volume (m3/tree)
Ornamental	15	9

Columnar	15	9
Small	20	12
Medium	25	15
Large	30	18
Conifer	25	15

9. For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca

Regards,

Sean Moore, RPP/MCIP
Senior Planner
Development Review South Unit
Planning, Infrastructure and Economic Development Dept.
City of Ottawa

Cell: 613-805-9804

- Please note I am working from home during this crisis until further notice

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PRE-CONSULTATION COMMENTS

Parks & Facilities Planning

Project: Barrhaven Town Centre - Minto

Date: 23 October, 2020

1. Parkland Dedication

- The Parkland Dedication By-Law calls for the dedication calculation for the Barrhaven Town Centre to be 5% of the gross land area of the area
- The current plan shows land conveyance of 2.15% / 0.50 ha (according to the chart on the Concept Plan). Therefore, the land conveyance shown in the development concept is significantly under-dedicated.
- Based on a development area of 23.26 ha, and a calculation of 5% of the gross area, the parkland dedication needs to be a minimum of 1.161 ha
- Parks & Facilities Planning is looking for the parkland dedication to be wholly fulfilled through land conveyance for the gross development area within the currently proposed subdivision.

2. Park shape and location

- Please provide a contiguous park block with no road crossings.

3. Timing

- The park block shown as '8' on Schedule A: Land Use Plan of the Barrhaven Town Centre Secondary Plan is to be dedicated in the first Draft Plan of Subdivision for the property.

4. To be included in the 1st Submission

- Please show a revised park block
- Please show high level park grading on the on the subdivision Preliminary Grading plan – including key spot elevations, flow arrows and slope percentages. Keep in mind that:
 - Park is to be graded to subdivision levels
 - Show positive surface drainage towards the ROW
 - The park is to have no encumbrances or easements either below or above ground level. This includes any current or future LRT requirements, utilities, etc. It also includes any stormwater flows from neighbouring properties.
- Please include the parkland dedication as part of the Planning Rationale - provide an explanation of how the proposed development will address and meet the Parkland Dedication requirements.
- Please include the park block specifically as part of the Geotechnical Report - please include text that speaks to the suitability of the soils for construction and load bearing, and any potential required amendments to make it suitable (if needed).
- Confirmation that there are no existing or proposed encumbrances on the proposed park block.

5. Developer Requirements for Land Conveyance of a Park Block

Please review the following reference documents which outline the requirements for parkland dedication and park block conveyance to the City:

- City of Ottawa Park Development Manual, 2nd edition
- City of Ottawa Parkland Dedication By-Law
- The standard parks Conditions of Draft Plan Approval

6. Concept revision for consideration

Please consider the following revision to the subdivision concept – or similar:



Benefits:

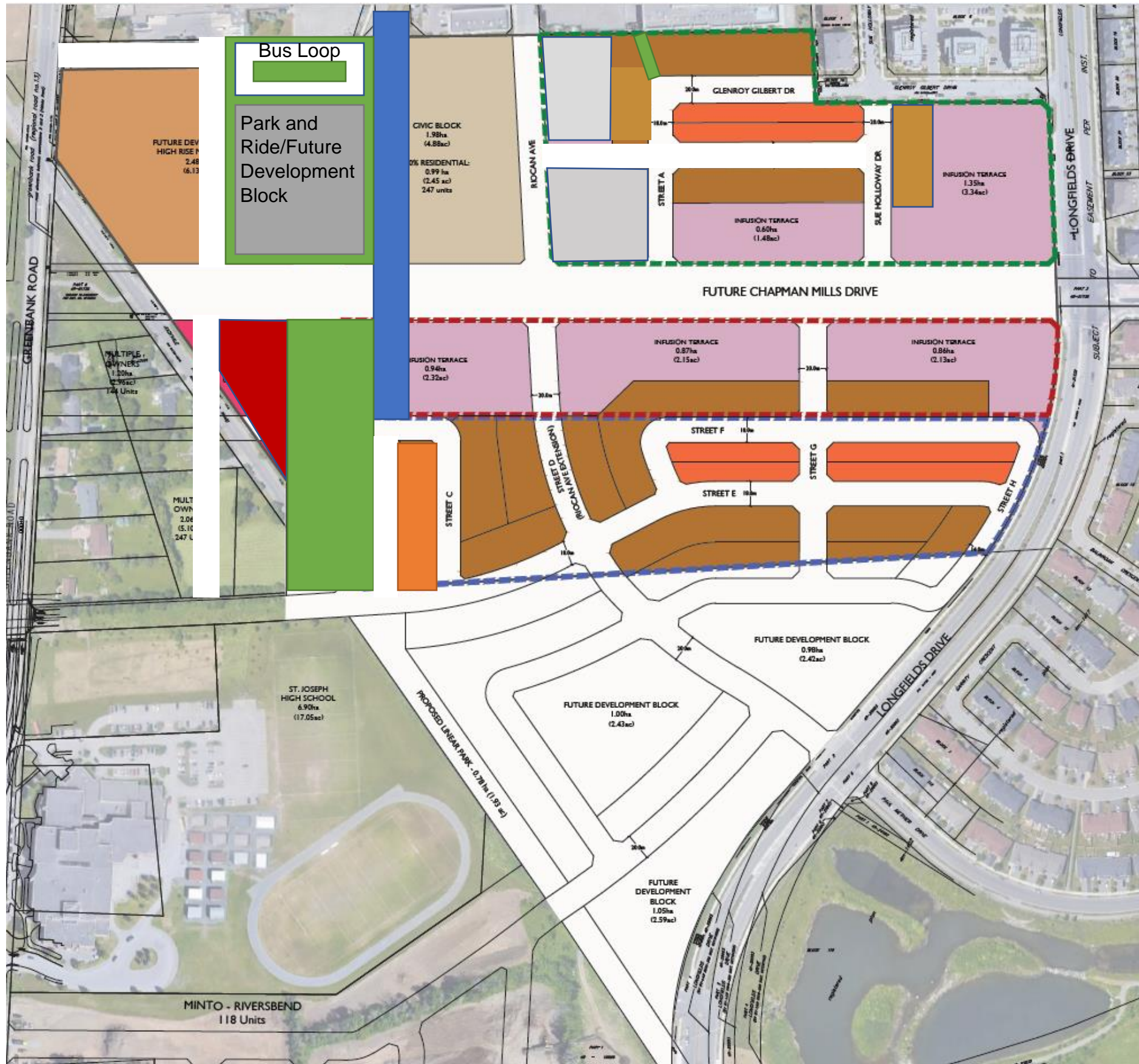
- Park block size is increased to meet dedication requirements
- Road crossing is eliminated
- Parkland dedication is balanced for the entirety of the Minto property
 - Phase 1 Draft Plan: 0.913 ha park
 - Phase 2 Draft Plan: 0.250 ha Civic Centre urban plaza or parkette
- Road frontage along the proposed park is increased
- Park block is adjacent to the LRT tail track. Therefore, the surface of those lands could blend into the park design.

Please don't hesitate to contact me if you have any questions.

Regards,
Jeannette.

Jeannette Krabicka

Planner, Parks & Facilities Planning
City of Ottawa



Alex Tourigny

From: Michael Hanifi <MHanifi@minto.com>
Sent: February 28, 2023 3:20 PM
To: Alex Tourigny
Cc: Carl Furney
Subject: RE: Barrhaven Town Centre Unit types

EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Hi Alex,

As a follow up, I was able to retrieve this table from a colleague for the Metro Town product at BTC. The Metro Towns are 2-bedroom units. Hope this helps.

PRODUCT TYPE	MODEL NAME	UNIT TYPE	BUILDING # STOREYS	ELEV.	BED FLOOR SQ FT	MAIN FLOOR SQ FT	TOTAL SQ FT
Stacked	Yorkdale	Lower Interior	3.5 storey	2	581	481	1062
Stacked	Woodbine	Upper Interior	3.5 storey	2	580	679	1260
Stacked	Union	Lower End/ Corner	3.5 storey	2	590	490	1081
Stacked	Leaside	Upper End/ Corner	3.5 storey	2	587	686	1274
Stacked	Yorkdale	Lower Interior	3.5 storey	2	581	481	1062
Stacked	Woodbine	Upper Interior	3.5 storey	2	580	679	1260
Stacked	Union	Lower End/ Corner	3.5 storey	2	590	490	1081
Stacked	Leaside	Upper End/ Corner	3.5 storey	2	587	686	1274

Let me know if you need anything else.

Thanks,
Michael



Michael Hanifi
Land Development Project Coordinator
MINTO COMMUNITIES - CANADA
200 - 180 Kent Street, Ottawa, ON, K1P 0B6
T 343.961.2615
A division of The Minto Group
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From: Michael Hanifi
Sent: Tuesday, February 28, 2023 1:53 PM
To: Alex Tourigny <ATourigny@dsel.ca>
Cc: Carl Furney <CFurney@minto.com>
Subject: RE: Barrhaven Town Centre Unit types

Hi Alex,

It is correct to assume they are 2-bedroom units. I've asked around about if we have a table (I'll get back to you with it if we do). Do you need the latest floor plans or anything else? I'll follow up with the Andrews about your request from yesterday as well.

Thanks,
Michael

From: Alex Tourigny <ATourigny@dsel.ca>
Sent: Tuesday, February 28, 2023 1:12 PM
To: Michael Hanifi <MHanifi@minto.com>
Cc: Carl Furney <CFurney@minto.com>
Subject: Barrhaven Town Centre Unit types

Hi Michael,

We assumed the units were mostly 2bedroom units when completing our supporting calculations for BTC. Does Minto have a table with a unit type description (1bed, 2bed, bachelors etc...)?

Thanks,

Alex Tourigny, P.Eng.

DSEL

david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: 613-845-2106 (NEW NUMBER)
cell: (343) 542-8847
e-mail: atourigny@dsel.ca

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APPENDIX B

Hydraulic Network Analysis

Water Demand Design Flows per Unit Count
City of Ottawa - Water Distribution Guidelines, July 2010



Domestic Demand

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4	-	0
Semi-detached	2.7	-	0
Townhouse	2.7	-	0
Apartment			0
Bachelor	1.4	-	0
1 Bedroom	1.4	-	0
2 Bedroom	2.1	60	126
3 Bedroom	3.1	-	0
Average	1.8	-	0

	Pop	Avg. Daily		Max Day		Peak Hour	
		m ³ /d	L/min	m ³ /d	L/min	m ³ /d	L/min
Total Domestic Demand	126	35.3	24.5	172.9	120.1	261.1	181.3

Institutional / Commercial / Industrial Demand

Property Type	Unit Rate	Units	Avg. Daily		Max Day		Peak Hour	
			m ³ /d	L/min	m ³ /d	L/min	m ³ /d	L/min
Commercial floor space	2.5 L/m ² /d	-	0.00	0.0	0.0	0.0	0.0	0.0
Office	75 L/9.3m ² /d	-	0.00	0.0	0.0	0.0	0.0	0.0
Restaurant*	125 L/seat/d	-	0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Light	35,000 L/gross ha/d	-	0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Heavy	55,000 L/gross ha/d	-	0.00	0.0	0.0	0.0	0.0	0.0
Total I/CI Demand			0.0	0.0	0.0	0.0	0.0	0.0
Total Demand			35.3	24.5	172.9	120.1	261.1	181.3

* Estimated number of seats at 1 seat per 9.3m²

Water Demand Design Flows per Unit Count
City of Ottawa - Water Distribution Guidelines, July 2010



Domestic Demand

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4	-	0
Semi-detached	2.7	-	0
Townhouse	2.7	-	0
Apartment			0
Bachelor	1.4	-	0
1 Bedroom	1.4	-	0
2 Bedroom	2.1	544	1143
3 Bedroom	3.1	-	0
Average	1.8	-	0

	Pop	Avg. Daily		Max Day		Peak Hour	
		m ³ /d	L/min	m ³ /d	L/min	m ³ /d	L/min
Total Domestic Demand	1143	320.0	222.3	800.1	555.6	1760.2	1222.4

Institutional / Commercial / Industrial Demand

Property Type	Unit Rate	Units	Avg. Daily		Max Day		Peak Hour	
			m ³ /d	L/min	m ³ /d	L/min	m ³ /d	L/min
Commercial floor space	2.5 L/m ² /d	-	0.00	0.0	0.0	0.0	0.0	0.0
Office	75 L/9.3m ² /d	-	0.00	0.0	0.0	0.0	0.0	0.0
Restaurant*	125 L/seat/d	-	0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Light	35,000 L/gross ha/d	-	0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Heavy	55,000 L/gross ha/d	-	0.00	0.0	0.0	0.0	0.0	0.0
Total I/CI Demand			0.0	0.0	0.0	0.0	0.0	0.0
Total Demand			320.0	222.3	800.1	555.6	1760.2	1222.4

* Estimated number of seats at 1 seat per 9.3m²

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 2020



Fire Flow Required

1. Base Requirement

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

L/min

Where *F* is the fire flow, *C* is the Type of construction and *A* is the Total floor area

Type of Construction:

Wood Frame

C 1.5 Type of Construction Coefficient per FUS Part II, Section 1
A 1301.0 m² Total floor area based on FUS Part II section 1

Fire Flow	11902.9 L/min
	12000.0 L/min rounded to the nearest 1,000 L/min

Adjustments

2. Reduction for Occupancy Type

Limited Combustible -15%

Fire Flow	10200.0 L/min
------------------	----------------------

3. Reduction for Sprinkler Protection

Non-Sprinklered 0%

Reduction	0 L/min
------------------	----------------

4. Increase for Separation Distance

Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC	
N Wood Frame	20.1m-30m	33		3	99	10%
S Wood Frame	10.1m-20m	33		3	99	15%
E Wood Frame	3.1m-10m	13		3	39	18%
W Wood Frame	0m-3m	13		3	39	23%
	% Increase					66% value not to exceed 75%

Increase	6732.0 L/min
-----------------	---------------------

Lw = Length of the Exposed Wall

Ha = number of storeys of the adjacent structure. Max 5 stories

LH = Length-height factor of exposed wall. Value rounded up.

EC = Exposure Charge

Total Fire Flow

Fire Flow	16932.0 L/min	fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section .
	17000.0 L/min	rounded to the nearest 1,000 L/min

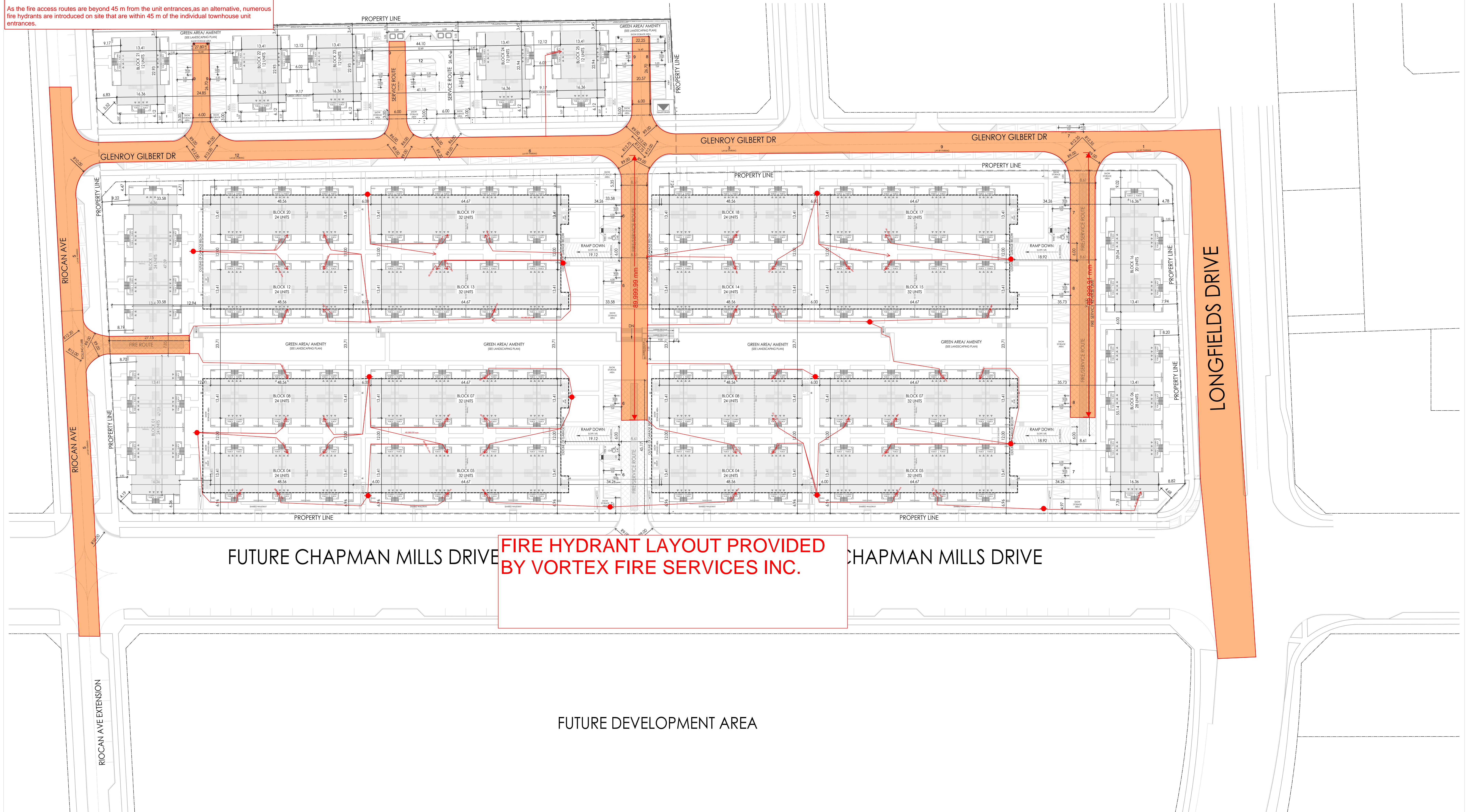
Notes:

-Type of construction, Occupancy Type and Sprinkler Protection information provided by _____.

-Calculations based on Fire Underwriters Survey - Part II

Fire Access Route:
 Due to the nature of the site, it is not practical to arrange for the fire access route to be within 45 m of a fire access route.
 Fire access routes have been extended throughout the site where feasible. Whilst not currently indicated the Chapman Mills Drive will also serve as a fire access route at some point in the future.
 The townhouses are constructed to Part 9 of the OBC and are fire separated from each other by a minimum of 1 h fire separation between the units. The common underground parking is non-combustible construction, and fire separated from the townhouse units above having a 2 h fire resistance rating.
 As the fire access routes are beyond 45 m from the unit entrances, as an alternative, numerous fire hydrants are introduced on site that are within 45 m of the individual townhouse unit entrances.

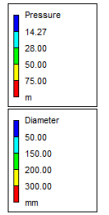
Note: The proposed fire hydrants are indicative only. The location is to be coordinated with other disciplines.
 Please ensure that any landscaping in these areas allows for travel for fire fighters. As with all alternative solutions these are subject to acceptance by the AHJ.



FUTURE CHAPMAN MILLS DRIVE FIRE HYDRANT LAYOUT PROVIDED BY VORTEX FIRE SERVICES INC. CHAPMAN MILLS DRIVE

FUTURE DEVELOPMENT AREA

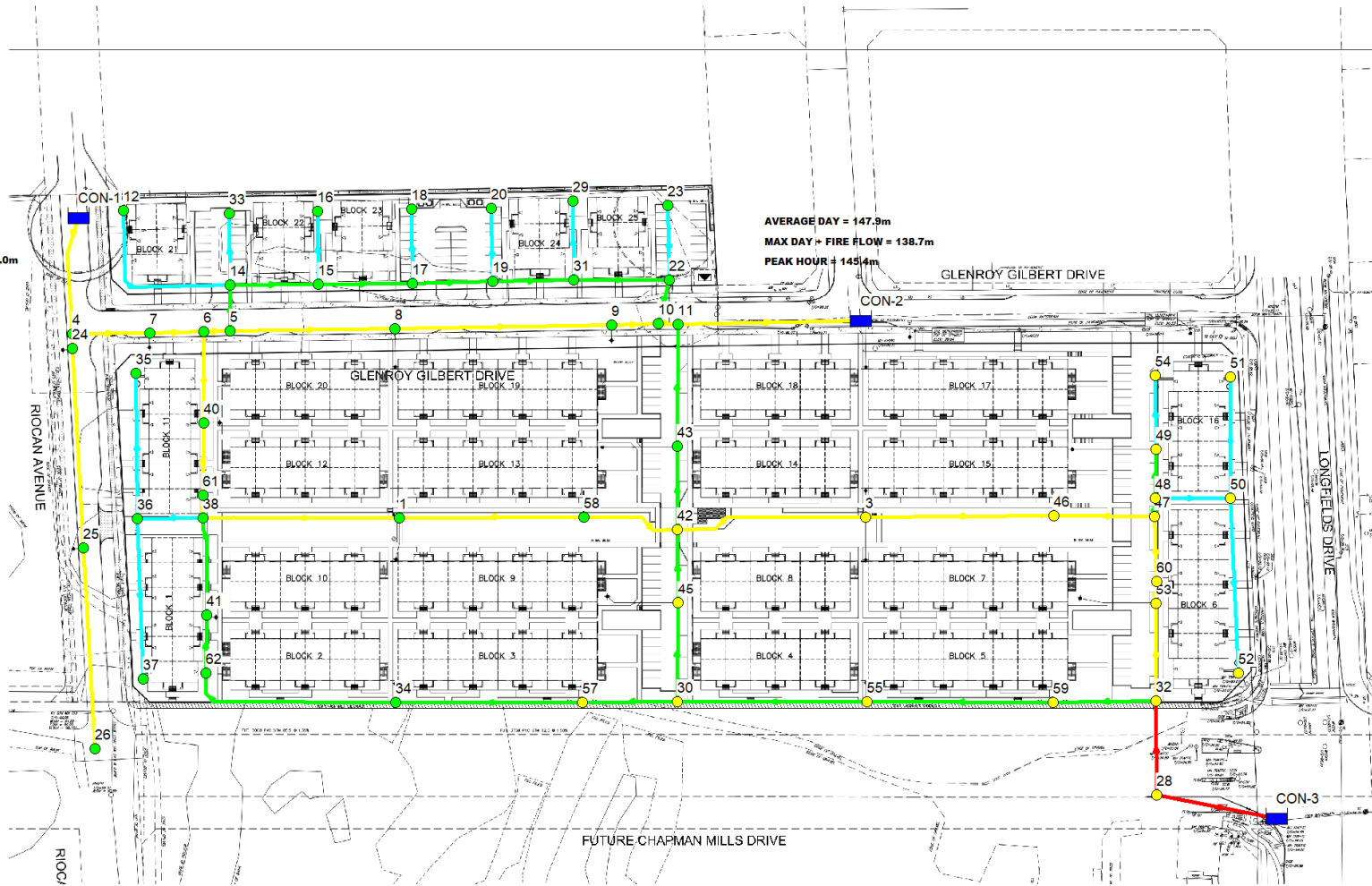
Fig 1 – AVERAGE DAY



AVERAGE DAY = 147.9m
MAX DAY + FIRE FLOW = 129.0m
PEAK HOUR = 145.4m

AVERAGE DAY = 147.9m
MAX DAY + FIRE FLOW = 138.7m
PEAK HOUR = 145.4m

AVERAGE DAY = 147.9m
MAX DAY + FIRE FLOW = 144.9m
PEAK HOUR = 145.4m



```

*****
*                               E P A N E T                               *
*                               Hydraulic and Water Quality                *
*                               Analysis for Pipe Networks                  *
*                               Version 2.0                                *
*****

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Input File: 2023-06-28_816_avgday.net

15-816: Minto - BTC Stage 1

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	CON-1	4	38.0	200
2	4	24	5.0	200
3	24	25	65.0	200
4	25	26	65.0	200
12	4	7	25.0	200
13	5	6	9.0	200
16	8	9	70.5	200
17	9	10	19.0	200
18	10	11	2.5	200
19	11	CON-2	39.0	200
24	33	14	23.5	50
26	15	16	23.5	50
30	19	20	23.5	50
35	35	36	47.0	50
36	36	37	52.5	50
37	36	38	21.5	50
39	40	6	29.5	200
43	11	43	40	150
46	42	45	22.0	150
47	45	30	34.0	150
49	46	47	9.1	200
50	47	48	6.0	150
51	48	49	17.0	150
52	48	50	24.5	50
53	50	51	39.5	50
54	50	52	57.5	50
56	53	32	20.5	200
57	54	49	23.0	50
48	42	3	63.0	200
58	3	46	61	200
9	28	32	41	300
61	28	CON-3	41	300
62	17	18	23.5	50
63	12	14	57.5	50
64	14	15	10	150
65	15	17	10	150
66	17	19	10	150



Link - Node Table: (continued)

Link ID	Start Node	End Node	Length m	Diameter mm
67	19	31	10	150
68	31	22	10	150
69	29	31	26.0	50
70	23	22	23.5	50
71	22	10	15.5	150
72	5	14	15.5	150

AVERAGE DAY

75	30	55	61.5	150
78	38	41	32.0	150
79	7	6	17.5	200
80	5	8	53.5	200
81	34	57	60.5	150
82	57	30	31.0	150
83	38	1	64	200
84	1	58	60	200
85	58	42	32.0	200
86	43	42	26.5	150
87	55	59	60.5	150
88	59	32	33.5	150
89	47	60	14.5	200
90	60	53	25.0	200
91	40	61	25.0	200
92	61	38	6.0	200
93	41	62	18.5	150
94	62	34	68.5	150

Node Results:

Node ID	Demand LPM	Head m	Pressure m	Quality
4	0.00	146.68	48.67	0.00
5	0.00	144.65	46.75	0.00
6	0.00	145.18	47.18	0.00
8	0.00	143.76	46.10	0.00
9	0.00	142.60	45.37	0.00
10	0.00	142.22	45.02	0.00
11	0.00	141.97	44.74	0.00
12	2.50	144.04	45.03	0.00
14	0.00	144.04	46.08	0.00
15	0.00	143.79	45.67	0.00
16	5.00	143.79	45.68	0.00
17	0.00	143.55	45.90	0.00
18	2.50	143.54	45.78	0.00
19	0.00	143.30	45.76	0.00
20	2.50	143.30	45.67	0.00
22	0.00	142.81	45.54	0.00
23	2.50	142.81	45.29	0.00



Node Results: (continued)

Node ID	Demand LPM	Head m	Pressure m	Quality
24	0.00	146.68	48.84	0.00
25	0.00	146.68	49.42	0.00
26	0.00	146.68	49.53	0.00
30	0.00	145.70	51.31	0.00
32	0.00	147.64	55.13	0.00
33	2.50	144.04	45.79	0.00
35	5.10	145.29	47.38	0.00
36	0.00	145.29	47.81	0.00
37	5.10	145.29	48.04	0.00
38	0.00	145.31	47.92	0.00
40	0.00	145.24	47.44	0.00
41	0.00	145.37	48.18	0.00
42	0.00	145.42	50.51	0.00
43	0.00	144.13	47.36	0.00
45	0.00	145.52	50.97	0.00
46	45.90	146.67	52.74	0.00
47	5.80	146.88	53.74	0.00
48	0.00	146.88	53.83	0.00
49	0.00	146.88	53.68	0.00

AVERAGE DAY

50	0.00	146.86	53.51	0.00
51	4.10	146.86	53.34	0.00
52	5.80	146.85	53.94	0.00
53	0.00	147.32	54.55	0.00
54	4.10	146.87	50.29	0.00
1	0.00	145.35	48.82	0.00
3	0.00	146.12	51.87	0.00
28	0.00	147.76	55.36	0.00
29	5.00	143.05	45.49	0.00
31	0.00	143.05	45.41	0.00
34	0.00	145.53	49.80	0.00
55	0.00	146.42	52.70	0.00
7	0.00	145.73	47.96	0.00
57	45.90	145.63	50.36	0.00
58	45.90	145.38	49.25	0.00
59	45.90	147.13	53.90	0.00
60	5.80	147.06	54.04	0.00
61	5.10	145.29	47.78	0.00
62	5.10	145.40	48.36	0.00
CON-2	6432.88	138.70	0.00	0.00 Reservoir
CON-3	-3155.01	147.90	0.00	0.00 Reservoir
CON-1	-3529.96	147.90	0.00	0.00 Reservoir



Link ID	Flow LPM	Velocity m/s	Headloss m/km	Status
1	3529.96	1.87	32.09	Open
2	0.00	0.00	0.00	Open
3	0.00	0.00	0.00	Open
4	0.00	0.00	0.00	Open
12	3529.96	1.87	37.92	Open
13	-4351.10	2.31	58.93	Open
16	2799.54	1.49	16.34	Open
17	2799.54	1.49	20.11	Open
18	4328.60	2.30	98.94	Open
19	6432.88	3.41	83.97	Open
24	-2.50	0.02	0.04	Open
26	5.00	0.04	0.14	Open
30	2.50	0.02	0.04	Open
35	-5.10	0.04	0.14	Open
36	5.10	0.04	0.14	Open
37	-10.20	0.09	0.52	Open
39	821.14	0.44	2.24	Open
43	-2104.27	1.98	53.94	Open
46	-599.49	0.57	4.88	Open
47	-599.49	0.57	5.25	Open
49	-2078.73	1.10	22.48	Open
50	14.00	0.01	0.01	Open
51	4.10	0.00	0.00	Open
52	9.90	0.08	0.49	Open
53	4.10	0.03	0.09	Open
54	5.80	0.05	0.17	Open
56	-2104.33	1.12	15.26	Open
57	-4.10	0.03	0.09	Open
48	-2032.83	1.08	11.14	Open
58	-2032.83	1.08	9.08	Open
9	3155.01	0.74	2.95	Open
61	-3155.01	0.74	3.50	Open
62	2.50	0.02	0.04	Open
63	-2.50	0.02	0.04	Open
64	1546.56	1.46	24.82	Open
65	1541.56	1.45	24.68	Open
66	1539.06	1.45	24.60	Open

AVERAGE DAY

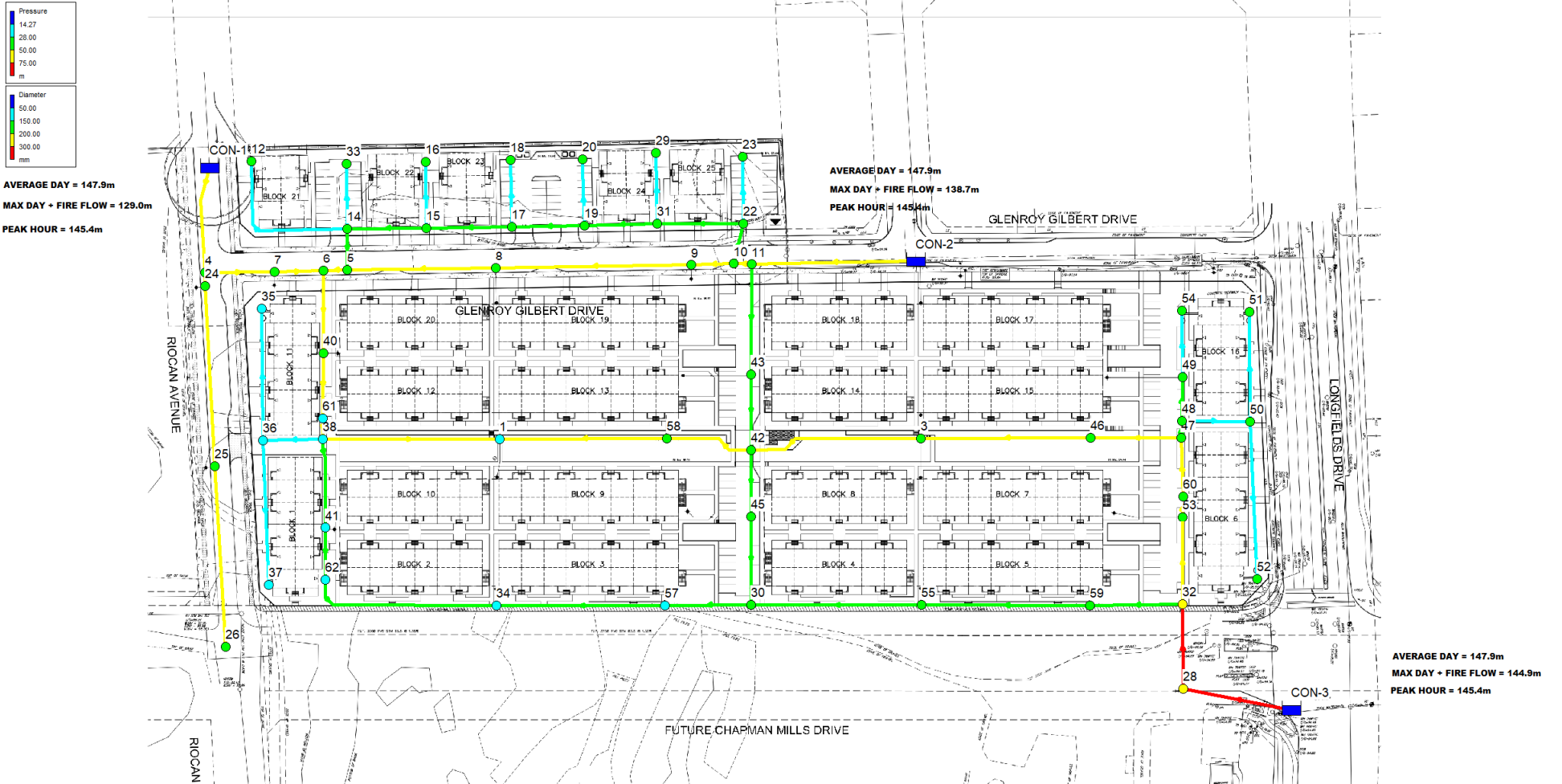
67	1536.56	1.45	24.53	Open
68	1531.56	1.44	24.38	Open
69	-5.00	0.04	0.13	Open
70	-2.50	0.02	0.04	Open
71	1529.06	1.44	37.98	Open
72	1551.56	1.46	39.05	Open
75	-1004.78	0.95	11.61	Open
78	-354.30	0.33	2.05	Open
79	3529.96	1.87	31.79	Open
80	2799.54	1.49	16.64	Open



Link Results: (continued)

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
81	-359.40	0.34	1.74	Open
82	-405.30	0.38	2.27	Open
83	-482.14	0.26	0.63	Open
84	-482.14	0.26	0.63	Open
85	-528.04	0.28	1.03	Open
86	-2104.27	1.98	48.45	Open
87	-1004.78	0.95	11.77	Open
88	-1050.68	0.99	15.12	Open
89	-2098.53	1.11	12.50	Open
90	-2104.33	1.12	10.59	Open
91	-821.14	0.44	1.82	Open
92	-826.24	0.44	2.91	Open
93	-354.30	0.33	1.80	Open
94	-359.40	0.34	1.78	Open

Fig 2 – MAX DAY + FIRE FLOW



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*                               E P A N E T                               *
*                               Hydraulic and Water Quality                *
*                               Analysis for Pipe Networks                  *
*                               Version 2.0                                *
*****

```

Input File: 2023-06-28_816_max-ff(blk10).net

15-816: Minto - BTC Stage 1

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	CON-1	4	38.0	200
2	4	24	5.0	200
3	24	25	65.0	200
4	25	26	65.0	200
12	4	7	25.0	200
13	5	6	9.0	200
16	8	9	70.5	200
17	9	10	19.0	200
18	10	11	2.5	200
19	11	CON-2	39.0	200
24	33	14	23.5	50
26	15	16	23.5	50
30	19	20	23.5	50
35	35	36	47.0	50
36	36	37	52.5	50
37	36	38	21.5	50
39	40	6	29.5	200
43	11	43	40	150
46	42	45	22.0	150
47	45	30	34.0	150
49	46	47	9.1	200
50	47	48	6.0	150
51	48	49	17.0	150
52	48	50	24.5	50
53	50	51	39.5	50
54	50	52	57.5	50
56	53	32	20.5	200
57	54	49	23.0	50
48	42	3	63.0	200
58	3	46	61	200
9	28	32	41	300
61	28	CON-3	41	300
62	17	18	23.5	50
63	12	14	57.5	50
64	14	15	10	150
65	15	17	10	150
66	17	19	10	150



Link - Node Table: (continued)

Link ID	Start Node	End Node	Length m	Diameter mm
67	19	31	10	150
68	31	22	10	150
69	29	31	26.0	50
70	23	22	23.5	50
71	22	10	15.5	150
72	5	14	15.5	150

MAX DAY + FIRE FLOW

75	30	55	61.5	150
78	38	41	32.0	150
79	7	6	17.5	200
80	5	8	53.5	200
81	34	57	60.5	150
82	57	30	31.0	150
83	38	1	64	200
84	1	58	60	200
85	58	42	32.0	200
86	43	42	26.5	150
87	55	59	60.5	150
88	59	32	33.5	150
89	47	60	14.5	200
90	60	53	25.0	200
91	40	61	25.0	200
92	61	38	6.0	200
93	41	62	18.5	150
94	62	34	68.5	150

Node Results:

Node ID	Demand LPM	Head m	Pressure m	Quality
4	0.00	128.97	30.96	0.00
5	0.00	129.72	31.82	0.00
6	0.00	128.93	30.93	0.00
8	0.00	131.04	33.38	0.00
9	0.00	132.76	35.53	0.00
10	0.00	133.33	36.13	0.00
11	0.00	133.71	36.48	0.00
12	6.25	130.57	31.56	0.00
14	0.00	130.59	32.63	0.00
15	0.00	130.94	32.82	0.00
16	12.50	130.93	32.82	0.00
17	0.00	131.31	33.66	0.00
18	6.25	131.30	33.54	0.00
19	0.00	131.67	34.13	0.00
20	6.25	131.67	34.04	0.00
22	0.00	132.41	35.14	0.00
23	6.25	132.41	34.89	0.00



Node Results: (continued)

Node ID	Demand LPM	Head m	Pressure m	Quality
24	0.00	128.97	31.13	0.00
25	0.00	128.97	31.71	0.00
26	0.00	128.97	31.82	0.00
30	0.00	125.43	31.04	0.00
32	0.00	142.93	50.42	0.00
33	6.25	130.58	32.33	0.00
35	12.75	123.52	25.61	0.00
36	0.00	123.56	26.08	0.00
37	12.75	123.52	26.27	0.00
38	0.00	123.62	26.23	0.00
40	0.00	126.17	28.37	0.00
41	4500.00	111.92	14.73	0.00
42	0.00	128.42	33.51	0.00
43	0.00	130.39	33.62	0.00
45	2500.00	125.76	31.21	0.00
46	114.75	136.54	42.61	0.00
47	14.50	137.95	44.81	0.00
48	0.00	137.95	44.90	0.00
49	0.00	137.95	44.75	0.00

50	0.00	137.89	44.54	0.00
51	10.25	137.87	44.35	0.00
52	14.50	137.83	44.92	0.00
53	0.00	140.84	48.07	0.00
54	10.25	137.94	41.36	0.00
1	5000.00	123.60	27.07	0.00
3	0.00	133.01	38.76	0.00
28	0.00	143.82	51.42	0.00
29	12.50	132.02	34.46	0.00
31	0.00	132.04	34.40	0.00
34	5000.00	110.85	15.12	0.00
55	0.00	131.88	38.16	0.00
7	0.00	128.94	31.17	0.00
57	114.75	120.13	24.86	0.00
58	114.75	126.20	30.07	0.00
59	114.75	138.32	45.09	0.00
60	14.50	139.14	46.12	0.00
61	12.75	124.37	26.86	0.00
62	12.75	111.68	14.64	0.00
CON-2	-8050.22	138.70	0.00	0.00 Reservoir
CON-3	-9072.03	144.90	0.00	0.00 Reservoir
CON-1	-508.00	129.00	0.00	0.00 Reservoir



Link Results:

Link ID	Flow LPM	Velocity m/s	Headloss m/km	Status
1	508.00	0.27	0.83	Open
2	0.00	0.00	0.00	Open
3	0.00	0.00	0.00	Open
4	0.00	0.00	0.00	Open
12	508.00	0.27	0.95	Open
13	5345.16	2.84	87.36	Open
16	-3469.53	1.84	24.35	Open
17	-3469.53	1.84	30.15	Open
18	-5401.41	2.87	152.33	Open
19	-8050.22	4.27	127.82	Open
24	-6.25	0.05	0.21	Open
26	12.50	0.11	0.75	Open
30	6.25	0.05	0.21	Open
35	-12.75	0.11	0.76	Open
36	12.75	0.11	0.75	Open
37	-25.50	0.22	2.88	Open
39	-5853.17	3.11	93.57	Open
43	2648.81	2.50	83.14	Open
46	3325.87	3.14	120.73	Open
47	825.87	0.78	9.59	Open
49	-5611.54	2.98	154.97	Open
50	35.00	0.03	0.03	Open
51	10.25	0.01	0.00	Open
52	24.75	0.21	2.67	Open
53	10.25	0.09	0.50	Open
54	14.50	0.12	0.95	Open
56	-5675.54	3.01	101.99	Open
57	-10.25	0.09	0.51	Open
48	-5496.79	2.92	72.91	Open
58	-5496.79	2.92	57.92	Open
9	9072.03	2.14	21.71	Open
61	-9072.03	2.14	26.26	Open
62	6.25	0.05	0.21	Open
63	-6.25	0.05	0.20	Open
64	-1888.14	1.78	35.92	Open
65	-1900.64	1.79	36.37	Open
66	-1906.89	1.80	36.59	Open

67	-1913.14	1.80	36.81	Open
68	-1925.64	1.82	37.26	Open
69	-12.50	0.11	0.74	Open
70	-6.25	0.05	0.20	Open
71	-1931.89	1.82	59.30	Open
72	-1875.64	1.77	56.05	Open
75	-3281.74	3.10	104.76	Open
78	5519.89	5.21	365.49	Open
79	508.00	0.27	0.82	Open
80	-3469.53	1.84	24.82	Open



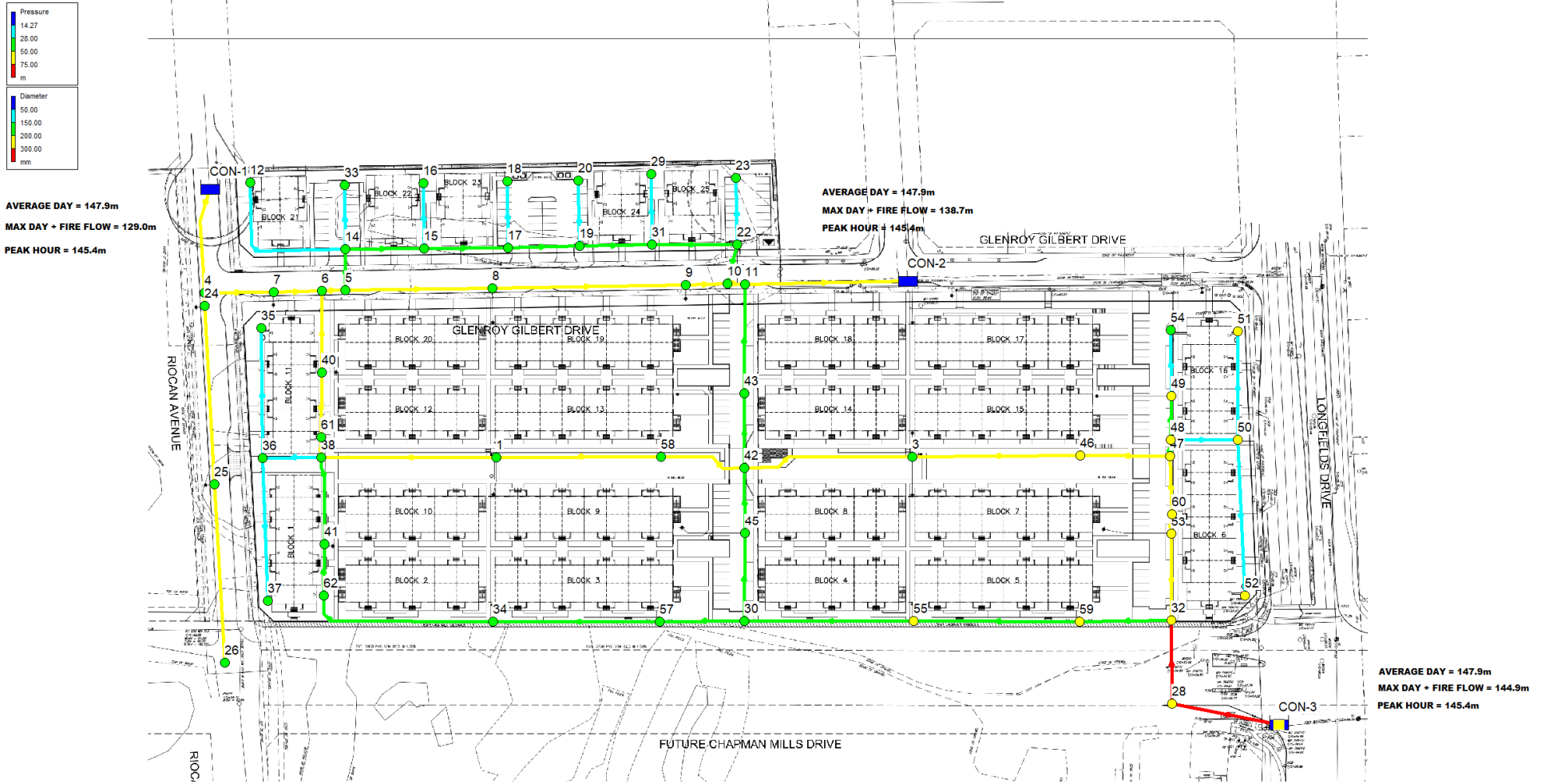
Page 5

15-816: Minto - BTC Stage 1

Link Results: (continued)

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
81	-3992.86	3.77	153.35	Open
82	-4107.61	3.87	171.27	Open
83	295.03	0.16	0.25	Open
84	-4704.97	2.50	43.40	Open
85	-4819.72	2.56	69.12	Open
86	2648.81	2.50	74.44	Open
87	-3281.74	3.10	106.45	Open
88	-3396.49	3.20	137.78	Open
89	-5661.04	3.00	82.01	Open
90	-5675.54	3.01	68.01	Open
91	5853.17	3.11	72.06	Open
92	5840.42	3.10	125.24	Open
93	1019.89	0.96	13.01	Open
94	1007.14	0.95	12.16	Open

Fig 3 – PEAK HOUR




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*****
*                               E P A N E T                               *
*                               Hydraulic and Water Quality                 *
*                               Analysis for Pipe Networks                 *
*                               Version 2.0                               *
*****

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Input File: 2023-06-28_816_peakhour.net

15-816: Minto - BTC Stage 1

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	CON-1	4	38.0	200
2	4	24	5.0	200
3	24	25	65.0	200
4	25	26	65.0	200
12	4	7	25.0	200
13	5	6	9.0	200
16	8	9	70.5	200
17	9	10	19.0	200
18	10	11	2.5	200
19	11	CON-2	39.0	200
24	33	14	23.5	50
26	15	16	23.5	50
30	19	20	23.5	50
35	35	36	47.0	50
36	36	37	52.5	50
37	36	38	21.5	50
39	40	6	29.5	200
43	11	43	40	150
46	42	45	22.0	150
47	45	30	34.0	150
49	46	47	9.1	200
50	47	48	6.0	150
51	48	49	17.0	150
52	48	50	24.5	50
53	50	51	39.5	50
54	50	52	57.5	50
56	53	32	20.5	200
57	54	49	23.0	50
48	42	3	63.0	200
58	3	46	61	200
9	28	32	41	300
61	28	CON-3	41	300
62	17	18	23.5	50
63	12	14	57.5	50
64	14	15	10	150
65	15	17	10	150
66	17	19	10	150



Link - Node Table: (continued)

Link ID	Start Node	End Node	Length m	Diameter mm
67	19	31	10	150
68	31	22	10	150
69	29	31	26.0	50
70	23	22	23.5	50
71	22	10	15.5	150
72	5	14	15.5	150

PEAK HOUR

75	30	55	61.5	150
78	38	41	32.0	150
79	7	6	17.5	200
80	5	8	53.5	200
81	34	57	60.5	150
82	57	30	31.0	150
83	38	1	64	200
84	1	58	60	200
85	58	42	32.0	200
86	43	42	26.5	150
87	55	59	60.5	150
88	59	32	33.5	150
89	47	60	14.5	200
90	60	53	25.0	200
91	40	61	25.0	200
92	61	38	6.0	200
93	41	62	18.5	150
94	62	34	68.5	150

Node Results:

Node ID	Demand LPM	Head m	Pressure m	Quality
4	0.00	144.36	46.35	0.00
5	0.00	142.71	44.81	0.00
6	0.00	143.08	45.08	0.00
8	0.00	142.09	44.43	0.00
9	0.00	141.30	44.07	0.00
10	0.00	141.04	43.84	0.00
11	0.00	140.88	43.65	0.00
12	13.75	142.21	43.20	0.00
14	0.00	142.26	44.30	0.00
15	0.00	142.08	43.96	0.00
16	27.50	142.00	43.89	0.00
17	0.00	141.91	44.26	0.00
18	13.75	141.89	44.13	0.00
19	0.00	141.74	44.20	0.00
20	13.75	141.72	44.09	0.00
22	0.00	141.41	44.14	0.00
23	13.75	141.39	43.87	0.00



Node Results: (continued)

Node ID	Demand LPM	Head m	Pressure m	Quality
24	0.00	144.36	46.52	0.00
25	0.00	144.36	47.10	0.00
26	0.00	144.36	47.21	0.00
30	0.00	143.32	48.93	0.00
32	0.00	145.11	52.60	0.00
33	13.75	142.24	43.99	0.00
35	28.05	142.68	44.77	0.00
36	0.00	142.84	45.36	0.00
37	28.05	142.67	45.42	0.00
38	0.00	143.11	45.72	0.00
40	0.00	143.09	45.29	0.00
41	0.00	143.13	45.94	0.00
42	0.00	143.16	48.25	0.00
43	0.00	142.31	45.54	0.00
45	0.00	143.22	48.67	0.00
46	252.45	144.12	50.19	0.00
47	31.90	144.32	51.18	0.00
48	0.00	144.32	51.27	0.00
49	0.00	144.32	51.12	0.00

PEAK HOUR

50	0.00	144.03	50.68	0.00
51	22.55	143.95	50.43	0.00
52	31.90	143.80	50.89	0.00
53	0.00	144.78	52.01	0.00
54	22.55	144.27	47.69	0.00
1	0.00	143.12	46.59	0.00
3	0.00	143.70	49.45	0.00
28	0.00	145.24	52.84	0.00
29	27.50	141.49	43.93	0.00
31	0.00	141.57	43.93	0.00
34	0.00	143.18	47.45	0.00
55	0.00	143.91	50.19	0.00
7	0.00	143.55	45.78	0.00
57	252.45	143.23	47.96	0.00
58	252.45	143.13	47.00	0.00
59	252.45	144.50	51.27	0.00
60	31.90	144.50	51.48	0.00
61	28.05	143.10	45.59	0.00
62	28.05	143.14	46.10	0.00
CON-2	5177.25	138.70	0.00	0.00 Reservoir
CON-3	-3317.80	145.40	0.00	0.00 Reservoir
CON-1	-3246.00	145.40	0.00	0.00 Reservoir



Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
1	3246.00	1.72	27.38	Open
2	0.00	0.00	0.00	Open
3	0.00	0.00	0.00	Open
4	0.00	0.00	0.00	Open
12	3246.00	1.72	32.31	Open
13	-3611.53	1.92	41.27	Open
16	2287.33	1.21	11.22	Open
17	2287.33	1.21	13.74	Open
18	3487.78	1.85	64.96	Open
19	5177.25	2.75	55.90	Open
24	-13.75	0.12	0.89	Open
26	27.50	0.23	3.24	Open
30	13.75	0.12	0.89	Open
35	-28.05	0.24	3.30	Open
36	28.05	0.24	3.23	Open
37	-56.10	0.48	12.54	Open
39	365.53	0.19	0.48	Open
43	-1689.47	1.59	35.71	Open
46	-436.75	0.41	2.70	Open
47	-436.75	0.41	2.90	Open
49	-2017.29	1.07	21.20	Open
50	77.00	0.07	0.12	Open
51	22.55	0.02	0.01	Open
52	54.45	0.46	11.63	Open
53	22.55	0.19	2.18	Open
54	31.90	0.27	4.11	Open
56	-2158.08	1.14	16.01	Open
57	-22.55	0.19	2.21	Open
48	-1764.83	0.94	8.53	Open
58	-1764.83	0.94	6.98	Open
9	3317.80	0.78	3.25	Open
61	-3317.80	0.78	3.86	Open
62	13.75	0.12	0.89	Open
63	-13.75	0.12	0.87	Open
64	1296.70	1.22	17.91	Open
65	1269.20	1.20	17.21	Open
66	1255.45	1.18	16.87	Open

PEAK HOUR

67	1241.70	1.17	16.53	Open
68	1214.20	1.15	15.86	Open
69	-27.50	0.23	3.22	Open
70	-13.75	0.12	0.86	Open
71	1200.45	1.13	23.95	Open
72	1324.20	1.25	28.87	Open
75	-907.27	0.86	9.61	Open
78	-190.02	0.18	0.63	Open
79	3246.00	1.72	27.13	Open
80	2287.33	1.21	11.42	Open



Link Results: (continued)

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
81	-218.07	0.21	0.69	Open
82	-470.52	0.44	3.00	Open
83	-259.66	0.14	0.20	Open
84	-259.66	0.14	0.20	Open
85	-512.11	0.27	0.97	Open
86	-1689.47	1.59	32.17	Open
87	-907.27	0.86	9.74	Open
88	-1159.72	1.09	18.20	Open
89	-2126.18	1.13	12.82	Open
90	-2158.08	1.14	11.10	Open
91	-365.53	0.19	0.40	Open
92	-393.58	0.21	0.70	Open
93	-190.02	0.18	0.56	Open
94	-218.07	0.21	0.70	Open

Boundary Conditions Minto Barrhaven Town Centre – Stage 1

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	245	4.08
Maximum Daily Demand	668	11.13
Peak Hour	1,392	23.20
Fire Flow Demand #1	17,000	283.33

Location



Results – Existing Conditions

Connection 1 – Riocan Avenue

Demand Scenario	Head (m)	Pressure ¹ (psi)
Maximum HGL	157.7	78.8
Peak Hour	140.9	54.9
Max Day plus Fire 1	130.0	39.5

Ground Elevation = 102.2 m

Connection 2 – Glenroy Gilbert Drive

Demand Scenario	Head (m)	Pressure ¹ (psi)
Maximum HGL	157.7	83.0
Peak Hour	140.9	59.0
Max Day plus Fire 1	139.6	57.2

Ground Elevation = 99.3 m

Connection 3 – Chapman Mills Drive

Demand Scenario	Head (m)	Pressure ¹ (psi)
Maximum HGL	157.7	89.5
Peak Hour	140.8	65.5
Max Day plus Fire 1	145.7	72.4

Ground Elevation = 94.7 m

Results – SUC Zone Reconfiguration

Connection 1 – Riocan Avenue

Demand Scenario	Head (m)	Pressure ¹ (psi)
Maximum HGL	147.9	64.9
Peak Hour	145.4	61.3
Max Day plus Fire 1	129.0	38.1

Ground Elevation = 102.2 m

Connection 2 – Glenroy Gilbert Drive

Demand Scenario	Head (m)	Pressure ¹ (psi)
Maximum HGL	147.9	69.1
Peak Hour	145.4	65.5
Max Day plus Fire 1	138.7	56.0

Ground Elevation = 99.3 m

Connection 3 – Chapman Mills Drive

Demand Scenario	Head (m)	Pressure ¹ (psi)
Maximum HGL	147.9	69.1
Peak Hour	145.4	65.5
Max Day plus Fire 1	144.9	71.2

Ground Elevation = 94.7 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.

APPENDIX C

Sanitary Servicing Documents

SANITARY SEWER CALCULATION SHEET



Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION							COMM		INSTIT		PARK		C+H	INFILTRATION			PIPE									
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL (FULL) (m/s)	VEL (ACT.) (m/s)
SERVICING 6																													
	113A	114A	0.10	6	6		13	0.10	13	3.72	0.16		0.00		0.00		0.00	0.00	0.10	0.10	0.03	0.19	24.5	200	3.10	57.75	0.00	1.84	0.41
Contribution From SERVICING 1, Pipe 112A - 114A								0.52	117				0.00		0.00		0.00		0.52	0.62									
	114A	115A						0.62	130	3.57	1.50		0.00		0.00		0.00	0.00	0.00	0.62	0.20	1.71	11.0	200	0.35	19.40	0.09	0.62	0.38
To GLENROY GILBERT DR, Pipe 115A - 116A								0.62	130				0.00		0.00		0.00		0.62										
SERVICING 5																													
	111A	112A	0.08	12	12		26	0.08	26	3.69	0.31		0.00		0.00		0.00	0.00	0.08	0.08	0.03	0.34	27.0	200	0.65	26.44	0.01	0.84	0.28
To SERVICING 1, Pipe 112A - 114A								0.08	26				0.00		0.00		0.00		0.08	0.08									
SERVICING 5																													
	109A	110A	0.09	6	6		13	0.09	13	3.72	0.16		0.00		0.00		0.00	0.00	0.09	0.09	0.03	0.19	24.5	200	0.75	28.40	0.01	0.90	0.25
To SERVICING 1, Pipe 110A - 112A								0.09	13				0.00		0.00		0.00		0.09	0.09									
SERVICING 4																													
	107A	108A	0.09	6	6		13	0.09	13	3.72	0.16		0.00		0.00		0.00	0.00	0.09	0.09	0.03	0.19	24.5	200	0.65	26.44	0.01	0.84	0.23
To SERVICING 1, Pipe 108A - 110A								0.09	13				0.00		0.00		0.00		0.09	0.09									
SERVICING 3																													
	105A	106A	0.08	12	12		26	0.08	26	3.69	0.31		0.00		0.00		0.00	0.00	0.08	0.08	0.03	0.34	26.0	200	0.65	26.44	0.01	0.84	0.28
To SERVICING 1, Pipe 106A - 108A								0.08	26				0.00		0.00		0.00		0.08	0.08									
SERVICING 2																													
	103A	104A	0.13	12	12		26	0.13	26	3.69	0.31		0.00		0.00		0.00	0.13	0.13	0.04	0.35	24.5	200	1.75	43.39	0.01	1.38	0.40	
To SERVICING 1, Pipe 104A - 106A								0.13	26				0.00		0.00		0.00		0.13	0.13									
SERVICING 1																													
	100A	101A						0.00				0.00		0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.0	200	2.85	55.37	0.00	1.76	0.10
	101A	102A						0.00	0			0.00		0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.5	200	3.60	62.23	0.00	1.98	0.11
	102A	104A	0.05	6	6		13	0.05	13	3.72	0.16		0.00		0.00		0.00	0.00	0.05	0.05	0.02	0.17	30.0	200	0.85	30.24	0.01	0.96	0.25
To SERVICING 1, Pipe 104A - 106A								0.05	13				0.00		0.00		0.00		0.05	0.05									
Contribution From SERVICING 1, Pipe 102A - 104A								0.05	13				0.00		0.00		0.00		0.05	0.05									
Contribution From SERVICING 2, Pipe 103A - 104A								0.13	26				0.00		0.00		0.00		0.13	0.18									
	104A	106A						0.18	39	3.67	0.46		0.00		0.00		0.00	0.00	0.18	0.18	0.06	0.52	33.5	200	0.35	19.40	0.03	0.62	0.26
Contribution From SERVICING 3, Pipe 105A - 106A								0.08	26				0.00		0.00		0.00		0.08	0.26									
	106A	108A						0.26	65	3.63	0.77		0.00		0.00		0.00	0.00	0.26	0.26	0.09	0.85	31.5	200	0.35	19.40	0.04	0.62	0.31
Contribution From SERVICING 4, Pipe 107A - 108A								0.09	13				0.00		0.00		0.00		0.09	0.35									
	108A	110A						0.35	78	3.62	0.91		0.00		0.00		0.00	0.00	0.35	0.35	0.12	1.03	20.5	200	1.60	41.49	0.02	1.32	0.55
Contribution From SERVICING 5, Pipe 109A - 110A								0.09	13				0.00		0.00		0.00		0.09	0.44									
	110A	112A						0.44	91	3.60	1.06		0.00		0.00		0.00	0.00	0.44	0.44	0.15	1.21	31.0	200	0.35	19.40	0.06	0.62	0.34
Contribution From SERVICING 5, Pipe 111A - 112A								0.08	26				0.00		0.00		0.00		0.08	0.52									
	112A	114A						0.52	117	3.58	1.36		0.00		0.00		0.00	0.00	0.52	0.52	0.17	1.53	32.0	200	0.40	20.74	0.07	0.66	0.38
To SERVICING 6, Pipe 114A - 115A								0.52	117				0.00		0.00		0.00		0.52										
GLENROY GILBERT DR																													
Contribution From SERVICING 6, Pipe 114A - 115A								0.62	130				0.00		0.00		0.00		0.62	0.62									
	115A	EX SAN118A	0.38				0	1.00	130	3.57	1.50		0.00		0.00		0.00	0.38	1.00	0.33	1.83	12.5	200	0.40	20.74	0.09	0.66	0.41	
DESIGN PARAMETERS																													
Park Flow = 9300 L/ha/da 0.10764 l/s/ha																													
Average Daily Flow = 280 l/p/day																													
Comm/Inst Flow = 28000 L/ha/da 0.3241 l/s/ha																													
Industrial Flow = 35000 L/ha/da 0.40509 l/s/ha																													
Max Res. Peak Factor = 4.00																													
Commercial/Inst./Park Peak Factor = 1.00																													
Institutional = 0.32 l/s/ha																													
Industrial Peak Factor = as per MOE Graph Extraneous Flow = 0.330 L/s/ha Minimum Velocity = 0.600 m/s Manning's n = (Conc) 0.013 (Pvc) 0.013 2 Bedroom coeff = 2.1																													
Designed: CPB														PROJECT: Minto - Barrhaven Town Centre Stage 1															
Checked: SLM														LOCATION: City of Ottawa															
Dwg. Reference: Sanitary Drainage Plan, Dwg. No.														File Ref: 15-816				Date: 29 Jun 2023				Sheet No. 1 of 4							

SANITARY SEWER CALCULATION SHEET



Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION							COMM		INSTIT		PARK		C+H	INFILTRATION			PIPE									
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
SERVICING 11																													
To SERVICING 9, Pipe 129A - 130A	Plug	129A	0.47	64	64		135	0.47	135	3.56	1.56		0.00		0.00		0.00		0.47	0.47	0.16	1.71	11.5	200	6.00	80.34	0.02	2.56	1.03
SERVICING 10																													
To SERVICING 9, Pipe 127A - 129A	Plug	127A	0.59	96	96		202	0.59	202	3.52	2.30		0.00		0.00		0.00		0.59	0.59	0.19	2.50	11.5	200	6.00	80.34	0.03	2.56	1.15
To SERVICING 9, Pipe 127A - 129A		126A	127A					0.00					0.00		0.00		0.00		0.00	0.00	0.00	0.00	10.5	200	0.95	31.97	0.00	1.02	0.06
SERVICING 8																													
To SERVICING 9, Pipe 124A - 127A		121A	124A	0.10	12	12	26	0.10	26	3.69	0.31		0.00		0.00		0.00		0.10	0.10	0.03	0.34	50.5	200	0.65	26.44	0.01	0.84	0.29
To SERVICING 9, Pipe 124A - 127A		122A	123A					0.00					0.00		0.00		0.00	0.00	0.00	0.00	0.00	0.00	44.5	200	0.75	28.40	0.00	0.90	0.05
To SERVICING 9, Pipe 124A - 127A		123A	124A	0.10	12	12	26	0.10	26	3.69	0.31		0.00		0.00		0.00		0.10	0.10	0.03	0.34	5.5	200	3.45	60.92	0.01	1.94	0.50
SERVICING 7																													
To SERVICING 9, Pipe 120A - 124A		118A	120A	0.08	12	12	26	0.08	26	3.69	0.31		0.00		0.00		0.00		0.08	0.08	0.03	0.34	49.5	200	0.90	31.12	0.01	0.99	0.32
To SERVICING 9, Pipe 120A - 124A		119A	120A	0.08	12	12	26	0.08	26	3.69	0.31		0.00		0.00		0.00		0.08	0.08	0.03	0.34	49.0	200	0.65	26.44	0.01	0.84	0.28
SERVICING 9																													
Contribution From SERVICING 13, Pipe 131A - 132A		132A	133A					0.36	101				0.00		0.00		0.00		0.36	0.36									
To SERVICING 14, Pipe 133A - 138A		133A						0.36	101	3.59	1.18		0.00		0.00		0.00	0.00	0.00	0.36	0.12	1.30	20.0	200	0.35	19.40	0.07	0.62	0.35
Contribution From SERVICING 16, Pipe 146A - 147A		147A	148A					0.57	135				0.00		0.00		0.00		0.57	0.57									
To SERVICING 19, Pipe 148A - 151A		148A						0.57	135	3.56	1.56		0.00		0.00		0.00	0.00	0.00	0.57	0.19	1.75	29.0	200	1.65	42.13	0.04	1.34	0.65
Contribution From SERVICING 7, Pipe 118A - 120A		120A	124A	0.02			0	0.08	26				0.00		0.00		0.00		0.08	0.16									
Contribution From SERVICING 7, Pipe 119A - 120A		120A	124A	0.02			0	0.18	52	3.65	0.61		0.00		0.00		0.00	0.00	0.02	0.18	0.06	0.67	27.0	200	1.05	33.61	0.02	1.07	0.42
Contribution From SERVICING 8, Pipe 121A - 124A		124A						0.10	26				0.00		0.00		0.00		0.10	0.28									
Contribution From SERVICING 8, Pipe 123A - 124A		124A						0.10	26				0.00		0.00		0.00		0.10	0.38									
Contribution From SERVICING 10, Pipe 125A - 127A		127A	129A					0.38	104	3.59	1.21		0.00		0.00		0.00	0.00	0.00	0.38	0.13	1.34	46.5	200	0.35	19.40	0.07	0.62	0.35
Contribution From SERVICING 10, Pipe 126A - 127A		127A	129A					0.59	202				0.00		0.00		0.00		0.59	0.97									
Contribution From SERVICING 10, Pipe 126A - 127A		127A	129A					0.00	0				0.00		0.00		0.00		0.00	0.97									
Contribution From SERVICING 11, Pipe 128A - 129A		129A	130A					0.97	306	3.46	3.43		0.00		0.00		0.00	0.00	0.00	0.97	0.32	3.75	76.0	200	0.35	19.40	0.19	0.62	0.47
Contribution From SERVICING 11, Pipe 128A - 129A		129A	130A	0.01			0	0.47	135				0.00		0.00		0.00		0.47	1.44									
		129A	130A	0.01			0	1.45	441	3.40	4.86		0.00		0.00		0.00	0.00	0.01	1.45	0.48	5.34	12.5	200	0.35	19.40	0.28	0.62	0.52
		130A	133A	0.23			0	1.68	441	3.40	4.86		0.00		0.00		0.00	0.00	0.23	1.68	0.55	5.42	19.5	200	0.35	19.40	0.28	0.62	0.53
To SERVICING 14, Pipe 133A - 138A								1.68	441				0.00		0.00		0.00		1.68										

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	I/s/ha
Average Daily Flow =	280	I/p/day		
Comm/Inst Flow =	28000	L/ha/da	0.3241	I/s/ha
Industrial Flow =	35000	L/ha/da	0.40509	I/s/ha
Max Res. Peak Factor =	4.00			
Commercial/Inst./Park Peak Factor =	1.00			
Institutional =	0.32	I/s/ha		

Industrial Peak Factor = as per MOE Graph
Extraneous Flow = 0.330 L/s/ha
Minimum Velocity = 0.600 m/s
Manning's n = (Conc) 0.013 (Pvc) 0.013
2 Bedroom coeff= 2.1

Designed:	CPB	PROJECT:	Minto - Barrhaven Town Centre Stage 1
Checked:	SLM	LOCATION:	City of Ottawa
Dwg. Reference:	Sanitary Drainage Plan, Dwg. No.	File Ref:	15-816
		Date:	29 Jun 2023
		Sheet No.	3
		of	4

SANITARY SEWER CALCULATION SHEET



Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION					CUMULATIVE		PEAK		COMM		INSTIT		PARK		C+H		INFILTRATION			PIPE										
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	AREA (ha)	POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)				
SERVICING 14																																	
Contribution From SERVICING 9, Pipe 130A - 133A								1.68	441				0.00	0.00			0.00			1.68	1.68												
Contribution From SERVICING 9, Pipe 132A - 133A								0.36	101				0.00	0.00			0.00			0.36	2.04												
	133A	138A	0.15				0	2.19	542	3.36	5.91		0.00	0.00	0.00	0.00	0.00	0.15	2.19	0.72	6.63	42.0	200	0.75	28.40	0.23	0.90	0.73					
Contribution From SERVICING 15, Pipe 135A - 138A								0.31	135				0.00	0.00			0.00			0.31	2.50												
Contribution From SERVICING 15, Pipe 137A - 138A								0.24	101				0.00	0.00			0.00			0.24	2.74												
	138A	139A						2.74	778	3.29	8.31		0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.74	0.90	9.21	15.0	200	0.35	19.40	0.47	0.62	0.61				
To FUTURE CHAPMAN MILLS DR, Pipe 139A - 140A								2.74	778				0.00	0.00			0.00			2.74													
FUTURE CHAPMAN MILLS DR																																	
Contribution From SERVICING 14, Pipe 138A - 139A								2.74	778				0.00	0.00			0.00			2.74	2.74												
	139A	140A	1.06				0	3.80	778	3.29	8.31		0.00	0.00	0.00	0.00	0.00	1.06	3.80	1.25	9.56	80.5	250	0.25	29.73	0.32	0.61	0.54					
	140A	152A	0.30				0	4.10	778	3.29	8.31		0.00	0.00	0.00	0.00	0.00	0.30	4.10	1.35	9.66	74.5	250	0.40	37.61	0.26	0.77	0.64					
Contribution From SERVICING 19, Pipe 151A - 152A								1.46	372				0.00	0.00			0.00			1.46	5.56												
	152A	EX SAN 138A	0.13				0	5.69	1150	3.21	11.96		0.00	0.00	0.00	0.00	0.00	0.13	5.69	1.88	13.83	36.0	250	0.25	29.73	0.47	0.61	0.59					

DESIGN PARAMETERS Park Flow = 9300 L/ha/da 0.10764 l/s/Ha Average Daily Flow = 280 l/p/day Comm/Inst Flow = 28000 L/ha/da 0.3241 l/s/Ha Industrial Flow = 35000 L/ha/da 0.40509 l/s/Ha Max Res. Peak Factor = 4.00 Commercial/Inst./Park Peak Factor = 1.00 Institutional = 0.32 l/s/Ha										Industrial Peak Factor = as per MOE Graph Extraneous Flow = 0.330 L/s/ha Minimum Velocity = 0.600 m/s Manning's n = (Conc) 0.013 (Pvc) 0.013 2 Bedroom coeff= 2.1										Designed: CPB Checked: SLM					PROJECT: Minto - Barrhaven Town Centre Stage 1 LOCATION: City of Ottawa				
Dwg. Reference: Sanitary Drainage Plan, Dwg. No.										File Ref: 15-816					Date: 29 Jun 2023					Sheet No. 4 of 4									

DYMOND STORAGE
McGary Terrace - 121
0.603 ha Commercial
1012 McGARY STREET
121-103
0.64 ha - 418pers.

**BARRHAVEN COURT
RETIREMENT CENTRE**
Retirement Home -102
1.42 ha. institutional

**SCHOOL ON
LONGFIELDS**
School-101
5.61 ha. institutional

1034 McGARY TERRACE & 117 LONGFIEDS DRIVE
San Stub - 103
0.96ha. - 618 pers.

**WATERFORD
RETIREMENT
CENTRE**
Lindenshade 5062
0.92 ha - 526 pers.

**MINTO
AMPERSAND**

**MINTO
BTC BLOCK A**
5063-B
0.64 ha. - 126 pers.

**MINTO
BTC BLOCK B**
13-5067-A
0.65ha. - 1142 pers.



DYMOND STORAGE

Dymon Self Storage - 1000 M
Wastewater Design Ca

McGary Terrace - 121
0.603 ha Commercial

Calculation Method 1 (City of Ottawa Design Guidelines):

Total Gross Area =	0.603 ha
Theoretical Unit Rate =	28,000 L/ha/day - per City of Ottawa Design Guidelines
Average Wastewater Flow =	16884 L/day
Average Wastewater Volume =	0.39 L/s (assuming 12 hour operation)
Peaking Factor =	1.5
Infiltration 0.33 L/s/ha=	0.20 L/s

Peak Design Flow = 0.79 L/s

Calculation Method 2 (Mechanical Fixture Count):

Proposed 5-Storey Building Sani. Flow =	75 GPM	= 4.73 L/s
Proposed Floor Drains of Building =	10 GPM	= 0.63 L/s
Anticipated Total Peak Flow =	85 GPM	= 5.36 L/s

Peak Design Flow = 5.36 L/s

Use the most conservative method; Q = 5.36 L/s

The proposed 150 mm diameter sanitary service with a slope of $\pm 0.5\%$ has a capacity of 11.2 L/s and a full flow velocity of 0.62 m/s. Therefore, the proposed sanitary service has sufficient capacity to accommodate the Peak Design Flow of 5.36 L/s.

Wastewater Design Flows per Unit Count
 City of Ottawa Sewer Design Guidelines, 2004



Site Area 0.640 ha

Extraneous Flow Allowances

Infiltration / Inflow (Dry)	0.03 L/s
Infiltration / Inflow (Wet)	0.16 L/s
Infiltration / Inflow (Total)	0.21 L/s

Domestic Contributions

Unit Type	Unit Rate	Units	Pop
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.7		0
Stacked Townhouse	2.3		0
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8	232	418

Total Pop 418

Average Domestic Flow 1.35 L/s

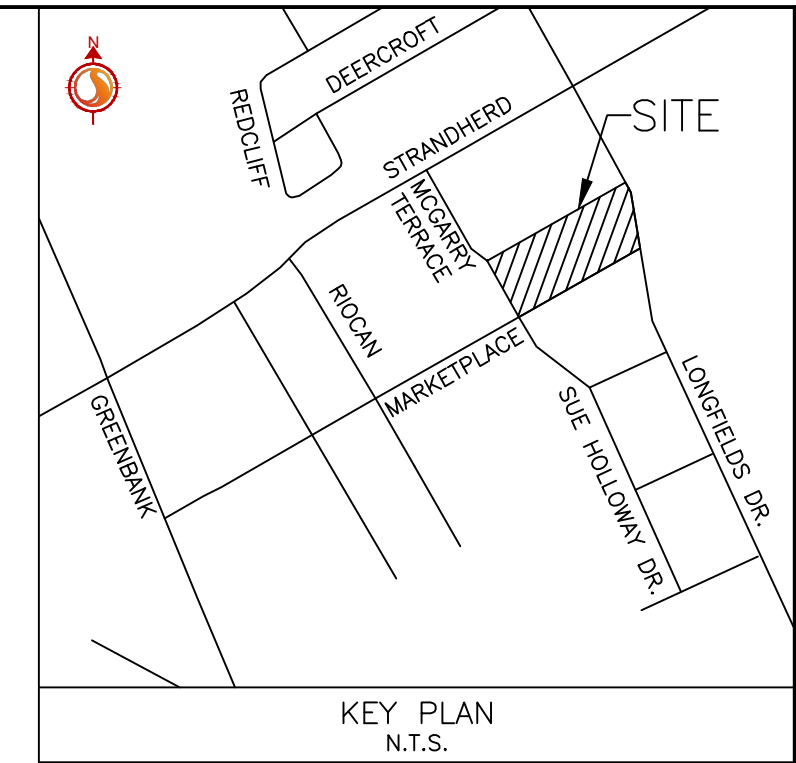
Peaking Factor 3.41

Peak Domestic Flow 4.62 L/s

Total Estimated Average Dry Weather Flow Rate	1.39 L/s
Total Estimated Peak Dry Weather Flow Rate	4.65 L/s
Total Estimated Peak Wet Weather Flow Rate	4.86 L/s

1012 MCGARY STREET
121-103
0.64 ha - 418pers.

**1034 MCGARY TERRACE &
117 LONGFIELDS DRIVE
0.96ha. - 618 pers.**



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Lily Xu
LILY XU, MCIP, RPP
(A) MANAGER, DEVELOPMENT REVIEW - SOUTH
PLANNING, INFRASTRUCTURE & ECONOMIC
DEVELOPMENT DEPARTMENT, CITY OF OTTAWA

APPROVED
By Lily Xu at 7:29 pm, Jul 11, 2019

Legend

	SANITARY DRAINAGE AREA ID#
	POPULATION
	SANITARY DRAINAGE AREA ha.
	SANITARY DRAINAGE AREA
	PROPOSED SANITARY SEWER
	EXISTING SANITARY SEWER
	EXISTING ASPHALT LIMITS

7	REVISED AS PER CITY COMMENTS	MJS	KS	19.05.14
6	REVISED AS PER CITY COMMENTS	AJ	KS	19.03.01
5	UPDATED AS PER CITY COMMENTS	JP	KS	18.09.24
4	UPDATED AS PER REVISED SITE PLAN	JP	KS	18.06.14
3	CORRECTED RELOCATION OF FH	DJC	KS	18.06.04
2	REVISED AS PER CITY COMMENTS	DJC	KS	18.06.01
1	ISSUED FOR SPA	MJS	KS	18.02.02

Revision

By	Appd.	YY.MM.DD
MJS	KS	18.01.26
MJS	KS	18.01.26
MJS	KS	18.01.26

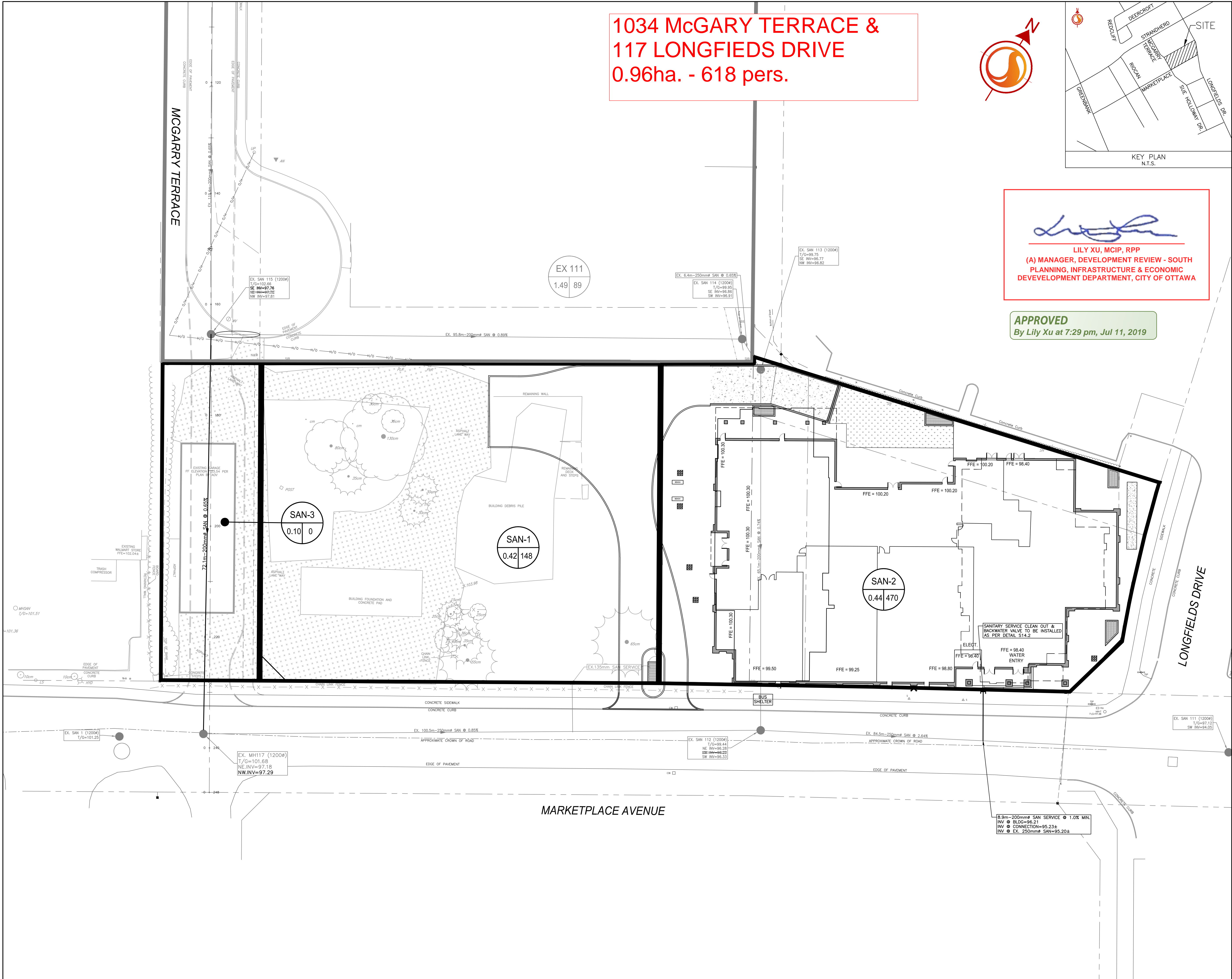
File Name: 160401399-
SA

Permit-Seal

Client/Project
1879369 ONTARIO INC. COB AS
SAINT JOSEPH DEVELOPMENTS
MARKETPLACE AVENUE
OTTAWA ON CANADA

Title
SANITARY DRAINAGE PLAN

Project No.	Scale	0 3 9 15m
160401399	1:300	
Drawing No.	Sheet	Revision
SA-1	7 of 7	7

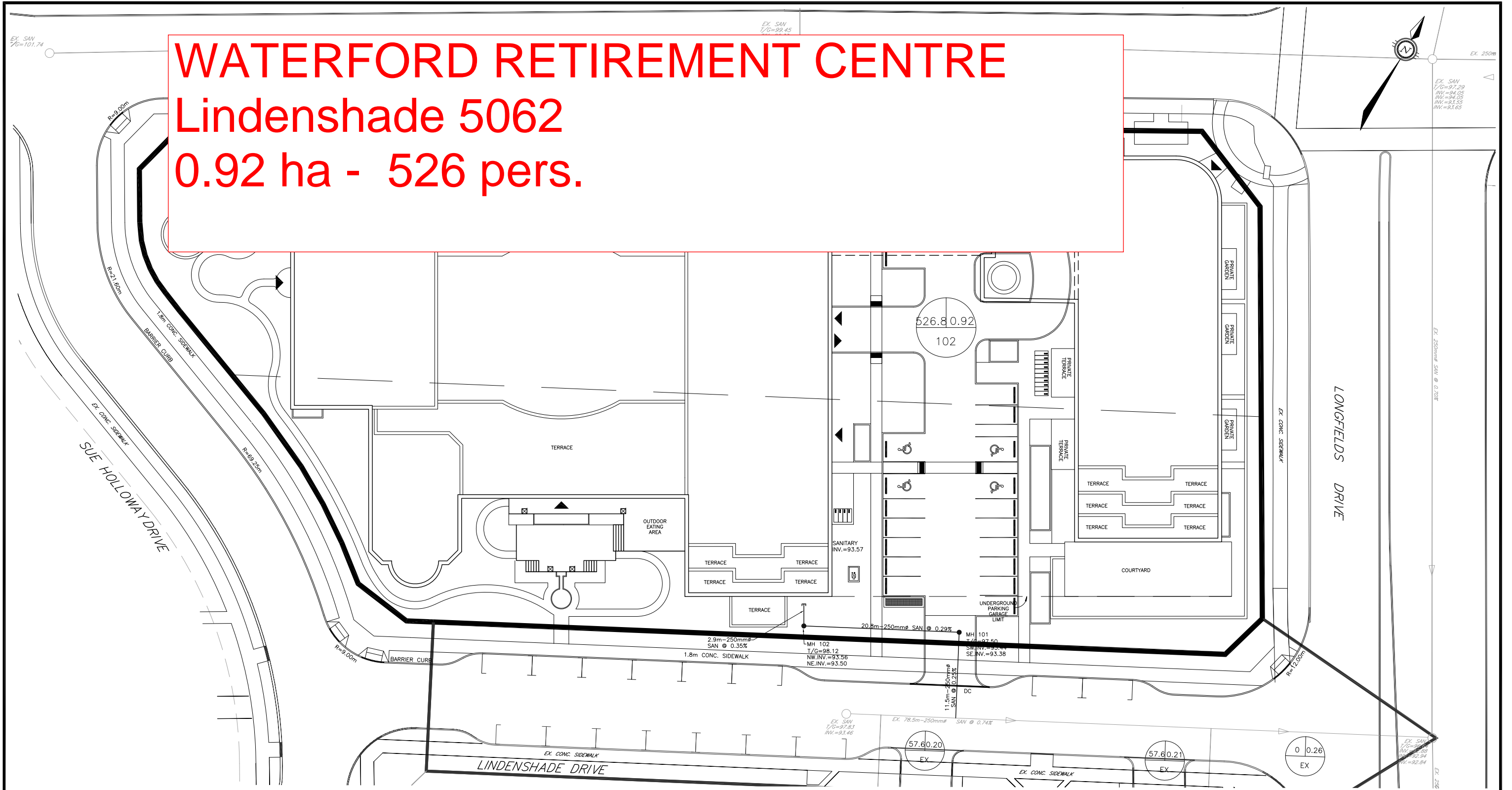


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2019/07/14 8:55 AM by: shara_mie

WATERFORD RETIREMENT CENTRE

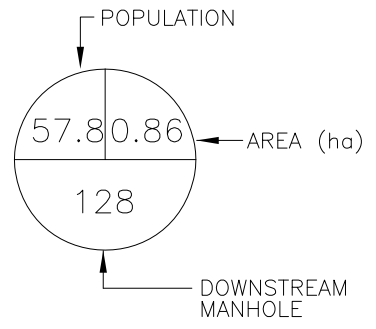
Lindenshade 5062

0.92 ha - 526 pers.



LEGEND

SANITARY DRAINAGE AREA BOUNDARY

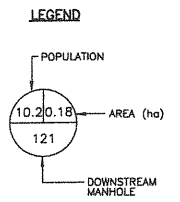
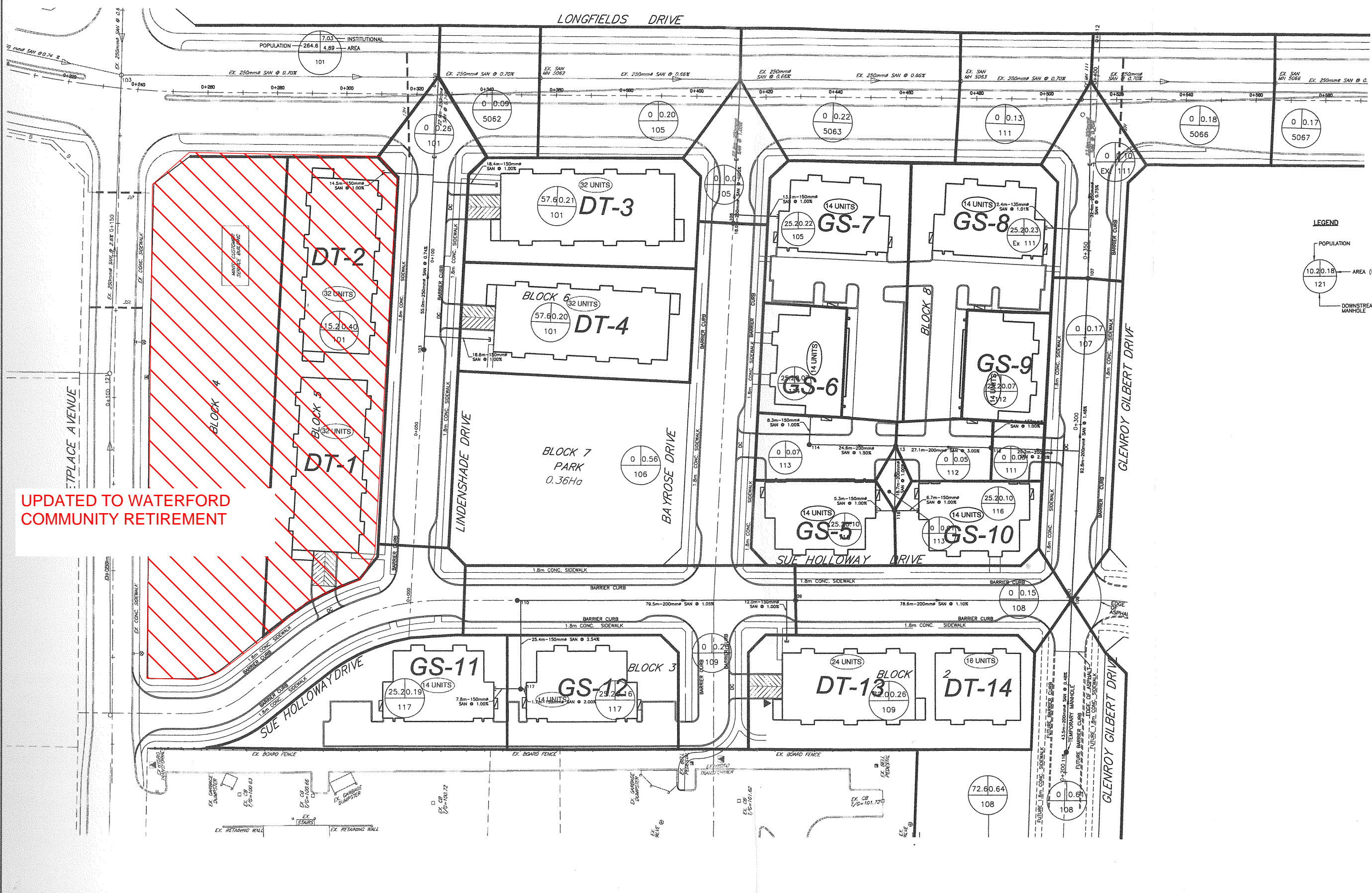


Robinson
Land Development

scale 1:500	CLIENT: WATERFORD RETIREMENT	project no. 16065
date 30/11/16	TITLE: SANITARY DRAINAGE AREA PLAN	SAN-1
drawn by JHB		



LONGFIELDS DRIVE

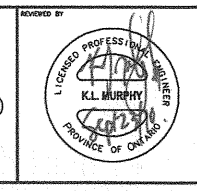
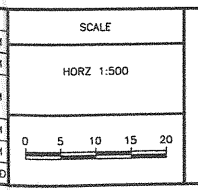


UPDATED TO WATERFORD COMMUNITY RETIREMENT

NOTES
 THE POSITION OF ALL POLE LINES, CONDUITS, WATERMANS, 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.

PRELIMINARY
 NOT FOR CONSTRUCTION

NO.	REVISION DESCRIPTION	DATE	BY	APPD.	NO.	REVISION DESCRIPTION	DATE	BY	APPD.
5	ISSUED FOR MOE APPROVAL	23/09/10	KLM	KLM	1	ISSUED FOR SITE PLAN APPLICATION	26/03/10	KLM	KLM
4	REVISED PER CITY COMMENTS	24/08/10	KLM	KLM	2	ISSUED FOR APPROVAL	26/05/10	KLM	KLM
3	REVISED PER CITY COMMENTS, REVISED SITE PLAN	16/07/10	KLM	KLM	3	REVISED PER CITY COMMENTS, REVISED SITE PLAN	16/07/10	KLM	KLM

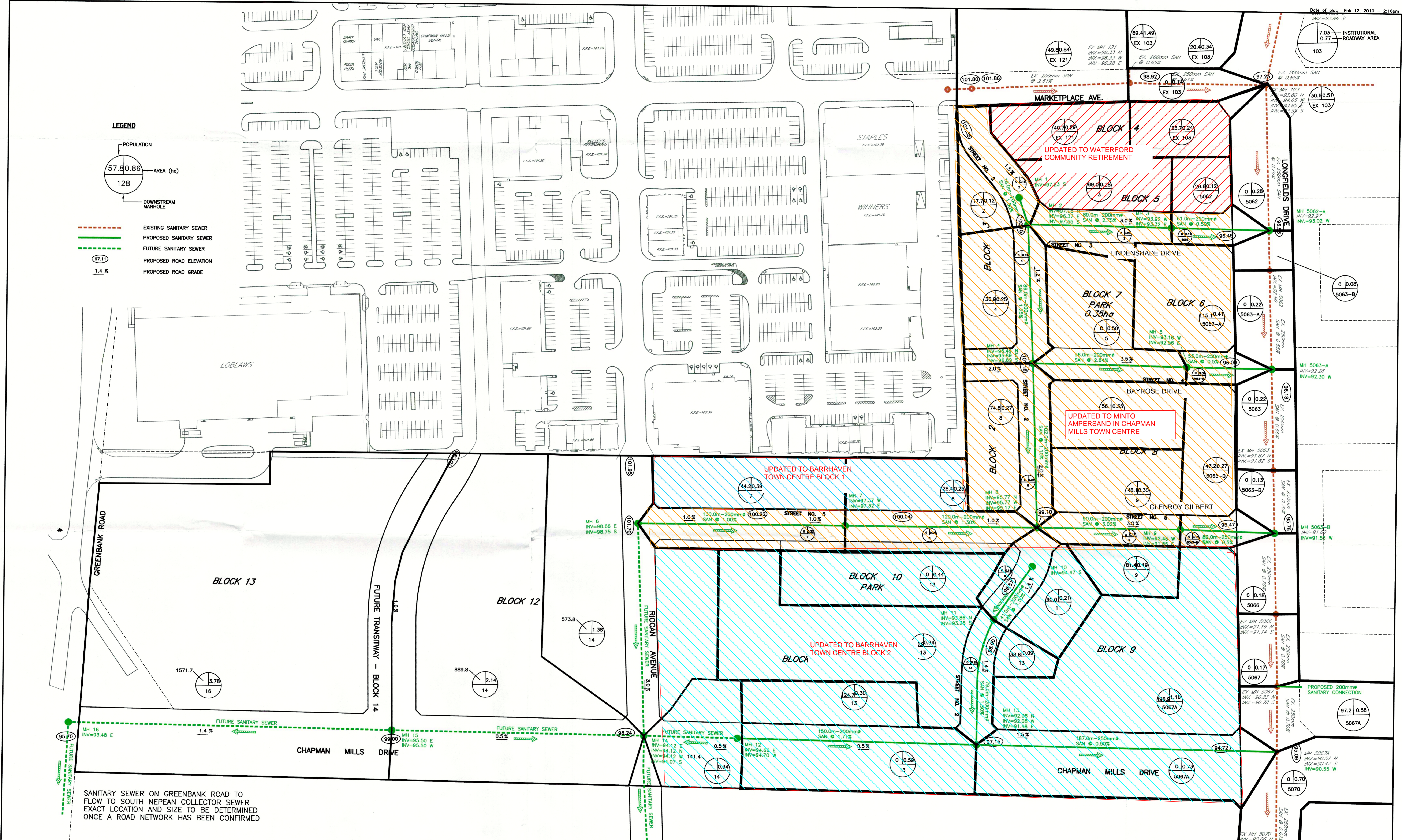
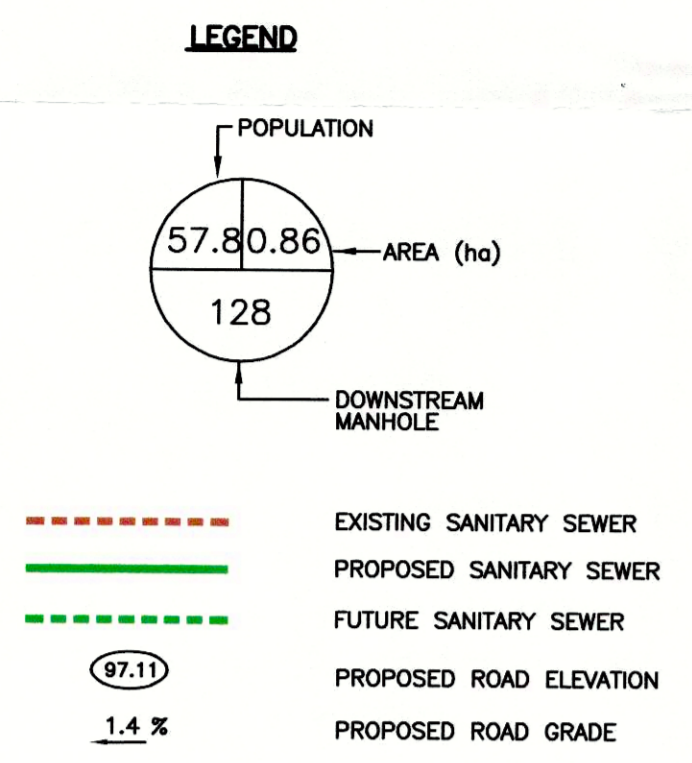


CLIENT: MINTO COMMUNITIES INC.

David McManus Engineering
 A Truax Global Company
 100-2620 Cassinville Drive, Ontario, Canada, K2B 9H4
 E-mail: mcm@mcmanus.com Tel: 613-228-1228 Fax: 613-228-1230

NO.	REVISION DESCRIPTION	DATE	BY	APPD.
1	ISSUED FOR SITE PLAN APPLICATION	26/03/10	KLM	KLM
2	ISSUED FOR APPROVAL	26/05/10	KLM	KLM
3	REVISED PER CITY COMMENTS, REVISED SITE PLAN	16/07/10	KLM	KLM
4	REVISED PER CITY COMMENTS	24/08/10	KLM	KLM
5	ISSUED FOR MOE APPROVAL	23/09/10	KLM	KLM

PROJECT	AMPERSAND IN CHAPMAN MILLS TOWN CENTRE
TITLE	SANITARY DRAINAGE AREA PLAN
PROJECT NO.	2884
DATE	MARCH 2010
DRAWING NO.	SAN1



NOTE
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMANS,
SEWERS AND OTHER UNDERGROUND AND OVERGROUND
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No.	REVISION	DATE	BY
3.	REVISED PER CITY COMMENTS	FEB 9/10	KLM
2.	REVISED PER CITY COMMENTS	DEC 14/09	KLM
1.	ISSUED FOR SERVICING BRIEF	JUNE 2/09	SMC



BASEPLAN	DME	SCALE
DESIGN	JHB	1:1000
CHECKED	SWB/JHB	0 10 20 30 40
CAD	SWB/JHB	
PROJ. MGR.	SMC	
APPROVED	SMC	

MINTO COMMUNITIES INC.
BARRHAVEN TOWN CENTRE
CITY OF OTTAWA

CONCEPTUAL SANITARY DRAINAGE AREA PLAN

PROJECT No. 2884
SURVEY BY DME
DATE MAY 2009
DRAWING No. 2884-SAN-101

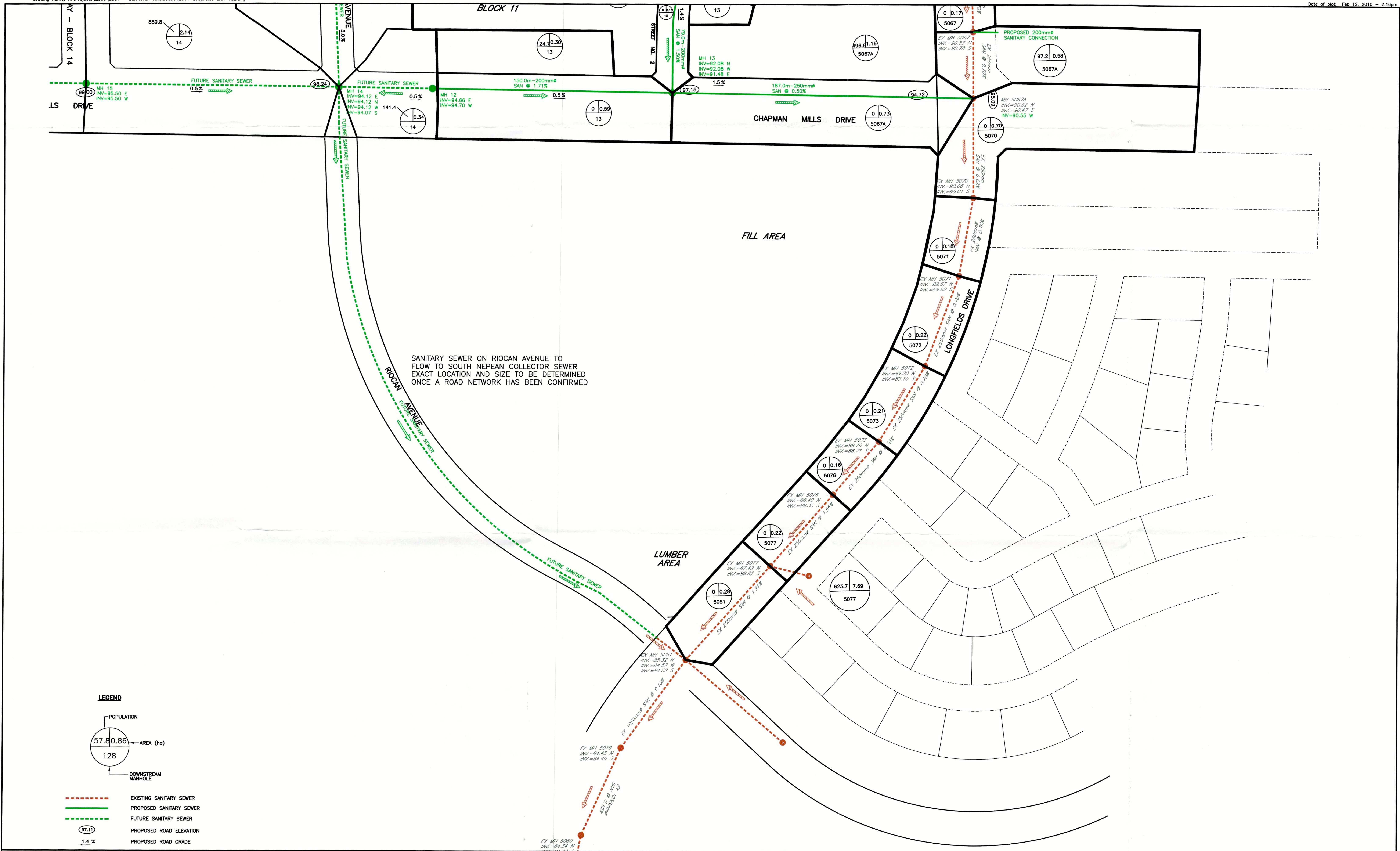
Table 1.1: Development Statistic Projections

Land Use	Total Area (ha)	Projected Residential Units	Residential Population per Unit *	Projected Population *
Block A – Stacked Townhouse Units	0.64	60	2.1	126
Block B – Stacked Townhouse Units	4.19	544	2.1	1142
Glenroy Gilbert Drive Extension	0.39	-	-	-
TOTAL	5.21	604		1268

* NOTE: Population projections may differ from population estimates used in background Transportation Studies, Planning Rationale, and other studies. Population projection and residential population per unit values are based on Ministry of Environment, Conservation and Parks guidelines for servicing demand calculations. Local Roads are included in Total Area estimates above.

MINTO
BTC BLOCK A
5063-B
0.64 ha. - 126 pers.

MINTO
BTC BLOCK B
13 -5067-A
0.65ha. - 1142 pers.



LEGEND

- POPULATION
- AREA (ha)
- DOWNSTREAM MANHOLE
- EXISTING SANITARY SEWER
- PROPOSED SANITARY SEWER
- FUTURE SANITARY SEWER
- PROPOSED ROAD ELEVATION
- PROPOSED ROAD GRADE

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.



No.	REVISION	DATE	BY
3.	REVISED PER CITY COMMENTS	FEB 9/10	KLM
2.	REVISED PER CITY COMMENTS	DEC 14/09	KLM
1.	ISSUED FOR SERVICING BRIEF	JUNE 2/09	SMC

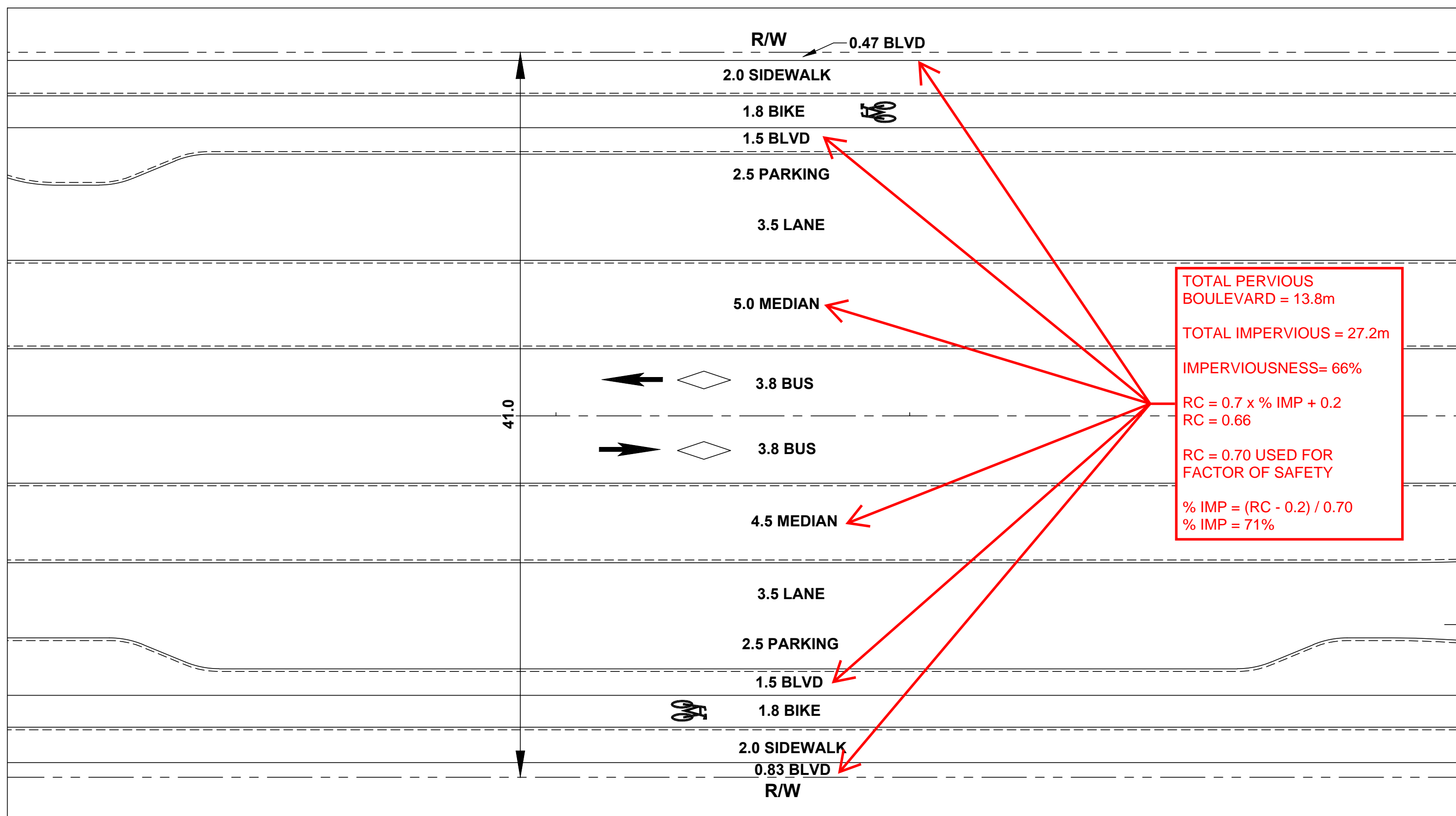


BASEPLAN	DME	SCALE
DESIGN	JHB	1:1000
CHECKED	SWB/JHB	
CAD	SWB/JHB	
PROJ. MGR.	SMC	0 10 20 30 40
APPROVED	SMC	

MINTO COMMUNITIES INC. BARRHAVEN TOWN CENTRE CITY OF OTTAWA CONCEPTUAL SANITARY DRAINAGE AREA PLAN	PROJECT No.	2884
	SURVEY BY	DME
	DATE	MAY 2009
	DRAWING No.	2884-SAN-102

APPENDIX D

Stormwater Servicing Documents



120 Iber Road, Unit 103
 Stittsville, ON K2S 1E9
 TEL: (613) 836-0856
 FAX: (613) 836-7183
 www.DSEL.ca

CHAPMAN MILLS DRIVE
41.0m ROW PERVIOUS FIGURE

PROJECT No.:	15-816
SCALE:	1:1500
DATE:	JUNE 2023
FIGURE:	1

Area ID	Total Area (m ²)	Pervious Area (m ²)	Impervious Area (m ²)	RC
South Block				
155-156	1634	560	1074	0.66
115-116	3649	1147	2502	0.68
PLUG-115	818	105	713	0.81
PLUG-115	1094	172	922	0.79
136-137	115	54	61	0.57
137-138	1575	158	1418	0.83
PLUG-131	1836	367	1469	0.76
126-127	3378	1255	2123	0.64
PLUG-121	1756	301	1455	0.78
103-106	767	142	625	0.77
106-109	104	19	85	0.77
163-162	742	223	519	0.69
162-124	1965	477	1488	0.73
134-135	2165	433	1732	0.76
122-123	818	105	713	0.81
161-160	1756	276	1480	0.79
164-144	4609	1514	3095	0.67
PLUG-133	1094	172	922	0.79
147-148	1796	308	1488	0.78
139-151	1730	384	1346	0.74
159-143	2464	657	1807	0.71
149-150	2442	551	1891	0.74
to Ex. Glenroy Gilbert	1657	417	1240	0.72
to Ex. Longfields	1736	660	1076	0.63
North Block				
102-103	376	170	206	0.58
100-101	1342	304	1038	0.74
103-106	266	137	129	0.54
104-105	2459	460	1999	0.77
107-108	1658	372	1286	0.74
106-109	276	142	134	0.54



Report

Nepean South Chapman Mills Stormwater Management Servicing Fourth Addendum

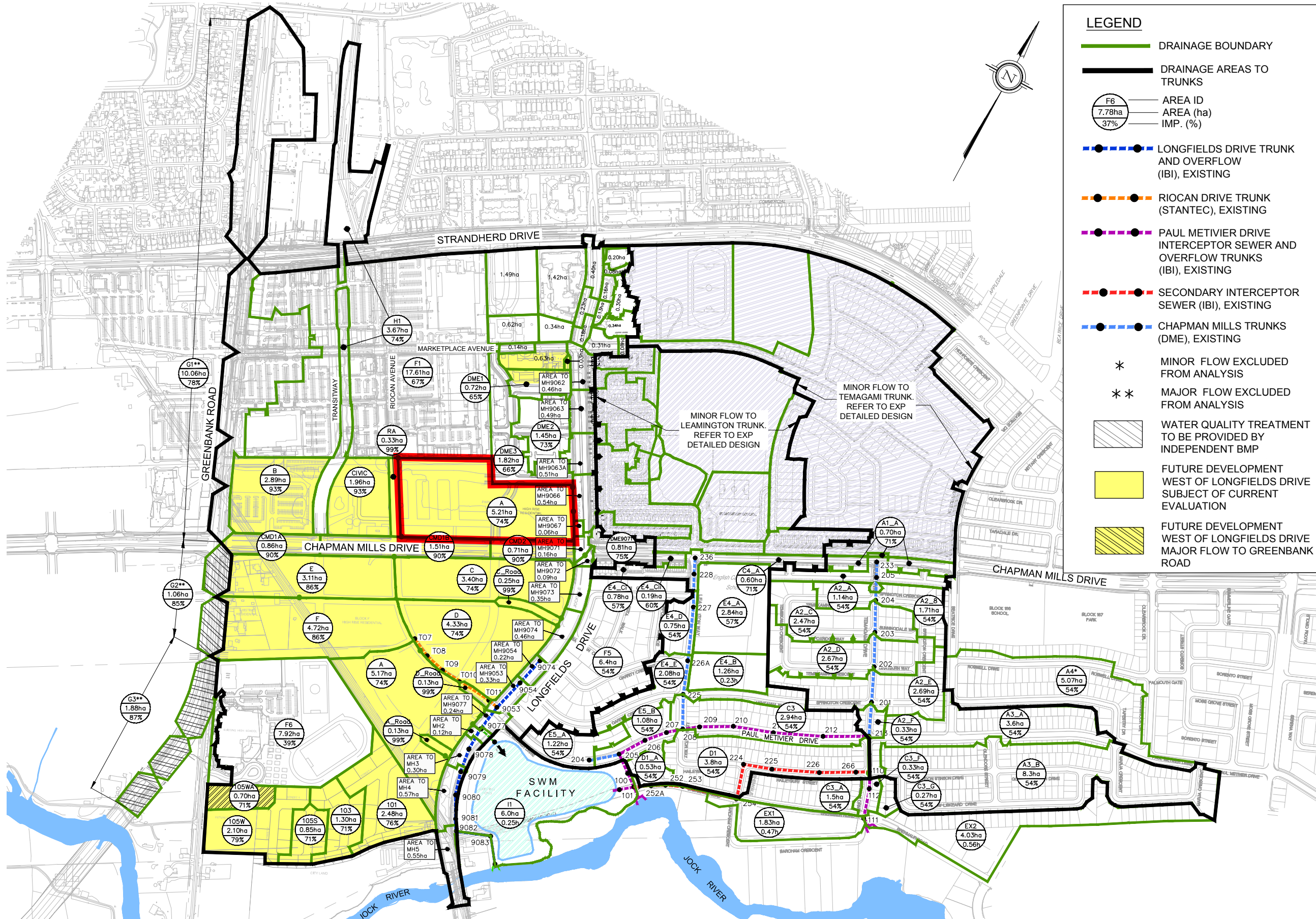


Prepared for Minto Communities – Canada
by IBI Group
February 16, 2018

Table 2.9 Revised drainage areas

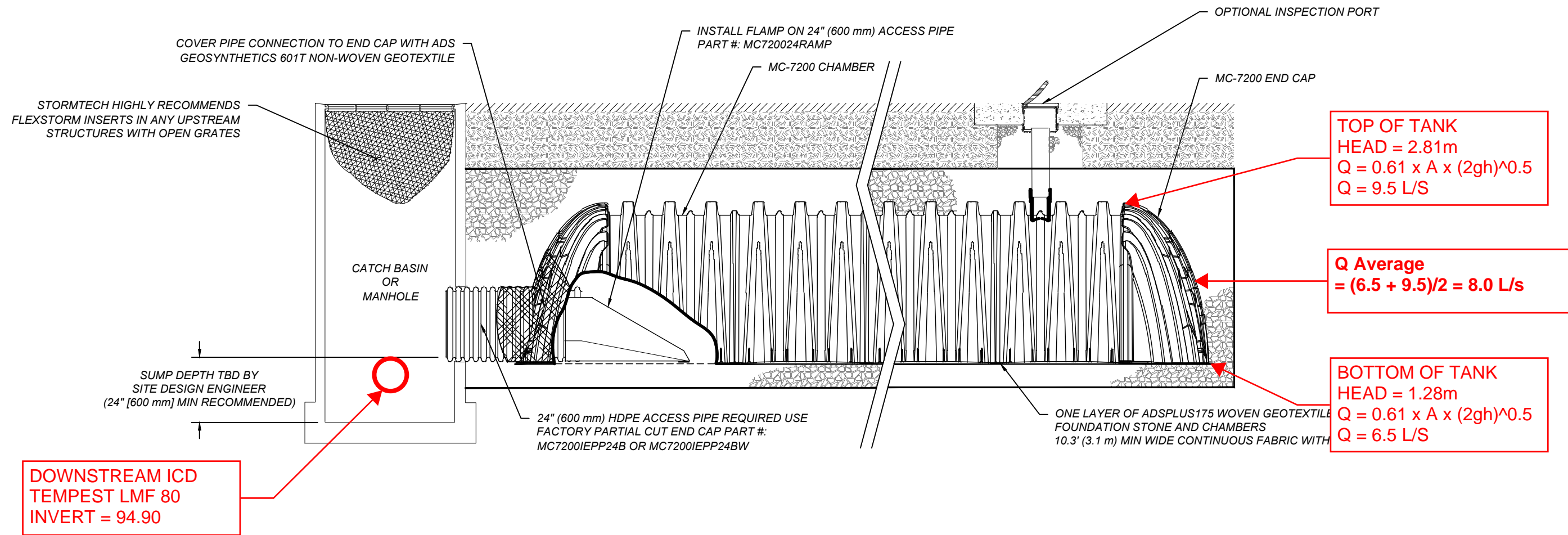
2006					UPDATED				
DRAINAGE AREA ID	AREA (HA)	TIMP (%)	SURFACE STORAGE (CU-M)	MINOR SYSTEM CAPTURE (L/S)	DRAINAGE AREA ID	AREA (HA)	TIMP (%)	SURFACE STORAGE (CU-M)	MINOR SYSTEM CAPTURE (L/S)
F2	14.4	85	3012 ⁽¹⁾	1575	DME-9063A (DME3)	1.82	66	252	435 ⁽²⁾
					Block A	5.21	74 ⁽³⁾	750	784 ⁽⁴⁾⁽⁵⁾⁽⁶⁾
F3	9.4	85	2057 ⁽¹⁾	956	R-9066	0.54	71	0	211
					Riocan Avenue	0.33	99	0	28 ⁽⁷⁾
					CMD1B	1.50	90 ⁽³⁾	0	752 ⁽⁴⁾⁽⁷⁾
					CMD2	0.71	90 ⁽³⁾	0	457 ⁽⁴⁾⁽⁵⁾
					Block B	2.89	93 ⁽³⁾	0	1331 ⁽⁴⁾
					Block H Civic	1.96	93 ⁽³⁾	0	900 ⁽⁴⁾
					CMD1A	0.86	90 ⁽³⁾	0	383 ⁽⁴⁾
F4	31.6	85	5814 ⁽¹⁾	3750	E	3.11 ⁽⁹⁾	86	0	280 ⁽¹⁰⁾
					F	4.72 ⁽⁹⁾	86	0	425 ⁽¹⁰⁾
					C	3.40	74 ⁽¹³⁾	0	306 ⁽¹⁰⁾
					C_ROAD	0.25	99	0	122 ⁽⁴⁾
					D	4.33	74 ⁽¹³⁾	0	389 ⁽¹⁰⁾
					D_ROAD	0.13	99	0	66 ⁽⁴⁾
					Parcel A	5.17	74 ⁽¹³⁾	0	465 ⁽¹⁰⁾
					A_ROAD	0.13	99	0	65 ⁽⁴⁾
					105W	2.10	79 ⁽³⁾	0	189 ⁽¹⁰⁾
					105WA ⁽¹⁶⁾	0.70	71 ⁽¹⁵⁾	0	63 ⁽¹⁰⁾
					105S	0.85	71 ⁽³⁾	0	77 ⁽¹⁰⁾
					103	1.30	71 ⁽³⁾	0	117 ⁽¹⁰⁾
101	2.48	76 ⁽³⁾	0	223 ⁽¹⁰⁾					
F6	7.37	37	863 ⁽¹⁾	627	F6 ⁽¹⁴⁾	7.84	39	680	831 ⁽⁴⁾
H1	3.2	80	392	530	H1	3.67	74	1056	556
G1	10.40	78	0	1544	G1	10.06	78	0	1869 ⁽⁸⁾
G2	1.08	85	0	268	G2 ⁽¹¹⁾	1.06	85	0	268 ⁽¹²⁾
G3	1.88	87	0	478	G3 ⁽¹¹⁾	1.88	87	0	478 ⁽¹²⁾

(1) 100 year on-site storage
 (2) Based on rational method for Ampersand Stage I
 (3) Weighted c value (from which imperviousness was calculated) established by engineering consultant completing conceptual design
 (4) 100 year flow capture (based on 100 year 3 hour Chicago storm)
 (5) 100 year flow from a 0.358 ha portion of Block A flow cascades to Chapman Mills Drive (CMD2)
 (6) Minor flow from a 0.915 ha portion of Block A drains via the storm sewer on Glenroy Gilbert Drive (via Ampersand Stage I); minor flow from a 3.936 ha portion and 100 year flow from a 0.358 ha portion drains via the storm sewer on Chapman Mills Drive
 (7) Major flow from Riocan Avenue cascades to Chapman Mills Drive (CMD1B)
 (8) Minor system capture per Stantec/AECOM July 2009
 (9) Drainage area extended west to Greenbank Road
 (10) Minor system capture increased to 90 l/s/ha from 85 l/s/ha
 (11) Water quality treatment for areas G2, G3 to be provided by an independent BMP
 (12) Minor system capture per TSH May 2006
 (13) Imperviousness consistent with that of Block A
 (14) Per detailed design of site
 (15) Per email from DSEL November 6, 2017
 (16) Major flow conveyed toward Greenbank Road



LEGEND

- DRAINAGE BOUNDARY
- DRAINAGE AREAS TO TRUNKS
- F6
7.78ha
37% AREA ID
AREA (ha)
IMP. (%)
- LONGFIELDS DRIVE TRUNK AND OVERFLOW (IBI), EXISTING
- RIOCAN DRIVE TRUNK (STANTEC), EXISTING
- PAUL METIVIER DRIVE INTERCEPTOR SEWER AND OVERFLOW TRUNKS (IBI), EXISTING
- SECONDARY INTERCEPTOR SEWER (IBI), EXISTING
- CHAPMAN MILLS TRUNKS (DME), EXISTING
- * MINOR FLOW EXCLUDED FROM ANALYSIS
- ** MAJOR FLOW EXCLUDED FROM ANALYSIS
- WATER QUALITY TREATMENT TO BE PROVIDED BY INDEPENDENT BMP
- FUTURE DEVELOPMENT WEST OF LONGFIELDS DRIVE SUBJECT OF CURRENT EVALUATION
- FUTURE DEVELOPMENT WEST OF LONGFIELDS DRIVE MAJOR FLOW TO GREENBANK ROAD



Stormwater - Proposed Development
 City of Ottawa Sewer Design Guidelines, 2012



Target Flow Rate

Q 147.00 L/s

Estimated Post Development Peak Flow from Unattenuated Areas

Area 0.04 0.08
 C 0.58 0.64

Total Area 0.12 ha <-- Sum of Drainage to CB 9, CB 10
 C 0.62 Rational Method runoff coefficient

t _c (min)	5-year					100-year				
	i (mm/hr)	Q _{actual} (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)	i (mm/hr)	Q _{actual} (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)
13.1	90.4	18.5	18.5	0.0	0.0	154.8	31.7	31.7	0.0	0.0

Note:
 T_c = 13.05 min per Design Sheet
 --> 5-year flow conveyed within Glenroy Gilbert Drive Extension storm sewer system.
 --> Flows exceeding the 5-year storm directed overland towards Riocan Avenue Extension.

Area 0.03 0.07
 C 0.54 0.64

Total Area 0.10 ha <-- Drainage to CB 13
 C 0.61 Rational Method runoff coefficient

t _c (min)	5-year					100-year				
	i (mm/hr)	Q _{actual} (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)	i (mm/hr)	Q _{actual} (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)
13.1	90.4	15.4	15.4	0.0	0.0	154.8	26.3	26.3	0.0	0.0

Note:
 T_c = 13.05 min per Design Sheet
 --> 5-year flow conveyed within Glenroy Gilbert Drive Extension storm sewer system.
 --> Flows exceeding the 5-year storm directed to DCB 15.

Area 0.08 0.08
 C 0.77 0.64

Total Area 0.16 ha <-- Drainage to CB 12, CB 14
 C 0.70 Rational Method runoff coefficient

t _c (min)	5-year					100-year				
	i (mm/hr)	Q _{actual} (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)	i (mm/hr)	Q _{actual} (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)
13.1	90.4	28.0	28.0	0.0	0.0	154.8	48.0	48.0	0.0	0.0

Note:
 T_c = 13.05 min per Design Sheet
 --> 5-year flow conveyed within Glenroy Gilbert Drive Extension storm sewer system.
 --> Flows exceeding the 5-year storm directed to DCB 16.

Estimated Post Development Peak Flow from Attenuated Areas

Area ID DCB 15
Available Sub-surface Storage

Total Subsurface Storage (m³)

Stage Attenuated Areas Storage Summary

	Surface Storage				Surface and Subsurface Storage			
	Stage (m)	Ponding (m ²)	h _o (m)	delta d (m)	V* (m ³)	V _{acc} ** (m ³)	Q _{release} † (L/s)	V _{drawdown} (hr)
Orifice INV	97.96		0.00			0.0	0.0	0.00
T/G	99.34	0.7	1.38	1.38	0.0	0.0	22.0	0.00
	99.49	56.0	1.53	0.15	3.2	3.2	23.2	0.04
Max Ponding	99.64	261.6	1.68	0.15	21.9	25.1	24.3	0.29

* V=Incremental storage volume
**V_{acc}=Total surface and sub-surface
† Q_{release} = Release rate calculated from orifice equation

Orifice Location DCB 15 Dia 94

Area 0.03 0.09
C 0.54 0.64

Total Area 0.13 ha
C 0.62 Rational Method runoff coefficient Note: Rational Method Coefficient "C" increased by 25% for 100-year calculations

t _c (min)	5-year					100-year				
	i (mm/hr)	Q _{actual} ‡ (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)	i (mm/hr)	Q _{actual} ‡ (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)
13	90.4	20.1	20.1	0.0	0.0	154.8	54.0	24.2	29.8	23.3
15	83.6	18.6	18.6	0.0	0.0	142.9	50.7	24.2	26.4	23.8
20	70.3	15.6	15.6	0.0	0.0	120.0	44.3	24.2	20.1	24.1
25	60.9	13.6	13.6	0.0	0.0	103.8	39.8	24.2	15.6	23.4
30	53.9	12.0	12.0	0.0	0.0	91.9	36.5	24.2	12.3	22.1
35	48.5	10.8	10.8	0.0	0.0	82.6	33.9	24.2	9.7	20.3
40	44.2	9.8	9.8	0.0	0.0	75.1	31.8	24.2	7.6	18.2
45	40.6	9.0	9.0	0.0	0.0	69.1	30.2	24.2	5.9	15.9
50	37.7	8.4	8.4	0.0	0.0	64.0	28.7	24.2	4.5	13.4
55	35.1	7.8	7.8	0.0	0.0	59.6	27.5	24.2	3.3	10.8
60	32.9	7.3	7.3	0.0	0.0	55.9	26.5	24.2	2.2	8.1
65	31.0	6.9	6.9	0.0	0.0	52.6	25.6	24.2	1.3	5.2
70	29.4	6.5	6.5	0.0	0.0	49.8	24.8	24.2	0.5	2.3
75	27.9	6.2	6.2	0.0	0.0	47.3	24.1	24.1	0.0	0.0
80	26.6	5.9	5.9	0.0	0.0	45.0	23.5	23.5	0.0	0.0
85	25.4	5.6	5.6	0.0	0.0	43.0	22.9	22.9	0.0	0.0
90	24.3	5.4	5.4	0.0	0.0	41.1	22.4	22.4	0.0	0.0
95	23.3	5.2	5.2	0.0	0.0	39.4	21.9	21.9	0.0	0.0
100	22.4	5.0	5.0	0.0	0.0	37.9	21.5	21.5	0.0	0.0
105	21.6	4.8	4.8	0.0	0.0	36.5	21.1	21.1	0.0	0.0
110	20.8	4.6	4.6	0.0	0.0	35.2	20.7	20.7	0.0	0.0

5-year Q_{attenuated} 20.1 L/s
5-year Max. Storage Required 0.0 m³
Est. 5-year Storage Elevation 97.96 m
100-year Q_{attenuated} 24.3 L/s
100-year Max. Storage Required 24.1 m³
Est. 100-year Storage Elevation 99.63 m

Minto
 BTC Stage 1 - Block A Glenroy Gilbert Extension
 Proposed Conditions

Area ID DCB 16
 Available Sub-surface Storage

Total Subsurface Storage (m³)

Stage Attenuated Areas Storage Summary

	Surface Storage				Surface and Subsurface Storage			
	Stage (m)	Ponding (m ²)	h _o (m)	delta d (m)	V* (m ³)	V _{acc} ** (m ³)	Q _{release} † (L/s)	V _{drawdown} (hr)
Orifice INV	97.96		0.00			0.0	0.0	0.00
T/G	99.34	0.7	1.38	1.38	0.0	0.0	29.1	0.00
	99.49	47.9	1.53	0.15	2.7	2.7	30.6	0.02
Max Ponding	99.64	219.2	1.68	0.15	18.5	21.2	32.1	0.18

* V=Incremental storage volume
 **V_{acc}=Total surface and sub-surface
 † Q_{release} = Release rate calculated from orifice equation

Orifice Location DCB 16 Dia 108

Area 0.01 0.09
 C 0.77 0.64

Total Area 0.10 ha
 C 0.65 Rational Method runoff coefficient *Note: Rational Method Coefficient "C" increased by 25% for 100-year calculations*

t _c (min)	5-year					100-year				
	i (mm/hr)	Q _{actual} † (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)	i (mm/hr)	Q _{actual} † (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)
13	89.9	16.0	16.0	0.0	0.0	153.9	54.2	31.8	22.4	17.7
15	83.6	14.9	14.9	0.0	0.0	142.9	51.8	31.8	19.9	18.0
20	70.3	12.5	12.5	0.0	0.0	120.0	46.7	31.8	14.8	17.8
25	60.9	10.8	10.8	0.0	0.0	103.8	43.1	31.8	11.3	16.9
30	53.9	9.6	9.6	0.0	0.0	91.9	40.4	31.8	8.6	15.5
35	48.5	8.6	8.6	0.0	0.0	82.6	38.3	38.3	0.0	0.0
40	44.2	7.9	7.9	0.0	0.0	75.1	36.7	36.7	0.0	0.0
45	40.6	7.2	7.2	0.0	0.0	69.1	35.3	35.3	0.0	0.0
50	37.7	6.7	6.7	0.0	0.0	64.0	34.2	34.2	0.0	0.0
55	35.1	6.3	6.3	0.0	0.0	59.6	33.2	33.2	0.0	0.0
60	32.9	5.9	5.9	0.0	0.0	55.9	32.4	32.4	0.0	0.0
65	31.0	5.5	5.5	0.0	0.0	52.6	31.7	31.7	0.0	0.0
70	29.4	5.2	5.2	0.0	0.0	49.8	31.0	31.0	0.0	0.0
75	27.9	5.0	5.0	0.0	0.0	47.3	30.5	30.5	0.0	0.0
80	26.6	4.7	4.7	0.0	0.0	45.0	30.0	30.0	0.0	0.0
85	25.4	4.5	4.5	0.0	0.0	43.0	29.5	29.5	0.0	0.0
90	24.3	4.3	4.3	0.0	0.0	41.1	29.1	29.1	0.0	0.0
95	23.3	4.2	4.2	0.0	0.0	39.4	28.7	28.7	0.0	0.0
100	22.4	4.0	4.0	0.0	0.0	37.9	28.4	28.4	0.0	0.0
105	21.6	3.8	3.8	0.0	0.0	36.5	28.1	28.1	0.0	0.0
110	20.8	3.7	3.7	0.0	0.0	35.2	27.8	27.8	0.0	0.0

5-year Q_{attenuated} 16.0 L/s
 5-year Max. Storage Required 0.0 m³
 Est. 5-year Storage Elevation 97.96 m
 100-year Q_{attenuated} 31.8 L/s
 100-year Max. Storage Required 18.0 m³
 Est. 100-year Storage Elevation 99.61 m

Minto
 BTC Stage 1 - Block A Glenroy Gilbert Extension
 Proposed Conditions

Area ID STM108
 Available Sub-surface Storage

Total Subsurface Storage (m³) 40.3 <-- Provided storage excludes storage volume below system invert

Stage Attenuated Areas Storage Summary

	Surface Storage				Surface and Subsurface Storage			
	Stage (m)	Ponding (m ²)	h _o (m)	delta d (m)	V* (m ³)	V _{acc} ** (m ³)	Q _{release} † (L/s)	V _{drawdown} (hr)
Orifice INV	96.49		0.00			0.0	0.0	0.00
Storage Chamber INV	97.54		1.05	1.05	0.0	0.0	5.8	0.00
Storage Chamber OBV	98.30		1.81	0.76	40.3	40.3	7.6	1.47
T/G	99.39	0.4	2.90	1.09	0.0	40.3	9.7	1.15
Max Ponding	99.69	189.7	3.20	0.30	19.8	60.1	10.0	1.67

* V=Incremental storage volume
 **V_{acc}=Total surface and sub-surface
 † Q_{release} = Release rate per Tempest LMF Flow Curve

Orifice Location STM108 ICD Tempest LMF 80
 Total Area 0.17 ha
 C 0.74 Rational Method runoff coefficient Note: Rational Method Coefficient "C" increased by 25% for 100-year calculations

t _c (min)	5-year					100-year				
	i (mm/hr)	Q _{actual} † (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)	i (mm/hr)	Q _{actual} † (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)
13	90.4	31.6	6.8	24.8	19.4	154.8	67.6	7.9	59.7	46.7
15	83.6	29.2	6.8	22.4	20.2	142.9	62.4	7.9	54.5	49.1
20	70.3	24.5	6.8	17.8	21.3	120.0	52.4	7.9	44.5	53.4
25	60.9	21.3	6.8	14.5	21.8	103.8	45.4	7.9	37.5	56.2
30	53.9	18.8	6.8	12.1	21.7	91.9	40.1	7.9	32.2	58.0
35	48.5	17.0	6.8	10.2	21.4	82.6	36.1	7.9	28.2	59.2
40	44.2	15.4	6.8	8.7	20.8	75.1	32.8	7.9	24.9	59.8
45	40.6	14.2	6.8	7.4	20.0	69.1	30.2	7.9	22.3	60.1
50	37.7	13.2	6.8	6.4	19.2	64.0	27.9	7.9	20.0	60.1
55	35.1	12.3	6.8	5.5	18.2	59.6	26.0	7.9	18.1	59.9
60	32.9	11.5	6.8	4.7	17.1	55.9	24.4	7.9	16.5	59.5
65	31.0	10.8	6.8	4.1	15.9	52.6	23.0	7.9	15.1	58.9
70	29.4	10.3	6.8	3.5	14.7	49.8	21.7	7.9	13.8	58.2
75	27.9	9.7	6.8	3.0	13.4	47.3	20.6	7.9	12.7	57.3
80	26.6	9.3	6.8	2.5	12.0	45.0	19.7	7.9	11.8	56.4
85	25.4	8.9	6.8	2.1	10.7	43.0	18.8	7.9	10.9	55.4
90	24.3	8.5	6.8	1.7	9.3	41.1	18.0	7.9	10.1	54.3
95	23.3	8.1	6.8	1.4	7.8	39.4	17.2	7.9	9.3	53.2
100	22.4	7.8	6.8	1.1	6.3	37.9	16.6	7.9	8.7	51.9
105	21.6	7.5	6.8	0.8	4.9	36.5	15.9	7.9	8.0	50.7
110	20.8	7.3	6.8	0.5	3.3	35.2	15.4	7.9	7.5	49.3

5-year Q_{attenuated} 6.8 L/s 100-year Q_{attenuated} 10.0 L/s
 5-year Max. Storage Required 21.8 m³ 100-year Max. Storage Required 60.1 m³
 Est. 5-year Storage Elevation 97.95 m Est. 100-year Storage Elevation 99.69 m

Notes:
 - Required storage volumes calculated using the average Q release rate between storage tank invert and max ponding elevation
 - Flow from the storage tank assumes maximum Q Release at max ponding elevation

Minto
 BTC Stage 1 - Block A Glenroy Gilbert Extension
 Proposed Conditions

Area ID STM105
 Available Sub-surface Storage

Total Subsurface Storage (m³) 67.4 <-- Provided storage excludes storage volume below system invert

Stage Attenuated Areas Storage Summary

	Surface Storage				Surface and Subsurface Storage			
	Stage (m)	Ponding (m ²)	h _o (m)	delta d (m)	V* (m ³)	V _{acc} ** (m ³)	Q _{release} † (L/s)	V _{drawdown} (hr)
Orifice INV	97.00		0.00			0.0	0.0	0.00
Storage Chamber INV	97.83		0.83	0.83		0.0	4.0	0.00
Storage Chamber OBV	98.59		1.59	0.76	67.4	67.4	5.5	3.40
T/G	99.69	0.4	2.69	1.10	0.0	67.4	7.2	2.60
Max Ponding	99.99	491.1	2.99	0.30	50.5	117.9	7.6	4.31

* V=Incremental storage volume
 **V_{acc}=Total surface and sub-surface
 † Q_{release} = Release rate per Tempest LMF Flow Curve

Orifice Location STM105 ICD Tempest LMF 70
 Total Area 0.25 ha
 C 0.77 Rational Method runoff coefficient Note: Rational Method Coefficient "C" increased by 25% for 100-year calculations

t _c (min)	5-year					100-year				
	i (mm/hr)	Q _{actual} ‡ (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)	i (mm/hr)	Q _{actual} ‡ (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)
13	90.4	48.4	5.0	43.3	33.9	154.8	103.5	5.8	97.7	76.5
15	83.6	44.7	5.0	39.7	35.7	142.9	95.5	5.8	89.7	80.7
20	70.3	37.6	5.0	32.6	39.1	120.0	80.2	5.8	74.4	89.3
25	60.9	32.6	5.0	27.6	41.3	103.8	69.4	5.8	63.6	95.4
30	53.9	28.8	5.0	23.8	42.9	91.9	61.4	5.8	55.6	100.1
35	48.5	25.9	5.0	20.9	44.0	82.6	55.2	5.8	49.4	103.7
40	44.2	23.6	5.0	18.6	44.7	75.1	50.2	5.8	44.4	106.6
45	40.6	21.7	5.0	16.7	45.1	69.1	46.2	5.8	40.4	109.0
50	37.7	20.1	5.0	15.1	45.4	64.0	42.7	5.8	36.9	110.8
55	35.1	18.8	5.0	13.8	45.4	59.6	39.9	5.8	34.1	112.4
60	32.9	17.6	5.0	12.6	45.4	55.9	37.4	5.8	31.6	113.6
65	31.0	16.6	5.0	11.6	45.2	52.6	35.2	5.8	29.4	114.6
70	29.4	15.7	5.0	10.7	44.9	49.8	33.3	5.8	27.5	115.4
75	27.9	14.9	5.0	9.9	44.6	47.3	31.6	5.8	25.8	116.0
80	26.6	14.2	5.0	9.2	44.1	45.0	30.1	5.8	24.3	116.5
85	25.4	13.6	5.0	8.6	43.6	43.0	28.7	5.8	22.9	116.8
90	24.3	13.0	5.0	8.0	43.1	41.1	27.5	5.8	21.7	117.1
95	23.3	12.5	5.0	7.5	42.5	39.4	26.4	5.8	20.6	117.2
100	22.4	12.0	5.0	7.0	41.8	37.9	25.3	5.8	19.5	117.2
105	21.6	11.5	5.0	6.5	41.1	36.5	24.4	5.8	18.6	117.1
110	20.8	11.1	5.0	6.1	40.4	35.2	23.5	5.8	17.7	117.0

5-year Q_{attenuated} 5.0 L/s 100-year Q_{attenuated} 7.6 L/s
 5-year Max. Storage Required 45.4 m³ 100-year Max. Storage Required 117.2 m³
 Est. 5-year Storage Elevation 98.34 m Est. 100-year Storage Elevation 99.99 m

Notes:
 - Required storage volumes calculated using the average Q release rate between storage tank invert and max ponding elevation
 - Flow from the storage tank assumes maximum Q Release at max ponding elevation

Minto
BTC Stage 1 - Block A Glenroy Gilbert Extension
Proposed Conditions

Area ID STM101
Available Sub-surface Storage

Total Subsurface Storage (m³) 35.0 <-- Provided storage excludes storage volume below system invert

Stage Attenuated Areas Storage Summary

	Surface Storage				Surface and Subsurface Storage			
	Stage (m)	Ponding (m ²)	h _o (m)	delta d (m)	V* (m ³)	V _{acc} ** (m ³)	Q _{release} † (L/s)	V _{drawdown} (hr)
Orifice INV	97.59		0.00			0.0	0.0	0.00
Storage Chamber INV	98.39		0.80	0.80		0.0	5.8	0.00
Storage Chamber OBV	99.15		1.56	0.76	35.0		7.9	1.23
T/G	100.25	0.4	2.66	1.10	0.0	35.0	10.3	0.94
Max Ponding	100.41	98.8	2.82	0.16	5.6	40.6	10.7	1.05

* V=Incremental storage volume
**V_{acc}=Total surface and sub-surface
† Q_{release} = Release rate per Tempest LMF Flow Curve

Orifice Location STM101 Dia Tempest LMF 95
Total Area 0.13 ha
C 0.74 Rational Method runoff coefficient Note: Rational Method Coefficient "C" increased by 25% for 100-year calculations

t _c (min)	5-year					100-year				
	i (mm/hr)	Q _{actual} ‡ (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)	i (mm/hr)	Q _{actual} ‡ (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)
13	90.4	24.2	6.7	17.5	13.7	154.8	51.7	8.3	43.4	34.0
15	83.6	22.3	6.7	15.7	14.1	142.9	47.7	8.3	39.5	35.5
20	70.3	18.8	6.7	12.1	14.5	120.0	40.1	8.3	31.8	38.2
25	60.9	16.3	6.7	9.6	14.4	103.8	34.7	8.3	26.4	39.7
30	53.9	14.4	6.7	7.7	13.9	91.9	30.7	8.3	22.4	40.4
35	48.5	13.0	6.7	6.3	13.2	82.6	27.6	8.3	19.3	40.6
40	44.2	11.8	6.7	5.1	12.3	75.1	25.1	8.3	16.9	40.4
45	40.6	10.9	6.7	4.2	11.3	69.1	23.1	8.3	14.8	40.0
50	37.7	10.1	6.7	3.4	10.2	64.0	21.4	8.3	13.1	39.3
55	35.1	9.4	6.7	2.7	9.0	59.6	19.9	8.3	11.7	38.5
60	32.9	8.8	6.7	2.1	7.7	55.9	18.7	8.3	10.4	37.5
65	31.0	8.3	6.7	1.6	6.3	52.6	17.6	8.3	9.3	36.4
70	29.4	7.8	6.7	1.2	4.9	49.8	16.6	8.3	8.4	35.2
75	27.9	7.5	6.7	0.8	3.5	47.3	15.8	8.3	7.5	33.9
80	26.6	7.1	6.7	0.4	2.0	45.0	15.0	8.3	6.8	32.5
85	25.4	6.8	6.7	0.1	0.5	43.0	14.3	8.3	6.1	31.1
90	24.3	6.5	6.5	0.0	0.0	41.1	13.7	8.3	5.5	29.6
95	23.3	6.2	6.2	0.0	0.0	39.4	13.2	8.3	4.9	28.1
100	22.4	6.0	6.0	0.0	0.0	37.9	12.7	8.3	4.4	26.5
105	21.6	5.8	5.8	0.0	0.0	36.5	12.2	8.3	3.9	24.8
110	20.8	5.6	5.6	0.0	0.0	35.2	11.8	8.3	3.5	23.2

5-year Q_{attenuated} 6.7 L/s
5-year Max. Storage Required 14.5 m³
Est. 5-year Storage Elevation 98.71 m
100-year Q_{attenuated} 10.7 L/s
100-year Max. Storage Required 40.6 m³
Est. 100-year Storage Elevation 100.41 m

Notes:
- Required storage volumes calculated using the average Q release rate between storage tank invert and max ponding elevation
- Flow from the storage tank assumes maximum Q Release at max ponding elevation

Summary of Release Rates and Storage Volumes

Control Area	5-year Release Rate (L/s)	5-year Required Storage (m ³)	100-Year Release Rate (L/s)	100-Year Required Storage (m ³)	100-Year Available Storage (m ³)
Unattenuated Areas (CB9 - CB14)	61.9	0.0	61.9	0.0	0.0
DCB 15	20.1	0.0	24.3	24.1	25.1
DCB 16	16.0	0.0	31.8	18.0	21.2
STM108	6.8	21.8	10.0	60.1	60.1
STM105	5.0	45.4	7.6	117.2	117.9
STM101	6.7	14.5	10.7	40.6	40.6
Total	116.5	81.7	146.3	259.9	264.9

Stormwater - Proposed Development
City of Ottawa Sewer Design Guidelines, 2012



Target Flow Rate

Q 637.00 L/s

Estimated Post Development Peak Flow from Unattenuated Areas

Area 0.17 ha <-- Sum of Unattenuated Drainage to Glenroy Gilbert Drive
C 0.72 Rational Method runoff coefficient

5-year						100-year				
t _c (min)	i (mm/hr)	Q _{actual} (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)	i (mm/hr)	Q _{actual} (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)
13.9	87.4	29.7	29.7	0.0	0.0	149.5	50.8	50.8	0.0	0.0

Note:
T_c = 13.88 min per Design Sheet

Area 0.16 ha <-- Sum of Unattenuated Drainage to Riocan Avenue
C 0.66 Rational Method runoff coefficient

5-year						100-year				
t _c (min)	i (mm/hr)	Q _{actual} (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)	i (mm/hr)	Q _{actual} (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)
13.9	87.4	25.6	25.6	0.0	0.0	149.5	43.8	43.8	0.0	0.0

Note:
T_c = 13.88 min per Design Sheet

Area 0.01 0.16 0.17 0.01
C 0.57 0.83 0.74 0.53

Total Area 0.35 ha <-- Sum of Unattenuated Drainage to Chapman Mills Drive
C 0.77 Rational Method runoff coefficient

5-year						100-year				
t _c (min)	i (mm/hr)	Q _{actual} (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)	i (mm/hr)	Q _{actual} (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)
13.9	87.4	65.4	65.4	0.0	0.0	149.5	111.9	111.9	0.0	0.0

Note:
T_c = 13.88 min per Design Sheet

Area 0.17 ha <-- Sum of Unattenuated Drainage to Longfields Drive
C 0.63 Rational Method runoff coefficient

5-year						100-year				
t _c (min)	i (mm/hr)	Q _{actual} (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)	i (mm/hr)	Q _{actual} (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)
13.9	87.4	26.0	26.0	0.0	0.0	149.5	44.5	44.5	0.0	0.0

Note:
T_c = 13.88 min per Design Sheet

Estimated Post Development Peak Flow from Attenuated Areas

Area ID STM115
Available Sub-surface Storage

Sewers	ID	450mm	525mm	1500mm	U/G Tank
		Storage Pipe Dia (mm)	450	525	1500
	L (m)	60	43.5	47	
	V _{sewer} (m ³)	9.5	9.4	83.1	27.9

*Top of lid or max ponding elevation : 98.87

Total Subsurface Storage (m³) 129.9 <-- Provided storage excludes storage volume below system invert

Stage Attenuated Areas Storage Summary

	Surface Storage				Surface and Subsurface Storage			
	Stage	Ponding	h _o	delta d	V*	V _{acc} **	Q _{release} †	V _{drawdown}
	(m)	(m ²)	(m)	(m)	(m ³)	(m ³)	(L/s)	(hr)
Orifice INV	95.11		0.00			0.0	0.0	0.00
Storage Pipe INV	96.17		1.06	1.06	0.0	0.0	36.9	0.00
Storage Pipe OBV	98.62		3.51	2.45	129.9	129.9	67.2	0.54
T/G	98.67	0.4	3.56	0.05	0.0	129.9	67.7	0.53
Max Ponding	98.87	72.3	3.76	0.20	5.2	135.1	69.5	0.54

* V=Incremental storage volume
 **V_{acc}=Total surface and sub-surface
 † Q_{release} = Release rate calculated from orifice equation

Orifice Location STM115 Dia 130

Area	0.08	0.36	0.11
C	0.81	0.68	0.79

Total Area 0.55 ha
 C 0.72 Rational Method runoff coefficient Note: Rational Method Coefficient "C" increased by 25% for 100-year calculations

t _c (min)	5-year					100-year				
	i (mm/hr)	Q _{actual} ‡ (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)	i (mm/hr)	Q _{actual} ‡ (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)
14	87.4	96.2	46.6	49.7	41.4	149.5	205.8	53.2	152.5	127.0
20	70.3	77.4	46.6	30.8	37.0	120.0	165.1	53.2	111.9	134.3
25	60.9	67.1	46.6	20.5	30.8	103.8	143.0	53.2	89.7	134.6
30	53.9	59.4	46.6	12.8	23.1	91.9	126.5	53.2	73.2	131.8
35	48.5	53.4	46.6	6.9	14.5	82.6	113.7	53.2	60.5	127.0
40	44.2	48.7	46.6	2.1	5.1	75.1	103.5	53.2	50.2	120.5
45	40.6	44.7	44.7	0.0	0.0	69.1	95.1	53.2	41.8	112.9
50	37.7	41.5	41.5	0.0	0.0	64.0	88.0	53.2	34.8	104.4
55	35.1	38.7	38.7	0.0	0.0	59.6	82.1	53.2	28.9	95.2
60	32.9	36.3	36.3	0.0	0.0	55.9	77.0	53.2	23.7	85.4
65	31.0	34.2	34.2	0.0	0.0	52.6	72.5	53.2	19.2	75.1
70	29.4	32.3	32.3	0.0	0.0	49.8	68.5	53.2	15.3	64.3
75	27.9	30.7	30.7	0.0	0.0	47.3	65.1	53.2	11.8	53.2
80	26.6	29.3	29.3	0.0	0.0	45.0	61.9	53.2	8.7	41.8
85	25.4	27.9	27.9	0.0	0.0	43.0	59.1	53.2	5.9	30.1
90	24.3	26.8	26.8	0.0	0.0	41.1	56.6	53.2	3.4	18.2
95	23.3	25.7	25.7	0.0	0.0	39.4	54.3	53.2	1.1	6.0
100	22.4	24.7	24.7	0.0	0.0	37.9	52.2	53.2	0.0	0.0
105	21.6	23.8	23.8	0.0	0.0	36.5	50.2	53.2	0.0	0.0
110	20.8	22.9	22.9	0.0	0.0	35.2	48.5	53.2	0.0	0.0
115	20.1	22.2	22.2	0.0	0.0	34.0	46.8	53.2	0.0	0.0

5-year Q _{attenuated}	46.6 L/s	100-year Q _{attenuated}	69.5 L/s
5-year Max. Storage Required	41.4 m ³	100-year Max. Storage Required	134.6 m ³
Est. 5-year Storage Elevation	96.95 m	Est. 100-year Storage Elevation	98.85 m

Notes:
 - Required storage volumes calculated using the average Q release rate between storage pipe invert to max ponding elevation.
 - Flow from the control area assumes Q Release at maximum ponding elevation.

Estimated Post Development Peak Flow from Attenuated Areas

Area ID STM126
Available Sub-surface Storage

Total Subsurface Storage (m³) 105.5 <-- Provided storage excludes storage volume below system invert

Stage Attenuated Areas Storage Summary

Stage	Surface Storage				Surface and Subsurface Storage			
	Ponding (m)	h _o (m)	delta d (m)	V* (m ³)	V _{acc} ** (m ³)	Q _{release} † (L/s)	V _{drawdown} (hr)	
Orifice INV	94.76	0.00			0.0	0.0	0.00	
Storage Chamber INV	94.84	0.07	0.07	0.0	0.0	4.7	0.00	
Storage Chamber OBV	96.36	1.60	1.53	105.5	105.5	21.7	1.35	

* V=Incremental storage volume
 **V_{acc}=Total surface and sub-surface
 † Q_{release} = Release rate calculated from orifice equation

Orifice Location STM126 dia 90
 Total Area 0.34 ha
 C 0.64 Rational Method runoff coefficient *Note: Rational Method Coefficient "C" increased by 25% for 100-year calculations*

t _c (min)	5-year					100-year				
	i (mm/hr)	Q _{actual} † (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)	i (mm/hr)	Q _{actual} † (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)
14	87.4	52.0	10.9	41.1	34.3	149.5	111.3	13.2	98.0	81.6
20	70.3	41.8	10.9	31.0	37.2	120.0	89.3	13.2	76.1	91.3
25	60.9	36.3	10.9	25.4	38.1	103.8	77.3	13.2	64.1	96.1
30	53.9	32.1	10.9	21.2	38.2	91.9	68.4	13.2	55.2	99.3
35	48.5	28.9	10.9	18.0	37.8	82.6	61.5	13.2	48.3	101.3
40	44.2	26.3	10.9	15.4	37.0	75.1	55.9	13.2	42.7	102.5
45	40.6	24.2	10.9	13.3	36.0	69.1	51.4	13.2	38.2	103.1
50	37.7	22.4	10.9	11.5	34.6	64.0	47.6	13.2	34.4	103.2
55	35.1	20.9	10.9	10.0	33.1	59.6	44.4	13.2	31.2	102.8
60	32.9	19.6	10.9	8.7	31.5	55.9	41.6	13.2	28.4	102.2
65	31.0	18.5	10.9	7.6	29.7	52.6	39.2	13.2	26.0	101.3
70	29.4	17.5	10.9	6.6	27.8	49.8	37.1	13.2	23.8	100.1
75	27.9	16.6	10.9	5.7	25.8	47.3	35.2	13.2	22.0	98.8
80	26.6	15.8	10.9	4.9	23.7	45.0	33.5	13.2	20.3	97.3
85	25.4	15.1	10.9	4.2	21.6	43.0	32.0	13.2	18.8	95.6
90	24.3	14.5	10.9	3.6	19.4	41.1	30.6	13.2	17.4	93.9
95	23.3	13.9	10.9	3.0	17.1	39.4	29.4	13.2	16.1	92.0
100	22.4	13.3	10.9	2.5	14.8	37.9	28.2	13.2	15.0	89.9
105	21.6	12.9	10.9	2.0	12.4	36.5	27.2	13.2	13.9	87.9
110	20.8	12.4	10.9	1.5	10.0	35.2	26.2	13.2	13.0	85.7
115	20.1	12.0	10.9	1.1	7.6	34.0	25.3	13.2	12.1	83.4

5-year Q_{attenuated} 10.9 L/s 100-year Q_{attenuated} 21.7 L/s
 5-year Max. Storage Required 38.2 m³ 100-year Max. Storage Required 103.2 m³
 Est. 5-year Storage Elevation 95.39 m Est. 100-year Storage Elevation 96.33 m

Notes:
 - Required storage volumes calculated using the average Q release rate within the tank
 - Flow from the storage tank assumes maximum Q Release at the tank obvert

Minto
BTC Stage 1 - Block B
Proposed Conditions

Area ID STM124
Available Sub-surface Storage 79.92
195.22
Total Subsurface Storage (m³) 275.1 <-- Provided storage excludes storage volume below system invert

Stage Attenuated Areas Storage Summary

	Surface Storage				Surface and Subsurface Storage			
	Stage (m)	Ponding (m ²)	h _o (m)	delta d (m)	V* (m ³)	V _{acc} ** (m ³)	Q _{release} † (L/s)	V _{drawdown} (hr)
Orifice INV	94.90		0.00			0.0	0.0	0.00
Storage Chamber INV	96.19		1.28	1.28	0.0	0.0	6.5	0.00
Storage Chamber OBV	97.71		2.81	1.53	275.1	275.1	9.5	8.05

* V=Incremental storage volume
**V_{acc}=Total surface and sub-surface
† Q_{release} = Release rate per Tempest LMF Flow Curve

Orifice Location STM124 ICD Tempest LMF 80

Area	0.18	0.20	0.08	0.07
C	0.78	0.73	0.81	0.69

Total Area 0.53 ha
C 0.75 Rational Method runoff coefficient *Note: Rational Method Coefficient "C" increased by 25% for 100-year calculations*

t _c (min)	5-year					100-year				
	i (mm/hr)	Q _{actual} † (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)	i (mm/hr)	Q _{actual} † (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)
14	87.4	96.9	7.6	89.3	74.4	149.5	207.3	8.0	199.3	166.0
20	70.3	78.0	7.6	70.3	84.4	120.0	166.4	8.0	158.4	190.1
30	53.9	59.8	7.6	52.2	94.0	91.9	127.4	8.0	119.4	215.0
40	44.2	49.0	7.6	41.4	99.3	75.1	104.2	8.0	96.2	231.0
50	37.7	41.8	7.6	34.1	102.4	64.0	88.7	8.0	80.7	242.1
60	32.9	36.6	7.6	28.9	104.1	55.9	77.5	8.0	69.5	250.3
70	29.4	32.6	7.6	25.0	104.8	49.8	69.1	8.0	61.1	256.5
80	26.6	29.5	7.6	21.8	104.8	45.0	62.4	8.0	54.4	261.2
90	24.3	27.0	7.6	19.3	104.3	41.1	57.0	8.0	49.0	264.7
100	22.4	24.9	7.6	17.2	103.3	37.9	52.6	8.0	44.6	267.5
110	20.8	23.1	7.6	15.5	102.1	35.2	48.8	8.0	40.8	269.5
120	19.5	21.6	7.6	14.0	100.5	32.9	45.6	8.0	37.6	270.9
130	18.3	20.3	7.6	12.7	98.7	30.9	42.9	8.0	34.9	271.9
140	17.3	19.2	7.6	11.5	96.8	29.2	40.4	8.0	32.4	272.5
150	16.4	18.2	7.6	10.5	94.6	27.6	38.3	8.0	30.3	272.7
160	15.6	17.3	7.6	9.6	92.3	26.2	36.4	8.0	28.4	272.6
170	14.8	16.5	7.6	8.8	89.9	25.0	34.7	8.0	26.7	272.3
180	14.2	15.7	7.6	8.1	87.4	23.9	33.2	8.0	25.2	271.7
190	13.6	15.1	7.6	7.4	84.8	22.9	31.8	8.0	23.8	270.9
200	13.0	14.5	7.6	6.8	82.1	22.0	30.5	8.0	22.5	269.9
210	12.6	13.9	7.6	6.3	79.2	21.1	29.3	8.0	21.3	268.8

5-year Q _{attenuated}	7.6 L/s	100-year Q _{attenuated}	9.5 L/s
5-year Max. Storage Required	104.8 m ³	100-year Max. Storage Required	272.7 m ³
Est. 5-year Storage Elevation	96.77 m	Est. 100-year Storage Elevation	97.70 m

Notes:
- Required storage volumes calculated using the average Q release rate within the tank
- Flow from the storage tank assumes maximum Q Release at the tank obvert

Area ID STM134
Available Sub-surface Storage

Total Subsurface Storage (m³) 79.7 <-- Provided storage excludes storage volume below system invert

Stage Attenuated Areas Storage Summary

	Surface Storage				Surface and Subsurface Storage			
	Stage (m)	Ponding (m ²)	h _o (m)	delta d (m)	V* (m ³)	V _{acc} ** (m ³)	Q _{release} † (L/s)	V _{drawdown} (hr)
Orifice INV	93.41		0.00			0.0	0.0	0.00
Storage Chamber INV	94.17		0.75	0.75		0.0	81.3	0.00
Storage Chamber OBV	95.69		2.28	1.53	79.7	79.7	141.3	0.16

* V=Incremental storage volume
 **V_{acc}=Total surface and sub-surface
 † Q_{release} = Release rate calculated from orifice equation

Orifice Location	STM134	dia	210
Area	0.18	0.22	0.11
C	0.76	0.76	0.79

Total Area 0.51 ha
 C 0.77 Rational Method runoff coefficient *Note: Rational Method Coefficient "C" increased by 25% for 100-year calculations*

t _c (min)	5-year					100-year				
	i (mm/hr)	Q _{actual} † (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)	i (mm/hr)	Q _{actual} † (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)
14	87.4	94.9	86.5	8.3	6.9	149.5	202.9	111.3	91.5	76.2
20	70.3	76.3	76.3	0.0	0.0	120.0	162.8	111.3	51.5	61.8
25	60.9	66.1	66.1	0.0	0.0	103.8	141.0	111.3	29.6	44.5
30	53.9	58.6	58.6	0.0	0.0	91.9	124.7	111.3	13.4	24.1
35	48.5	52.7	52.7	0.0	0.0	82.6	112.1	111.3	0.8	1.6
40	44.2	48.0	48.0	0.0	0.0	75.1	102.0	102.0	0.0	0.0
45	40.6	44.1	44.1	0.0	0.0	69.1	93.7	93.7	0.0	0.0
50	37.7	40.9	40.9	0.0	0.0	64.0	86.8	86.8	0.0	0.0
55	35.1	38.1	38.1	0.0	0.0	59.6	80.9	80.9	0.0	0.0
60	32.9	35.8	35.8	0.0	0.0	55.9	75.9	75.9	0.0	0.0
65	31.0	33.7	33.7	0.0	0.0	52.6	71.5	71.5	0.0	0.0
70	29.4	31.9	31.9	0.0	0.0	49.8	67.6	67.6	0.0	0.0
75	27.9	30.3	30.3	0.0	0.0	47.3	64.1	64.1	0.0	0.0
80	26.6	28.8	28.8	0.0	0.0	45.0	61.1	61.1	0.0	0.0
85	25.4	27.5	27.5	0.0	0.0	43.0	58.3	58.3	0.0	0.0
90	24.3	26.4	26.4	0.0	0.0	41.1	55.8	55.8	0.0	0.0
95	23.3	25.3	25.3	0.0	0.0	39.4	53.5	53.5	0.0	0.0
100	22.4	24.3	24.3	0.0	0.0	37.9	51.4	51.4	0.0	0.0
105	21.6	23.4	23.4	0.0	0.0	36.5	49.5	49.5	0.0	0.0
110	20.8	22.6	22.6	0.0	0.0	35.2	47.8	47.8	0.0	0.0
115	20.1	21.8	21.8	0.0	0.0	34.0	46.2	46.2	0.0	0.0

5-year Q_{attenuated}	86.5 L/s	100-year Q_{attenuated}	141.3 L/s
5-year Max. Storage Required	6.9 m³	100-year Max. Storage Required	76.2 m³
Est. 5-year Storage Elevation	94.30 m	Est. 100-year Storage Elevation	95.62 m

Notes:
 - Required storage volumes calculated using the average Q release rate within the tank
 - Flow from the storage tank assumes maximum Q Release at the tank obvert

Minto
BTC Stage 1 - Block B
Proposed Conditions

Area ID STM164
Available Sub-surface Storage

Total Subsurface Storage (m³) 203.5 <-- Provided storage excludes storage volume below system invert

Stage Attenuated Areas Storage Summary

Stage	Surface Storage			Surface and Subsurface Storage			
	Ponding (m)	h _o (m)	delta d (m)	V* (m ³)	V _{acc} ** (m ³)	Q _{release} † (L/s)	V _{drawdown} (hr)
Orifice INV	92.98	0.00			0.0	0.0	0.00
Storage Chamber INV	93.14	0.16	0.16		0.0	3.5	0.00
Storage Chamber OBV	94.28	1.30	1.14	203.5	203.5	11.3	5.00

* V=Incremental storage volume
 **V_{acc}=Total surface and sub-surface
 † Q_{release} = Release rate per Tempest LMF Flow Curve

Orifice Location STM164 ICD Tempest LMF 105
 Total Area 0.46 ha
 C 0.67 Rational Method runoff coefficient Note: Rational Method Coefficient "C" increased by 25% for 100-year calculations

t _c (min)	5-year					100-year				
	i (mm/hr)	Q _{actual} † (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)	i (mm/hr)	Q _{actual} † (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)
14	87.4	74.8	6.5	68.3	56.9	149.5	159.9	7.4	152.5	127.0
20	70.3	60.1	6.5	53.6	64.4	120.0	128.4	7.4	121.0	145.2
25	60.9	52.1	6.5	45.6	68.4	103.8	111.1	7.4	103.7	155.6
30	53.9	46.2	6.5	39.7	71.4	91.9	98.3	7.4	90.9	163.6
35	48.5	41.5	6.5	35.0	73.6	82.6	88.4	7.4	81.0	170.0
40	44.2	37.8	6.5	31.3	75.2	75.1	80.4	7.4	73.0	175.2
45	40.6	34.8	6.5	28.3	76.4	69.1	73.9	7.4	66.5	179.5
50	37.7	32.2	6.5	25.7	77.2	64.0	68.4	7.4	61.0	183.1
55	35.1	30.1	6.5	23.6	77.8	59.6	63.8	7.4	56.4	186.1
60	32.9	28.2	6.5	21.7	78.1	55.9	59.8	7.4	52.4	188.7
65	31.0	26.6	6.5	20.1	78.3	52.6	56.3	7.4	48.9	190.9
70	29.4	25.1	6.5	18.6	78.3	49.8	53.3	7.4	45.9	192.7
75	27.9	23.9	6.5	17.4	78.2	47.3	50.6	7.4	43.2	194.3
80	26.6	22.7	6.5	16.2	77.9	45.0	48.1	7.4	40.7	195.6
85	25.4	21.7	6.5	15.2	77.6	43.0	46.0	7.4	38.6	196.7
90	24.3	20.8	6.5	14.3	77.2	41.1	44.0	7.4	36.6	197.6
95	23.3	20.0	6.5	13.5	76.7	39.4	42.2	7.4	34.8	198.4
100	22.4	19.2	6.5	12.7	76.1	37.9	40.6	7.4	33.2	199.0
105	21.6	18.5	6.5	12.0	75.4	36.5	39.1	7.4	31.7	199.4
110	20.8	17.8	6.5	11.3	74.7	35.2	37.7	7.4	30.3	199.8
115	20.1	17.2	6.5	10.7	74.0	34.0	36.4	7.4	29.0	200.0
120	19.5	16.7	6.5	10.2	73.2	32.9	35.2	7.4	27.8	200.2
125	18.9	16.1	6.5	9.6	72.3	31.9	34.1	7.4	26.7	200.2
130	18.3	15.7	6.5	9.2	71.5	30.9	33.1	7.4	25.7	200.2

5-year Q_{attenuated} 6.5 L/s
 5-year Max. Storage Required 78.3 m³
 Est. 5-year Storage Elevation 93.58 m
 100-year Q_{attenuated} 11.3 L/s
 100-year Max. Storage Required 200.0 m³
 Est. 100-year Storage Elevation 94.26 m

Notes:
 - Required storage volumes calculated using the average Q release rate within the tank
 - Flow from the storage tank assumes maximum Q Release at the tank obvert

Area ID STM159
Available Sub-surface Storage 48.75
161.53
Total Subsurface Storage (m³) 210.3 <-- Provided storage excludes storage volume below system invert

Stage Attenuated Areas Storage Summary

	Surface Storage				Surface and Subsurface Storage			
	Stage (m)	Ponding (m ²)	h _o (m)	delta d (m)	V* (m ³)	V _{acc} ** (m ³)	Q _{release} † (L/s)	V _{drawdown} (hr)
Orifice INV	93.17		0.00			0.0	0.0	0.00
Storage Chamber INV	93.22		0.05	0.05		0.0	2.7	0.00
Storage Chamber OBV	94.36		1.19	1.14	210.3	210.3	13.0	4.49

* V=Incremental storage volume
**V_{acc}=Total surface and sub-surface
† Q_{release} = Release rate calculated from orifice equation

Orifice Location STM159 Dia 75
Area 0.18 0.25
C 0.79 0.71
Total Area 0.43 ha
C 0.74 Rational Method runoff coefficient *Note: Rational Method Coefficient "C" increased by 25% for 100-year calculations*

t _c (min)	5-year					100-year				
	i (mm/hr)	Q _{actual} † (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)	i (mm/hr)	Q _{actual} † (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)
14	87.4	77.6	6.7	70.9	59.0	149.5	165.9	7.8	158.1	131.6
20	70.3	62.4	6.7	55.7	66.8	120.0	133.2	7.8	125.3	150.4
30	53.9	47.9	6.7	41.2	74.2	91.9	102.0	7.8	94.1	169.4
40	44.2	39.2	6.7	32.6	78.1	75.1	83.4	7.8	75.6	181.4
50	37.7	33.4	6.7	26.8	80.3	64.0	71.0	7.8	63.1	189.4
60	32.9	29.3	6.7	22.6	81.3	55.9	62.0	7.8	54.2	195.1
70	29.4	26.1	6.7	19.4	81.5	49.8	55.3	7.8	47.4	199.2
80	26.6	23.6	6.7	16.9	81.2	45.0	49.9	7.8	42.1	202.1
90	24.3	21.6	6.7	14.9	80.4	41.1	45.6	7.8	37.8	204.1
100	22.4	19.9	6.7	13.2	79.3	37.9	42.1	7.8	34.2	205.4
110	20.8	18.5	6.7	11.8	77.9	35.2	39.1	7.8	31.2	206.1
120	19.5	17.3	6.7	10.6	76.4	32.9	36.5	7.8	28.7	206.4
130	18.3	16.2	6.7	9.6	74.6	30.9	34.3	7.8	26.5	206.3
140	17.3	15.3	6.7	8.7	72.7	29.2	32.4	7.8	24.5	205.9
150	16.4	14.5	6.7	7.8	70.6	27.6	30.6	7.8	22.8	205.2
160	15.6	13.8	6.7	7.1	68.5	26.2	29.1	7.8	21.3	204.3
170	14.8	13.2	6.7	6.5	66.2	25.0	27.8	7.8	19.9	203.2
180	14.2	12.6	6.7	5.9	63.8	23.9	26.5	7.8	18.7	201.8
190	13.6	12.1	6.7	5.4	61.4	22.9	25.4	7.8	17.6	200.3
200	13.0	11.6	6.7	4.9	58.9	22.0	24.4	7.8	16.6	198.7
210	12.6	11.1	6.7	4.5	56.3	21.1	23.5	7.8	15.6	196.9

5-year Q_{attenuated} 6.7 L/s
5-year Max. Storage Required 81.5 m³
Est. 5-year Storage Elevation 93.66 m
100-year Q_{attenuated} 13.0 L/s
100-year Max. Storage Required 206.4 m³
Est. 100-year Storage Elevation 94.34 m

Notes:
- Required storage volumes calculated using the average Q release rate within the tank
- Flow from the storage tank assumes maximum Q Release at the tank obvert

Area ID STM149
Available Sub-surface Storage

Total Subsurface Storage (m³) 74.8 <-- Provided storage excludes storage volume below system invert

Stage Attenuated Areas Storage Summary

	Surface Storage				Surface and Subsurface Storage			
	Stage (m)	Ponding (m ²)	h _o (m)	delta d (m)	V* (m ³)	V _{acc} ** (m ³)	Q _{release} † (L/s)	V _{drawdown} (hr)
Orifice INV	92.84		0.00			0.0	0.0	0.00
Storage Chamber INV	92.93		0.09	0.09		0.0	32.2	0.00
Storage Chamber OBV	94.07		1.23	1.14	74.8	74.8	119.1	0.17

* V=Incremental storage volume
 **V_{acc}=Total surface and sub-surface
 † Q_{release} = Release rate calculated from orifice equation

Orifice Location STM149 Dia 225
 Area 0.18 0.24
 C 0.78 0.74

Total Area 0.42 ha
 C 0.76 Rational Method runoff coefficient Note: Rational Method Coefficient "C" increased by 25% for 100-year calculations

t _c (min)	5-year					100-year				
	i (mm/hr)	Q _{actual} † (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)	i (mm/hr)	Q _{actual} † (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)
14	87.4	77.2	54.3	22.8	19.0	149.5	165.0	75.7	89.3	74.4
20	70.3	62.1	54.3	7.7	9.3	120.0	132.4	75.7	56.8	68.1
25	60.9	53.8	53.8	0.0	0.0	103.8	114.7	75.7	39.0	58.5
30	53.9	47.6	47.6	0.0	0.0	91.9	101.4	75.7	25.7	46.3
35	48.5	42.9	42.9	0.0	0.0	82.6	91.2	75.7	15.5	32.5
40	44.2	39.0	39.0	0.0	0.0	75.1	83.0	75.7	7.3	17.5
45	40.6	35.9	35.9	0.0	0.0	69.1	76.2	75.7	0.6	1.5
50	37.7	33.3	33.3	0.0	0.0	64.0	70.6	70.6	0.0	0.0
55	35.1	31.0	31.0	0.0	0.0	59.6	65.8	65.8	0.0	0.0
60	32.9	29.1	29.1	0.0	0.0	55.9	61.7	61.7	0.0	0.0
65	31.0	27.4	27.4	0.0	0.0	52.6	58.1	58.1	0.0	0.0
70	29.4	25.9	25.9	0.0	0.0	49.8	55.0	55.0	0.0	0.0
75	27.9	24.6	24.6	0.0	0.0	47.3	52.2	52.2	0.0	0.0
80	26.6	23.5	23.5	0.0	0.0	45.0	49.7	49.7	0.0	0.0
85	25.4	22.4	22.4	0.0	0.0	43.0	47.4	47.4	0.0	0.0
90	24.3	21.5	21.5	0.0	0.0	41.1	45.4	45.4	0.0	0.0
95	23.3	20.6	20.6	0.0	0.0	39.4	43.5	43.5	0.0	0.0
100	22.4	19.8	19.8	0.0	0.0	37.9	41.9	41.9	0.0	0.0
105	21.6	19.1	19.1	0.0	0.0	36.5	40.3	40.3	0.0	0.0
110	20.8	18.4	18.4	0.0	0.0	35.2	38.9	38.9	0.0	0.0
115	20.1	17.8	17.8	0.0	0.0	34.0	37.5	37.5	0.0	0.0

5-year Q_{attenuated} 54.3 L/s
 5-year Max. Storage Required 19.0 m³
 Est. 5-year Storage Elevation 93.22 m
 100-year Q_{attenuated} 119.1 L/s
 100-year Max. Storage Required 74.4 m³
 Est. 100-year Storage Elevation 94.06 m

Notes:
 - Required storage volumes calculated using the average Q release rate within the tank
 - Flow from the storage tank assumes maximum Q Release at the tank obvert

Summary of Release Rates and Storage Volumes

Control Area	5-year Release Rate (L/s)	5-year Required Storage (m ³)	100-Year Release Rate (L/s)	100-Year Required Storage (m ³)	100-Year Available Storage (m ³)
Unattenuated Areas					
Glenroy Gilbert	29.7	0.0	50.8	0.0	0.0
Riocan	25.6	0.0	43.8	0.0	0.0
Chapman Mills	65.4	0.0	111.9	0.0	0.0
Longfields	26.0	0.0	44.5	0.0	0.0
Attenuated Areas					
STM115	46.6	41.4	69.5	134.6	135.1
STM126	10.9	38.2	21.7	103.2	105.5
STM124	7.6	104.8	9.5	272.7	275.1
STM134	86.5	6.9	141.3	76.2	79.7
STM164	6.5	78.3	11.3	200.0	203.5
STM159	6.7	81.5	13.0	206.4	210.3
STM149	54.3	19.0	119.1	74.4	74.8
Total	365.9	370.1	636.6	1067.6	1084.1

Date: June, 2023
DSEL File: 816

ICD Sizing (CBs within City ROW)

Orifice Dia (mm)	Head (m)	Flow (L/s)
83	1.38	17.5
94	1.38	22.4
102	1.38	26.4
108	1.38	29.6
127	1.38	40.9
152	1.38	58.5
178	1.38	80.3

CB ID	Area (Ha)	RC	Design Flow (5yr)	ICD Size (mm)
C/ICB 3	0.08	0.72	16.7	83
CB 4	0.08	0.72	16.7	83
CB 5	0.08	0.72	16.7	83
CB 6	0.08	0.72	16.7	83
CB 7	0.03	0.72	6.3	83
CB 8	0.03	0.72	6.3	83
CB 9	0.09	0.61	15.9	83
CB 10	0.03	0.64	5.6	83
CB 12	0.08	0.70	16.2	83
CB 13	0.10	0.61	17.7	83
CB 14	0.08	0.70	16.2	83

5-yr
i 104.2 mm/hr
T_c 10.0 min

Stormwater - Proposed Development
City of Ottawa Sewer Design Guidelines, 2012



Estimated Post Development Peak Flow to DICB 1

Area 0.72 ha <-- Sum of Unattenuated Drainage from Future Chapman Mills Drive
C 0.70 Rational Method runoff coefficient

10-year					
t _c (min)	i (mm/hr)	Q _{actual} (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)
13.9	102.3	143.3	143.3	0.0	0.0

Note:
T_c = 13.88 min per Design Sheet

Area 0.01 0.16 0.17 0.01
C 0.57 0.83 0.74 0.53

Total Area 0.35 ha <-- Sum of Unattenuated Drainage to Chapman Mills Drive (from Block B)
C 0.77 Rational Method runoff coefficient

5-year					
t _c (min)	i (mm/hr)	Q _{actual} (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)
13.9	87.4	65.4	65.4	0.0	0.0

Note:
T_c = 13.88 min per Design Sheet

Design Parameters

Max Head: 1.380 m Controlled Flow Rate: 0.2087 m³/s

Calculations

A blockage factor has also been applied.

Orifice Flow

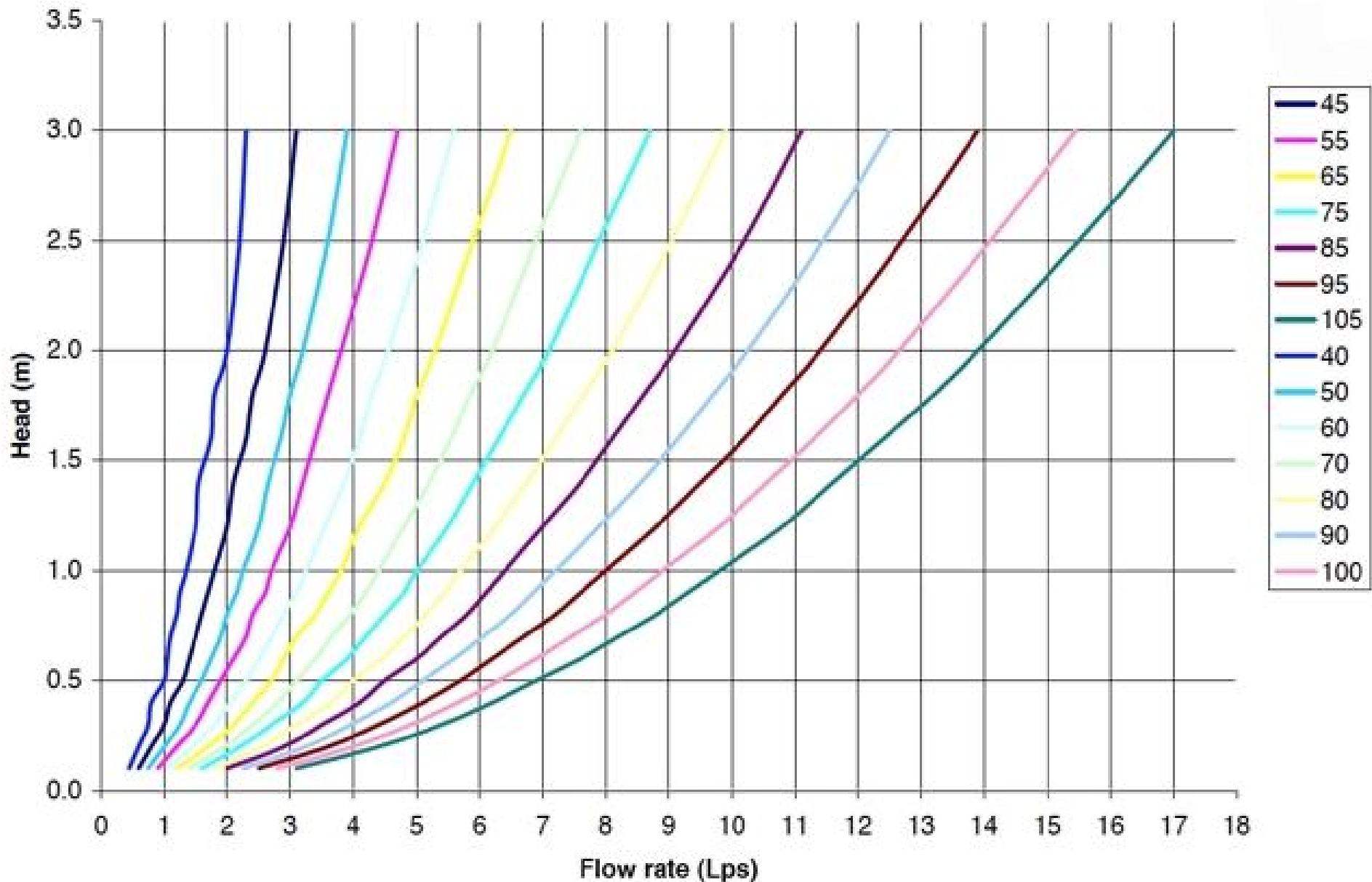
$$Q = CA(2gH)^{0.5} \qquad A = \pi r^2$$

where: C = 0.62
A = area of ICD outlet
H = maximum depth

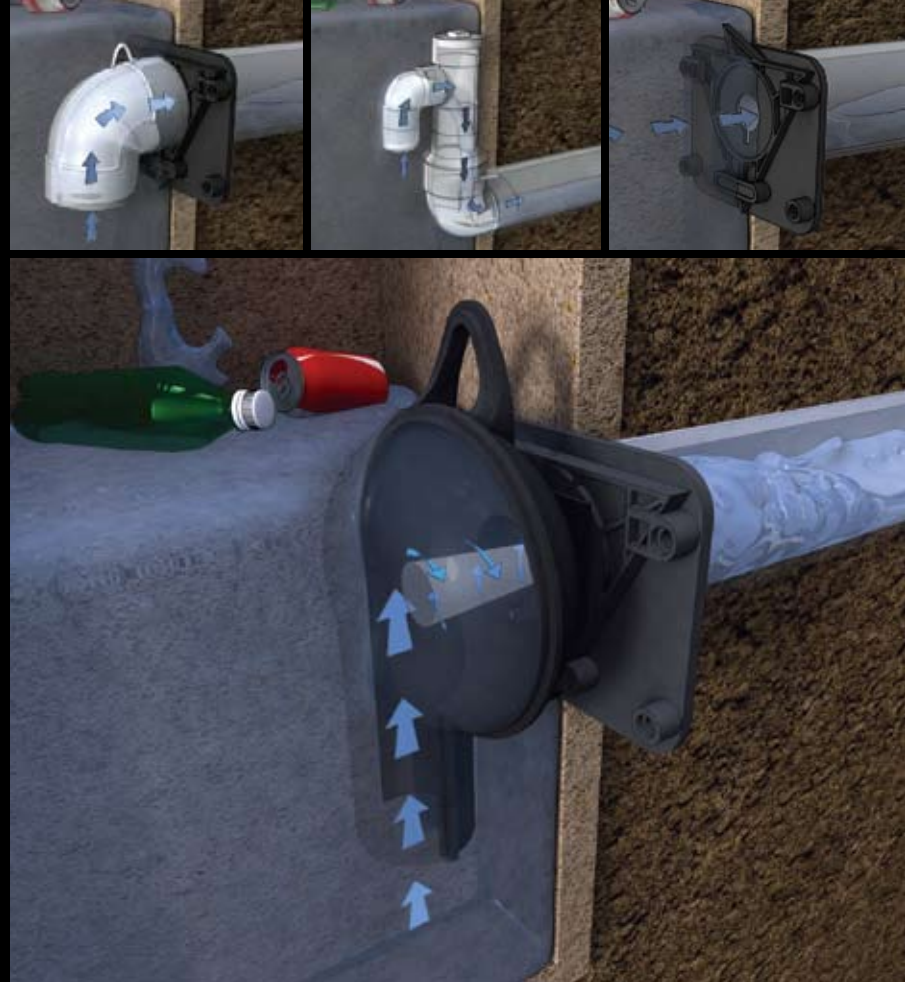
Area of ICD required = 0.06 m²
Diameter of Circular ICD= 0.2870 m
287.0 mm

Diameter ICD Provided = 285 mm

TEMPEST LMF flow curves



The Next Generation in Storm Sewer Inlet Controls



STORM WATER FLOW CONTROL

THE COST-EFFECTIVE SOLUTION TO YOUR STORM WATER SURCHARGE PROBLEMS

- Conserves sewer system capacity
- System accommodates low to high flows
- Integrated odour and floatable control
- Fast and easy to install and maintain



IPEX

We build tough products for tough environments®



THE NEXT GENERATION IN STORM SEWER INLET CONTROLS

✓ Reduces Sewer Overflows and Basement Backups

Tempest is a family of cost-effective inlet control devices that work together across a series of catch basins to limit the amount of storm water runoff that can enter a combined sewer system during a storm event. Basement backups and sewer overflows are avoided because storm water surcharges are controlled at the sewer inlet and are allowed to remain in catch basins or temporarily above ground.

✓ Integrated Odour and Floatable Control

In addition to flow control, Tempest systems can also alleviate sewer system odour emissions as well as prevent floating debris from entering the sewer system.

✓ Wide Range of Models & Pre-set Flow Rates

Available in a wide range of patent pending models and pre-set flow rates, Tempest systems can accommodate most storm water flow control requirements from 32 GPM to 270 GPM and beyond. Application specific solutions can also be engineered to meet your unique needs in both wet and dry catch basin environments.

✓ Easy to Install and Maintain

Constructed from durable PVC, Tempest units are corrosion free and built to last. The Tempest's light weight design accommodates both square and round catch basins and features a universal back plate and interchangeable components with no moving parts that makes the units quick and easy to install over a catch basin outlet pipe.

These devices also include a quick release mechanism to allow easy access for service without the need to drain the installation.



“IPEX has been a great partner for us in terms of providing a quality system that meets all requirements and a knowledgeable staff that delivers reliable field support”

*Kevin Secord
Multi-Drain Inc. (Ottawa, Ontario)*

FEATURES & BENEFITS

- 1 Restricts flow to a narrow range regardless of head
- 2 Unit design prevents the passage of floatables and odours
- 3 Neoprene gasket for air-tight seal*
- 4 Virtually maintenance free and corrosion free durable PVC construction
- 5 Features a quick release mechanism that's accessed with reach bar. Unit can then be simply lifted out for easy maintenance*
- 6 Universal back plates available for both square and round catch basins*



For Square
Catch Basins



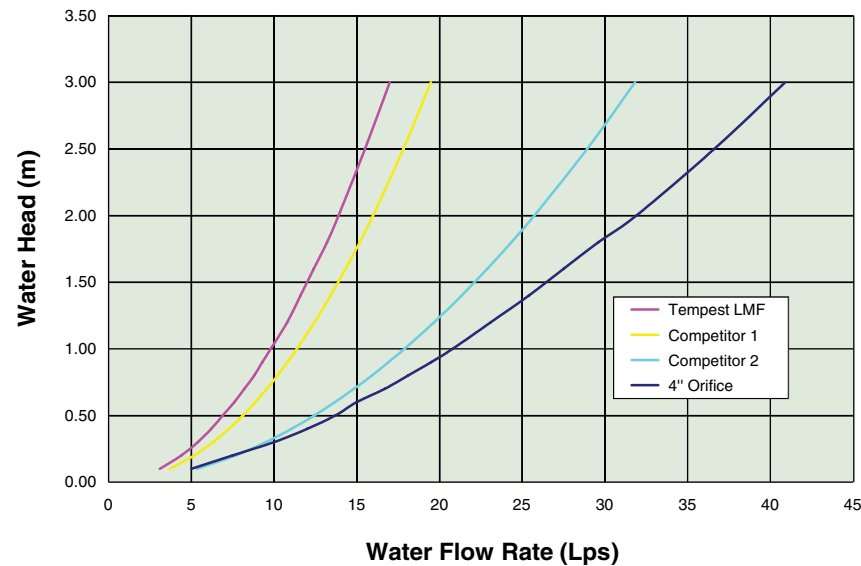
For Round
Catch Basins

Tempest LMF

The system depicted is the Tempest LMF available in 14 pre-set rates and designed specifically for low to moderate flow rates with an engineered inlet design that eliminates the passage of odour and floatables

*Excluding Tempest HF Sump

Tempest Inlet Control Devices restrict flow to a narrower range than traditional methods regardless of head



THE NEXT GENERATION IN STORM SEWER INLET CONTROLS



THE TEMPEST FAMILY OF SYSTEMS

TEMPEST LMF

Restricts:

- ✓ Flow
- ✓ Odours
- ✓ Floatables



LOW to MODERATE FLOW RATES

32 GPM (2 L/s) – 270 GPM (17 L/s)

14 pre-set flow rates

The Tempest LMF system features a vortex inlet design that allows a low flow rate to be set and eliminates the passage of odours and floatables and allows for debris and sediment to collect in the structure.

TEMPEST HF & HF SUMP

Restricts:

- ✓ Flow
- ✓ Odours
- ✓ Floatables



HIGH FLOW RATES

240 GPM (15 L/s) or greater

5 pre-set flow rates

The standard Tempest HF system allows a near constant discharge rate to be set and eliminates the passage of odours and floatables and allows for debris and sediment to collect in the structure.

The Tempest HF SUMP system is designed for catch basins & manholes in which there is no sump or the outlet pipe is too low to install standard Tempest device.

TEMPEST MHF

Restricts:

- ✓ Flow



Plate

Plug

MEDIUM TO HIGH FLOW RATES

143 GPM (9L/s) or greater

Specified pre-set flow rates

The Tempest MHF is a standard orifice plate or plug device designed to allow a specified flow volume through the outlet pipe at a specified head.

www.ipexamerica.com



PROBLEM: SURCHARGED SEWER SYSTEMS



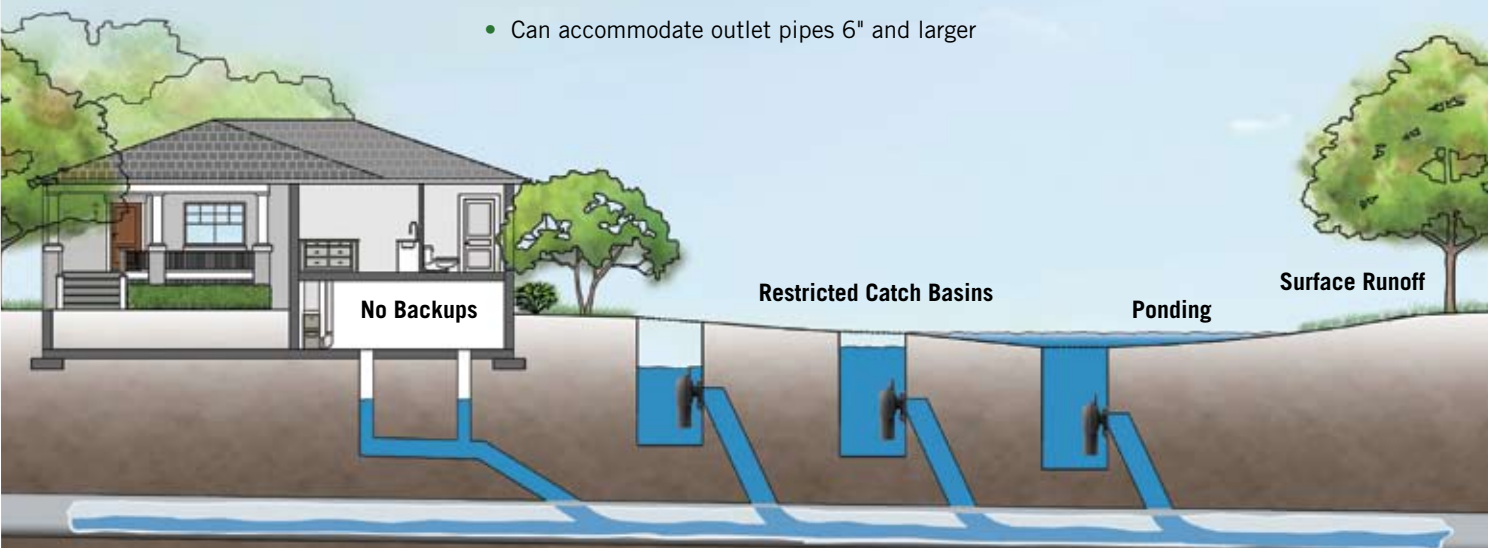
During heavy rain events, storm sewers can become overloaded causing sewer backups into residential basements and onto urban environments and streets. These events cause significant environmental and property damage and are all too common in older sections of municipalities where combined, undersized sewer systems often end up discharging a mixture of storm water runoff and sanitary wastewater into homes, streets and lakes when sewer capacities exceed historical norms.

Traditional approaches to overcoming these challenges have been expensive, disruptive and time consuming for municipalities and the private sector.

SOLUTION: TEMPEST INLET CONTROL SYSTEMS



- Provides control by restricting flow into the sewer system
- Provides temporary ponding in catch basins, parking lots & roadways
- Helps preserve sewer capacity, slows down the inlet flow
- Reduces residential flooding and flash flooding
- Water surcharge is controlled & directed as per engineer design
- Can accommodate outlet pipes 6" and larger



Previously overloaded sewer now controlled without size increase

CUSTOMER SERVICE CENTER

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Toll Free: (800) 463-9572
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Markets served by IPEX group products are:

- Electrical systems
- Telecommunications and utility piping systems
- PVC, CPVC, PP, ABS, PEX, FR-PVDF and PE pipe and fittings (1/4" to 48")
- Industrial process piping systems
- Municipal pressure and gravity piping systems
- Plumbing and mechanical piping systems
- PE Electrofusion systems for gas and water
- Industrial, plumbing and electrical cements
- Irrigation systems

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