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FUNCTIONAL SERVICING REPORT

FOR

2275 MER BLEUE ROAD

CAIVAN COMMUNITIES

CITY OF OTTAWA

PROJECT NO.: 20-1214

JUNE 9, 2021
3RD SUBMISSION

FUNCTIONAL SERVICING REPORT
FOR
2275 MER BLEUE ROAD

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FUNCTIONAL SERVICING REPORT
FOR
2275 MER BLEUE ROAD

CAIVAN COMMUNITIES

PROJECT NO.: 20-1214

1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has been retained by Caivan Communities to prepare a Functional Servicing Report (FSR) in support of their application for draft plan approval and zoning by-law amendment for 2275 Mer Bleue Road.

The subject site is approximately 4 ha and is located immediately east of Mer Bleue Road and south of Brian Coburn Boulevard in the Cumberland Ward (Ward 19) as shown on the ***Figure 1 – Site Location***. The subject site is adjacent to Minto's Avalon Encore – Stage 6 development, which was designed and approved with allowances for the subject site.

The subject site is within the McKinnon's Creek Watershed and under the jurisdiction of South Nation Conservation (SNC).

This FSR is prepared to demonstrate conformance with the design criteria of the City of Ottawa, the Ministry of the Environment, Conservation and Parks (MECP), background studies, and general industry practice.

1.1 Existing Conditions

The subject site generally consists of agricultural land surrounded by existing roads (Mer Bleue Road, Brian Coburn Boulevard) and existing development (Avalon Encore).

The study area is generally flat with existing elevations ranging from 87.0 m to 88 m.

Based on a ***Geotechnical Investigation, PG5521-1 Revision 1*** by Paterson Group dated March 10, 2021, the subsurface conditions consist of topsoil layer underlain by a deep deposit of silty clay. A hard to stiff brown silty clay crust was observed within the upper 2.7 m to 3.0 m below the ground surface. The weathered silty clay crust was observed to be underlain by a firm to stiff layer of unweathered grey silty clay. The permissible grade raise restrictions are between 88.6 m to 89.2 m for the proposed development.

1.2 Development Concept

The proposed development concept can be seen in ***Figure 2 – Draft Plan***. Within the study area, the proposed land uses include 79 standard townhomes, 44 back-to-back townhomes, a servicing / walkway block and rights-of-way (ROWs). The ROW widths are 18.0m, 16.5 m throughout and 14.0 m on window streets. The 18.0m ROW extends from the proposed development connection to existing Sculpin Street. There is also a mixed-use density block, which is estimated to have 150 residential units with commercial development on the main floor.

The predicted populations associated with the development concept are described in ***Table 1***:

Table 1: Development Statistic Projections Derived from Concept Plan

Land Use	Total Area (ha)	Projected Residential Units	Residential Population per Unit	Projected Population
Townhomes	2.01	123	2.7	333
Mixed Use Density Block	0.72	150	1.8	270
Walkways / Servicing Block	0.05			
Local Streets	1.26			
Total	**4.04 ha**	**109**		**295**

1.3 Summary of Pre-consultation

The following provides a summary of the pre-consultation to date:

1.3.1 City of Ottawa

A Pre-Application Consultation Meeting was held on September 22, 2020 with City of Ottawa staff to discuss the subject site for a Major Rezoning / Subdivision Application. A copy of the notes, provided in an email from Steve Belan on September 30, 2020, is enclosed in ***Appendix A***.

1.4 Existing Permits / Approvals

The existing permits and approvals relating to the FSR study area are presented in ***Table 2***. The copy of the existing permits and approvals are enclosed in ***Appendix A*** for reference.

Table 2: Existing Permits / Approvals

Agency	Approval Type	Approval Number	Remarks
MECP	Amended Environmental Compliance Approval (ECA)	#6142-BEJHCE (August 1, 2019)	The existing Avalon West (N5) SWM Pond provides the storm outlet for the FSR study area.
MECP	Amended Environmental Compliance Approval (ECA)	#7375-A8QGEU (April 12, 2016)	The existing Tenth Line Pump Station provides the sanitary outlet for the FSR study area.
MECP	Environmental Compliance Approval (ECA)	#0606-AHXJCH (February 2, 2017)	The sanitary and storm sewers in Avalon Encore Stage 5 provide the outlet for the FSR study area.
MECP	Environmental Compliance Approval (ECA)	#8605-AYUHJG (May 30, 2018)	The sanitary and storm sewers in Avalon Encore Stage 6 provide the immediate outlet for the FSR study area.

1.5 Required Permits / Approvals

The required approvals relating to the subject site are presented in ***Table 3.***

Table 3: Required Permits / Approvals

Agency	Permit/Approval Required	Trigger	Remarks
MECP	Environmental Compliance Approval (ECA)	Construction of new sanitary and storm sewers.	The City will review the storm/sanitary sewers on behalf of the MECP through the Transfer of Review process.
MECP	Permit to Take Water (PTTW)	If pumping for construction of proposed land uses (e.g. basements for homes) exceeds 400,000 L/day of ground and/or surface water.	Pumping of groundwater or surface water may be required during construction. Refer to Paterson Group Report PG5521-1 by dated December 22, 2020.
MECP	Environmental Activity and Sector Registry (EASR)	If pumping for construction of proposed land uses (e.g. basements for residential homes) ranges between 50,000 to 400,000 L/day of ground and/or surface water.	Pumping of groundwater or surface water may be required during construction. Refer to Paterson Group Report PG5521-1 by dated December 22, 2020.
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.

2.0 GUIDELINES, PREVIOUS STUDIES, AND REPORTS

2.1 Existing Studies, Guidelines, and Reports

The following documents informed the preparation of this FSR report:

- **Ottawa Sewer Design Guidelines**
  City of Ottawa, October 2012
  (City Standards)
    - **Technical Bulletin ISDTB-2014-01**
      City of Ottawa, February 5, 2014
      (ITSB-2014-01)
    - **Technical Bulletin PIEDTB-2016-01**
      City of Ottawa, September 6, 2016
      (PIEDTB-2016-01)
    - **Technical Bulletin ISTB-2018-01**
      City of Ottawa, March 21, 2018
      (ISTB-2018-01)
    - **Technical Bulletin ISTB-2019-02**
      City of Ottawa, July 18, 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 ISDTB-2018-02**
      City of Ottawa, March 21, 2018
      (ISTB-2018-02)
- **Stormwater Management Planning and Design Manual**
  Ministry of Environment, March 2003
  (*SWMP Design Manual)*
- Erosion & Sediment Control Guidelines for Urban Construction
  TRCA, 2019
  (E&S Guidelines)
- Geotechnical Investigation, Proposed Residential Development, 2275 Mer Bleue Road (PG5521-1, Revision 1)

Paterson Group, March 10, 2021
(*Geotechnical Investigation*)

- Mer Bleue Community Design Plan Infrastructure Servicing Study
  IBI Group, April 2006
  (Mer Bleue CDP ISS)
- Avalon West (Neighbourhood 5) Stormwater Management Facility Design, Revision 5
  IBI Group, October 2013
  (Avalon West N5 SWM Report)
- Avalon West (Neighbourhood 5) Stormwater Management Facility Design, Proposed Mattamy Bisson Lands
  IBI Group, November 3, 2014
  (Avalon West N5 SWM Report Update)
- Avalon Encore Stage 5, Stormwater Management, Watermain, Storm Sewer and Sanitary Sewer Design Brief, Revision 2
  Atrel Engineering, January 2017
  (Stage 5 Design Brief)
- Avalon Encore Stage 6, Stormwater Management and Site Servicing Design Brief
  Atrel Engineering, March 16, 2018
  (Stage 6 Design Brief)
- Design Brief for Interim Expansion of the Avalon West Stormwater Management Pond for the Summerside South Phase 1 Subdivision
  DSEL & JFSA, June 2019
  (Expansion Pond Design Brief)

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The subject site is located within Zone 2E of the City's water distribution system, per the Water Distribution Mapping excerpt in ***Appendix C,*** which is fed by two booster pumping stations and the Innes Road elevated storage tank at Belcourt Boulevard, providing balancing, fire and emergency storage.

In the vicinity of the site, there are the following existing watermains:

- Existing 400 mm diameter watermain on Mer Bleue Road;
- Existing 400 mm diameter watermain on Brian Coburn Boulevard;
- Existing 200 mm diameter watermain on Walkway Block to Aquarium Avenue in Avalon Encore, Stage 6
- Existing 200 mm diameter watermain on Sculpin Street in Avalon Encore, Stage 6.

The existing watermain network surrounding the subject site is depicted on ***Figure 6 – Watermain Servicing Plan***. Refer to the Record Drawings for the adjacent connections, contained in ***Appendix B***. Demands for the subject site have been considered in the detailed design of Avalon Encore, Stage 6 by Atrel Engineering.

3.2 Proposed Water Supply

Water supply to the site will be provided by connection to the municipal water system. As shown on ***Figure 6 – Watermain Servicing Plan***, connections are provided to the 200 mm diameter watermains on the Walkway Block to Aquarium Avenue and Sculpin Street in Avalon Encore, Stage 6. A connection to the 400 mm diameter watermain on Brian Coburn Boulevard will be provided to the Mixed-Use Density Block.

The proposed development will be serviced internally by 200 mm diameter watermains designed in accordance with the ***Water Supply Guidelines*** as summarized in ***Table 4***. The proposed watermains are depicted on ***Figure 6 – Watermain Servicing Plan***.

Table 4: Water Supply Design Criteria

Design Parameter	Value
Residential - Townhome	2.7 p/unit
Residential – Apartment	1.8 p/unit
Residential – Average Daily Demand	280 L/p/day
Commercial – Average Daily Demand	28,000 L/ha/day
Residential - Maximum Daily Demand	2.5 x Average Daily Demand
Residential - Maximum Hourly Demand	2.2 x Maximum Daily Demand
Residential - Minimum Hourly Demand	0.5 x Average Daily Demand
Commercial - Maximum Daily Demand	1.5 x Average Daily Demand
Commercial - Maximum Hourly Demand	1.8 x Maximum Daily Demand
Commercial - Minimum Hourly Demand	0.5 x Average Daily Demand
Minimum Watermain Size	150 mm diameter
Minimum Depth of Cover	2.4 m from top of watermain to finished grade
Peak hourly demand operating pressure	276 kPa and 552 kPa
Fire flow operating pressure minimum	140 kPa
Extracted from Section 4: Ottawa Design Guidelines, Water Distribution (July 2010). Daily consumption rates revised to align with the updated wastewater rates identified by City of Ottawa Technical Bulletin ISDTB-2018-02 (March 21, 2018).	

The City of Ottawa Water Supply Design Criteria reflected in the ***Stage 6 Design Brief*** was based on the Water Distribution Guidelines; however, since the publication of the report, demands have been updated to correspond to the updated sanitary demand criteria per ISDTB-2018-02 (March 21, 2018).

Based on the existing hydraulic grade line (HGL) in Zone 2E, operating pressures in the development are not anticipated to drop below 276 kPa (40 psi) or exceed 552 kPa (80 psi).

From the ***Stage 6 Design Brief***, it is noted that the subject site will be provided with two 200 mm diameter watermains, which will yield an available flow of 215.59 L/s for the southern parcel of the site and 169.05 L/s for the northern parcel of the site, while providing a residual pressure of 140 kPa. It is further noted that the subject site can also be serviced by the existing 400 mm diameter watermain located on Brian Coburn Boulevard and Mer Bleue Road if it is established during detailed design that additional flows are required. Refer to an excerpt from the ***Stage 6 Design Brief*** in ***Appendix C***.

A hydraulic analysis will be prepared for the proposed water distribution network to confirm that water supply is available within the required pressure range under the anticipated demand during average day, peak hour and fire flow conditions.

3.2.1 Fire Flow Demand

The City of Ottawa's cap of 10,000 L/min (167 L/s) as outlined in ISDTB-2018-02 will be applied to standard townhomes. Detailed calculations for the back-to-back townhomes and the mid-rise residential / commercial will be confirmed through detailed fire flow calculations and consideration for fire walls to limit demand.

3.2.2 Boundary Conditions

Boundary conditions for the subject site will be requested from the City of Ottawa; however, boundary conditions were provided for the Avalon Encore, Stage 6 development, which considered development of the subject site. The boundary conditions were provided in the form of Hydraulic Grade Line (HGL) for Peak Hour, Maximum Day Plus Fire Flow and Maximum HGL (high pressure check) and are summarized in Section 4.0 of the ***Stage 6 Design Brief***. The excerpt is included in ***Appendix C***.

Based on the maximum HGL of 130.4 m at Connection 1 and Connection 3 in the boundary conditions from the ***Stage 6 Design Brief*** (see ***Appendix C***), minimum and maximum proposed grades of 88.02 m and 89.00 m (***Figure 2 – Concept Grading Plan***), and assuming few head losses, average daily pressures throughout the development are anticipated to range between 406 kPa and 416 kPa. This value would fall within the City of Ottawa's desired operating pressure under normal operations (350 kPa to 480 kPa), and would not exceed the maximum 552 kPa.

3.2.3 Water Demand Calculations

A summary of preliminary water demands for the FSR study area is presented in ***Table 4.1.*** A 10% contingency was added to demands in the boundary condition request to account for any future minor changes to the development concept plan. There are 123 townhomes proposed in the current concept plan, so the anticipated residential demands will be lower than contemplated in the following table.

Table 4.1: Summary of Water Demands

Dwelling Type	Number of Units	**Population**		**Demand** (L/cap/day)	**Avg Day** (L/s)	**Max Day** 2.5 x Avg Day (L/s)	**Peak Hour** 2.2 x Max Day (L/s)	**Min Hour** 0.5 x Avg Day (L/s)
		Persons per unit	Population per dwelling type					
Townhomes	123	2.7	333	280	1.08	2.70	5.94	0.54
Mixed-Use Density Block (Residential)	150	1.8	270	280	0.88	2.20	4.84	0.44
	Area (ha)			**Demand** (L/ha/day)	**Avg Day** (L/s)	**Max Day** 1.5 x Avg Day (L/s)	**Peak Hour** 1.8 x Max Day (L/s)	**Min Hour** 0.5 x Avg Day (L/s)
Mixed-Use Density Block (Commercial)	0.75			28,000	0.24	0.36	0.65	0.12
Total +10% Contingency					2.42	5.79	12.57	1.21

3.3 Water Supply Conclusion

The subject site will be serviced internally by 200 mm watermains, which will be looped to the existing 200 mm diameter watermains on the Walkway Block to Aquarium Avenue and on Sculpin Street, both within Avalon Encore, Stage 6. The proposed Mixed-Use Density block will be serviced by connecting to the existing 400 mm watermain on Brian Coburn Boulevard. A 400 mm diameter watermain is also available on Mer Bleue Road; however, there is currently not a proposal to connect to that watermain and requirements will be further assessed at detailed design.

The subject site was accounted for in the design of Avalon Encore, Stage 6; however, water demands have been lowered since the publication of the ***Stage 6 Design Brief*** due to the release of updated sanitary design guidelines in ISDTB-2018-02 (March 21, 2018).

A detailed hydraulic analysis will be completed to confirm that the proposed water network can deliver all domestic and fire flows as per the Ministry of the Environment, Conservation and Parks, City of Ottawa and Fire Underwriters criteria. The proposed water supply network has been designed in accordance with City of Ottawa standards.

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The proposed sanitary outlet for the FSR study area is the existing sanitary sewers within Minto's Avalon Development, to the Tenth Line Road Pump Station. The existing sewers adjacent to the development are as follows:

- Existing 200 mm diameter sanitary sewer at 0.32% at Walkway to Aquarium Avenue; and
- Existing 200 mm diameter sanitary sewer at 0.35% at Sculpin Street.

The Record Drawings for these existing sewers are enclosed in ***Appendix B***.

4.2 Wastewater Design

The sanitary flows from the subject site were accounted for in the Avalon Encore Stage 6 design. Enclosed in ***Appendix D*** are the Sanitary Drainage Area Plan and corresponding sanitary design sheet from the ***Stage 6 Design Brief***.

The allowable sanitary flows in this design were based on the following:

Walkway Block to Aquarium Avenue @ Existing MH 6059

- 2.20 ha
- Equivalent Population = 314
- Peak Factor = 1.5
- Peak Flow = 1.91 L/s
- Extraneous Flow = 0.62 L/s
- Total Peak Flow = 2.52 L/s

Sculpin Street @ Existing MH 6108*

- 1.96 ha
- Equivalent Population = 280
- Peak Factor = 1.5
- Peak Flow = 1.70 L/s
- Extraneous Flow = 0.55 L/s
- Total Peak Flow = 2.25 L/s

*Note that the sanitary design sheet does not match the sanitary drainage plan from the ***Stage 6 Design Brief***; however, the sanitary drainage plan numbers were used for the comparison to be conservative for allowable flows.

The subject site will be designed with 200 mm diameter sanitary sewers throughout. The proposed sanitary sewer layout and drainage areas are depicted on ***Figure 5 – Sanitary Servicing Plan***.

Table 5 summarizes the ***City Standards*** which have been used in the design of the proposed wastewater sewer system.

Table 5: Wastewater Design Criteria

Design Parameter	Value
Medium Density Residential	2.7 p/unit
Peak Wastewater Generation per Person	280 L/p/d
Peaking Factor Applied	Harmon's Equation (2.0 min, 4.0 max)
Harmon – Correction Factor	0.80
Commercial / Institutional Flows	28,000 L/ha/day
Commercial / Institutional Peak Factor	1.0 (ICI in contributing area is < 20%)
Infiltration and Inflow Allowance	0.33 L/s/ha
Park Peaking Factor	1.5
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} A R^{2/3} S^{1/2}$
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
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines (October 2012) and ISTB-2018-01 (March 21, 2018)	

The sanitary design sheets for the subject side area are enclosed in ***Appendix D***.

Applying the criteria in Table 5, the peak sanitary flow from the subject site to the Walkway Block at Aquarium Avenue is 5.40 L/s. The peak sanitary flow from the subject site to Sculpin Street is 2.98 L/s. These flows are slightly higher than the flows that were designed for in the Avalon Encore Stage 6 design. Capacity in the downstream sewers was reviewed to confirm that there is sufficient capacity. It should again be noted that the downstream system was designed with old design guidelines and the entire network can be updated to reflect the current guidelines and free up capacity.

4.3 Sanitary Hydraulic Grade Line (HGL)

The sanitary emergency overflow structure is located within the City of Ottawa unopened road allowance near the sanitary pump station on Tenth Line Road. As noted in the ***Stage 6 Design Brief***, the sanitary HGL was calculated in conjunction with previous reports, to confirm that the minimum 0.30 m freeboard was provided throughout the proposed and existing developments. The resulting sanitary HGL elevations for the proposed outlets are shown on the Record Drawings, enclosed in ***Appendix B***. The design for the subject site has regard for the sanitary HGL, providing 0.30 m freeboard throughout the proposed development.

4.4 Wastewater Servicing Conclusion

The subject site discharges sanitary flows at two locations within Avalon Encore Stage 6: a Walkway Block to Aquarium Avenue and to Sculpin Street. The adjacent site was designed to convey flows from the subject site. Since the time of publication of the Stage 6 Design Brief, the sanitary design guidelines have been updated to reflect ISTB-2018-01 (March 21, 2018).

Although the peak flows from the proposed site are slightly greater than the flows that were considered in the adjacent design, it has been confirmed that there is sufficient residual capacity in the existing downstream system.

The design has regard for the sanitary HGL, providing 0.30 m freeboard throughout the proposed development.

The sanitary sewers have been designed in accordance with City of Ottawa standards.

5.0 STORMWATER CONVEYANCE

5.1 Existing Conditions

The subject site generally consists of agricultural land surrounded by existing roads (Mer Bleue Road, Brian Coburn Boulevard) and existing development (Avalon Encore).

The study area is generally flat with existing elevations ranging from 87.0 m to 88.0 m.

Based on a ***Geotechnical Investigation, PG5521-1, Revision 1*** by Paterson Group dated March 10, 2021, the subsurface conditions consist of topsoil layer underlain by a deep deposit of silty clay. A hard to stiff brown silty clay crust was observed within the upper 2.7 m to 3.0 m below the ground surface. The weathered silty clay crust was observed to be underlain by a firm to stiff layer of unweathered grey silty clay. The permissible grade raise restrictions are between 88.6 m to 89.2 m for the proposed development.

There are existing storm sewers within Avalon Encore Stage 6 for the site to discharge to, as follows:

- Existing 975 mm diameter storm sewer at the Walkway to Aquarium Avenue
- Existing 975 mm diameter storm sewer on Sculpin Street

5.2 Proposed Stormwater Management Strategy

The subject site is tributary to the existing Avalon West (N5) SWM Facility, south of Avalon Encore Stage 5, which will control both the quantity and quality of the stormwater from the subject site before discharging to McKinnon's Creek to the south. The following provides a brief history for the Avalon West (N5) SWM Facility:

- Originally designed for quality and quantity control, in accordance with the October 2013 ***Avalon West (Neighbourhood 5) Stormwater Management Facility Design*** report by IBI Group.
- Later revised to accommodate Mattamy's Summerside West Phases 1, 2 and 3 with the November 2014 ***Update to Avalon West Stormwater Management Facility Design Report: Proposed Mattamy Bisson Lands*** memo by IBI Group and subsequent SWM Reports for Summerside West Phases 1-3.
- An interim expansion of the existing SWM Facility was proposed to accommodate Summerside South phase 1 prior to any improvements to downstream McKinnon's Creek, as detailed in the June 2019 ***Design Brief for Interim Expansion of the Avalon West Stormwater Management Pond for the Summerside South Phase 1 Subdivision*** by DSEL and JFSA.
- The adjacent Avalon Encore Stage 6 has designed and approved with capacity for the subject site. As described in the ***Stage 6 Design Brief***, Avalon Encore Stage

6, including the subject site, falls within the western trunk watershed, which conveys its runoff to the Avalon West (N5) SWM Facility.

5.3 Post-Development Stormwater Management Targets

Stormwater management requirements for the stormwater management scheme have been adopted from the documents noted above, ***City Standards***, and the ***MECP SWMP Manual***.

The following specific standards are expected to be required for stormwater management within the subject property:

- Quality control is not required on site and will be provided through the existing Avalon West (N5) SWM Facility.
- Storm sewers on local roads are to be designed to provide at least a 2-year level of service without any ponding per the City's latest Technical Bulletin PIEDTB-2016-01 using a time of concentration of 10 minutes.
- Inflow rate into the minor system shall be limited to 220 L/s/ha.
- For less frequent storms, the minor system sewer capture will be restricted with the use of inlet control devices to prevent excessive hydraulic surcharges.
- Under full flow conditions, the allowable velocity in storm sewers is to be no less than 0.80 m/s. The preferred maximum velocity is 3.0 m/s, with an allowance of up to 6.0 m/s on an exceptional basis only.
- For the 100-year storm and for all 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.
- The major system shall be designed with sufficient capacity to allow the excess runoff of a 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, must remain below all building openings during the stress test event (100-year + 20%), and must maintain 15 cm vertical clearance between spill elevation on the street and the ground elevation at the nearest building envelope.
- When catch basins are installed in rear yards, safe overland flow routes are to be provided to allow the release of excess flows from such areas. A minimum of 30 cm of vertical clearance is required between the rear yard spill elevation and the ground elevation at the adjacent building envelope.
- The product of the maximum flow depths on streets and maximum flow velocity must be less than 0.60 m^2/s on all roads.

5.3.1 Quality Control Targets

An Enhanced Level of Protection (80% total suspended solids removal) per MECP guidelines will be achieved in the Avalon West (N5) SWM Facility.

5.3.2 Quantity Control Targets

Quantity control treatment will be provided in the Avalon West (N5) SWM Facility, which was designed to include the tributary area of the subject site. The SWM Facility has been designed with sufficient storage to match pre-development flows on key points C and E on downstream McKinnon's Creek for the 2, 5, and 100-year 24-hour SCS Type ii storms.

5.4 Proposed Minor System

The subject site will be serviced by a conventional storm sewer system designed in accordance with City of Ottawa standards that is to generally follow the local road network and proposed servicing easements. There are two proposed storm outlets for the subject site, with both tributary to the Western Trunk Sewer, which flows to the existing Avalon West (N5) SWM Facility.

The proposed storm sewers are depicted on ***Figure 4 – Storm Servicing Plan***.

Street catch basins located within low points will collect drainage from the streets and front yards, while rear yard catch basins will capture drainage from backyards. Perforated catch basin leads will be provided in rear yards, except the last segment where it connects to the right-of-way which will be solid pipe, per current City standards. The location of catch basins and low points will be determined through the detailed grading design for the development.

The preliminary rational method design of the minor system captures drainage for storm events up to the 2-year event for local roads, with minor system capture limited to the 5-year event for the Mixed-Use Density Block. Inlet control devices (ICDs) will be used in catch basins within the subject property to limit the flows accordingly.

Table 6 summarizes the standards that will be employed in the detailed design of the storm sewer network.

Table 6: Storm Sewer Design Criteria

Design Parameter	Value
Minor System Design Return Period	1:2 year (PIEDTB-2016-01) for local roads, without ponding
Minor System Capture for Mixed-Use Density Block	1:5 year
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	$i = \frac{A}{(t_c + B)^C}$
Initial Time of Concentration	10 minutes
Rational Method	$Q = CiA$
Minor System Inflow Rate per Avalon Encore Stage 6 Design	220 L/s/ha
Runoff coefficient for paved and roof areas	0.9
Runoff coefficient for landscaped areas	0.2
Storm sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} A R^{2/3} S^{1/2}$
Minimum Sewer Size	250 mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.0 m from crown of sewer to grade
Minimum Full Flowing Velocity	0.8 m/s
Maximum Full Flowing Velocity	3.0 m/s
Extracted from Sections 5 and 6 of the City of Ottawa Sewer Design Guidelines (October 2012) and PIEDTB-2016-01 (September 6, 2016)	

The paved area and grassed area runoff coefficients of 0.9 and 0.2, respectively, were used to calculate average runoff coefficients that were applied across the site.

The storm drainage area plans and design sheets for the Avalon Encore Stage 6 design are enclosed in ***Appendix E***. Based on the Atrel design, the following has been provided for the subject site:

<u>Walkway Block at Aquarium Avenue @ Existing MH 6559</u>

- 2.20 ha
- Runoff Coefficient = 0.80
- Time of Concentration = 15 minutes
- Peak Flow (5-Year Intensity) = 408.84 L/s

<u>Sculpin Street @ Existing MH 6608</u>

- 1.96 ha
- Runoff Coefficient = 0.80
- Time of Concentration = 15 minutes
- Peak Flow (5-Year Intensity) = 456.46 L/s

The storm design sheets for the subject site are enclosed in ***Appendix E***. The peak flows based on the Rational Method is 309 L/s and 256 L/s at the Walkway Block and Sculpin Street, respectively. This confirms that there's sufficient capacity in the downstream storm sewer system.

Inlet control devices (ICDs) will be employed to ensure that storm flows entering the minor system are limited to the appropriate peak storm flow. At the time of detailed design, a hydraulic grade line (HGL) analysis will be completed and underside of footing elevations will be set at a minimum of 0.30 m above the HGL elevation.

5.5 Hydraulic Grade Line Analysis

Preliminary hydraulic gradeline calculations for the proposed storm sewer within the subject site were performed using spreadsheet calculations. Refer to the ***2275 Mer Bleue Road / Preliminary Stormwater Management Design*** memo by JFSA dated March 26, 2021, enclosed in Appendix E. As presented in the memo, a 0.30 m freeboard is provided between the 100-year hydraulic gradeline and the estimated underside of footing elevations throughout the subject site.

5.6 Proposed Major System

Major system conveyance, or overland flow (OLF), will be provided to accommodate flows in excess of the minor system capacity. OLF is accommodated by generally storing stormwater up to the 100-year design event in road sags then routing additional surface flow along the road network towards the proposed outlets, as shown on ***Figure 3 – Concept Grading Plan.*** The 100-year flows on the Mixed-Use Density Block will be required to be controlled on site.

5.7 Stormwater Conclusions

The storm outlet for the subject site is the Avalon West (N5) SWM Facility, which treats the flows for quantity and quality control before discharging to McKinnon's Creek. The adjacent Avalon Encore Stage 6 was designed with capacity for the subject site and will convey flows to the SWM Facility via the Western Trunk.

The minor system inflow rate shall be limited to the 220 L/s/ha with a time of concentration of 10 minutes. The two outlets are located at the Walkway Block to Aquarium Avenue and at Sculpin Street. Both outlets were designed to convey a larger flow than was generated by the current design. As such, there is sufficient capacity in the downstream storm system. A preliminary hydraulic grade line analysis has been completed to confirm that 0.30 m freeboard between the estimated underside of footing elevations and the 100-year hydraulic gradeline is provided throughout the subject site.
The minor system is designed to capture the 2-year event for local roads and minor system capture for the mixed-use density block to be limited to the 5-year event.

Major system conveyance will be provided to accommodate flows in excess of the minor system capacity, generally accommodated by generally storing stormwater up to the 100-year design event in road sags, then routing additional surface flow along the road network to the proposed outlets.

The storm sewers have been designed in accordance with the City of Ottawa and MECP standards.

6.0 SITE GRADING

6.1 Master Grading

The subject site is constrained by grade raise restrictions, downstream infrastructure and existing grades on surrounding properties and roads.

The site is subject to grade raise restrictions between 88.6 m to 89.2 m based on the information provided in the ***Geotechnical Investigation*** by Paterson Group, dated March 10, 2021.

Proposed grades for the site have been designed to be as low as possible based on grade raise restrictions, servicing constraints and existing surrounding properties. Refer to ***Figure 3 – Grading Plan*** for proposed centerline of road grades.

Detailed grading plans will be forwarded to the geotechnical consultant for review and recommendations at the time of detailed design. Final signoff for detailed grading plans will be provided by the Geotechnical Engineer.

6.2 Grading Criteria

The following grading criteria and guidelines will be applied at the time of detailed design as per City of Ottawa Guidelines:

- Driveway slopes will have a maximum slope of 6%;
- Grading in grassed / landscaped areas to range from 2% to 3:1, with terracing required for flops larger than 7%;
- Swales are to be 0.15 m deep with 3:1 side slopes unless otherwise indicated on the drawings;
- Perforated pipe will be required for drainage swales if they are less than 1.5% in slope; and
- Swales are to be 0.15 m deep with 3:1 side slopes unless otherwise indicated on the drawings.

7.0 EROSION AND SEDIMENT CONTROL

Soil erosion occurs naturally and is a function of soil type, climate and topography. The extent of erosions losses is exaggerated during construction where the vegetation has been removed and the top layer of soil is disturbed.

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

The following recommendations to the contractor will be included in contract documents:

- Limit extent of exposed soils at any given time.
- Re-vegetate exposed areas as soon as possible.
- Minimize the area to be cleared and grubbed.
- Protect exposed slopes with plastic or synthetic mulches.
- Install silt fence to prevent sediment from entering existing ditches.
- No refueling or cleaning of equipment near existing watercourses.
- Provide sediment traps and basins during dewatering.
- Install filter cloth between catch basins and frames.
- Installation of mud mats at construction accesses.
- Construction of temporary sedimentation ponds to treat water prior to outletting to existing wetlands and watercourses.
- Plan construction at proper time to avoid flooding.

Refer to ***Figure 7 – Erosion and Sediment Control Plan***, to be updated and detailed with detailed design and prior to construction.

8.0 CONCLUSION AND RECOMMENDATIONS

A summary of the Functional Servicing Report for 2275 Mer Bleue Road is as follows:

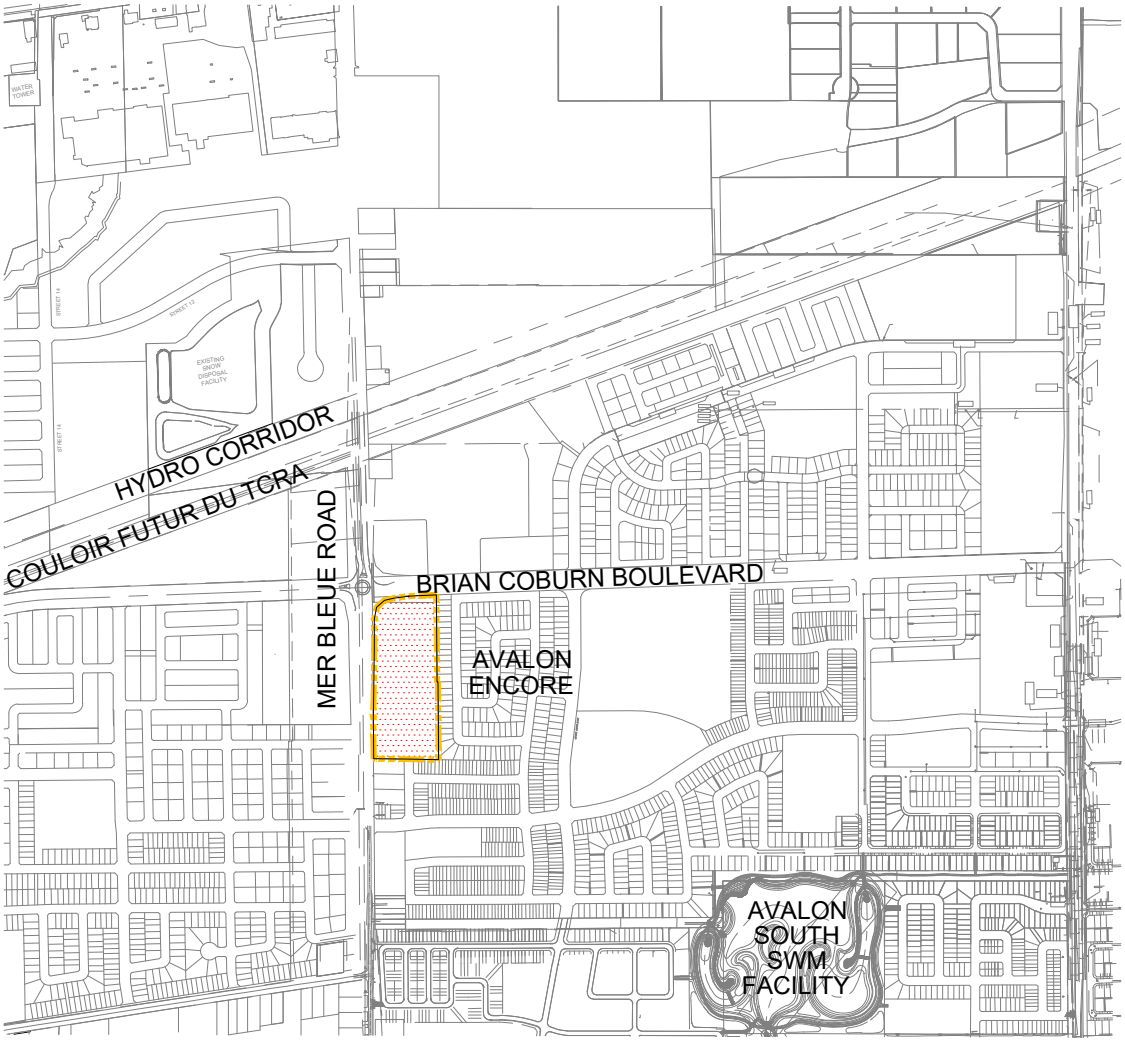
- Approvals will be required from the City of Ottawa and MECP.
- The adjacent Minto Avalon Encore Subdivision was designed with capacity for the subject site, which is now proposed as residential and a mixed-use block (residential mid-rise with main floor commercial).
- Water supply is provided by connections to existing 200 mm watermains via an existing Walkway Block to Aquarium Avenue and via Sculpin Street. The mixed-use density block is proposed to connect to the 400 mm diameter to Brian Coburn Boulevard. There is also a 400 mm diameter watermain on Mer Bleue Road; however, direct connections from the subject site are not proposed and requirements will be assessed at detailed design.
- A detailed hydraulic analysis will be completed to confirm that the proposed water network can deliver all domestic and fire flows as per the MECP, City of Ottawa and FUS criteria. It is expected that adequate water supply will be available for the subject site based on the robust existing watermain system surrounding it.
- Sanitary flows are proposed to discharge at two locations within Avalon Encore Stage 6 – to the Walkway Block to Aquarium Avenue and to Sculpin Street. The adjacent site was designed to convey flows from the subject site.
- Since the design for the adjacent site was completed, the City of Ottawa has updated their design guidelines per ISTB-2018-01 (March 21, 2018). Even with the new guidelines implemented, the peak sanitary flows are higher than designed for. Reviewing the downstream design sheets, it is confirmed that there is sufficient residual capacity in the downstream infrastructure.
- The design has regard for the 100-year emergency HGL from the Tenth Line Pump Station overflow. The design will provide 0.30 m freeboard from the sanitary HGL.
- The storm outlet for the subject site is the Avalon West (N5) SWM Facility, which treats the flows for quantity and quality control before discharging to McKinnon's Creek. The adjacent Avalon Encore Stage 6 was designed with capacity for the subject site and will convey flows to the SWM Facility via the Western Trunk.
- The minor system inflow rate shall be limited to the 220 L/s/ha with a time of concentration of 10 minutes. The two outlets are located at the Walkway Block to Aquarium Avenue and at Sculpin Street. Both outlets were designed to convey a larger flow than was generated by the current design. As such, there is sufficient capacity in the downstream storm system.
- The minor system is designed to capture the 2-year event for local roads and minor system capture for the mixed-use density block to be limited to the 5-year event.

- A preliminary HGL analysis has been completed to confirm that the underside of footing elevations are provided with 0.30 m freeboard from the 100-year HGL elevation.
- Major system conveyance will be provided to accommodate flows in excess of the minor system capacity, generally accommodated by generally storing stormwater up to the 100-year design event in road sags, then routing additional surface flow along the road network to the proposed outlets.
- The site is subject to a grade raise restriction of 1.5 to 1.7 m. Detailed grading plans will be reviewed by a geotechnical engineer and recommendations will be made, as required.
- Erosion and sediment control measures will be implemented and maintained throughout construction. Adjacent properties and watercourses will be protected from any negative impacts from construction.
- The design for 2275 Mer Bleue Road will be completed in general conformance with the City of Ottawa and MECP Design Guidelines and criteria presented in other background study documents.

Prepared by,
David Schaeffer Engineering Ltd.

Per: Kevin L Murphy, P.Eng.

2021-06-09_mer_bleue_fsr_3rd_submission.docx



LEGEND

SITE BOUNDARY

2275 MER BLEUE ROAD	SITE LOCATION	DATE: JUNE 2021
		SCALE: 1:15000
david schaeffer engineering ltd	120 Iber Road, Unit 203 Stittsville, ON K2S 1E9 TEL: (613) 836-0856 FAX: (613) 836-7183 www.DSEL.ca	PROJECT No.: 20-1214
		FIGURE: 1

david schaeffer engineering ltd

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

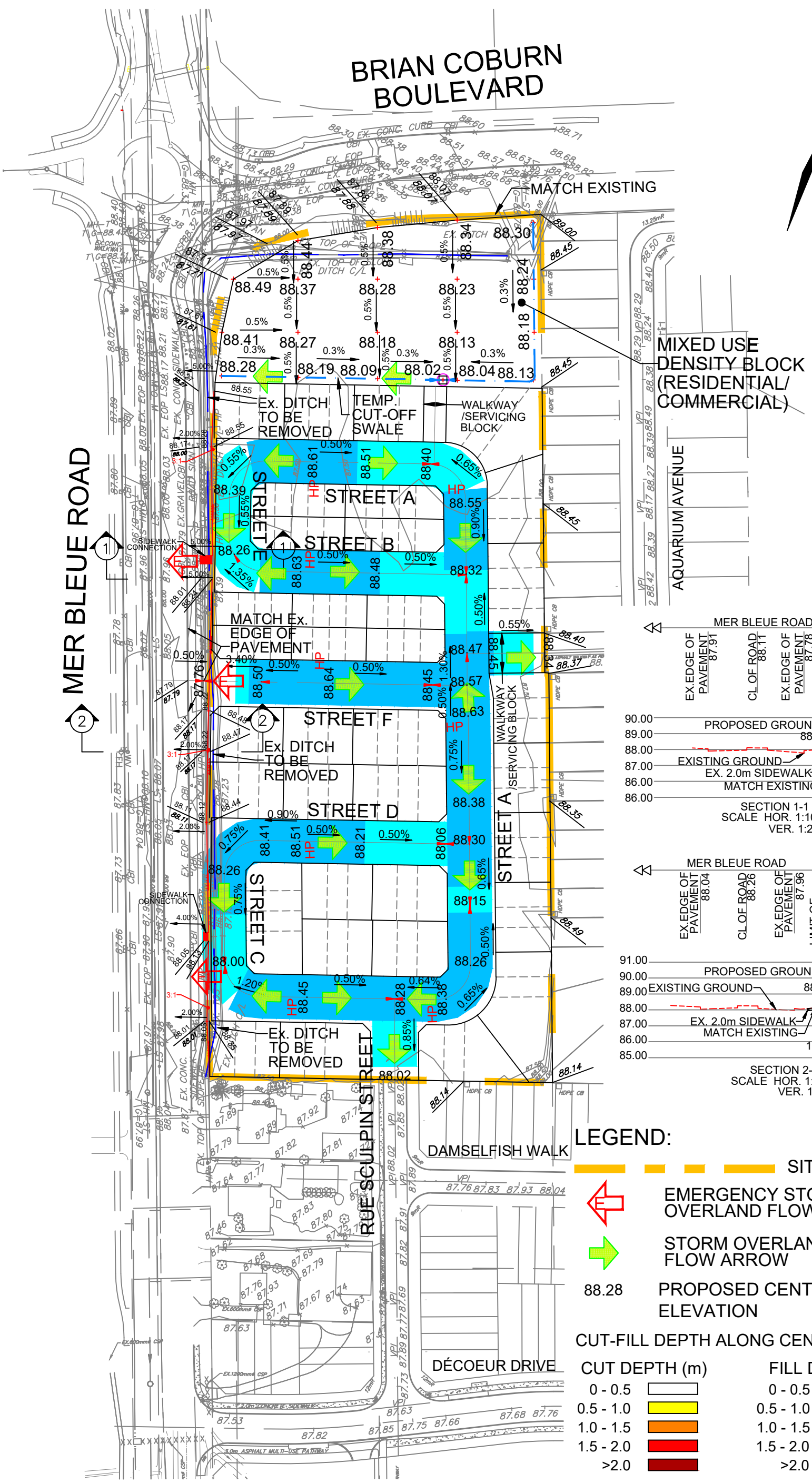
DRAFT PLAN
2275 MER BLEUE ROAD

DATE: JUNE 2021

SCALE: 1:1500

PROJECT No.: 20-1214

FIGURE: 2



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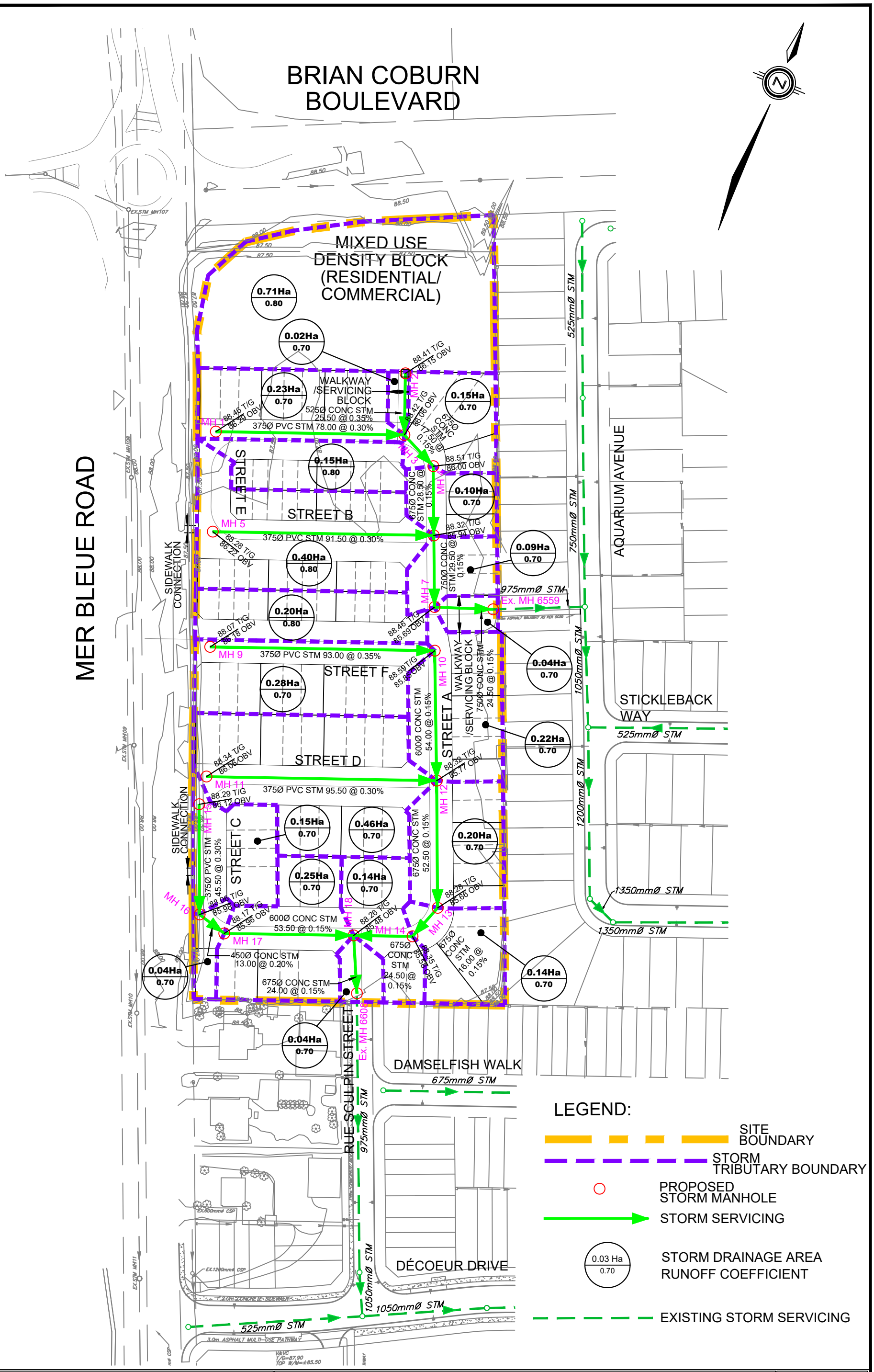
120 Iber Road, Unit 103
Stittsville, ON K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

CONCEPT GRADING PLAN
2275 MER BLEUE ROAD

DATE: JUNE 2021
SCALE: 1:1500
PROJECT No.: 20-1214
FIGURE: 3



david schaeffer engineering ltd

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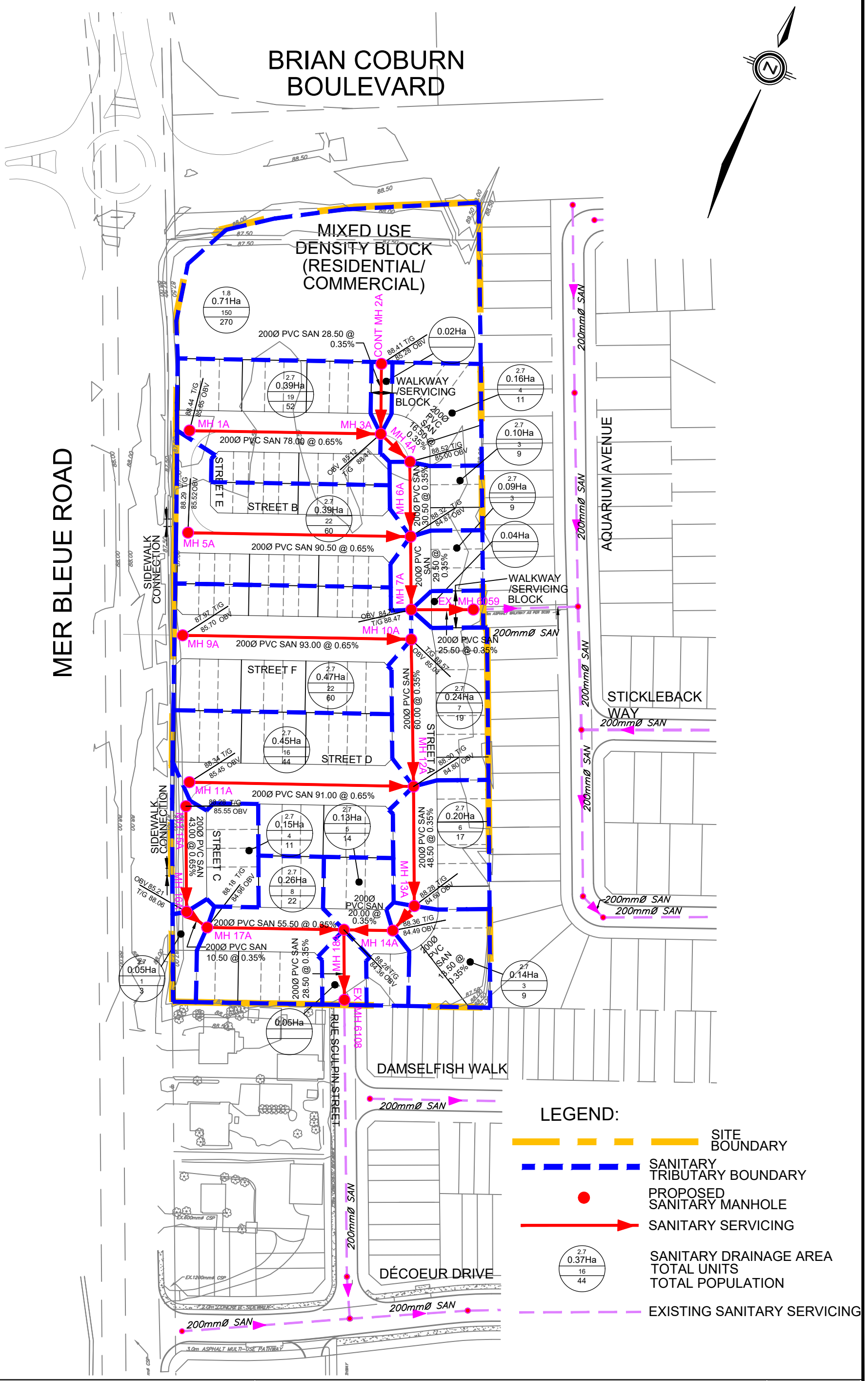
Stittsville, ON K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

STORM SERVICING PLAN
2275 MER BLEUE ROAD

DATE: JUNE 2021
SCALE: 1:1500
PROJECT No.: 20-1214
FIGURE: 4



david schaeffer engineering ltd

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

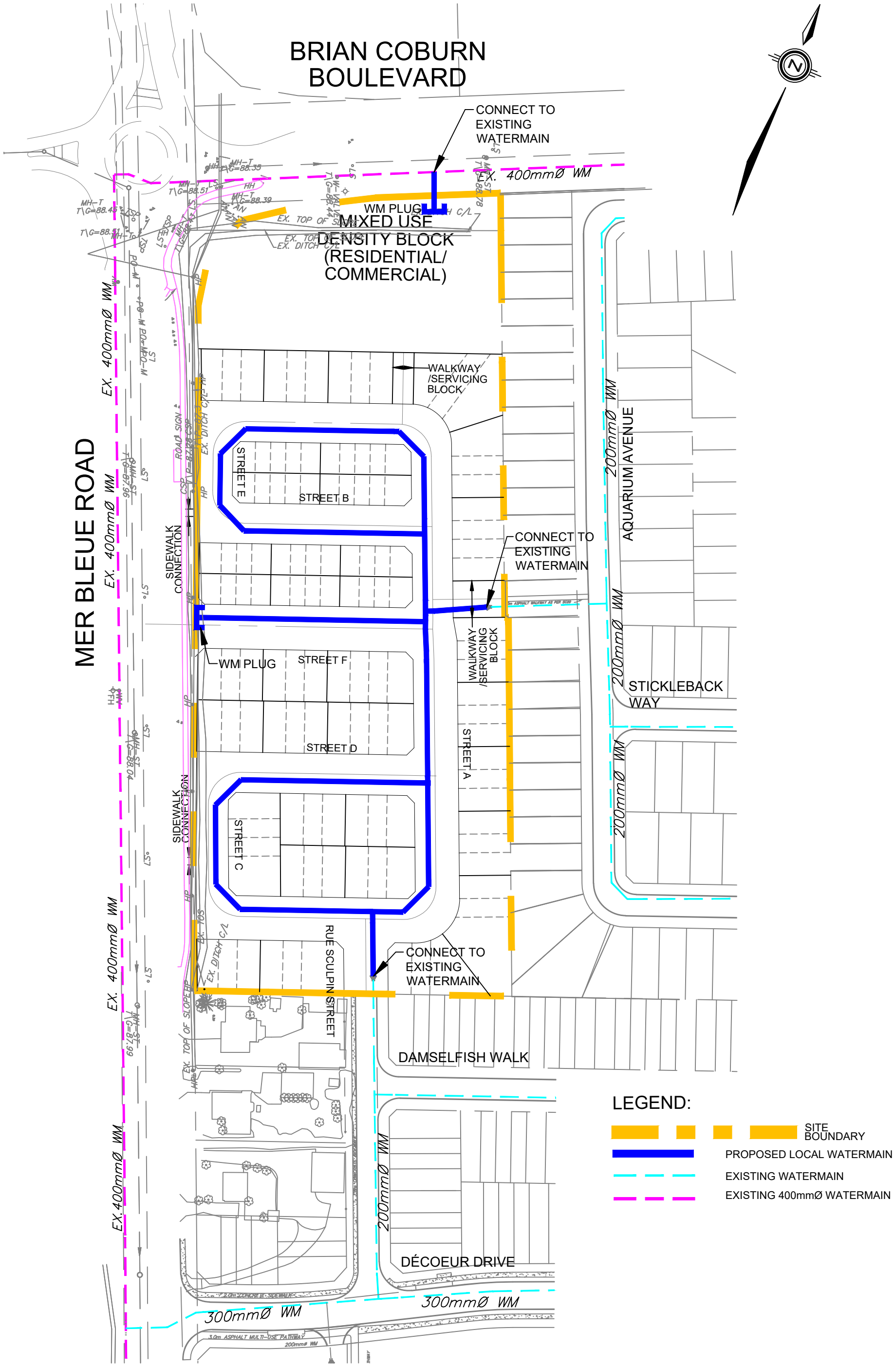
SANITARY SERVICING PLAN
2275 MER BLEUE ROAD

DATE: JUNE 2021

SCALE: 1:1500

PROJECT No.: 20-1214

FIGURE: 5



david schaeffer engineering ltd

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

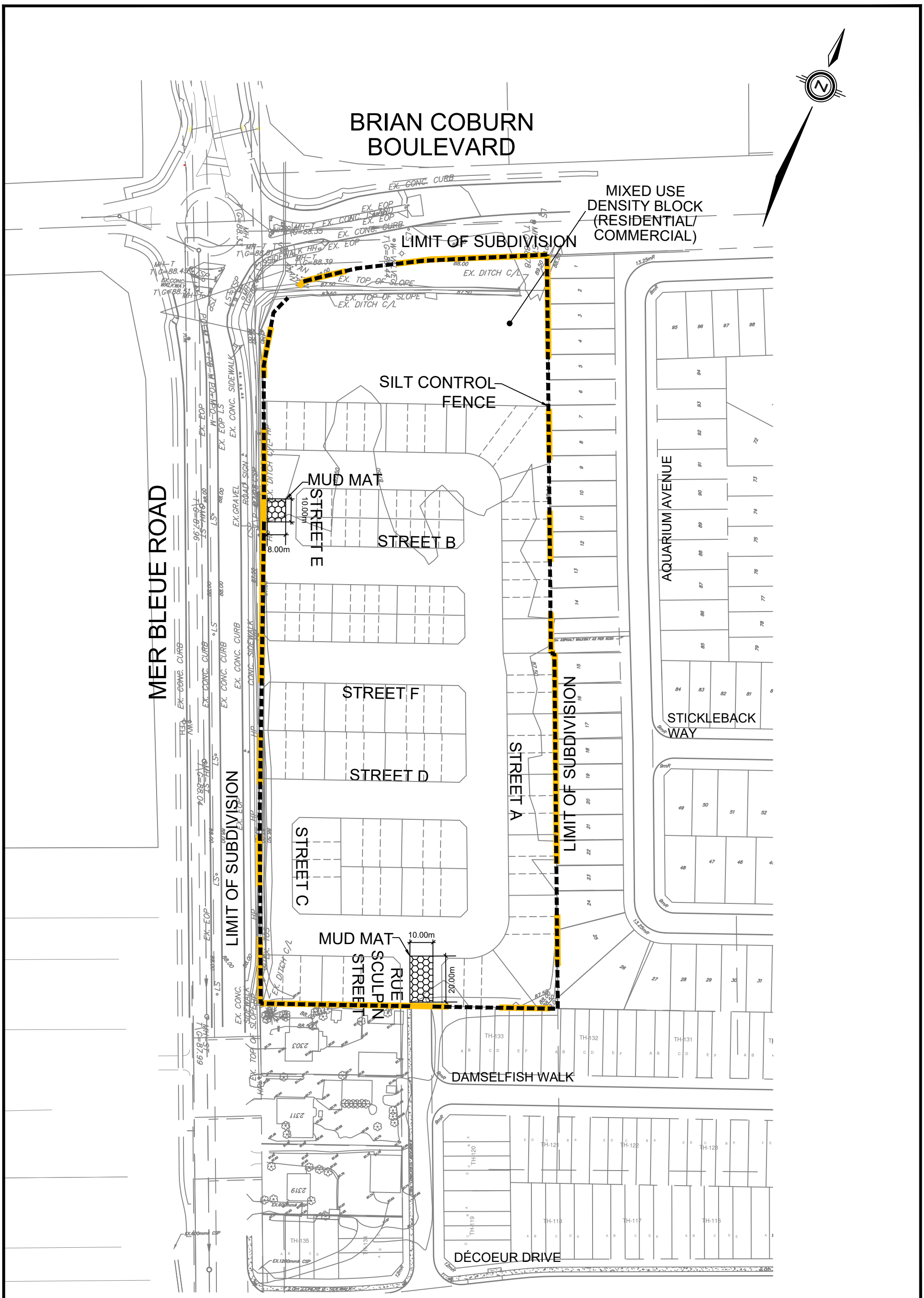
WATERMAIN SERVICING PLAN
2275 MER BLEUE ROAD

DATE: JUNE 2021

SCALE: 1:1500

PROJECT No.: 20-1214

FIGURE: 6



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Fax. (613) 836-7183
www.DSEL.ca

EROSION AND SEDIMENT CONTROL PLAN
2275 MER BLEUE ROAD

DATE: JUNE 2021

SCALE: 1:1500

PROJECT No.: 20-1214

FIGURE: 7

APPENDIX A

Pre-Consultation and Existing Approvals

7 - PRE-CONSULTATION MINUTES by City of Ottawa (September 30, 2020)

Anton Udaltsov

From: Belan, Steve <Steve.Belan@ottawa.ca>
Sent: September 30, 2020 5:41 PM
To: Hugo Lalonde; Julie Carrara
Cc: Steve Pichette; Mark Crockford; Andrew Harte
Subject: Pre-con Follow-up - 2275 Mer Bleue
Attachments: Mer Bleue 2275_UD Comments PRE1.docx; Pre-con comments_MerBleue.docx; AODA Checklist.docx; TIA Screening Form.pdf; 170401-S5.pdf; 170401-S4.pdf; 20-09-18_SK-02_Concept_2063.pdf; tree_sensitive_soil_guide_en.pdf

Hello Hugo

Please refer to the below [and/or attached notes] regarding the Pre-Application Consultation (pre-con) Meeting held on September 22, 2020 for the property at 2275 Mer Bleue Road for Major Rezoning/Subdivision in order to allow the development of subdivision consisting of new public streets with street townhouse unit and back to back units and a future mixed-used development block by Caivan Homes. I have also attached the required Plans & Study List for application submission.

Below [and attached] are staff's preliminary comments based on the information available at the time of pre-con meeting:

Planning

- The area is General Urban Area in the OP and a Commercial and Commercial/Residential in the Mer Bleue Community Design Plan
- After reviewing the Mer Bleue Community Design Plan I don't believe that an amendment to the plan as this proposal dose not change the number of high density residential block, change the location of the road or infrastructure network or remove an identified park.
- Zoning amendment will be necessary to rezone a large segment of the property to Residential uses and re-delineate where the mixed-use area will start.
- Subdivision application to create the public streets and development blocks.
- Applicant must now provide a proposed strategy for public consultation as directed by Bill 73
- Planning has concerns that the northern mixed-use (MU) block is being made too small. The three townhouse blocks abutting the MU block overlaps the existing street access to Mer Bleue. The removal of this access would limit the flexibility to develop the MU block.
- Planning will not support 16.5 m ROW in this new development. 18 metre right of ways are to be designed in.
- Window streets are not a preferred option by the City. Dwelling units facing Mer Bleue with a back lane would be preferred.
- The east assess to Aquarium is only wide enough for a pedestrian link. An equal size block will need to line up with this block on your development.
- Would like a more refined concept of how to develop the MU block I think that medical offices could work with the health hub to the north. Could be developed like the offices along CenterPoint Drive.

Urban Design

- Please refer to the attached comments

Engineering

The attached “Pre-application consultation servicing memo” summarizes engineering design considerations as per our discussion. [Ensure the memo addresses all relevant engineering issues.]

Submission Requirements

1. Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide the following information:

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

3. Required Plans and Reports:
   Submission:

   Draft Plan of Subdivision
   Concept Plan Showing Proposed Land Uses and Landscaping
   Planning Rationale
   Draft Streetscaping Plan
   Archaeological Resource Assessment (to satisfy a condition of draft approval/approval)
   Topographical Plan of Survey with a published bench mark
   Grading & Drainage Plan
   General Plan of Services
   Erosion & Sediment Control Plan
   Composite Utility Plan
   Design Brief and Stormwater Management Report
   Geotechnical Report
   Stationary Noise Study
   TIA
   TCR memo
   Phase 1 ESA
   Phase 2 ESA (if recommended by the Phase 1)

4. Storm Design
   The “Mer Bleue Community Design Plan Infrastructure Servicing Study” and “Avalon West (Neighbourhood 5), Stormwater Management Facility Design Report” prepared by IBI Group recommends that the storm water be conveyed to the existing Storm Water Management (SWM) Basin located south of Neighbourhood 5. N5 SWM Pond.

   Design Constraints
   The main storm drainage design constraints can be summarized as follows:

   Minor System
   i. Storm sewer designed using the rational formula for the 5 year storm using a time of concentration of 10 minutes.
   ii. The inflow rate into the minor system shall be limited to 220 L/s/ha, as per IBI’s report.
   iii. Arterial roads area shall be restricted to a 1:10 year storm and a 10 minute inlet time which represents 238 l/s/ha according to IBI’s report.

   Major System

On street routing and storage area must be provided and illustrated on the grade control plan. This routing must incorporate a maximum 0.35m flow depth on street under either static or dynamic conditions.

Some site Release Rates are currently in place, shown on these plans as 86 L/s via block 231 and Sculpin Street at 76.5 L/s. 162.5 L/s maximum RR.

5. Minimum Drawing and File Requirements- All Plans
Plans are to be submitted on standard A1 size (594mm x 841mm) sheets, utilizing an appropriate Metric scale (1:200, 1:250, 1:300, 1:400, or 1:500).
With all submitted plans provide an individual PDF of the plans unlocked and flattened.
Reports: please provide one complete PDF file of each reports.

*****Note that Mer Bleue and Brian Coburn has no sanitary sewer in available.

Feel free to contact Infrastructure Project Manager, [xx], at [contact information], for follow-up questions.]

Transportation

- Please see the attached comments
- A TIA and Noise Study will be required
- ROW are typically 14.5m for Window streets and 18 m for locals
- The proximity of the access to the roundabout will need further review.

Feel free to contact Transportation Project Manager, [xx], at [contact information], for follow-up questions.

Parkland

- Parkland dedication /Cash-in-lieu of parkland will be based on unit counts and parkland contributions made by the surrounding subdivisions.

Conservation Authority

- The South Nation Conservation Authority will be reviewing the application stormwater quality and quantity criteria.

Other

- Other concerns or notes
- You are encouraged to contact the Ward Councillor, Councillor xx, at [email] about the proposal.

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

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

Please do not hesitate to contact me if you have any questions.

Regards,

Steve Belan

Steve Belan, MCIP, RPP

Planner Planning Services, Development Review Services
Planning, Infrastructure and Economic Development
City of Ottawa / Ville d'Ottawa
110 Laurier Avenue West, 4th Floor / 110, avenue Laurier Ouest, 4e étage
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Telephone / tél.: 613-580-2424 ext./poste 27591
E-mail / courriel: Steve.Belan@ottawa.ca

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09/22/2020

2275 Mer Bleue – City of Ottawa Planner: Steve Belan Urban Design Comments - Pre-consultation

Christopher Moise OAA MRAIC
Architect | Urban Designer
City of Ottawa

Comments

- Please refer to the CDP and provide a rationale to any changes proposed;
- The CDP also has extensive design guidelines associated with all aspects of this proposal so we expect that as the design develops these guidelines will be implemented;
- We can provide additional design review and guidance as more information is provided and the design develops.

This is an exciting project in an area full of potential. We look forward to helping you achieve its goals with the highest level of design resolution. We are happy to assist and answer any questions regarding the above. Good luck.

My pre-consultation notes are as follows:

- Follow Traffic Impact Assessment Guidelines
    - Screening form (attached), Screening form will have to be reviewed by the Transportation Project Manager. After review and if, any trigger is satisfied, TIA will be required.
    - Start this process as soon as possible.
    - Applicant advised that their application will not be deemed complete until the submission of step 1-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).
    - Request base mapping asap if RMA is required. Contact Engineering Services (https://ottawa.ca/en/city-hall/planning-and-development/engineering-services)
- Geometric Road Design (GRD) drawings will be required with the first submission of underground infrastructure and grading drawings. These drawings should include such items as, but is not limited to:
    - Road Signage and Pavement Marking for the subdivision;
    - Intersection control measure at new internal intersections; and
    - Location of depressed curbs and TWSIs;
    - More details can be provided upon request
- Residential streets (local and collector) are to be designed for 30 kph speed limits (posted)
- Ensure the roads are designed in accordance with the traffic calming and collector road guidelines (if applicable).
- Site triangles at the following locations on the final plan will be required:
    - Collector Road to Arterial Road: 5 metre x 5 metres
- Noise Impact Studies required for the following:
    - Road
    - Stationary (if there will be any exposed mechanical equipment due to the proximity to neighbouring noise sensitive land uses)
- On site plan:
    - Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
    - Turning templates will be required for all accesses showing the largest vehicle to access the site; required for internal movements and at all access (entering and exiting and going in both directions).
    - Show all curb radii measurements; ensure that all curb radii are reduced as much as possible
    - Show lane/aisle widths.
    - Sidewalk is (not) to be continuous across access as per City Specification 7.1.
- The City recommends development on private property be in accordance with the City's Accessibility Design Standards (see attached Site Plan Checklist, which summarizes AODA requirements). As the proposed site is commercial/institutional/industrial and for general public use, AODA legislation applies.

- The City recommends development on private property be in accordance with the Accessibility Design Standards (AODA legislation). As the site proposed is residential, it is suggested that the design conforms to the Site Plan Checklist, which summarizes AODA requirements (attached).

1. Accessible Parking Spaces

The terms Type A and Type B Parking Spaces have the same meaning as within O. Reg 191/11

This section applies to:

1) *Parking garages and related structures*
2) *Surface parking*
3) *On-street parking*

Standard Ref.	Requirements	Compliance	Comments
3.1.1.	**Provision:** 1 Type A accessible parking space must be provided where there are 12 or fewer spaces (see Table 3 for a complete list)	Y N N/A	
3.1.2	**Provision:** 4% of the total number of parking spaces should be accessible	Y N N/A	
3.1.2	**Provision:** if the total number of spaces is greater than 1001, provide 11 accessible parking spaces plus an addition 1% of the total number of spaces	Y N N/A	
3.1.3	**Access Aisle:** minimum of 1.5 m (see Figure 25)	Y N N/A	
3.1.3	**Location:** a maximum of 30 m from nearest accessible entrance	Y N N/A	
3.1.3	**Surface:** firm, stable and slip resistant	Y N N/A	
3.1.3	**Running slope:** maximum of 1:50 (2%)	Y N N/A	
3.1.3	**Cross slope:** maximum of 1:50 (2%)	Y N N/A	
3.1.3	**Type A spaces:** Length 5.2 m Width 3.4 m Type B spaces Length: 5.2 m Width: 2.4 m	Y N N/A	
3.1.3	**Overhead clearance:** minimum of 2.1 m	Y N N/A	
3.1.3	**Access Aisle:** minimum of 1.5 m. Must be clearly marked and adjacent to accessible parking space	Y N N/A	
3.1.4.1	**Vertical Signage:** **Width:** 0.3 m **Height:** 0.6 m (minimums)	Y N N/A	

Note – this Checklist must be read in conjunction with the City of Ottawa's Accessible Design Standards Document, 2015. All figures referenced in this document can be found in the City's Accessible Design Standards document.

	Mounted: 1.5 m to 2.0 m high at centre • Marked with International Symbol of Accessibility (see Figure 25)		
3.1.4.2	**Pavement Markings** • Marked with the International Symbol of Accessibility • 15.25 m wide by 15.25 m deep • Locate near the back of the space for 90 degree or angled parking spaces • Locate in the centre for parallel parking spaces (see Figure 27)	Y N N/A	

2. Passenger Loading Zone

Standard Ref.	Requirements	Compliance	Comments
3.2.1	**Location:** maximum of 30 m from nearest accessible entrance	Y N N/A	
3.2.1	**Side Access Aisle** **Length:** 7.4 m **Width:** 2.4 m (minimums) (see Figure 28)	Y N N/A	
3.2.1	**Vertical Clearance:** 3.6 m	Y N N/A	
3.2.1	**Path of Travel:** minimum of 1.8 m wide to nearest accessible entrance	Y N N/A	
3.2.1.1	**Vertical Signage** **Width**: 0.3 m by 0.6 m **Mount:** 1.5 m to 2.0 m high at centre (see Figure 29)	Y N N/A	

Note – this Checklist must be read in conjunction with the City of Ottawa's Accessible Design Standards Document, 2015. All figures referenced in this document can be found in the City's Accessible Design Standards document.

3. Exterior Paths of Travel

Where stairs are located on an accessible Exterior route or walkway, an alternative Accessible route is to be provided immediately adjacent to the stairs

This section applies to:

1) *Pedestrian routes that serve facility entrances*
2) *Pedestrian routes that serve as a connection between a site boundary and entrance into the site*
3) *Public Rights-of-Way*
4) *Ramps and Curb Ramps*

Standard Ref.	Requirements	Compliance	Comments
3.3.1	**Surface:** firm, stable and slip resistant	Y N N/A	
3.3.1	**Lighting**: Provide in accordance with Section 5.7 (Lighting)	Y N N/A	
3.3.2	**Path of travel:** minimum 1.8 m wide	Y N N/A	
3.3.3.1	**Running Slope:** 1:20 (5%) (maximum)	Y N N/A	
3.3.3.2	**Cross Slope:** 1:20 (2%) (maximum) where surface is concrete or asphalt. 1:10 (10%) in all other cases.	Y N N/A	
3.3.1	**Rest Area:** If width is less than 1.8 m, provided every 30 m along path of travel. Rest area to be 1.8 m by 1.8 m (minimums)	Y N N/A	
3.3.4	**Guards:** Provide when change in level is more than 0.6 m	Y N N/A	
2.1.4	**Gratings or Openings:** 13 mm (maximum) wide in direction of travel. Longest side, if rectangular, must be perpendicular with the direction of travel	Y N N/A	

4. Curb Ramps

A curb ramp provides a transition where there is a change in level between exterior path of travel and adjacent vehicular route

This section applies to:

1) *Pedestrian crossings at intersections*
2) *Parking spaces, passenger loading zones and related access aisles*
3) *Any other exterior route where there is a grade change.*

Standard Ref.	Requirements	Compliance	Comments
3.4.1	**Surface:** firm, stable and slip resistant	Y N N/A	
3.4.2	**Clear width:** 1.5 m (minimum), exclusive of flares	Y N N/A	
3.4.3	**Running Slope**: 1:12 (8.33%) (maximum)	Y N N/A	
3.4.3	**Cross Slope:** 1:50 (2%) (maximum) (see Figure 33b)	Y N N/A	
3.4.6	**Tactile Surface Walking Indicators (TWSI):** minimum depth of 610mm, at 150 mm to 200 mm from edge of curb (see 33b)	Y N N/A	
3.4.2.2	**Flared Side:** 1m wide; slope 1:15 to 1:10.	Y N N/A	

Note – this Checklist must be read in conjunction with the City of Ottawa's Accessible Design Standards Document, 2015. All figures referenced in this document can be found in the City's Accessible Design Standards document.

5. Ramps

Ramps are provided when the slope of a path of travel exceeds a gradient of 1:20 (5%)

Refer to the Ontario Building Code for all applied requirements for ramps.

For all ramp standards, see Figure 3

Standard Ref.	Requirements	Compliance	Comments
2.2.1.1	**Running Slope:** 1:15 (6.67%)	Y N N/A	
2.2.1.2	**Cross-Slope:** 1:50 (2%)	Y N N/A	
2.2.1	**Surface:** firm, stable and slip-resistant	Y N N/A	
2.2.1	**Clear Width:** 1.1 m (minimum)	Y N N/A	
2.2.1.4	**Colour Contrasting Strip:** to be provided at slope changes. 50 mm wide colour-contrasted and slip resistant strip equal to the width of the ramp	Y N N/A	
2.2.1	**Lighting:** provide in accordance with Section 5.7 (Lighting)	Y N N/A	
2.2.2	**Length:** 9 m, or less, or provide landing	Y N N/A	
2.2.2	**Landing:** to be provided at top, bottom or intermediate level, or where there is directional change. (see Figure 5)	Y N N/A	
2.2.3.1	**Handrail:** 865 to 965 mm high on both sides. **Clear width**: 1.1 m between handrails (see Figure 8)	Y N N/A	

Note – this Checklist must be read in conjunction with the City of Ottawa's Accessible Design Standards Document, 2015. All figures referenced in this document can be found in the City's Accessible Design Standards document.

6. Stairs

This section applies to stairs provided for exterior or interior environments

Refer to the Ontario Building Code for all applied requirements for stairs.

For all stair standards, see Figure 10

Standard Ref.	Requirements	Compliance	Comments
2.3	**Stairs:** where provided, an alternative accessible route is to be provided immediately adjacent, and may include a ramp or other accessible means of negotiating grade change	Y N N/A	Note which alternative to stairs is provided.
2.3.1	**Surface:** firm, stable and slip-resistant	Y N N/A	
2.3.1.1	**Tread:** 280 mm to 355 mm deep	Y N N/A	
2.3.1.1	**Riser:** 125 mm to 180 mm high	Y N N/A	
2.3.1	**Open Riser:** not permitted	Y N N/A	
2.3.1.2	**Nosing Projection:** 38 mm (maximum) (see Figure 10)	Y N N/A	
2.3.1.2	**Nosing Strip**: 50 mm deep, colour contrasted, at leading edge of tread and extending the full length of the tread	Y N N/A	
2.3.1.3	**Tactile Surface Walking Indicators (TWSI):** minimum of 610 mm deep, one tread back (see Figure 11)	Y N N/A	
2.3.1	**Lighting:** to be provided in accordance with Section 5.7	Y N N/A	
2.3.2.2	**Handrail:** 865 mm to 965 mm high on both sides. (see Figure 12)	Y N N/A	

7. Building Entrance			*This section does not apply* ☐
Standard Ref	Requirements	Compliance	Comments
4.1.1	**Provision:** at least one (1) accessible entrance 50% of the total number of building entrances (see Figure 36)	Y N N/A	
4.1.1	**Provision:** 50% of the total number of building entrances must be accessible (see Figure 36)	Y N N/A	
4.1.1	**Provision:** 30 m or less from nearest accessible parking space, or passenger loading or drop off zones	Y N N/A	

8. Benches and Seats

This section applies to
1) Rest areas and accessible routes
2) Outdoor public use eating areas
3) Waiting areas

Standard Ref	Requirements	Compliance	Comments
2.10.1	Seat height between 450 mm and 500 mm above finished floor (see Figure 23)	Y N N/A	
2.10.1	Seat depth between 330 mm and 510 mm	Y N N/A	
2.10.1	Back support extending 320 mm (minimum) above seat surface	Y N N/A	
2.10.1	Provide at least one (1) armrest at a height between 220 mm and 300 mm from the seat for additional support	Y N N/A	

Note – this Checklist must be read in conjunction with the City of Ottawa's Accessible Design Standards Document, 2015. All figures referenced in this document can be found in the City's Accessible Design Standards document.

City of Ottawa 2017 TIA Guidelines Screening Form

1. Description of Proposed Development

Municipal Address	
Description of Location	
Land Use Classification	
Development Size (units)	
Development Size (m^2)	
Number of Accesses and Locations	
Phase of Development	
Buildout Year	

If available, please attach a sketch of the development or site plan to this form.

2. Trip Generation Trigger

Considering the Development's Land Use type and Size (as filled out in the previous section), please refer to the Trip Generation Trigger checks below.

Land Use Type	Minimum Development Size
Single-family homes	40 units
Townhomes or apartments	90 units
Office	3,500 m^2
Industrial	5,000 m^2
Fast-food restaurant or coffee shop	100 m^2
Destination retail	1,000 m^2
Gas station or convenience market	75 m^2

** If the development has a land use type other than what is presented in the table above, estimates of person-trip generation may be made based on average trip generation characteristics represented in the current edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual.*

If the proposed development size is greater than the sizes identified above, the Trip Generation Trigger is satisfied.

3. Location Triggers

	Yes	No
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?		
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?*		

**DPA and TOD are identified in the City of Ottawa Official Plan (DPA in Section 2.5.1 and Schedules A and B; TOD in Annex 6). See Chapter 4 for a list of City of Ottawa Planning and Engineering documents that support the completion of TIA).*

If any of the above questions were answered with 'Yes,' the Location Trigger is satisfied.

4. Safety Triggers

	Yes	No
Are posted speed limits on a boundary street are 80 km/hr or greater?		
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?		
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)?		
Is the proposed driveway within auxiliary lanes of an intersection?		
Does the proposed driveway make use of an existing median break that serves an existing site?		
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?		
Does the development include a drive-thru facility?		

If any of the above questions were answered with 'Yes,' the Safety Trigger is satisfied.

5. Summary

	Yes	No
Does the development satisfy the Trip Generation Trigger?		
Does the development satisfy the Location Trigger?		
Does the development satisfy the Safety Trigger?		

If none of the triggers are satisfied, the TIA Study is complete. If one or more of the triggers is satisfied, the TIA Study must continue into the next stage (Screening and Scoping).

NOTES:

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2. PROVIDE INSULATION AT CATCHBASINS IN ACCORDANCE WITH CITY OF OTTAWA'S STANDARD DETAIL DRAWING W23.
3. INSTALL ALL SERVICES IN ACCORDANCE WITH CITY OF OTTAWA'S STANDARD DETAIL DRAWINGS R21, W26, W36, W38 AND S11.1.
4. PROVIDE CATHODIC PROTECTION ON WATERMAIN AS PER CITY OF OTTAWA'S STANDARD DETAIL DRAWINGS AND SPECIFICATIONS.
5. RESTRAIN ALL BENDS, TEES, AND CAPS TO CITY OF OTTAWA'S STANDARD DETAIL DRAWINGS AND SPECIFICATIONS.
6. ALL PROPOSED WATER SERVICES AND MAINS MUST HAVE MINIMUM COVER OF 2.4m OTHERWISE PROVIDE THERMAL INSULATION AS PER OSDD W22.
7. ALL SIDEWALKS SHALL BE HANDICAP ACCESSIBLE AND AS PER CITY PF OTTAWA'S STANDARD DETAIL DRAWINGS SC4, SC6 AND SC7.2.
8. ALL CONNECTION TO EXISTING WATERMAIN STUB SHALL BE PERFORM BY THE CITY OF OTTAWA, THE EXCAVATION, BACKFILL AND REINSTATEMENT SHALL BE PERFORM BY THE CONTRACTOR.
9. CONNECT TO EXISTING SANITARY, STORM AND WATERMAIN STUBS.
10. IN AREAS WHERE SERVICE TRENCHES ARE LOCATED WITHIN 3 METRES OF RESIDENTIAL FOUNDATION, SUCH AS REAR YARD CATCHBASIN LEADS, IT WILL BE NECESSARY TO BACKFILL THE PORTION OF THE TRENCH BELOW THE FOUNDATION LEVEL WITH ENGINEERED FILL.
11. FOR THRUST BLOCK DESIGN, ON THE WATERMAIN, A SOIL BEARING CAPACITY OF 20 KPA CAN BE USED (REFER TO 170401-TD1 FOR DESIGN).
12. ALL STORM SEWERS WITH 900mm IN DIAMETER AND GREATER MUST BE BENCHED. ALL SANITARY MANHOLES MUST BE BENCHED. SEWER SHALL HAVE CLASS "B" BEDDING.
13. THE CITY OF OTTAWA WILL NOT PERMIT ANY ENCROACHMENTS ONTO ANY REAR YARD CATCH BASIN LEAD DRAINAGE EASEMENTS.
14. ALL STORM AND SANITARY SERVICES ARE TO BE EQUIPPED WITH A BACKWATER VALVE. AS PER CITY OF OTTAWA'S STANDARD DETAIL DRAWINGS S14 AND S14.2.
15. ALL HYDRANTS ARE TO BE LOCATED AND INSTALLED AS PER CITY OF OTTAWA'S STANDARD DETAIL DRAWINGS W18 AND W19.
16. CONTRACTOR IS TO REPAIR BENCHING TO ALL EXISTING SAN MH PRIOR TO CONNECTIONS.
17. SPECIAL PIPE BEDDING AND COVER IS REQUIRED IN AREAS OF GRAY SILTY CLAY AND SHALL BE INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO BACKFILL.
18. CURBS SHALL BE DEPRESSED AT EVERY ENTRANCE CROSSING AS PER CITY OF OTTAWA'S STANDARD DETAIL DRAWINGS SC1.1 AND SC7.1.
19. PERFORATED PIPE FOR REAR YARD SHALL BE INSTALLED AS PER CITY OF OTTAWA'S STANDARD DETAIL DRAWING S28.
20. ALL MANHOLE COVERS ARE TO HAVE RUBBER PLUGS AS PER CITY OF OTTAWA'S STANDARD DETAIL DRAWINGS S24 AND S24.1.
21. STORM AND SANITARY SERVICE CONNECTIONS MUST BE ABOVE THE SPRING LINE OF THE SEWER MAIN PIPE AS PER CITY OF OTTAWA'S STANDARD DETAIL DRAWING S11.
22. SERVICE CONNECTIONS TO SEWERS OVER 5m DEEP REQUIRE APPROVED CONTROLLED SETTLEMENT JOINTS AS PER CITY OF OTTAWA STANDARD DETAIL DRAWINGS S11 AND S11.1.

LEGEND

- EXISTING DECIDUOUS TREE
- EXISTING TREE LINE
- EXISTING FIRE HYDRANT
- EXISTING VALVE AND VALVE CHAMBER
- EXISTING VALVE AND VALVE BOX
- EXISTING STORM MANHOLE
- EXISTING SANITARY MANHOLE
- EXISTING CATCHBASIN
- EXISTING LIGHT POLE
- EXISTING HYDRO POST
- EXISTING SIGN
- EX. PADMOUNT HYDRO TRANSFORMER
- EXISTING BELL PEDESTAL
- EXISTING CABLE PEDESTAL
- EXISTING STANDARD IRON BAR
- EXISTING WATERMAIN
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- PROPOSED WATERMAIN
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED STORM MANHOLE
- PROPOSED SANITARY MANHOLE
- PROPOSED BEND C/W THRUSTBLOCK (SPECIAL DESIGN)
- PROPOSED CAP C/W THRUSTBLOCK (SPECIAL DESIGN)
- PROPOSED VALVE AND VALVE BOX
- PROPOSED VALVE AND VALVE CHAMBER
- PROPOSED FIRE HYDRANT
- PROPOSED DITCH INLET CATCHBASIN AS PER OPSD 705.030
- PROPOSED HDPE CB AS PER CITY OF OTTAWA'S STANDARD DETAIL DRAWING S30 AND S31.
- PROPOSED WATERTIGHT COVER
- PROPOSED CATCHBASIN
- PROPOSED INSULATION
- T/F=87.38 PROPOSED TOP OF FLANGE ELEVATION
- HOUSE SERVICE
- 9mR CURB RADIUS
- TWSI TACTILE WALKING SURFACE INDICATORS AS PER CITY OF OTTAWA'S STANDARD DETAIL DRAWINGS SC 7.1 AND SC 7.3
- OUTSIDE PROPOSED DEVELOPMENT
- SITE PLAN APPROVAL

ITEM: TOP OF FLANGE – HYDRANT ±150mm ABOVE GROUND LEVEL, ON SOUTH SIDE OF DECOEUR DRIVE. (STATION 1+535) ELEV.=87.88

REVIEWED
By WC at 8:46 am, May 28, 2018

Will Curry

WILL CURRY
PROJECT MANAGER
PLANNING, INFRASTRUCTURE & ECONOMIC DEVELOPMENT DEPARTMENT, CITY OF OTTAWA

AVALON ENCORE STAGE 6 PERMANENT ICD

RR-19 = 83mm DIAMETER ICD, RELEASE RATE OF 19.0 L/S
RR-24 = 94mm DIAMETER ICD, RELEASE RATE OF 24.0 L/S
RR-28 = 102mm DIAMETER ICD, RELEASE RATE OF 28.5 L/S
RR-32 = 108mm DIAMETER ICD, RELEASE RATE OF 32.0 L/S
RR-44 = 127mm DIAMETER ICD, RELEASE RATE OF 44.0 L/S
RR-45 = 127mm DIAMETER ICD, RELEASE RATE OF 45.0 L/S
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AVALON ENCORE STAGE 6 TEMPORARY ICD

DICB 1 – RR-86 = 178mm DIAMETER ICD, RELEASE RATE OF 86.0 L/S
DICB 2 – RR-76.5 = 178mm DIAMETER ICD, RELEASE RATE OF 76.5 L/S
DICB 3 – RR-45 = 127mm DIAMETER ICD, RELEASE RATE OF 45.0 L/S
CBMH 6626 – RR-53 = 127mm DIAMETER ICD, RELEASE RATE OF 53.0 L/S (PLUG TYPE)

OUTSIDE OF PROPOSED DEVELOPMENT ICD

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* REFER TO 170401-TD1 FOR DETAILS
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4	ISSUED FOR CONSTRUCTION	MAY 7/18	AGS
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SCALE 1:500 (5m 0 15m)

DESIGN PLM
CHECKED AGS
DRAWN PNC
CHECKED PLM
APPROVED AGS

LICENSED PROFESSIONAL ENGINEER A. G. Y. SAUVE 100142393 May 17, 2018 PROVINCE OF ONTARIO

ATREL Engineering Ltd.
Engineers - Ingénieurs
1-2884 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4K 1M6
TEL.: (613) 446-7423

CITY OF OTTAWA
EAST URBAN COMMUNITY
AVALON ENCORE STAGE 6

MINTO COMMUNITIES INC.

PLAN
GENERAL PLAN OF SERVICES

CLIENT No. 148
PROJECT No. 170401
DRAWING No. 170401-S5

D07-16-09-0018-STAGE 6

16796

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- EXISTING CONIFEROUS TREE
- EXISTING MANHOLE
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- EXISTING HYDRO POLE
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- 9mR CURB RADIUS
- TWSI TACTILE WALKING SURFACE INDICATORS AS PER CITY OF OTTAWA'S STANDARD DETAIL DRAWINGS SC 7 AND SC 7.3
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- SITE PLAN APPROVAL

TBM: TOP OF FLANGE – HYDRANT ±150mm ABOVE GROUND LEVEL ON SOUTH SIDE OF DECOEUR DRIVE. (STATION 14+330) ELEV=87.88

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RR-286 = 334mm DIAMETER ICD, RELEASE RATE OF 286.0 L/S

* REFER TO 170401-TD1 FOR DETAILS
* ICD SHALL BE WALL MOUNT TYPE EXCEPT IF IDENTIFIED OTHERWISE

REVIEWED
By WC at 8:44 am, May 28, 2018
WILL CURRY
PROGRAM MANAGER
PLANNING, INFRASTRUCTURE & ECONOMIC DEVELOPMENT DEPARTMENT, CITY OF OTTAWA

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.

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5	AS PER CITY COMMENTS	MAY 17/18	AGS

SCALE 1:500 (5m 0 15m)

DESIGN PLM | CHECKED AGS | DRAWN PNC | CHECKED PLM | APPROVED AGS

LICENSED PROFESSIONAL ENGINEER A. G. Y. SAUVE 100142393 May 17, 2018 PROVINCE OF ONTARIO

ATREL Engineering Ltd. Ltée
Engineers - Ingénieurs
1-2884 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4K 1M6
TEL.: (613) 446-7423

CITY OF OTTAWA
EAST URBAN COMMUNITY
AVALON ENCORE STAGE 6

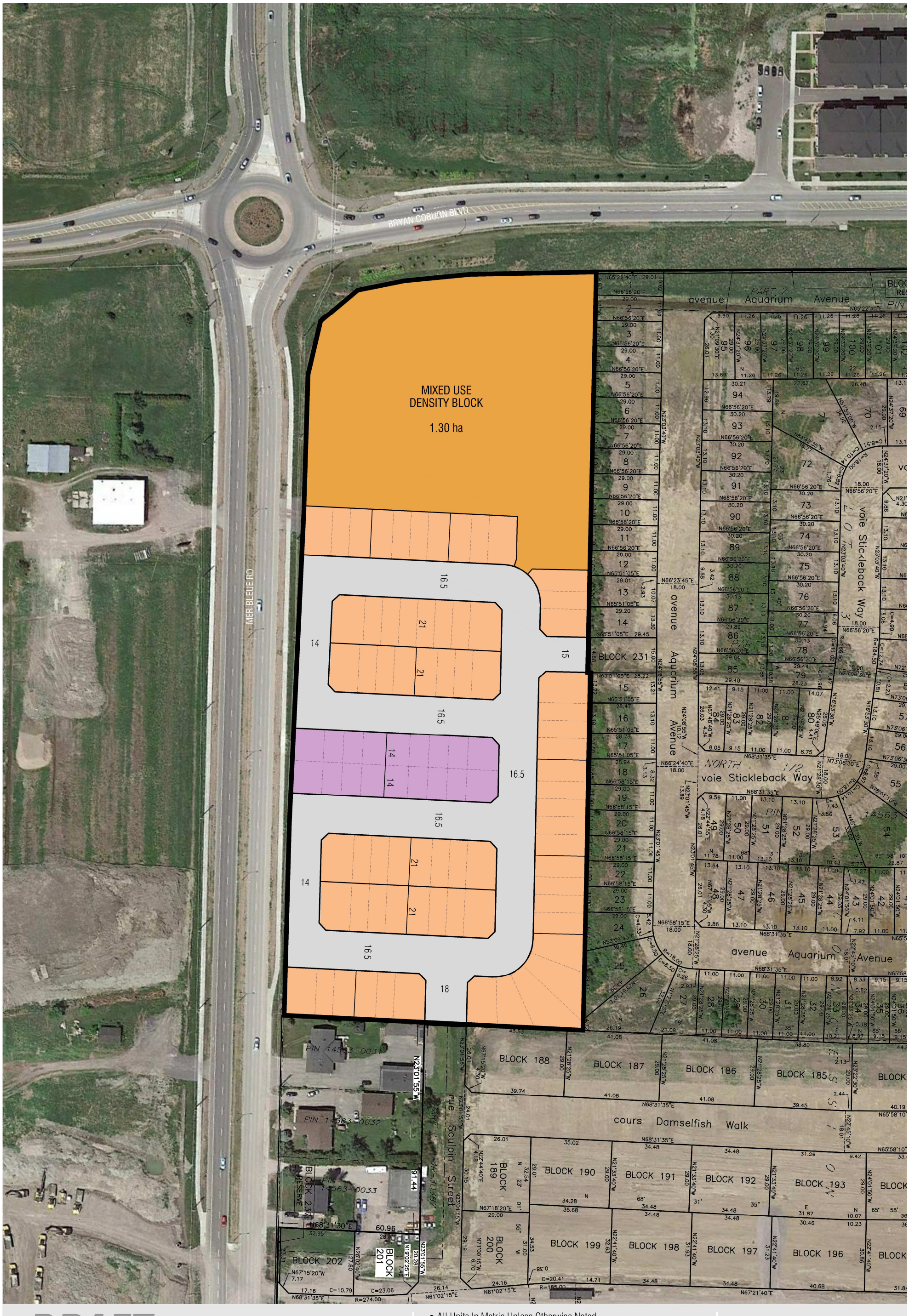
MINTO COMMUNITIES INC.

CLIENT No. 148
PROJECT No. 170401
DRAWING No. 170401-S4

PLAN
GENERAL PLAN OF SERVICES

D07-16-09-0018-STAGE 6

16796



DRAFT

- All Units In Metric Unless Otherwise Noted.
- Base Information Obtained From Various Sources And Is Approximate.
- Schedule / Plan Information Is Conceptual And Requires Verification by Appropriate Agency.
- Aerial Photo: Google Earth, Approx. Spring 2018

GERRARD DESIGN

CAIVAN 2075 MER BLEUE | Ottawa, Ontario

PRELIMINARY LOTTED CONCEPT

SEP 18, 2020

PROJECT 2063

SCALE 1:1500

SK-02

Tree Planting in Sensitive Marine Clay Soils - 2017 Guidelines

Background: Existing Clay Soils Policy

The City of Ottawa's Clay Soils Policy, as it is often referred to by city staff and external stakeholders, is derived from a 2005 report titled Trees and Foundations Strategy in Areas of Sensitive Marine Clay in the City of Ottawa (approved by Planning and Environment Committee on September 27, 2005 and by City Council on October 12, 2005).

This report was mainly focused on the provision of a risk management framework for the assessment and mitigation or possible removal of existing City trees where the trees were identified as a significant contributing factor for foundation damage. One of the six recommendations speaks to the planting of new trees on City property in Sensitive Marine Clay (SMC) soils, which can be used interchangeably with the more technical terminology of Champlain Sea Clay soils – but for the purposes of this report, the term Sensitive Marine Clay soils will be used because of historical continuity with the 2005 report noted above.

This recommendation established that when planting trees on city property where SMC soils are known to exist, the tree must be low water demand and planted at a distance equivalent to the full mature height of the tree from a building foundation or structure. This became the Council direction and policy for all new street tree planting in SMC soils, or simply, the Clay Soils Policy.

The practical result of the implementation of this policy has been many new subdivisions with only four varieties of small ornamental trees (Amur Maple, Serviceberry, Crab Apple and Japanese Lilac, which can be planted at a separation distance of 7.5 meters, their approximate mature height, from a building foundation) and some streets with no trees at all.

The Policy has since been described by some stakeholders as overly onerous, highly risk adverse, and based on inadequate scientific evidence. The results have been undesirable for residents, the Development Industry, and the City of Ottawa, who all wish to see tree-lined streets that contribute to the health and liveability of new communities and to work towards Council's strategic initiative of increasing urban forest cover.

Towards an Improved Clay Soils Policy

In March 2015, Planning Committee approved the report titled Building Better and Smarter Suburbs: Strategic Directions and Action Plan. Two of the Action Plan items in the report specifically dealt with obtaining better geotechnical information on clay soils and using that improved scientific basis to bring flexibility to the existing Clay Soils Policy where warranted. This builds on the early work of the draft Street Tree Manual for Greenfield Neighbourhoods, which demonstrated that improvements to tree planting in greenfield communities could only be accomplished by revising the Clay Soils Policy.

During the spring and summer of 2016, under the direction of the Greater Ottawa Homebuilders Association, a group of companies with expertise in geotechnical engineering, landscape architecture and forestry, including Golder, Paterson, Houle Chevrier, NAK and IFS Associates, undertook a review the City of Ottawa's existing requirements for tree planting in sensitive marine clay soils. Background information used for this review included the City of Ottawa's Draft Street Tree Manual (June 2015) and the United Kingdom's National House Building Council – Chapter 4.2 Building Near Trees (NHBC Standards 2016).

This 2016 review resulted in proposed technical revisions to the Clay Soils Policy. City staff from Forestry, Planning, Parks and Facilities Planning, and Legal have reviewed and built upon these proposed revisions to produce the Tree Planting in Sensitive Marine Clay Soils – 2017 Guidelines. These collaborative efforts are

based on the notion of planting trees in SMC soils in accordance with improved scientific and geotechnical information, with updated technical and procedural details outlined in this document.

The Tree Planting in Sensitive Marine Clay Soils - 2017 Guidelines were received by Planning Committee on September 26, 2017, and approved by delegated authority in October 2017. Going forward, implementation of the 2017 Guidelines is expected to increase the number and/or size and variety of street trees in new subdivisions in areas of sensitive marine clay soils.

Guidelines for Tree Planting in Sensitive Marine Clay Soils

The following Guidelines are primarily focused on small and medium size street trees. However, large trees (mature height over 14m) can still be planted in areas of SMC soils provided a tree to foundation setback equal to the full mature height of the tree can be provided (e.g. in a park or other green space).

For street trees in the road right-of-way where SMC soils have been identified, the tree to foundation setbacks may be reduced to **4.5m** for small (mature tree height up to 7.5m) and medium size trees (mature tree height 7.5m-14m) provided all of the following six conditions are met:

1. The modified plasticity index of the soil between the underside of footing (USF) and a depth of 3.5m generally does not exceed 40%. This corresponds to soils with low/medium potential for soil volume change. Clay soils that exceed the 40% plasticity index are considered to have high potential for soil volume change. For these worst-case soils, the setbacks and tree planting restrictions remain unchanged from the 2005 Clay Soils Policy (tree setback must equal the mature height of the tree – i.e. 7.5m setback for small trees).

2. The USF is 2.1m or greater below the lowest finished grade. Note: this footing level must be satisfied for footings within 10m of the tree, as measured from the centre of the tree trunk, and verified by means of the Grading Plan as indicated in the Procedural Changes below.

3. A **small** size tree must be provided with a minimum of **25m^3** of available soil volume, as determined by a Landscape Architect. A **medium** size tree must be provided with a minimum of **30m^3** of available soil volume, as determined by a Landscape Architect. The developer will ensure the soil is generally uncompacted when backfilling in street tree planting locations.

   Note: the soil volume calculation must be based on a depth of 1.5m below finished grade (e.g. 5m length x 4m width at surface x 1.5m depth = 30m^3). It may include lands in the right-of-way and on private property, but must subtract the volume of shallow utility trenches (i.e. volume of shallow utility trenches cannot count towards minimum soil volume).

4. The tree species must be small to medium size, as confirmed by a Landscape Architect in the Landscape Plan.

5. The foundation walls are to be reinforced at least nominally (minimum of two upper and two lower 15M bars in the foundation wall) to provide ductility as described in the Geotechnical Report.

6. Grading surrounding the tree must promote draining to the tree root zone (in such a manner as not to be detrimental to the tree), as noted on the subdivision Grading Plan.

Procedural Changes Required to Implement the Tree Planting in Sensitive Marine Clay Soils - 2017 Guidelines:

In areas of clay soils, the following procedures and conditions are to be followed for new plans of subdivision:

Tests

- One Atterberg Limits test and one water content test on 150 metre spacing (closer spacing where there are variations in soil composition, topography, etc.) and a grain size test for every four boreholes.
- One shrinkage test per subdivision.

Grading Plan

- The USF depth will be verified by means of the grading plan.
- The subdivision grading plan will promote draining to the tree root zone (in such a manner as not to be detrimental to the tree) and be noted in a drawing as part of the Grading Plan.

Geotechnical Reports

- Reinforcement of foundation walls will be confirmed by the Geotechnical Report. In any SMC soils, foundation walls are to be reinforced at least nominally, with a minimum of two upper and two lower 15M (rebar size) bars in the foundation wall.
- A Geotechnical Engineer will provide a separate section within the Geotechnical Report on Sensitive Marine Clay soils, which includes a signed letter and corresponding map that confirms the locations of low/medium and/or high sensitivity clay soils, as determined by the plasticity tests (referenced above under Guideline 1).
- The Geotechnical Report with signed letter and map will be provided to the Landscape Architect prior to preparation of the Landscape Plan in order to inform details of the Landscape Plan.
- The Geotechnical Report with signed letter and map will be circulated by the City Planner file lead, with the Landscape Plan, to Forestry staff and the Planning Foresters for review in conjunction with the Landscape Plan. This must be completed prior to registration of the subdivision agreement.

Landscape Plan

- A Landscape Architect will develop a Landscape Plan that is consistent with the information and recommendations provided in the Geotechnical Report to the satisfaction of the Planning, Infrastructure and Economic Development Department and Forestry Services. The Landscape Plan shall include a note indicating that is has been developed as per the Geotechnical Report (date, author), the letter (date, author), and Map (date, title).
- At the time of tree planting, in addition to providing an F1 inspection form, the Landscape Architect will provide a signed letter indicating that trees are of small or medium size and have been planted with appropriate soil volume, as noted in Guidelines #3 and #4 above.

Minimum Number of Trees per Plan of Subdivision

- In areas of low/medium plasticity SMC soils (modified plasticity index generally does not exceed 40%), the minimum number of trees that must be provided in a plan of subdivision will be one tree per lot, and two per corner lot, with the following exceptions that intend to maximize the number of medium size trees that can be planted:
    - Where abutting properties form a continuous greenspace between driveways (i.e. many townhouse and semi-detached dwellings; some detached dwellings where driveways are on opposite sides of the house) one medium size tree will be planted instead of two smaller sized trees, provided the minimum recommended soil volume can be achieved. In these cases only, for the purpose of determining the minimum number of trees in a plan of subdivision, one medium size tree that is replacing two small trees will be "counted" as two trees.
    - The medium size tree should be planted as close as possible to the middle of this continuous greenspace (in the right-of-way) to maximize available soil volume.
    - On larger lots with sufficient soil volume for a medium size tree, one medium size tree will be planted on each lot (or each side of a corner lot), even if abutting properties form a continuous greenspace between driveways.

Subdivision Conditions

The following details are intended to assist file leads with the writing of new draft plan of subdivision conditions to support the implementation of the Tree Planting in Sensitive Marine Clay Soils - 2017 Guidelines:

- City of Ottawa Forestry staff will:
    - Review the Geotechnical Report and prepare and approve any direction to homeowners regarding tree watering or surface permeability in proximity to trees.
    - Notify homeowners that trees on City property will be subject to City tree maintenance programs for pruning and other maintenance.
    - Provide file leads with the appropriate Subdivision Conditions prior to registration.
- In areas of low/medium plasticity SMC soils (modified plasticity index generally does not exceed 40%):
    - The minimum number of trees that must be provided in a plan of subdivision will be one tree per lot, and two per corner lot, except where abutting properties form a continuous greenspace between driveways. In these cases, one medium size tree will be planted instead of two small size trees, provided the minimum $30m^3$ of soil volume can be achieved. In these cases only, for the purpose of determining the minimum number of trees in a plan of subdivision, one medium size tree that is replacing two small trees will be "counted" as two trees.
    - The medium size tree should be planted as close as possible to the middle of this continuous greenspace (in the right-of-way) to maximize available soil volume.
    - On larger lots with sufficient soil volume for a medium size tree, one medium size tree will be planted on each lot (or each side of a corner lot), even if abutting properties form a continuous greenspace between driveways.
    - Where medium size trees cannot be planted because of high plasticity clay soils, small trees shall be planted at one tree per lot.
    - If trees need to be replaced, Forestry staff reserve the right to plant appropriate size trees at one tree per lot.

Ontario

Ministry of the Environment, Conservation and Parks
Ministère de l'Environnement, de la Protection de la nature et des Parcs

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 6142-BEJHCE
Issue Date: August 1, 2019

Minto Communities Inc.
180 Kent Street, Unit 200
Ottawa, Ontario
K1P 0B6

Site Location: Avalon West (Neighbourhood 5) Stormwater Management Pond Expansion
Part of Lot 4, Concession 11 (Cumberland)
City of Ottawa, Ontario

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

modifications to existing stormwater management Works to serve Summerside South - Phase 1 development, located in the City of Ottawa, for the collection, transmission, treatment and disposal of stormwater runoff from a total catchment area of 255.90 hectares, to provide Enhanced Level water quality protection and erosion control, and to attenuate post-development peak flows to pre-development peak flows for all storm events up to and including the 100-year storm event, discharging to McKinnon's Creek, consisting of the following:

- **stormwater management facility (catchment area 255.90 hectares):** wet pond expansion with one (1) new sediment forebay, located south of Brian Coburn Boulevard, between Tenth Line Road and Mer Bleue Road, having a permanent storage volume of 106,087 cubic metres, an extended detention volume of 20,511 cubic metres, and a total storage volume of 217,211 cubic metres including the permanent pool, at a total depth of 3.60 metres, an additional outlet structure comprised of a 3.5 metre long concrete weir equipped with a 1,200 millimetre diameter storm outlet pipe, allowing a maximum discharge of 12,900 litres per second and 17,476 litres per second under the 100-year storm event to Points C and E, respectively, in McKinnon's Creek, located immediately behind Blocks 118 to 128, and Blocks 482 and 485;

Previous Works:

- **grassed swale:** a 300 metre long grassed conveyance ditch constructed on municipal land from the outlet of the existing Western Trunk Storm Sewer, designed to accommodate the run-off up to the 100-year storm

event from a catchment area of 6.59 hectares, having a maximum ponding depth of 1.61 metres, a bottom width of 1 metre, a top width of 24 metres, and 3:1 side slopes, complete with an inlet rip-rap lined 20 metres long and 10 metres wide plunge pool, discharging to the sediment forebay of the stormwater management facility;

including erosion/sedimentation control measures during construction and all other controls and appurtenances essential for the proper operation of the aforementioned Works;

all in accordance with the submitted application and supporting documents listed in Schedule "A" forming part of this Approval.

For the purpose of this environmental compliance approval, the following definitions apply:

Definitions:

1. "Approval" means this entire document and any schedules attached to it, and the application;

2. "Director" means a person appointed by the Minister pursuant to section 5 of the EPA for the purposes of Part II.1 of the EPA;

3. "District Manager" means the District Manager of the appropriate local District Office of the Ministry, where the Works are geographically located;

4. "EPA" means the *Environmental Protection Act,* R.S.O. 1990, c.E.19, as amended;

5. "Ministry" means the ministry of the government of Ontario responsible for the EPA and OWRA and includes all officials, employees or other persons acting on its behalf;

6. "Owner" means Minto Communities Inc., and includes its successors and assignees;

7. "OWRA" means the *Ontario Water Resources Act, R.S.O. 1990, c. O.40* , as amended;

8. "Previous Works" means those portions of the sewage Works previously approved under an Approval;

9. "Works" means the sewage Works described in the Owner's application, and this Approval.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL CONDITIONS

1. The Owner shall ensure that any person authorized to carry out work on or operate any aspect of the Works is notified of this Approval and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

2. Except as otherwise provided by these Conditions, the Owner shall design, build, install, operate and maintain the Works in accordance with the description given in this Approval, and the application for approval of the Works.

3. Where there is a conflict between a provision of any document in the schedule referred to in this Approval and the conditions of this Approval, the conditions in this Approval shall take precedence, and where there is a conflict between the documents in the schedule, the document bearing the most recent date shall prevail.

4. Where there is a conflict between the documents listed in Schedule "A" and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

5. The conditions of this Approval are severable. If any condition of this Approval, or the application of any requirement of this Approval to any circumstance, is held invalid or unenforceable, the application of such condition to other circumstances and the remainder of this Approval shall not be affected thereby.

2. EXPIRY OF APPROVAL

1. This Approval will cease to apply to those parts of the Works which have not been constructed within five (5) years of the date of this Approval.

2. In the event that completion and commissioning of any portion of the Works is anticipated to be delayed beyond the specified expiry period, the Owner shall submit an application of extension to the expiry period, at least twelve (12) months prior to the end of the period. The application for extension shall include the reason(s) for the delay, whether there is any design change(s) and a review of whether the standards applicable at the time of Approval of the Works are still applicable at the time of request for extension, to ensure the ongoing protection of the environment.

3. CHANGE OF OWNER

1. The Owner shall notify the District Manager and the Director, in writing, of any of the following changes within thirty (30) days of the change occurring:

    a. change of Owner;

b. change of address of the Owner;

c. change of partners where the Owner is or at any time becomes a partnership, and a copy of the most recent declaration filed under the *Business Names Act,* R.S.O. 1990, c.B17 shall be included in the notification to the District Manager; or

d. change of name of the corporation where the Owner is or at any time becomes a corporation, and a copy of the most current information filed under the *Corporations Information Act,* R.S.O. 1990, c. C39 shall be included in the notification to the District Manager.

2. In the event of any change in ownership of the Works, other than a change to a successor municipality, the Owner shall notify in writing the succeeding owner of the existence of this Approval, and a copy of such notice shall be forwarded to the District Manager and the Director.

3. The Owner shall ensure that all communications made pursuant to this condition refer to the number at the top of this Approval.

4. OPERATION AND MAINTENANCE

1. If applicable, any proposed storm sewers or other stormwater conveyance in this Approval can be constructed but not operated until the proposed stormwater management facilities in this Approval or any other Approval that are designed to service the storm sewers or other stormwater conveyance are in operation.

2. The Owner shall make all necessary investigations, take all necessary steps and obtain all necessary approvals so as to ensure that the physical structure, siting and operations of the Works do not constitute a safety or health hazard to the general public.

3. The Owner shall inspect and ensure that the design minimum liquid retention volume is maintained in the Works at all times, except when maintenance is required.

4. The Owner shall undertake an inspection of the condition of the Works, at least once a year, and undertake any necessary cleaning and maintenance to ensure that sediment, debris and excessive decaying vegetation are removed from the Works to prevent the excessive build-up of sediment, oil/grit, debris and/or decaying vegetation, to avoid reduction of the capacity and/or permeability of the Works, as applicable. The Owner shall also regularly inspect and clean out the inlet to and outlet from the Works to ensure that these are not obstructed.

5. The Owner shall construct, operate and maintain the Works with the objective that the effluent from the Works is essentially free of floating and settleable solids and does not contain oil or any other substance in amounts sufficient to create a visible film, sheen,

foam or discoloration on the receiving waters.

6. The Owner shall maintain a logbook to record the results of these inspections and any cleaning and maintenance operations undertaken, and shall keep the logbook at the Owner's administrative office for inspection by the Ministry. The logbook shall include the following:

   a. the name of the Works; and

   b. the date and results of each inspection, maintenance and cleaning, including an estimate of the quantity of any materials removed and method of clean-out of the Works.

7. The Owner shall prepare an operations manual prior to the commencement of operation of the Works that includes, but is not necessarily limited to, the following information:

   a. operating and maintenance procedures for routine operation of the Works;

   b. inspection programs, including frequency of inspection, for the Works and the methods or tests employed to detect when maintenance is necessary;

   c. repair and maintenance programs, including the frequency of repair and maintenance for the Works;

   d. contingency plans and procedures for dealing with potential spills and any other abnormal situations and for notifying the District Manager; and

   e. procedures for receiving, responding and recording public complaints, including recording any follow-up actions taken.

8. The Owner shall maintain the operations manual current and retain a copy at the Owner's administrative office for the operational life of the Works. Upon request, the Owner shall make the manual available to Ministry staff.

5. TEMPORARY EROSION AND SEDIMENT CONTROL

1. The Owner shall install and maintain temporary sediment and erosion control measures during construction and conduct inspections once every two (2) weeks and after each significant storm event (a significant storm event is defined as a minimum of 25 mm of rain in any 24 hours period). The inspections and maintenance of the temporary sediment and erosion control measures shall continue until they are no longer required and at which time they shall be removed and all disturbed areas reinstated properly.

2. The Owner shall maintain records of inspections and maintenance which shall be made available for inspection by the Ministry, upon request. The record shall include the name of the inspector, date of inspection, and the remedial measures, if any, undertaken to

maintain the temporary sediment and erosion control measures.

6. REPORTING

1. One (1) week prior to the start-up of the operation of the Works, the Owner shall notify the District Manager (in writing) of the pending start-up date.

2. The Owner shall, upon request, make all reports, manuals, plans, records, data, procedures and supporting documentation available to Ministry staff.

3. The Owner shall prepare a performance report within ninety (90) days following the end of the period being reported upon, and submit the report(s) to the District Manager when requested. The first such report shall cover the first annual period following the commencement of operation of the Works and subsequent reports shall be prepared to cover successive annual periods following thereafter. The reports shall contain, but shall not be limited to, the following information:

   a. a description of any operating problems encountered and corrective actions taken;

   b. a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the Works, including an estimate of the quantity of any materials removed from the Works;

   c. a summary of any complaints received during the reporting period and any steps taken to address the complaints;

   d. a summary of all spill or abnormal discharge events; and

   e. any other information the District Manager requires from time to time.

7. RECORD KEEPING

1. The Owner shall retain for a minimum of five (5) years from the date of their creation, all records and information related to or resulting from the operation, maintenance and monitoring activities required by this Approval.

Schedule "A"

1. Application for Environmental Compliance Approval, dated June 28, 2019, received on July 4, 2019, submitted by Minto Communities Inc.;

2. Transfer of Review Letter of Recommendation, dated June 28, 2019. revised on July 24, 2019, and signed by Jeff McEwen, P. Eng., Manager, Development Review East Branch, City of Ottawa, including the following supporting documents:

   a. Final Plans and Specifications prepared by David Schaeffer Engineering Ltd.

   b. Stormwater Management Report prepared by David Schaeffer Engineering Ltd.

3. Email received on July 19, 2019 from Jeff McEwen, P. Eng., City of Ottawa.

4. Email received on July 23, 2019 from Kate Anderson, E.I.T., David Schaeffer Engineering Ltd.

5. Emails received on July 22, 2019, July 24, 2019, and July 30, 2019 from Will Curry, C.E.T., City of Ottawa.

6. Emails received on July 30, 2019 from Jennifer Ailey, P. Eng., David Schaeffer Engineering Ltd.

7. Application for Approval of Municipal and Private Sewage Works, dated August 13, 2007, with cover letter and Attachments 2, 3, and 4 from Charles Warnock, Program Manager, Infrastructure Approvals, City of Ottawa, dated October 4, 2007 and received on October 9, 2007;

8. Taggart Realty Management: Neighbourhood 5 - East Urban Community Interim Stormwater Management Report, prepared by IBI Group, dated July 2007 and received on August 14, 2007;

9. Set of engineering drawings for Neighbourhood 5 Interim SWM Facility, (Contract No. 12130), prepared by IBI Group, dated July 2007;

10. Revised Drawing No. 100A, Neighbourhood 5 Interim SWM Facility, (Project No. 12130), prepared by IBI Group, dated April 7, 2008;

11. Letter from Robert W. Wingate of IBI Group to the Ministry, dated November 9, 2007;

12. Letter from Peter Deir of IBI Group to the Ministry, dated November 13, 2007;

13. Letter from Ted Phillips of Taggart Investments to the Ministry, dated December 18,

2007;

14. Written procedure issued March 6, 2008 and cosigned by Robert W. Wingate of IBI Group and Ted Edward Phillips of Taggart Realty;

15. Application for Approval of Municipal and Private Sewage Works, dated November 6, 2009 and received on November 19, 2009, Neighbourhood 5 Phase II Interim Stormwater Management Report, dated August 2009, and drawings and addendum documents prepared and submitted by IBI Group;

16. Application for Approval of Municipal and Private Sewage Works, dated March 1, 2011 and received on March 5, 2011, and final plans and specifications prepared by IBI Group;

17. Application for Amended Environmental Compliance Approval, dated March 19, 2013 and received on March 21, 2013, submitted by the City of Ottawa;

18. Avalon West (Neighbourhood 5) Interim Stormwater Management Report, dated March 2013, prepared by IBI Group;

19. Engineering Drawings 104, dated February 27, 2012, and 700A, dated February 21, 2012, prepared by IBI Group;

20. E-mail from Rikke Brown of IBI Group to the Ministry, dated May 22, 2013;

21. E-mail from Rikke Brown of IBI Group to the Ministry, dated May 23, 2013;

22. Application for Environmental Compliance Approval, dated November 1, 2013 and received on January 7, 2014, submitted by the City of Ottawa;

23. Avalon West (Neighbourhood 5) Stormwater Management Facility Design, Revision 5, dated October 2013, prepared by IBI Group;

24. Set of Engineering Drawings (14 drawings) for Avalon West (Neighbourhood 5) SWM Facility, dated September 19, 2013, prepared by IBI Group;

25. Copy of letter from James Holland of South Nation Conservation to Minto Communities Inc., dated November 25, 2013;

26. E-mail from Peter Deir of IBI Group to the Ministry, dated July 9, 2014;

27. Application for Environmental Compliance Approval, dated June 8, 2015 and received on June 24, 2015, submitted by the City of Ottawa;

28. Stormwater Management Report for Summerside West Phase 1, dated June 2015,

prepared by J.F. Sabourin and Associates Inc.;

29. Copy of memorandum from IBI Group to David Schaeffer Engineering Ltd., dated November 3, 2014;

30. Copy of e-mail from Mathieu Leblanc of South Nation Conservation to David Schaeffer Engineering Ltd., dated June 23, 2015;

31. E-mail from Jennifer Ailey of David Schaeffer Engineering Ltd. to the Ministry, dated September 2, 2015;

32. E-mail from Peter Deir of IBI Group to the Ministry, dated September 17, 2015; and

33. E-mail from Jennifer Ailey of David Schaeffer Engineering Ltd. to the Ministry, dated September 30, 2015.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed to ensure that the Works are constructed and operated in the manner in which they were described and upon which approval was granted. This condition is also included to emphasize the precedence of conditions in the Approval and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review.

2. Condition 2 is included to ensure that, when the Works are constructed, the Works will meet the standards that apply at the time of construction to ensure the ongoing protection of the environment.

3. Condition 3 is included to ensure that the Ministry records are kept accurate and current with respect to the approved Works and to ensure that subsequent owners of the Works are made aware of the Approval and continue to operate the Works in compliance with it.

4. Condition 4 is included as regular inspection and necessary removal of sediment and excessive decaying vegetation from the Works are required to mitigate the impact of sediment, debris and/or decaying vegetation on the treatment capacity of the Works. The Condition also ensures that adequate storage is maintained in the Works at all times as required by the design. Furthermore, this Condition is included to ensure that the Works are operated and maintained to function as designed.

5. Condition 5 is included as installation, regular inspection and maintenance of the temporary sediment and erosion control measures is required to mitigate the impact on the downstream receiving watercourse during construction until they are no longer required.

6. Condition 6 is included to provide a performance record for future references, to ensure that the Ministry is made aware of problems as they arise, and to provide a compliance record for all the terms and conditions outlined in this Approval, so that the Ministry can work with the Owner in resolving any problems in a timely manner.

7. Condition 7 is included to require that all records are retained for a sufficient time period to adequately evaluate the long-term operation and maintenance of the Works.

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). 1339-A28J6Z issued on October 2, 2015.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

a. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
b. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;
5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

* **Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 1st day of August, 2019

THIS APPROVAL WAS MAILED
ON AUG 0 2 2019
(Signed)

A. Ahmed

Aziz Ahmed, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

CA/
c: District Manager, MECP Ottawa
Clerk, City of Ottawa
Jeff McEwen, P. Eng., Manager, Development Review East Branch, City of Ottawa
William Curry, C.E.T., Planning, Infrastructure and Economic Development, City of Ottawa
Brent Strachan, A.S.O., Minto Communities Inc.
Jennifer Ailey, David Schaeffer Engineering Ltd.

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER 7375-A8QGEU
Issue Date: April 12, 2016

City of Ottawa
800 Green Creek Drive
Ottawa, Ontario
K1J 1K6

Site Location: Tenth Line Pump Station
2428 Tenth Line Road
Lot Pt. 3, Concession 11
Geographic Township of Cumberland
City of Ottawa

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

amendment to the wastewater infrastructure Works to include modifications in an existing sewage Works (identified under "Previous Works"), consisting of sanitary sewer, sewage pumping station and forcemain as follows:

Proposed Works:

Revisions to the Tenth Line Pump Station, consisting of the following:

- revised tributary drainage area to include the addition of 32 hectares (ha) of Mattamy Summerside West Lands, 23 ha of Minto Urban Expansion Lands and 15.6 Ha of future development lands (Mer Blue Expansion Area 10);

- installation of a new reversed slope 1050 mm diameter concrete sanitary overflow pipe (from Station 0+000.000 to Station 0+036.141) connecting existing sanitary MH 10128 to proposed storm MH 700, discharging overflow to the existing Avalon West (N5) Stormwater Management Pond;

- installation of a new 2400 mm diameter monitoring manhole for access to a velocity-area type flow meter for overflow monitoring that is connected to the sanitary pumping station and the City of Ottawa SCADA network;

- installation of an ultrasonic depth sensor in the existing sanitary MH 10128 that is connected to the sanitary pumping station and the City of Ottawa SCADA network;

- decommissioning of existing overflows from sanitary MH 512 on Harvest Valley Avenue, sanitary MH 284 on Frank Cauley Way and Sanitary MH 100A at the intersection of Brian Coburn Boulevard and Strasbourg Street;

Previous Works:

Inlet Gravity Sanitary Sewer

A 675 mm diameter inlet gravity concrete sanitary sewer constructed on Tenth Line Road servicing Avalon South Subdivision (N4), from Street 31 (80 m south of the pump station) and a stubbed section of gravity sewer for future connection from Neighbourhood 5 (N5) and the Bilberry Creek Industrial Park (BCIP);

Sewage Pump Station

A sanitary sewage pump station with a rated firm capacity of 425 L/s constructed to serve the N4, N5, and the BCIP, comprising of an in-ground cast-in-place wet well located on East side of Tenth Line Road, 2000 m south of Innes Road consisting of the following:

- A cast-in-place bypass chamber located immediately upstream of the wetwell, equipped with two (2) aluminium air vents, flushing connection, isolation valve, pump rails, and process piping;

- Sewage in-flow to the wetwell is directed through an aluminium trash basket;

- A cast-in-place wetwell equipped with three (3) 45 kW (60 HP) submersible pumps (two duty and one standby) of the non-clog type, each pump is capable of pumping up to 170 L/s in the smallest forcemain at 20 m TDH, complete with soft starters, an ultrasonic transducer for liquid level measurement and pump control together with a Multitrode sensor as backup;

- The wetwell is equipped with two (2) aluminum vents, complete with bird screens and one (1) external blower for ventilation;

- The valve room located in the basement is equipped with a common header, which splits into two forcemains (300 mm and 400 mm), equipped with two (2) electromagnetic flow meters, pressure surge relief valve, and swab launcher for forcemain cleaning;

- A 200 kW diesel engine generator set for standby power during emergencies located within the existing above ground control building, including a 1250 L capacity fuel storage facility located with a spill containment area;

- An offsite overflow connection located at the intersection of Street 6 and Street 31 from sanitary sewer (SAMH511) to the storm sewer (STMH543) with an emergency overflow float alarm at the wetwell;

- The control building has electrical and control equipment, including a new Supervisory Control and Data Acquisition (SCADA) system;

- The station is equipped with a 100 mm diameter watermain complete with backflow prevention for washroom facilities; yard hydrant and flushing connection in the bypass chamber constructed 300 mm above the overflow elevation;

Sewage Forcemains

Two parallel polyvinyl chloride (PVC) sanitary forcemains, 300 mm and 400 mm diameter, constructed from the control building to the west side of Tenth Line Road. The forcemains convey flow north 300 m to Street 45 (Vista Park Drive) in the Avalon South Subdivision, where the sewage outlets to a gravity trunk sewer;

including erosion/sedimentation control measures during construction and all other controls and appurtenances essential for the proper operation of the aforementioned Works;

All in accordance with the submitted Environmental Compliance Approval (ECA) application dated (1) March 03, 2016, including all other supporting documents prepared by David Schaeffer Engineering Ltd., and (2) dated July 5, 2005, including all other supporting documents prepared by Stantec Consulting Limited, forming part of this approval.

For the purpose of this environmental compliance approval, the following definitions apply:

"Act" means the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended;

"Approval" means this entire document including the application and any supporting documents listed in any schedules in this Approval;

"BOD5" (also known as TBOD5) means five day biochemical oxygen demand measured in an unfiltered sample and includes carbonaceous and nitrogenous oxygen demand;

"Director" means a person appointed by the Minister pursuant to section 5 of the Environmental Protection Act for the purposes of Part II.1 of the Environmental Protection Act;

"E. Coli" refers to the thermally tolerant forms of Escherichia that can survive at 44.5 degrees Celsius;

"Emergency Situation" means a structural, mechanical or electrical failure that causes a temporary reduction in the capacity of the Sewage Pumping Station or an unforeseen flow condition that may result in:

a) danger to the health or safety of any person; or
b) injury or damage to any property, or serious risk of injury or damage to any property.

"EPA" means the Environmental Protection Act, R.S.O. 1990, c.E.19, as amended;

"Event" in the context the Sewage Pumping Station located outside the Sewage Treatment Plant, means an

action or occurrence, at the Sewage Pumping Station that causes a Sewage Pumping Station Overflow. An Event ends when there is no recurrence of a Sewage Pumping Station Overflow in the 12-hour period following the last Sewage Pumping Station Overflow. Two Events are separated by at least 12 hours during which there has been no recurrence of a Sewage Pumping Station Overflow;

"Limited Operational Flexibility" (LOF) means the Modifications that the Owner is permitted to make to the Works under this Approval;

"Ministry" means the ministry of the government of Ontario responsible for the Environmental Protection Act and the Ontario Water Resources Act and includes all officials, employees or other persons acting on its behalf;

"Notice of Modifications" means the form entitled “Notice of Modifications to Sewage Works” included in Schedule "A";

"Owner" means City of Ottawa and includes its successors and assignees;

"Previous Works" means those portions of the sewage Works previously approved under an Approval;

"Professional Engineer" means a person entitled to practise as a Professional Engineer in the Province of Ontario under a licence issued under the Professional Engineers Act;

"Sewage Pumping Station Overflow" means any discharge from a Sewage Pumping Station located outside the Sewage Treatment Plant that does not undergo any treatment or only receives partial treatment before it is discharged to the environment;

"Substantial Completion" has the same meaning as “substantial performance” in the Construction Lien Act;

"Works" means the sewage works described in the Owner's application(s) and this Approval.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL PROVISIONS

(1) The Owner shall ensure that any person authorized to carry out work on or operate any aspect of the Works is notified of this Approval and the Conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

(2) Except as otherwise provided by these Conditions, the Owner shall design, build, install, operate and maintain the Works in accordance with the description given in this Approval, and the application for approval of the Works.

(3) Where there is a conflict between a provision of any submitted document referred to in this Approval

and the Conditions of this Approval, the Conditions in this Approval shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

(4) Where there is a conflict between the listed submitted documents, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

(5) The Conditions of this Approval are severable. If any Condition of this Approval, or the application of any requirement of this Approval to any circumstance, is held invalid or unenforceable, the application of such Condition to other circumstances and the remainder of this Approval shall not be affected thereby.

(6) The issuance of, and compliance with the Conditions of this Approval does not:

(a) relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement, including, but not limited to, the obligation to obtain approval from the local conservation authority necessary to construct or operate the sewage Works; or

(b) limit in any way the authority of the Ministry to require certain steps be taken to require the Owner to furnish any further information related to compliance with this Approval.

2. EXPIRY OF APPROVAL

(1) This Approval will cease to apply to those parts of the Works which have not been constructed within **five (5) years** of the date of this Approval.

3. CHANGE OF OWNER

(1) The Owner shall notify the Director, in writing, of any of the following changes within **thirty (30) days** of the change occurring:

(a) change of Owner;

(b) change of address of the Owner;

(c) change of partners where the Owner is or at any time becomes a partnership, and a copy of the most recent declaration filed under the Business Names Act, R.S.O. 1990, c. B17 shall be included in the notification to the Director;

(d) change of name of the corporation where the Owner is or at any time becomes a corporation, and a copy of the most current information filed under the Corporations Information Act, R.S.O. 1990, c. C39 shall be included in the notification to the Director.

4. UPON THE SUBSTANTIAL COMPLETION OF THE WORKS

(1) Upon the Substantial Completion of the Works, the Owner shall prepare a statement, certified by a Professional Engineer, that the Works are constructed in accordance with this Approval, and upon request, shall make the written statement available for inspection by Ministry personnel.

(2) Within **one (1) year** of the Substantial Completion of the Works, a set of as-built drawings showing the Works "as constructed" shall be prepared. These drawings shall be kept up to date through revisions undertaken from time to time and a copy shall be retained at the Works for the operational life of the Works.

5. SEWAGE PUMPING STATION OVERFLOW

(1) Any Sewage Pumping Station Overflow is prohibited, except:

(a) in an Emergency Situation;

(b) where the Sewage Pumping Station Overflow is a direct and unavoidable result of a planned maintenance procedure, the Owner notified the Water Supervisor **fifteen (15) days** prior to the Sewage Pumping Station Overflow and the Water Supervisor has given written consent of the Sewage Pumping Station Overflow; or,

(c) where the Sewage Pumping Station Overflow is planned for research or training purposes, the discharger notified the Water Supervisor **fifteen (15) days** prior to the Sewage Pumping Station Overflow and the Water Supervisor has given written consent of the Sewage Pumping Station Overflow.

(2) The Owner shall forthwith notify the Spills Action Centre (SAC) at 1-800-268-6060 or e-mail at moe.sac.moe@ontario.ca and the Medical Officer of Health of every Sewage Pumping Station Overflow Events. This notice shall include, at a minimum, the following information:

(a) the date and time at which the Event(s) started,

(b) duration of the Event(s);

(c) the location of the Event**(s)**;

(d) the measured or estimated volume of the Event(s) (unless the Event(s) is/are ongoing); and

(e) the reason for the Event (s).

(3) The Owner shall submit Sewage Pumping Station Overflow Event Reports to the Ministry's local office on an Annual basis, no later than forty-five (45) days following the end of the calendar year covered by the Event Report. Event Reports may be in an electronic format specified by the Ministry. In each Event Report the Owner shall include, at a minimum, the following information on any Event(s)

that occurred:

(a) the date and time at which the Event(s) started,

(b) duration of the Event(s);

(c) the location of the Event**(s)**;

(d) the measured or estimated volume of the Event(s) (unless the Event(s) is/are ongoing); and

(e) the reason for the Event(s).

(4) The Owner shall use best efforts to collect a representative sample consisting of a minimum of two (2) grab samples of the Sewage Pumping Station Overflow and have it analysed for parameters outlined in Table 1 of Condition 7 (2) using the protocols specified in Condition 7 (3), one at the beginning of the Event and the second approximately near the end of the Event, to best reflect the effluent quality of such Sewage Pumping Station Overflow.

(5) The Owner shall maintain a record of all Sewage Pumping Station Overflow(s), which shall contain, at a minimum, the types of information set out in Condition 5 (2 a) to 5 (2 e) in respect of each Sewage Pumping Station Overflow.

6. OPERATION AND MAINTENANCE

(1) The Owner shall exercise due diligence in ensuring that, at all times, the Works and the related equipment and appurtenances used to achieve compliance with this Approval are properly operated and maintained. Proper operation and maintenance shall include effective performance, adequate funding, adequate operator staffing and training, including training in all procedures and other requirements of this Approval and the Act and regulations, adequate laboratory facilities, process controls and alarms and the use of process chemicals and other substances used in the Works.

(2) The Owner shall prepare an operations manual within **six (6) months** of Substantial Completion of the Works, that includes, but not necessarily limited to, the following information:

(a) operating procedures for routine operation of the Works;

(b) inspection programs, including frequency of inspection, for the Works and the methods or tests employed to detect when maintenance is necessary;

(c) repair and maintenance programs, including the frequency of repair and maintenance for the Works;

(d) procedures for the inspection and calibration of monitoring equipment;

(e) a spill prevention control and countermeasures plan, consisting of contingency plans and

procedures for dealing with equipment breakdowns, potential spills and any other abnormal situations, including notification of the Water Supervisor; and

(f) procedures for receiving, responding and recording public complaints, including recording any follow-up actions taken.

(3) The Owner shall maintain the operations manual current and retain a copy at the location of the Works for the operational life of the Works. Upon request, the Owner shall make the manual available to Ministry staff.

(4) The Owner shall, upon request, make all manuals, plans, records, data, procedures and supporting documentation available to Ministry staff.

7. MONITORING AND RECORDING

The Owner shall, upon the issuance of this Approval, carry out the following monitoring program:

(1) All samples and measurements taken for the purposes of this Approval are to be taken at a time and in a location characteristic of the quality and quantity of the effluent stream over the time period being monitored.

(2) Samples shall be collected at the following sampling points, at the frequency specified, by means of the specified sample type and analysed for each parameter listed and all results recorded:

Table 1 - Monitoring during a Sewage Pumping Station Overflow Event (Samples to be collected from the Sewage Pumping Station Overflow stream near the Sewage Pumping Station)	
Sample Type	Grab
Parameters	BOD5, Total Suspended Solids, Total Phosphorus, E. Coli

(3) The methods and protocols for sampling, analysis and recording shall conform, in order of precedence, to the methods and protocols specified in the following:

(a) the Ministry's Procedure F-10-1, “Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only), as amended from time to time by more recently published editions;

(b) the Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" (January 1999), ISBN 0-7778-1880-9, as amended from time to time by more recently published editions;

(c) the publication "Standard Methods for the Examination of Water and Wastewater" (21st edition), as amended from time to time by more recently published editions.

8. REPORTING

(1) **Fifteen (15) days** prior to the date of a planned Sewage Pumping Station Overflow being conducted pursuant to Condition 5 and as soon as possible for an unplanned Sewage Pumping Station Overflow, the Owner shall notify the Water Supervisor in writing of the pending start date, in addition to an assessment of the potential adverse effects on the environment and the duration of the Sewage Pumping Station Overflow.

(2) In addition to the obligations under Part X of the Environmental Protection Act, (which includes contacting the Spills Action Centre (SAC) at 1-800-268-6060 or e-mail at moe.sac.moe@ontario.ca), the Owner shall, within **ten (10) working days** of the occurrence of any reportable spill as defined in Ontario Regulation 675/98, Bypass or loss of any product, by-product, intermediate product, oil, solvent, waste material or any other polluting substance into the environment, (with the exception of a sanitary sewage discharged during an Event), submit a full written report of the occurrence to the Water Supervisor describing the cause and discovery of the spill or loss, clean-up and recovery measures taken, preventative measures to be taken and schedule of implementation.

(3) The Owner shall prepare and submit a report to the Water Supervisor on an annual basis. The reports shall contain the following information:

(a) a copy of all Notice of Modifications submitted to the Water Supervisor as a result of Schedule A, Section 1 (Limited Operational Flexibility) with a status report on the implementation of each modification;

(b) a report summarizing all modifications completed as a result of Schedule A, Section 3.

9. LIMITED OPERATIONAL FLEXIBILITY

(1) The Owner may make modifications to the Works in accordance with the Terms and Conditions of this Approval and subject to the Ministry's "Limited Operational Flexibility Criteria for Modifications to Sewage Works", included under Schedule A of this Approval, as amended.

(2) Sewage works proposed under Limited Operational Flexibility shall adhere to the design guidelines contained within the Ministry's publication "Design Guidelines for Sewage Works 2008", as amended.

(3) The Owner shall ensure at all times, that the Works, related equipment and appurtenances which are installed or used to achieve compliance are operated in accordance with all Terms and Conditions of this Approval.

(4) For greater certainty, the following are not permitted as part of Limited Operational Flexibility:

(a) Modifications to the Works that result in an increase of the Rated Capacity of the Works;

(b) Modifications to the Works that may adversely affect the approved effluent quality criteria or the location of the discharge/outfall;

(c) Modifications to the Works approved under s.9 of the EPA, and

(d) Modifications to the Works pursuant to an order issued by the Ministry.

(5) Implementation of Limited Operational Flexibility is not intended to be used for piecemeal measures that result in major alterations or expansions.

(6) If the implementation of Limited Operational Flexibility requires changes to be made to the Emergency Response, Spill Reporting and Contingency Plan, the Owner shall, as deemed necessary in consultation with the Water Supervisor, provide a revised copy of this plan for approval to the local fire services authority prior to implementing Limited Operational Flexibility.

(7) For greater certainty, any alteration made under the Limited Operational Flexibility may only be carried out after other legal obligations have been complied with including those arising from the Environmental Protection Act, Niagara Escarpment Planning and Development Act, Oak Ridges Moraine Conservation Act, Lake Simcoe Protection Act and Greenbelt Act.

(8) Prior to implementing Limited Operational Flexibility, the Owner shall complete a Notice of Modifications describing any proposed modifications to the Works and submit it to the Water Supervisor.

10. TEMPORARY EROSION AND SEDIMENT CONTROL

(1) The Owner shall install and maintain temporary sediment and erosion control measures during construction and conduct inspections once every **two (2) weeks** and after each significant storm event (a significant storm event is defined as a minimum of 25 mm of rain in any 24 hours period). The inspections and maintenance of the temporary sediment and erosion control measures shall continue until they are no longer required and at which time they shall be removed and all disturbed areas reinstated properly.

(2) The Owner shall maintain records of inspections and maintenance which shall be made available for inspection by the Ministry, upon request. The record shall include the name of the inspector, date of inspection, and the remedial measures, if any, undertaken to maintain the temporary sediment and erosion control measures.

11. RECORD KEEPING

(1) The Owner shall retain for a minimum of **five (5) years** from the date of their creation, all records and information related to or resulting from the operation and maintenance activities required by this Approval.

SCHEDULE 'A'

Limited Operational Flexibility Criteria for Modifications to Sewage Works

1. The modifications to sewage works approved under an Environmental Compliance Approval (Approval) that are permitted under the Limited Operational Flexibility (LOF), are outlined below and are subject to the LOF conditions in the Approval, and require the submission of the Notice of Modifications. If there is a conflict between the sewage works listed below and the Terms and Conditions in the Approval, the Terms and Conditions in the Approval shall take precedence.

1.1 Sewage Pumping Stations

a. Adding or replacing equipment where new equipment is located within an existing sewage pumping station site, provided that the facility Rated Capacity is not exceeded and the existing flow process and/or treatment train are maintained, as applicable.

1.2 Pilot Systems

a. Installation of pilot systems for new or existing technologies provided that:
   i. any effluent from the pilot system is discharged to the inlet of the sewage pumping station or hauled off-site for proper disposal,
   ii. any effluent from the pilot system discharged to the inlet of the sewage pumping station or sewage conveyance system does not significantly alter the composition/concentration of the influent sewage to be treated in the downstream process; and that it does not add any inhibiting substances to the downstream process, and
   iii. the pilot system's duration does not exceed a maximum of two years; and a report with results is submitted to the Director and Water Supervisor three months after completion of the pilot project.

2. Sewage works that are exempt from section 53 of the OWRA by O. Reg. 525/98 continue to be exempt and are not required to follow the notification process under this Limited Operational Flexibility.

3. Normal or emergency operational modifications, such as repairs, reconstructions, or other improvements that are part of maintenance activities, including cleaning, renovations to existing approved sewage works equipment, provided that the modification is made with Equivalent Equipment, are considered pre-approved.

4. The modifications noted in section (3) above are not required to follow the notification protocols under Limited Operational Flexibility, provided that the number of pieces and description of the equipment as described in the Approval does not change.

Ontario
Ministry of
the Environment

Notice of Modification to Sewage Works

RETAIN COPY OF COMPLETED FORM AS PART OF THE ECA AND SEND A COPY TO THE WATER SUPERVISOR (FOR MUNICIPAL) OR DISTRICT MANAGER (FOR NON-MUNICIPAL SYSTEMS)

Part 1 – Environmental Compliance Approval (ECA) with Limited Operational Flexibility

(Insert the ECA's owner, number, issuance date and notice number, which should start with "01" and consecutive numbers thereafter)

ECA Number	Issuance Date (mm/dd/yy)	Notice number (if applicable)

ECA Owner	Municipality

Part 2: Description of the modifications as part of the Limited Operational Flexibility

(Attach a detailed description of the sewage works)

Description shall include:
1. A detail description of the modifications and/or operations to the sewage works (e.g. sewage work component, location, size, equipment type/model, material, process name, etc.)
2. Confirmation that the anticipated environmental effects are negligible.
3. List of updated versions of, or amendments to, all relevant technical documents that are affected by the modifications as applicable, i.e. submission of documentation is not required, but the listing of updated documents is (design brief, drawings, emergency plan, etc.)

Part 3 – Declaration by Professional Engineer

I hereby declare that I have verified the scope and technical aspects of this modification and confirm that the design:
1. Has been prepared or reviewed by a Professional Engineer who is licensed to practice in the Province of Ontario;
2. Conforms with the Limited Operational Flexibility as per the ECA;
3. Has been designed consistent with Ministry's Design Guidelines, adhering to engineering standards, industry's best management practices, and demonstrating ongoing compliance with s.53 of the Ontario Water Resources Act; and other appropriate regulations.

I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate.

Name (Print)	PEO License Number

Signature	Date (mm/dd/yy)

Name of Employer

Part 4 – Declaration by Owner

I hereby declare that: 1. I am authorized by the Owner to complete this Declaration; 2. The Owner consents to the modification; and 3. These modifications to the sewage works are proposed in accordance with the Limited Operational Flexibility as described in the ECA. 4. The Owner has fulfilled all applicable requirements of the *Environmental Assessment Act*. I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate.	
Name of Owner Representative (Print)	Owner representative's title (Print)
Owner Representative's Signature	Date (mm/dd/yy)

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed to ensure that the Works are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the Approval and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review. The condition also advises the Owners their responsibility to notify any person they authorized to carry out work pursuant to this Approval the existence of this Approval.

2. Condition 2 is included to ensure that, when the Works are constructed, the Works will meet the standards that apply at the time of construction to ensure the ongoing protection of the environment.

3. Condition 3 is included to ensure that the Ministry records are kept accurate and current with respect to the approved works and to ensure that subsequent owners of the Works are made aware of the Approval and continue to operate the Works in compliance with it.

4. Condition 4 is included to ensure that the Works are constructed in accordance with the Approval and that record drawings of the Works "as constructed" are maintained for future references.

5. Conditions 5 and 7 are included to indicate that Sewage Pumping Station Overflow of untreated and/or partially treated sewage to the environment is prohibited, save in certain limited circumstances where the failure to do so could result in greater injury to the public interest than the Sewage Pumping Station Overflow itself, or where the Sewage Pumping Station Overflow can be limited or otherwise mitigated by handling it in accordance with an approved contingency plan. The notification and documentation requirements allow the Ministry to take action in an informed manner and will ensure the *Owner* is aware of the extent and frequency of Sewage Pumping Station Overflow Event(s).

6. Condition 6 is included to require that the Works be properly operated, maintained, funded, staffed and equipped such that the environment is protected and deterioration, loss, injury or damage to any person or property is prevented. As well, the inclusion of a comprehensive operations manual governing all significant areas of operation, maintenance and repair is prepared, implemented and kept up-to-date by the Owner and made available to the Ministry. Such a manual is an integral part of the operation of the Works. Its compilation and use should assist the Owner in staff training, in proper plant operation and in identifying and planning for contingencies during possible abnormal conditions. The manual will also act as a benchmark for Ministry staff when reviewing the Owner's operation of the Works.

7. Condition 8 is included to provide a performance record for future references, to ensure that the Ministry is made aware of problems as they arise, so that the Ministry can work with the Owner in resolving any problems in a timely manner.

8. Condition 9 is included to ensure that the Works are operated in accordance with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider. These conditions are also included to ensure that a Professional Engineer has reviewed

the proposed Modifications and attests that the Modifications are in line with that of Limited Operational Flexibility, and provide assurance that the proposed Modifications comply with the Ministry's requirements stipulated in the terms and conditions of this Approval, Ministry policies, guidelines, and industry engineering standards and best management practices.

9. Condition 10 is included as installation, regular inspection and maintenance of the temporary sediment and erosion control measures is required to mitigate the impact on the downstream receiving watercourse during construction, until they are no longer required.

10. Condition 11 is included to require that all records are retained for a sufficient time period to adequately evaluate the long-term operation and maintenance of the Works.

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). 6338-6EVJJ8 issued on August 3, 2005

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment and Climate Change
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 12th day of April, 2016

Gregory Zimmer, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

MS/

c: District Manager, MOECC Ottawa office
Water Supervisor, MOECC Ottawa Office
Jennifer Ailey, David Schaeffer Engineering Ltd.
Charles Warnock, City of Ottawa
Linda Carkner, Program Manager, City of Ottawa, Infrastructure Services

Ontario

Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement climatique

ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 0606-AHXJCH
Issue Date: February 2, 2017

Minto Communities Inc.
180 Kent Street, Suite 200
Ottawa, Ontario
K1P 0B6

Site Location: Avalon West, Stage 5
3100 Brian Coburn Boulevard
City of Ottawa, Ontario

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act , R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

storm and sanitary sewers to be constructed in the City of Ottawa, as follows;

storm sewers on Decoeur Drive (from Station 14+443 to Station +15+056.5), Park Number 2 (from MH 142 to MH 5566), Future School Number 3 (from MH 134 to MH 5561), Hepatica Way (from Station 16+466 to Station 16+541.5 and from Station 16+545.5 to Station +16+773.5), Hyssop Street (from Station 18+516.5 to Station 18+730.5), Mountain Sorrel Way (from Station 20+091.5 to Station 20+380, from Station 20+391.5 to Station 20+571.5, and from Station 20+626 to Station 20+756.5), June Grass Street (from Station 12+089.5 to Station 21+307.5), Vendome Street (from Station 26+092.5 to Station 26+220.5), Maskinonge Crescent (from Station 27+088 to Station 27+242.5 and from Station 27+250.5 to Station 27+453), L'Esturgeon Street (from Station 30+047.5 to Station 30+510), Walkway Easement (from MH 5590 to MH W-FS), and Malachigan Crescent (from Station 31+092.5 to Station 31+372.5); and

sanitary sewers on Jerome Jodoin Drive (from Station 1+299.5 to Station 1+490), Decoeur Drive (from Station 14+441.5 to Station 15+056.5), Park Number 2 (from MH 42 to MH 5052), Future School Number 2 (from Stub 22 to MH 5030), Hepatica Way (from Station 16+468.5 to Station 16+772), Hyssop Street (from Station 18+518 to Station 18+729), Mountain Sorrel Way (from Station 20+089 to Station 20+573 and from Station 20+625 to Station 20+755), June Grass Street (from Station 21+091 to Station 21+306), Vendome Street (from Station 26+091 to Station 26+219), Maskinonge Crescent (from Station 27+091 to Station 27+450), L'Esturgeon Street (from Station 30+046 to Station 30+507.5), and Malachigan Crescent (from Station 31+091 to Station 31+374;

all in accordance with the application from Minto Communities Inc., dated January 11, 2017, including final plans and specifications prepared by Atrel Engineering Ltd., Consulting Engineers.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;

2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*****
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment and Climate Change
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 2nd day of February, 2017

Gregory Zimmer, P.Eng.
Director
appointed for the purposes of Part II.1 of the *Environmental Protection Act*

DG/
c: District Manager, MOECC Ottawa
Jeff McEwen, Manager, City of Ottawa (File No. D07-16-09-0018)
Linda Carkner, City of Ottawa, Program Manager, Infrastrucure Services
M. Rick O'Connor, City Clerk, City of Ottawa
Andre Sauve, P.Eng., Atrel Engineering Ltd.

Ontario

Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement climatique

ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 8605-AYUHJG
Issue Date: May 30, 2018

Minto Communities Inc.
180 Kent Street, Suite 200
Ottawa, Ontario
K1P 0B6

Site Location: Avalon Encore – Stage 6
2336 Tenth Line Road
City of Ottawa, Ontario

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

the establishment of wastewater infrastructure Works located in the City of Ottawa, consisting of the following:

storm sewers on Décoeur Drive (from Station 14+084 to Station 14+443), Gardenpost Terrace (from Station 29+418 to Station 29+715), Guppy Grove (Station 33+095 to Station 33+231), Sculpin Street (from Station 37+085 to Station 37+222), Damselfish Walk (from Station 32+099.5 to Station 32+321.5), Aquarium Avenue (from Station 33+243 to Station 34+251), Stickleback Way (from Station 36+089.5 to Station 36+371), Shiner Lane (from Station 35+094 to Station 35+166), Commercial lot 2575 Mer Bleue storm services off Aquarium Avenue, the proposed park and Future Site Plan services off Gardenpost Terrace, discharging to existing municipal sewage system, located on Jerome Jodoin Drive; and

sanitary sewers on Décoeur Drive (from Station 14+089 to Station 14+441), Gardenpost Terrace (from Station 29+420.5 to Station 30+012.5), Guppy Grove (from Station 33+091 to Station 33+248), Sculpin Street (from Station 33+088 to Station 37+220), Damselfish Walk (from Station 32+101 to Station 32+319), Aquarium Avenue (from Station 33+248 to Station 34+243.5), Shiner Lane (from Station 35+091.5 to Station 33+170.5), Jerome Jodoin Drive (from Station 1+854 to Station 1+490), Commercial lot 2575 Mer Bleue sanitary service off Aquarium Avenue, the proposed park, the Future Site Plan services off Gardenpost Terrace and Future School services, discharging to existing sanitary sewers, located on Décoeur Drive; and

ditches on Mer Bleue Road (from Station 8+450 to Station 8+635 (West) and

from Station 9+490 to Station 8+620 (East)) to be re-directed towards the proposed deep inlet catch basin 6 and 7, deep inlet catch basin 4 to be constructed on Mer Bleue Road (Station 8+422 (East)) to drain existing ditch along Mer Bleue Road (from Station 8+371 to Station 8+422 (East)), discharging to the existing municipal sewage system, located on Jerome Jodoin Drive;

including erosion/sedimentation control measures during construction and all other controls and appurtenances essential for the proper operation of the aforementioned Works;

all in accordance with the submitted application and supporting documents listed in Schedule "A" forming part of this Approval.

For the purpose of this environmental compliance approval, the following definitions apply:

1. "*Approval*" means this entire document and any schedules attached to it, and the application;
2. "*Director*" means a person appointed by the Minister pursuant to section 5 of the *EPA* for the purposes of Part II.1 of the *EPA*;
3. "*District Manager*" means the District Manager of the appropriate local District Office of the Ministry, where the *Works* are geographically located;
4. "*EPA*" means the *Environmental Protection Act, R.S.O. 1990, c.E.19 ,* as amended;
5. "*Ministry*" means the ministry of the government of Ontario responsible for the *EPA* and *OWRA* and includes all officials, employees or other persons acting on its behalf;
6. "*Owner*" means Minto Communities Inc., and includes its successors and assignees;
7. "*OWRA*" means the *Ontario Water Resources Act, R.S.O. 1990, c. O.40*, as amended;
8. "*Works*" means the sewage Works described in the *Owner*'s application, and this *Approval*.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. **GENERAL CONDITIONS**
    1. The *Owner* shall ensure that any person authorized to carry out work on or operate any aspect of the *Works* is notified of this *Approval* and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.
    2. Except as otherwise provided by these Conditions, the *Owner* shall design, build, install, operate and maintain the *Works* in accordance with the description given in this *Approval*, and the application for approval of the *Works*.
    3. Where there is a conflict between a provision of any document in the schedule referred to in this *Approval* and the conditions of this *Approval*, the conditions in this *Approval* shall take precedence, and where there is a conflict between the documents in the schedule, the document bearing the most recent date shall prevail.
    4. Where there is a conflict between the documents listed in Schedule "A" and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.
    5. The conditions of this *Approval* are severable. If any condition of this *Approval*, or the application of any requirement of this *Approval* to any circumstance, is held invalid or unenforceable, the application of such condition to other circumstances and the remainder of this *Approval* shall not be affected thereby.

2. EXPIRY OF APPROVAL

1. This *Approval* will cease to apply to those parts of the Works which have not been constructed within five (5) years of the date of this *Approval*.
2. In the event that completion and commissioning of any portion of the *Works* is anticipated to be delayed beyond the specified expiry period, the *Owner* shall submit an application of extension to the expiry period, at least twelve (12) months prior to the end of the period. The application for extension shall include the reason(s) for the delay, whether there is any design change(s) and a review of whether the standards applicable at the time of *Approval* of the *Works* are still applicable at the time of request for extension, to ensure the ongoing protection of the environment.

3. CHANGE OF OWNER

1. The *Owner* shall notify the *District Manager* and the *Director*, in writing, of any of the following changes within thirty (30) days of the change occurring:

    a. change of *Owner*;

    b. change of address of the *Owner*;

    c. change of partners where the *Owner* is or at any time becomes a partnership, and a copy of the most recent declaration filed under the *Business Names Act ,* R.S.O. 1990, c.B17 shall be included in the notification to the *District Manager*; or

    d. change of name of the corporation where the *Owner* is or at any time becomes a corporation, and a copy of the most current information filed under the *Corporations Information Act*, R.S.O. 1990, c. C39 shall be included in the notification to the *District Manager*.

2. In the event of any change in ownership of the *Works*, other than a change to a successor municipality, the *Owner* shall notify in writing the succeeding owner of the existence of this Approval, and a copy of such notice shall be forwarded to the *District Manager* and the Director.
3. The *Owner* shall ensure that all communications made pursuant to this condition refer to the number at the top of this Approval.

4. OPERATION AND MAINTENANCE

1. If applicable, any proposed storm sewers or other stormwater conveyance in this Approval can be constructed but not operated until the proposed stormwater management facilities in this Approval or any other Approval that are designed to service the storm sewers or other stormwater conveyance are in operation.

Schedule "A"

1. Application for Environmental Compliance Approval, dated April 25, 2018, received on May 03, 2018, submitted by Minto Communities Inc.;
2. Transfer of Review Letter of Recommendation, dated April 30, 2018, and signed by Josh White, P.Eng., Senior Engineer - Infrastructure Applications, City of Ottawa.
3.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed to ensure that the Works are constructed and operated in the manner in which they were described and upon which approval was granted. This condition is also included to emphasize the precedence of conditions in the Approval and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review.
2.
3. Condition 2 is included to ensure that, when the Works are constructed, the Works will meet the standards that apply at the time of construction to ensure the ongoing protection of the environment.
4.
5. Condition 3 is included to ensure that the Ministry records are kept accurate and current with respect to the approved Works and to ensure that subsequent owners of the Works are made aware of the Approval and continue to operate the Works in compliance with it.
6.
7. Condition 4 is included to prevent the operation of stormwater pipes and other conveyance until such time that their required associated stormwater management Works are also constructed.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

a. The portions of the environmental compliance approval or each term or condition in the

environmental compliance approval in respect of which the hearing is required, and;

b. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;
5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment and Climate Change
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or** www.ert.gov.on.ca

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 30th day of May, 2018

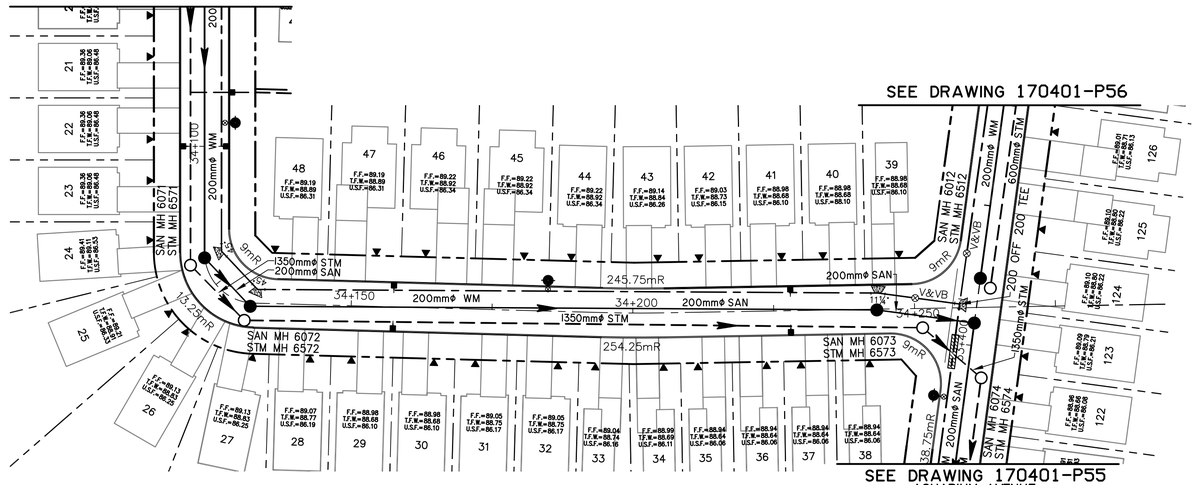
Christina Labarge, P.Eng.
Director
appointed for the purposes of Part II.1 of the *Environmental Protection Act*

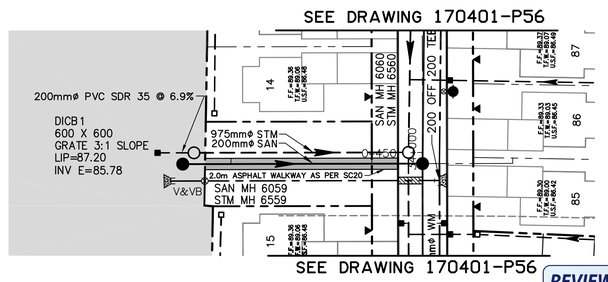
EV/
c: District Manager, MOECC Ottawa
Clerk, City of Ottawa (File No. D07-16-09-0018)
Linda Carkner, Program Manager, City of Ottawa
Domenic Idone, Director, Minto Communities
Josh White, P.Eng., Senior Engineer - Infrastructure Applications, City of Ottawa

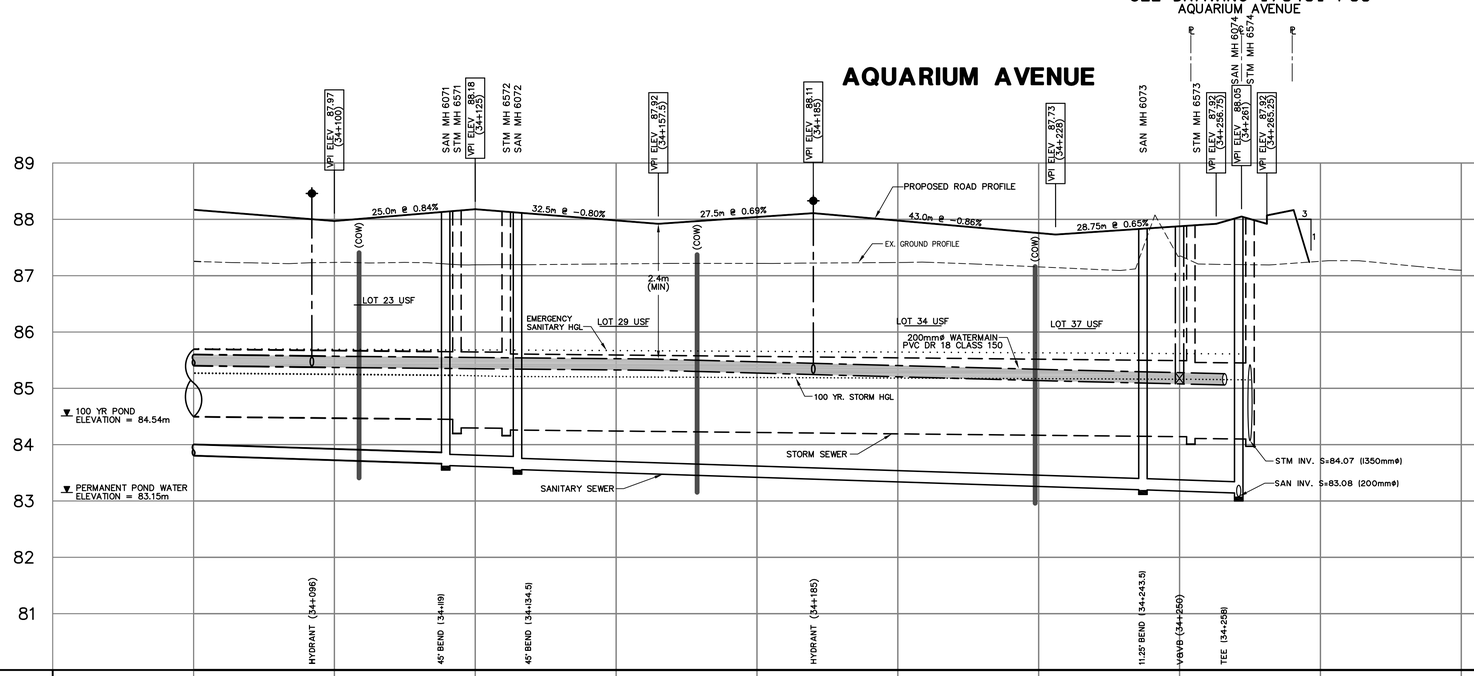
Will Curry, C.E.T., City of Ottawa
Andre Sauve, Atrel Engineering Ltd.

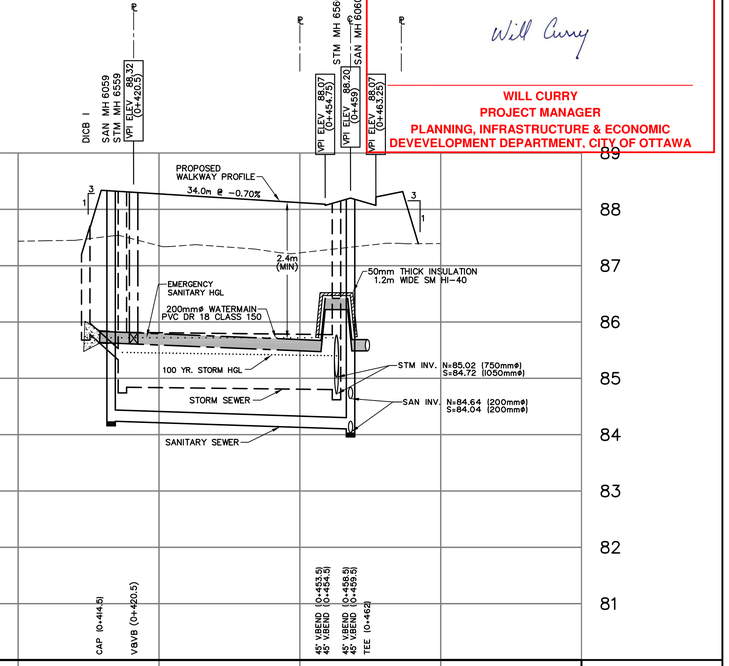
APPENDIX B

Record Drawings









NOTES:

(COW) CUT OFF WALL (1.5m WIDE) SHALL BE INSTALLED AS PER CITY OF OTTAWA'S STANDARD DETAIL DRAWING S8 (SPACED NO MORE THAN 60m APART)

WATERMAIN CROSSING BELOW AND OVER SEWERS SHALL BE AS PER CITY OF OTTAWA'S STANDARD DETAIL DRAWINGS W25 AND W25.2 RESPECTIVELY.

(SL)	SAFETY LANDING AS PER OPSD 404.020
▨	OUTSIDE PROPOSED DEVELOPMENT

REVIEWED
By WC at 8:23 am, May 28, 2018

Will Curry
WILL CURRY
PROJECT MANAGER
PLANNING, INFRASTRUCTURE & ECONOMIC DEVEVELOPMENT DEPARTMENT, CITY OF OTTAWA

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 △-APPLIES WHEN DRAWING MODIFIED	DATE	BY
1	AS PER CITY COMMENTS	MAR. 16/18	AGS
2	ISSUED FOR TENDER	MAR. 28/18	AGS
3	AS PER CITY COMMENTS	APR. 26/18	AGS
4	ISSUED FOR CONSTRUCTION	MAY 7/18	AGS
5	AS PER CITY COMMENTS	MAY 17/18	AGS

SCALE
1:500
5m 0 15m
HORIZONTAL
1:50
0.5m 0 1.5m
VERTICAL

DESIGN	PLM
CHECKED	AGS
DRAWN	PNC
CHECKED	AGS
APPROVED	AGS

LICENSED PROFESSIONAL ENGINEER
A. G. Y. SAUVE
100142393
May 17, 2018
PROVINCE OF ONTARIO

ATREL Engineering Ltd Ltée
Engineers - Ingénieurs
1-2884 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4K 1M6
TEL.: (613) 446-7423

CITY OF OTTAWA
EAST URBAN COMMUNITY
AVALON ENCORE STAGE 6

MINTO COMMUNITIES INC.

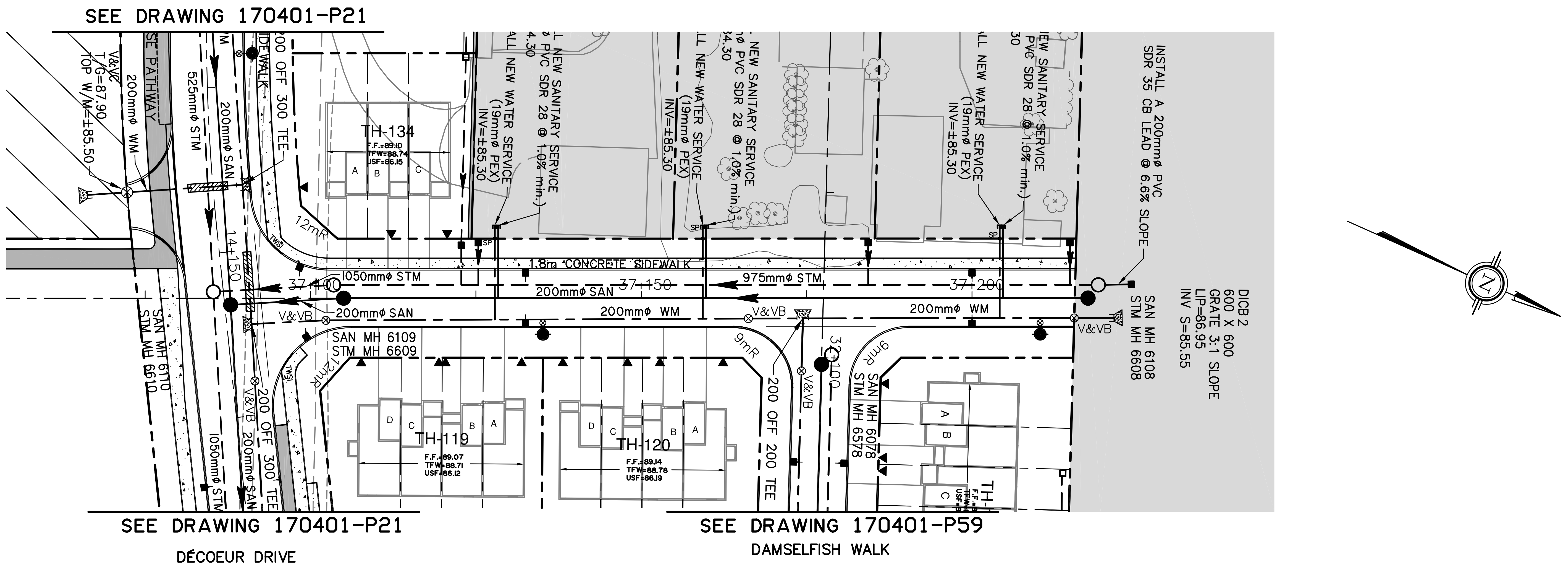
CLIENT No.
148
PROJECT No.
170401

PLAN AND PROFILE
AQUARIUM AVENUE & COMMERCIAL WALKWAY
STATION 34+075 TO STATION 34+300
STATION 0+400 TO STATION 0+475

DRAWING No.
170401-P58

D07-16-09-0018-STAGE 6

16796



NOTES:

(COW) CUT OFF WALL (1.5m WIDE) SHALL BE INSTALLED AS PER CITY OF OTTAWA'S STANDARD DETAIL DRAWING S8 (SPACED NO MORE THAN 60m APART)

WATERMAIN CROSSING BELOW AND OVER SEWERS SHALL BE AS PER CITY OF OTTAWA'S STANDARD DETAIL DRAWINGS W25 AND W25.2 RESPECTIVELY.

(SL) SAFETY LANDING AS PER OPSD 404.020

▨ OUTSIDE PROPOSED DEVELOPMENT

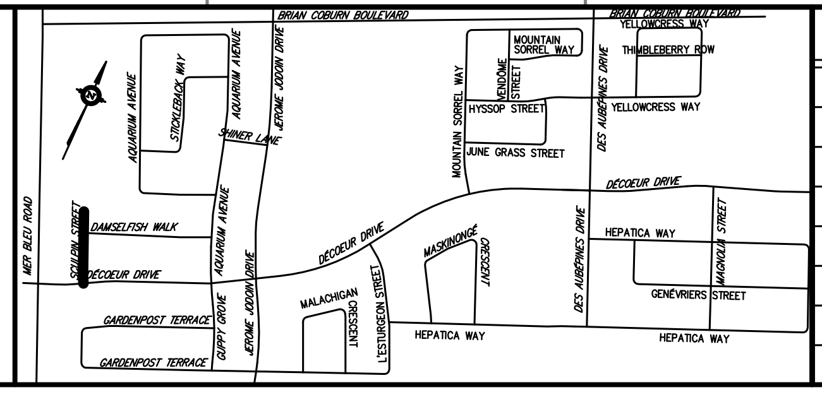
RECORD DRAWING

JANUARY 23, 2019

THIS "RECORD DRAWING" HAS BEEN PREPARED BASED ON INSPECTIONS AND OBSERVATIONS UNDERTAKEN BY ATREL ENGINEERING LTD. STAFF DURING KEY STAGES OF CONSTRUCTION AND ON INFORMATION SUBMITTED, IN PART BY OTHERS. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, ATREL ENGINEERING LTD. IS NOT RESPONSIBLE FOR ITS ACCURACY, OR FOR ERRORS OR OMISSIONS THAT MAY HAVE BEEN INCORPORATED INTO THIS DRAWING AS A RESULT.

SCULPIN STREET

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 △-APPLIES WHEN DRAWING MODIFIED	DATE	BY
△3	AS PER CITY COMMENTS	APR. 26/18	AGS
△4	ISSUED FOR CONSTRUCTION	MAY 7/18	AGS
△5	AS PER CITY COMMENTS	MAY 17/18	AGS
△6	UPDATED WITH PRELIMINARY UTILITY DESIGNS	JUNE 21/18	AGS
△7	AS PER UTILITY COMMENTS	JULY 13/18	AGS
△8	ISSUED FOR APPROVAL	AUG. 2/18	AGS
△9	AS PER CITY COMMENTS	AUG. 22/18	AGS
△10	RECORD DRAWING	JAN. 23/19	AGS

SCALE
1:500 HORIZONTAL (5m 0 15m)
1:50 VERTICAL (0.5m 0 1.5m)

DESIGN PLM
CHECKED AGS
DRAWN PNC
CHECKED AGS
APPROVED AGS

ATREL Engineering Ltd Ltée
Engineers - Ingénieurs
1-2884 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4K 1M6
TEL.: (613) 446-7423

CITY OF OTTAWA
EAST URBAN COMMUNITY
AVALON ENCORE STAGE 6

MINTO COMMUNITIES INC.

CLIENT No. 148
PROJECT No. 170401
DRAWING No. 170401-P62

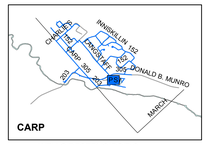
PLAN AND PROFILE
SCULPIN STREET
STATION 37+075 TO STATION 37+250

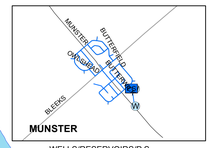
D07-16-09-0018-STAGE 6

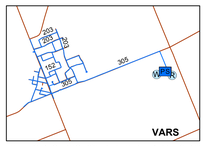
APPENDIX C

Water Supply

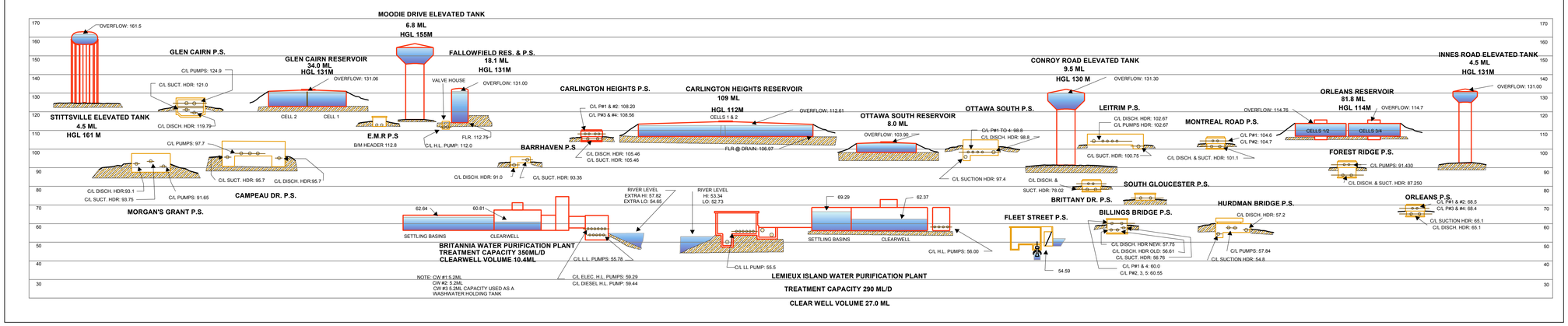
City of Ottawa - Water Distribution System
Facilities & Feedermains







ORLEANS P.S.
FOREST RIDGE P.S
Ogilvie Rd. Backup P.S.
ORLEANS RES.
MONTREAL ROAD P.S.
BRITTANY DRIVE P.S.
FLEET STREET P.S.
LEMIEUX ISLAND PURIFICATION PLANT & P.S. & RES.
INNES RD ELEVATED TANK
SUBJECT SITE
HURDMAN P.S.
Innes Rd Backup P.S.
Innes Rd/BearBrook Rd Backup P.S.
BRITANNIA PURIFICATION PLANT & P.S. & RES.
BILLINGS BRIDGE P.S.
MORGAN'S GRANT P.S.
CAMPEAU DR. P.S.
ENERGY MINES & RESOURCES P.S.
CARLINGTON HEIGHTS P.S. & RES.
CONROY RD ELEVATED TANK
SOUTH GLOUCESTER P.S.
LEITRIM P.S.
GLEN CAIRN P.S. & RES
BARRHAVEN P.S.
Merivale Rd. Backup P.S.
OTTAWA SOUTH P.S & RES.
FALLOWFIELD RD. RES. & P.S.
STITTSVILLE ELEVATED TANK
Abbott/Iber St. Backup P.S.
MOODIE ELEVATED TANK
SHADOW RIDGE P.S. & WELLS
1E
1W
2E
2W2C
3C
3W
4C
ME
EMR
BARR



Legend

Water System Structure

- Pump Station
- Backup Pump Station
- Water Treatment Plant
- Well
- Elevated Tank
- Reservoir

WATERMAINS

Priority, Internal Diameter

- Backbone 1524mm - 1981mm
- Backbone 1067mm - 1372mm
- Backbone 610mm - 914mm
- Backbone 406mm - 508mm
- Backbone 152mm - 305mm
- Distribution 1676mm - 1981mm
- Distribution 1067mm - 1372mm
- Distribution 610mm - 914mm
- Distribution 406mm - 508mm
- Distribution 305mm - 381mm

PRESSURE ZONES

- 1E
- 1W
- 2E
- 2W2C
- 3C
- 3W
- 4C
- BARR
- EMR
- ME
- MG
- MONT
- SHADOW RIDGE

N
W E
S

Ottawa

Planning, Infrastructure and Economic Development Department
Right of Way, Heritage & Urban Design Services
Infrastructure Services

0 1,000 2,000 4,000 6,000
Meters

FIGURE 1-1

Drawn By: Gis & Data Management

Date:23- Oct- 2017

4.0 WATERMAIN ANALYSIS

4.1 Background and Boundary Conditions

This watermain analysis was carried out using the "H2ONET v.5.0" program as a design aid. The governing authorities design guidelines used during this analysis are the City of Ottawa's Design Guidelines for Water Distribution and the Technical Bulletin ISDTB-2014-02 - "Revision to Ottawa Design Guidelines - Water".

The following table summarizes the population densities imposed by the City of Ottawa's Guidelines which were used for the purpose of this study.

Unit Type	Population Density
Townhomes	2.7
Singles	3.4

The water demands for the site were calculated using an average daily consumption rate of 350 l/c.d for residential dwellings and of 28,000 l/ha/d for both commercial and institutional lots. The table below condenses the calculated results for demands under average day, maximum day and peak hour conditions for the proposed site.

Type of Development	Average Daily Demand	Maximum Daily Demand	Peak Hour Demand
Residential	350 l/c.d	2.5 x Average Day	5.5 x Average Day
Commercial	28,000 l/ha./d	1.5 x Average Day	1.8 x Average Day
Institutional	28,000 l/ha./d	1.5 x Average Day	1.8 x Average Day
Avalon Encore – Stage 6	10.1720 l/s	24.0060 l/s	55.9465 l/s

Boundary conditions were provided by the City of Ottawa for all proposed connection locations (Refer to Avalon Encore Stage 6 – Boundary Conditions for details):

- Intersection of Brian Coburn Blvd and Jerome Jodoin Dr. (ex. 300mm watermain)
- Intersection of Mer Bleue Rd. and Décoeur Dr. (ex. 400mm watermain stub)
- Intersection of Jerome Jodoin Dr. and Décoeur Dr. (ex. 300mm watermain stubs)
- Intersection of Jerome Jodoin Dr. and Gardenpost Terrace (ex. 300mm watermain stub)

Please refer to plan 170401-WA1 in Appendix "E" for connection point location details and proposed watermain layout.

The following table summarizes the boundary conditions provided by the City that were used for the purpose of this analysis

Connection Scenarios	Brian Coburn Blvd. and Jérome Jodoin Dr.	Mer Bleue Rd. and Décoeur Dr.	Jérome Jodoin Dr. and Décoeur Dr.	Jérome Jodoin Dr. and Gardenpost Ter.
Average Day	130.3 m	130.4 m	130.1 m	130.5 m
Peak Hour	125.2 m	125.8 m	124.5 m	125.7 m
Max. Day + Fireflow (167 l/s)	126.1 m	124.2 m	124.2 m	124.4 m
Max. Day + Fireflow (200 l/s)	125.5 m	125.3 m	122.2 m	122.2 m
Max. Day + Fireflow (250 l/s)	124.7 m	124.3 m	119.7 m	121.2 m

4.2 Assessment of the Watermain System

The analysis was executed under average day and peak hour conditions (Refer to sketch 170401-WA2 in Appendix "E" for average day demands).

The system was designed and verified in order to satisfy residual pressure requirements from the City of Ottawa's Design Guidelines for Water Distribution which ranges from 276 kPa to 552 kPa during average day and peak hour demands. Additionally, the system was checked with a reduction in pressure of 29.43 kPa in order to simulate demands at the third floor levels of possible terrace units. The additional 29.43 kPa was calculated as 3 m x 9.81 kPa/m. The following table summarizes maximum and minimum residual pressures throughout the network for each condition, additionally; tables 30 to 33 in Appendix "E" show all relevant calculations and results from these analyses.

Condition	Min. Head (m)	Min. Pressure (kPa)	Max. Head (m)	Max. Pressure (kPa)
Average Day	41.63	407.98	42.98	421.14
Peak Hour	36.26	355.29	37.98	372.18

Fire-flows of 167, 200 and 250 l/s were also simulated throughout the system during maximum day demand. The system was designed and verified in order to withstand fire flow demands while satisfying minimum residual pressure requirements of 140 kPa. The future site plan was evaluated using the typical Infusion terrace model from Minto Communities Inc. which yields a required fire flow of 200 l/s. Furthermore, the commercial lot located at the south-eastern quadrant of Brian Coburn Boulevard and Mer Bleue Road will be provided with two 200 mm diameter watermains which will yield an available flow of 215.59 l/s for the southern parcel and 169.05 l/s for the northern parcel while providing a residual pressure of 140 kPa. The commercial block can also be serviced by the existing 400 mm diameter watermain located on Brian Coburn Boulevard and Mer Bleue Road if additional flows are required during the detail design.

4.3 Fire Underwriters Survey (FUS)

The Fire Underwriters Survey provides guidance for the calculation of required fire flows. Fire flows of 167, 200 and 250 l/s were simulated throughout the system during maximum day demands (Refer to Table 35 in Appendix "E" for the FUS analytical process).

The maximum day plus fire flow analysis was conducted in two parts, first, the fire flow demand for each typical unit was calculated and, secondly, a maximum day plus fire-flow analysis was executed at each node using the worst case scenario from surrounding units.

In summary, the watermain pipe sizing was governed by the fire flow demands of the site as they are much greater than average day and peak hour demands. All relevant fire flow calculations and results are found in Table 34 in Appendix "E".

5.0 BEST MANAGEMENT PRATICES

To minimize the impact of the development to the watercourse, it is suggested to implement various mitigating measures mainly to reduce the suspended solids as follows:

i) A sump of at least 600mm will be provided in all catchbasins in order to minimize the amount of suspended solids from entering the sewer system.

ii) Each inlet catch basin will be controlled by an inlet controlled device, which will reduce the runoff rate.

iii) Generally the swale slopes are between 1.5 to 2.0%, which are the minimum grades as required by the City of Ottawa. A subdrain will be installed where a swale of less than 1.5% slope is proposed as shown on the plans. These grassed swales will slow down the runoff and provide an opportunity for infiltration.

iv) During construction, filter cloth will be placed under all catch basin and manhole frame and covers, siltation curtains and straw bales will be placed wherever water runoff can carry excessive sediments into the sewer system.

v) To prevent the event where water runoff would get into the storm sewer during construction, temporary construction ICDs will be installed at the various outlet of the proposed development. Refer to Appendix "B" Table 10 to 12 for Orifice sizing and location.

vi) To prevent the event where water runoff would get into the sanitary sewer during construction, a temporary construction ICD would need to be installed ahead of any construction of the proposed development. Refer to Appendix "D" Tables 20 & 21 for Orifice sizing and location.

Avalon Encore Stage 6 - Boundary Conditions

Information Provided:

Date provided October 2017

Provided Information:

Scenario	Demand	
	L/min	L/s
Average Daily Demand	607.69	10.1
Maximum Daily Demand	1277.92	21.3
Peak Hour	2449.47	40.8
Fire Flow Demand # 1	10000	166.7
Fire Flow Demand # 2	12000	200.0
Fire Flow Demand # 3	15000	250.0

Location:

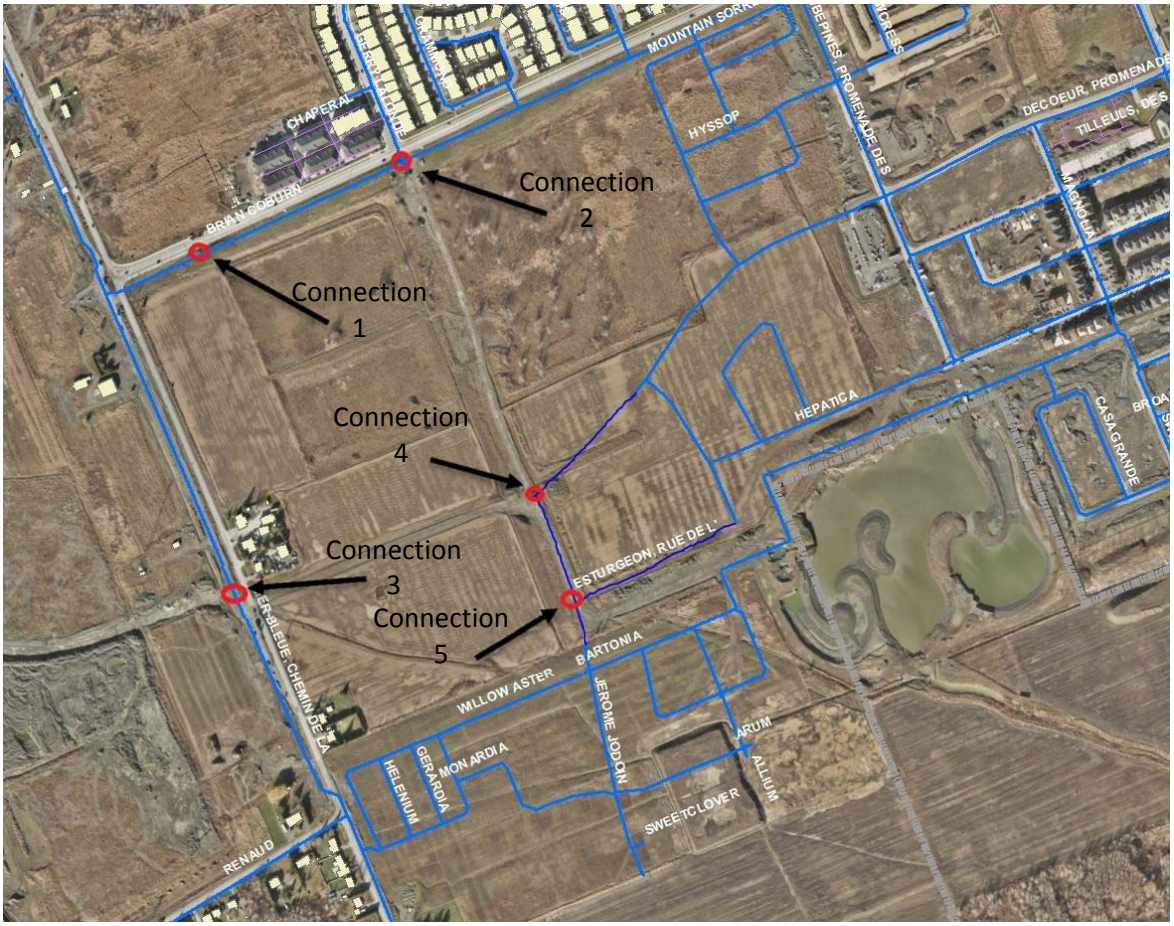


Figure 1 - Connection points

Results:

Connection 1 - Brian Coburn Blvd

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.4	59.8
Peak Hour	125.7	53.1
Max Day plus Fire (10,000 l/min)	126.4	54.1
Max Day plus Fire (12,000 l/min)	125.5	53.6
Max Day plus Fire (15,000 l/min)	124.7	52.5

[1] Ground Elevation = 88.3 m

Connection 2 - Brian Coburn Blvd and Gerry Lalonde Dr.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.3	60.4
Peak Hour	125.2	53.2
Max Day plus Fire (10,000 l/min)	126.1	54.5
Max Day plus Fire (12,000 l/min)	125.5	53.6
Max Day plus Fire (15,000 l/min)	124.7	52.5

[1] Ground Elevation = 87.9 m

Connection 3 - Mer Bleue Rd

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.4	61.5
Peak Hour	125.8	54.9
Max Day plus Fire (10,000 l/min)	124.2	52.6
Max Day plus Fire (12,000 l/min)	125.3	55.3
Max Day plus Fire (15,000 l/min)	124.3	52.8

[1] Ground Elevation = 87.2 m

Connection 4 – Gerry Lalonde Dr. and Decoeur Prom.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.1	61.1
Peak Hour	124.5	53.1
Max Day plus Fire (10,000 l/min)	124.2	52.6
Max Day plus Fire (12,000 l/min)	122.2	49.8
Max Day plus Fire (15,000 l/min)	119.7	46.3

[1] Ground Elevation = 87.1 m

Connection 5 – Gerry Lalonde Dr. and Hepatica

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.5	61.8
Peak Hour	125.7	55.1
Max Day plus Fire (10,000 l/min)	124.4	53.3
Max Day plus Fire (12,000 l/min)	122.2	49.8
Max Day plus Fire (15,000 l/min)	121.2	48.7

[1] Ground Elevation = 86.9 m

Notes:

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 D

Wastewater Collection

LEGEND

- 0.63ha / 10 / 40 — SANITARY DRAINAGE SUB AREA / POPULATION EQUIVALENT
- NUMBER OF UNITS IN SUB AREA
- DRAINAGE AREA BOUNDARY
- PROPOSED SANITARY SEWER
- EXISTING SANITARY SEWER
- OUTSIDE PROPOSED DEVELOPMENT
- SITE PLAN APPROVAL

REVIEWED
By WC at 8:47 am, May 28, 2018

Will Curry

WILL CURRY
PROJECT MANAGER
PLANNING, INFRASTRUCTURE & ECONOMIC
DEVEVELOPMENT DEPARTMENT, CITY OF OTTAWA

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 △-APPLIES WHEN DRAWING MODIFIED	DATE	BY
1	AS PER CITY COMMENTS	MAR. 16/18	AGS
2	ISSUED FOR TENDER	MAR. 28/18	AGS
3	AS PER CITY COMMENTS	APR. 26/18	AGS
4	ISSUED FOR CONSTRUCTION	MAY 7/18	AGS
5	AS PER CITY COMMENTS	MAY 17/18	AGS

SCALE 1:750 (8m 0 24m)

DESIGN PLM · CHECKED AGS · DRAWN PNC · CHECKED PLM · APPROVED AGS

LICENSED PROFESSIONAL ENGINEER — A. G. Y. SAUVE — 100142393 — May 17, 2018 — PROVINCE OF ONTARIO

ATREL Engineering Ltd. Ltée.
Engineers - Ingénieurs
1-2884 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4K 1M6
TEL.: (613) 446-7423

CITY OF OTTAWA
EAST URBAN COMMUNITY
AVALON ENCORE STAGE 6

MINTO COMMUNITIES INC.

PLAN
SANITARY DRAINAGE AREA PLAN

CLIENT No. 148
PROJECT No. 170401
DRAWING No. 170401-SANI

D07-16-09-0018-STAGE 6

16796

LEGEND

- 0.63ha / 10 / 40 — SANITARY DRAINAGE SUB AREA; POPULATION EQUIVALENT
- NUMBER OF UNITS IN SUB AREA
- DRAINAGE AREA BOUNDARY
- PROPOSED SANITARY SEWER
- EXISTING SANITARY SEWER
- OUTSIDE PROPOSED DEVELOPMENT
- SITE PLAN APPROVAL

REVIEWED
By WC at 8:48 am, May 28, 2018

Will Curry

WILL CURRY
PROJECT MANAGER
PLANNING, INFRASTRUCTURE & ECONOMIC
DEVEVELOPMENT DEPARTMENT, CITY OF OTTAWA

AQUARIUM AVENUE
STICKLEBACK WAY
SHINER LANE
JEROME JODOIN DRIVE
SAN MH 6001
SAN MH 6002
SAN MH 6003
SAN MH 6004
SAN MH 6005
SAN MH 6006
SAN MH 6007
SAN MH 6008
SAN MH 6009
SAN MH 6010
SAN MH 6011
SAN MH 6012
SAN MH 6013
SAN MH

SANITARY SEWER COMPUTATION FORM

Table 22

DATE: **March, 2018**
DESIGNED BY: PLM
CHECKED BY: AGS

PROJECT: Neighbourhood 5 - Avalon Encore - Stage 6
CLIENT: Minto Communities Inc.
PROJECT #: 170401
BY: ATREL ENGINEERING LTD

q= 350 l/cap.day
i= 0.28 l/ha.s
PVC/CONC N= 0.013
OTHER N= 0.024

Townhouse= 2.7 person/unit
Back to Back= 2.7 person/unit
Single Dwellings= 3.4 person/unit

STREET NAMES	LOCATION FROM (Up)		TO (Down)		RESIDENTIAL INDIVIDUAL AREA (ha.)	INDIVIDUAL POP.	CUMULATIVE AREA (ha.)	CUMULATIVE POP.	PEAKING FACTOR M	FLOW Q(p) (L/S)	COMMERCIAL , INSTITUTIONAL INDIVIDUAL AREA (ha.)	INDIVIDUAL POP.	CUMULATIVE AREA (ha.)	CUMULATIVE POP.	PEAKING FACTOR M	FLOW Q(p) (L/S)	PEAK EXT.FLOW Q(i) (L/S)	**PEAK DES. Q(d) (L/S)**	SEWER DATA TYPE PIPE	DIA. (N0M) (mm)	(ACT) (MM)	SLOPE (%)	LENGTH (M)	CAP. (L/S)	Remaining Capacity (%)	VEL. (M/S)	UpStream Obv. (M)	UpStream Inv. (M)	DwnStream Obv. (M)	DwnStream Inv. (M)	HGL at UP-MH (M)	HGL Out UP-MH (M)	HGL at Down MH (M)	USF ELEV. (M)	FREEBOARD HGL (M)	FREEBOARD REQUIREMENT SATISFIED
Aquarium Avenue	MH	6001	MH	6002	0.34	21.0	0.34	21	4.00	0.34							0.10	0.44	PVC	200	201.2	0.65	68.5	26.86	98%	0.84	85.77	85.57	85.32	85.12	85.48	85.48	85.48	86.47	0.70	YES
Aquarium Avenue	MH	6002	MH	6003	0.33	21.0	0.67	42	4.00	0.68							0.19	0.87	PVC	200	201.2	0.32	72.0	18.93	95%	0.60	85.32	85.12	85.09	84.89	85.48	85.48	85.48	86.40	0.92	YES
Aquarium Avenue	MH	6003	MH	6004	0.10	4.0	0.77	46	4.00	0.75							0.22	0.96	PVC	200	201.2	0.32	11.5	18.93	95%	0.60	85.06	84.86	85.02	84.82	85.48	85.48	85.48	86.48	1.00	YES
Aquarium Avenue	MH	6004	MH	6010	0.33	24.0	1.10	70	4.00	1.13							0.31	1.44	PVC	200	201.2	0.32	68.0	18.93	92%	0.60	84.66	84.46	84.44	84.24	85.48	85.48	85.48	86.22	0.74	YES
Stickleback Way	MH	6007	MH	6008	0.34	24.0	0.34	24	4.00	0.39							0.10	0.48	PVC	200	201.2	0.65	37.0	26.86	98%	0.84	85.74	85.54	85.50	85.30	85.50	85.50	85.50	86.35	0.61	YES
Stickleback Way	MH	6008	MH	6009	0.11	4.0	0.45	28	4.00	0.45							0.13	0.58	PVC	200	201.2	0.32	10.5	18.93	97%	0.60	85.47	85.27	85.44	85.24	85.48	85.48	85.48	86.57	1.09	YES
Stickleback Way	MH	6009	MH	6010	0.35	21.0	0.80	49	4.00	0.79							0.22	1.02	PVC	200	201.2	0.32	71.0	18.93	95%	0.60	85.27	85.07	85.04	84.84	85.48	85.48	85.48	86.40	0.92	YES
Aquarium Avenue	MH	6010	MH	6011	0.47	34.0	2.37	153	4.00	2.48							0.66	3.14	PVC	200	201.2	0.32	62.5	18.93	83%	0.60	84.44	84.24	84.24	84.04	85.48	85.48	85.47	86.09	0.61	YES
Aquarium Avenue	MH	6011	MH	6013	0.33	24.0	2.70	177	4.00	2.87							0.76	3.62	PVC	200	201.2	0.32	51.0	18.93	81%	0.60	84.21	84.01	84.05	83.85	85.47	85.47	85.46	86.05	0.58	YES
Aquarium Avenue	MH	6012	MH	6013	0.62	41.0	0.62	41	4.00	0.66							0.17	0.84	PVC	200	201.2	0.65	94.5	26.86	97%	0.84	84.73	84.53	84.12	83.92	85.46	85.46	85.46	86.13	0.67	YES
Shiner Lane	MH	6013	MH	6025	0.12		3.44	218	4.00	3.53							0.96	4.50	PVC	200	201.2	1.00	79.0	33.31	87%	1.05	83.71	83.51	82.92	82.72	85.46	85.46	85.45	n/a	n/a	n/a
Jerome Jodoin	MH	6015	MH	6020	0.56	28.0	0.56	28	4.00	0.45							0.16	0.61	PVC	200	201.2	1.20	86.0	36.49	98%	1.15	85.36	85.16	84.33	84.13	85.55	85.55	85.55	86.27	0.72	YES
School	MH	6019	MH	6020							7.68	1098.0	7.68	1098	1.50	6.67	2.15	8.82	PVC	200	201.2	0.65	13.5	26.86	67%	0.84	83.88	83.68	83.79	83.59	85.56	85.56	85.55	n/a	n/a	n/a
Jerome Jodoin	MH	6020	MH	6025	0.48	24.0	1.04	52	4.00	0.84			7.68	1098	1.50	6.67	2.44	9.96	PVC	200	201.2	0.32	97.5	18.93	47%	0.60	83.73	83.53	83.42	83.22	85.55	85.54	85.45	86.17	0.63	YES
Jerome Jodoin	MH	6025	MH	6026	0.34	17.0	4.82	287	4.00	4.65			7.68	1098	1.50	6.67	3.50	14.82	PVC	300	299.2	0.20	69.5	42.94	65%	0.61	82.92	82.62	82.78	82.48	85.45	85.45	85.43	86.15	0.70	YES
Jerome Jodoin	MH	6026	MH	6027	0.41	21.0	5.23	308	4.00	4.99			7.68	1098	1.50	6.67	3.61	15.28	PVC	300	299.2	0.20	75.0	42.94	64%	0.61	82.78	82.48	82.63	82.33	85.43	85.43	85.41	86.04	0.61	YES
Jerome Jodoin	MH	6027	MH	5050	0.45	28.0	5.68	336	4.00	5.44			7.68	1098	1.50	6.67	3.74	15.86	PVC	300	299.2	0.20	95.5	42.94	63%	0.61	82.63	82.33	82.44	82.14	85.41	85.41	85.38	85.95	0.54	YES
Aquarium Avenue	MH	6050	MH	6051	0.47	34.0	0.47	34	4.00	0.55							0.13	0.68	PVC	200	201.2	0.65	76.5	26.86	97%	0.84	85.62	85.42	85.12	84.92	85.72	85.72	85.72	86.54	0.82	YES
Aquarium Avenue	MH	6051	MH	6060	0.65	45.0	1.12	79	4.00	1.28							0.31	1.59	PVC	200	201.2	0.32	87.0	18.93	92%	0.60	85.12	84.92	84.84	84.64	85.72	85.72	85.72	86.45	0.73	YES
Commercial	MH	6059	MH	6060							2.20	314.0	2.20	314	1.50	1.91	0.62	2.52	PVC	200	201.2	0.32	42.5	18.93	87%	0.60	84.44	84.24	84.30	84.10	85.72	85.72	85.72	n/a	n/a	n/a
Aquarium Avenue	MH	6060	MH	6070	0.25	14.0	1.37	93	4.00	1.51			2.20	314	1.50	1.91	1.00	4.41	PVC	200	201.2	0.32	49.5	18.93	77%	0.60	84.24	84.04	84.08	83.88	85.72	85.72	85.71	86.40	0.68	YES
Stickleback Way	MH	6064	MH	6065	0.51	34.0	0.51	34	4.00	0.55							0.14	0.69	PVC	200	201.2	0.65	72.0	26.86	97%	0.84	85.47	85.27	85.00	84.80	85.71	85.71	85.71	86.37	0.66	YES
Stickleback Way	MH	6065	MH	6066	0.16	7.0	0.67	41	4.00	0.66							0.19	0.85	PVC	200	201.2	0.32	11.5	18.93	95%	0.60	84.97	84.77	84.93	84.73	85.71	85.71	85.71	86.34	0.63	YES
Stickleback Way	MH	6066	MH	6070	0.46	34.0	1.13	75	4.00	1.22							0.32	1.53	PVC	200	201.2	0.32	63.0	18.93	92%	0.60	84.90	84.70	84.70	84.50	85.71	85.71	85.71	86.31	0.60	YES
Aquarium Avenue	MH	6070	MH	6071	0.35	24.0	2.85	192	4.00	3.11			2.20	314	1.50	1.91	1.41	6.43	PVC	200	201.2	0.32	68.5	18.93	66%	0.60	84.08	83.88	83.86	83.66	85.71	85.71	85.68	86.44	0.73	YES
Aquarium Avenue	MH	6071	MH	6072	0.15	7.0	3.00	199	4.00	3.22			2.20	314	1.50	1.91	1.46	6.59	PVC	200	201.2	0.32	11.5	18.93	65%	0.60	83.83	83.63	83.79	83.59	85.68	85.68	85.68	86.25	0.57	YES
Aquarium Avenue	MH	6072	MH	6073	0.85	68.0	3.85	267	4.00	4.33			2.20	314	1.50	1.91	1.69	7.93	PVC	200	201.2	0.32	111.0	18.93	58%	0.60	83.76	83.56	83.40	83.20	85.68	85.68	85.62	86.06	0.38	YES
Aquarium Avenue	MH	6073	MH	6074	0.11	7.0	3.96	274	4.00	4.44			2.20	314	1.50	1.91	1.72	8.07	PVC	200	201.2	0.32	17.5	18.93	57%	0.60	83.40	83.20	83.34	83.14	85.62	85.62	85.61	86.21	0.59	YES
Aquarium Avenue	MH	6074	MH	6075	0.22	13.0	4.18	287	4.00	4.65			2.20	314	1.50	1.91	1.79	8.34	PVC	200	201.2	0.32	46.5	18.93	56%	0.60	83.28	83.08	83.13	82.93	85.61	85.61	85.58	86.02	0.41	YES
Aquarium Avenue	MH	6075	MH	6080	0.13	11.0	4.31	298	4.00	4.83			2.20	314	1.50	1.91	1.82	8.56	PVC	200	201.2	0.32	27.5	18.93	55%	0.60	83.13	82.93	83.04	82.84	85.58	85.58	85.56	86.02	0.44	YES
Damselfish Walk	MH	6078	MH	6079	0.81	81.0	0.81	81	4.00	1.31							0.23	1.54	PVC	200	201.2	0.65	117.0	26.86	94%	0.84	84.64	84.44	83.88	83.68	85.57	85.57	85.57	86.09	0.52	YES
Damselfish Walk	MH	6079	MH	6080	0.71	71.0	1.52	152	4.00	2.46							0.43	2.89	PVC	200	201.2	0.32	101.0	18.93	85%	0.60	83.88	83.68	83.55	83.35	85.57	85.57	85.56	85.98	0.41	YES
Aquarium Avenue	MH	6080	MH	6081	0.33	25.0	6.16	475	3.99	7.67			2.20	314	1.50	1.91	2.34	11.92	PVC	200	201.2	0.32	69.5	18.93	37%	0.60	83.04	82.84	82.82	82.62	85.56	85.56	85.47	85.98	0.42	YES
Aquarium Avenue	MH	6081	MH	6170			6.16	475	3.99	7.67			2.20	314	1.50	1.91	2.34	11.92	PVC	200	201.2	0.32	13.0	18.93	37%	0.60	82.82	82.62	82.78	82.58	85.47	85.47	85.45	n/a	n/a	n/a
Decoeur Drive	MH	6100	MH	6110	0.31	14.0	0.31	14	4.00	0.23							0.09	0.31	PVC	300 200	201.2	1.20	68.5	36.49	99%	1.15	84.87	84.67	84.05	83.85	85.51	85.51	85.51	86.16	0.65	YES
Sculpin Street	MH	6108	MH	6109	0.44	27.0	0.44	27	4.00	0.44	2.52	360.0	2.52	360	1.50	2.19	0.83	3.45	PVC	200	201.2	0.32	112.5	18.93	82%	0.60	84.20	84.00	83.84	83.64	85.52	85.52	85.51	86.12	0.60	YES
Sculpin Street	MH	6109	MH	6110			0.44	27	4.00	0.44			2.52	360	1.50	2.19	0.83	3.45	PVC	200	201.2	0.32	17.0	18.93	82%	0.60	83.84	83.64	83.79	83.59	85.51	85.51	85.51	n/a	n/a	n/a
Decoeur Drive	MH	6110	MH	6111	0.16	3.0	0.91	44	4.00	0.71			2.52	360	1.50	2.19	0.96	3.86	PVC	200	201.2	0.32	48.0	18.93	80%	0.60	83.73	83.53	83.57	83.37	85.51	85.51	85.50	86.06	0.55	YES
Decoeur Drive	MH	6111	MH	6112	0.51	36.0	1.42	80	4.00	1.30			2.52	360	1.50	2.19	1.10	4.59	PVC	200	201.2	0.32	86.5	18.93	76%	0.60	83.57	83.37	83.29	83.09	85.50	85.50	85.48	86.00	0.50	YES
Decoeur Drive	MH	6112	MH	6170	0.73	63.0	2.15	143	4.00	2.32			2.52	360	1.50	2.19	1.31	5.81	PVC	200	201.2	0.32	95.0	18.93	69%	0.60	83.29	83.09	82.98	82.78	85.48	85.48	85.45	85.96	0.48	YES

SANITARY SEWER COMPUTATION FORM

Table 22

DATE: **March, 2018**
DESIGNED BY: PLM
CHECKED BY: AGS

PROJECT: Neighbourhood 5 - Avalon Encore - Stage 6
CLIENT: Minto Communities Inc.
PROJECT #: 170401
BY: ATREL ENGINEERING LTD

q= 350 l/cap.day
i= 0.28 l/ha.s
PVC/CONC N= 0.013
OTHER N= 0.024

Townhouse= 2.7 person/unit
Back to Back= 2.7 person/unit
Single Dwellings= 3.4 person/unit

STREET NAMES	LOCATION FROM (Up)		TO (Down)		RESIDENTIAL INDIVIDUAL AREA (ha.)	INDIVIDUAL POP.	CUMULATIVE AREA (ha.)	CUMULATIVE POP.	PEAKING FACTOR M	FLOW Q(p) (L/S)	COMMERCIAL , INSTITUTIONAL INDIVIDUAL AREA (ha.)	INDIVIDUAL POP.	CUMULATIVE AREA (ha.)	CUMULATIVE POP.	PEAKING FACTOR M	FLOW Q(p) (L/S)	PEAK EXT.FLOW Q(i) (L/S)	**PEAK DES. Q(d) (L/S)**	SEWER DATA TYPE PIPE	DIA. (N0M) (mm)	(ACT) (MM)	SLOPE (%)	LENGTH (M)	CAP. (L/S)	Remaining Capacity (%)	VEL. (M/S)	UpStream Obv. (M)	UpStream Inv. (M)	DwnStream Obv. (M)	DwnStream Inv. (M)	HGL at UP-MH (M)	HGL Out UP-MH (M)	HGL at Down MH (M)	USF ELEV. (M)	FREEBOARD HGL (M)	FREEBOARD REQUIREMENT SATISFIED
Easement	MH	6119	MH	6120	0.37	7.0	0.37	7	4.00	0.11							0.10	0.22	PVC	200	201.2	0.65	36.0	26.86	99%	0.84	85.70	85.50	85.47	85.27	85.48	85.48	85.48	n/a	n/a	n/a
Gardenpost Terrace	MH	6120	MH	6121	0.79	76.0	1.16	83	4.00	1.34							0.32	1.67	PVC	200	201.2	0.32	120.0	18.93	91%	0.60	85.41	85.21	85.02	84.82	85.48	85.48	85.48	86.07	0.59	YES
Gardenpost Terrace	MH	6121	MH	6126	0.90	92.0	2.06	175	4.00	2.84							0.58	3.41	PVC	200	201.2	0.32	120.0	18.93	82%	0.60	85.02	84.82	84.63	84.43	85.48	85.48	85.47	85.78	0.30	YES
Gardenpost Terrace	MH	6125	MH	6126	0.30	22.0	0.30	22	4.00	0.36							0.08	0.44	PVC	200	201.2	0.65	56.0	26.86	98%	0.84	84.99	84.79	84.63	84.43	85.47	85.47	85.47	85.77	0.30	YES
Guppy Grove	MH	6126	MH	6160	0.35	27.0	2.71	224	4.00	3.63							0.76	4.39	PVC	200	201.2	1.45	76.0	40.11	89%	1.26	84.57	84.37	83.47	83.27	85.47	85.47	85.46	85.78	0.31	YES
Gardenpost Terrace	MH	6130	MH	6140	0.19	14.0	0.19	14	4.00	0.23							0.05	0.28	PVC	200	201.2	1.20	37.5	36.49	99%	1.15	85.04	84.84	84.59	84.39	85.52	85.52	85.52	85.88	0.36	YES
Site Plan	MH	6139	MH	6140	0.81	173.0	0.81	173	4.00	2.80							0.23	3.03	PVC	200	201.2	0.32	10.0	18.93	84%	0.60	84.08	83.88	84.05	83.85	85.52	85.52	85.52	n/a	n/a	n/a
Gardenpost Terrace	MH	6140	MH	6141	0.08	6.0	1.08	193	4.00	3.13							0.30	3.43	PVC	200	201.2	0.32	17.0	18.93	82%	0.60	83.99	83.79	83.94	83.74	85.52	85.52	85.52	85.88	0.36	YES
Gardenpost Terrace	MH	6141	MH	6142			1.08	193	4.00	3.13							0.30	3.43	PVC	200	201.2	0.32	10.0	18.93	82%	0.60	83.91	83.71	83.88	83.68	85.52	85.52	85.52	n/a	n/a	n/a
Gardenpost Terrace	MH	6142	MH	6150	0.12	3.0	1.20	196	4.00	3.18							0.34	3.51	PVC	200	201.2	0.32	40.5	18.93	81%	0.60	83.85	83.65	83.72	83.52	85.52	85.52	85.52	85.82	0.30	YES
Park	MH	6149	MH	6150	0.88	15.0	0.88	15	4.00	0.24							0.25	0.49	PVC	200	201.2	0.65	11.0	26.86	98%	0.84	83.71	83.51	83.64	83.44	85.52	85.52	85.52	n/a	n/a	n/a
Gardenpost Terrace	MH	6150	MH	6151	0.60	54.0	2.68	265	4.00	4.29							0.75	5.04	PVC	200	201.2	0.32	111.0	18.93	73%	0.60	83.58	83.38	83.22	83.02	85.52	85.52	85.49	85.82	0.30	YES
Gardenpost Terrace	MH	6151	MH	6160	0.50	49.0	3.18	314	4.00	5.09							0.89	5.98	PVC	200	201.2	0.32	79.0	18.93	68%	0.60	83.22	83.02	82.96	82.76	85.49	85.49	85.46	85.81	0.32	YES
Guppy Grove	MH	6160	MH	6161			5.89	538	3.96	8.63							1.65	10.27	PVC	300	299.2	0.20	7.0	42.94	76%	0.61	82.87	82.57	82.86	82.56	85.46	85.46	85.46	85.80	0.34	YES
Guppy Grove	MH	6161	MH	6170	0.32	25.0	6.21	563	3.95	9.00							1.74	10.74	PVC	300	299.2	0.20	73.5	42.94	75%	0.61	82.86	82.56	82.71	82.41	85.46	85.46	85.45	85.78	0.32	YES
Decoeur Drive	MH	6170	MH	5050	0.18		14.70	1181	3.75	17.95			4.72	674	1.50	4.10	5.44	27.48	PVC	300	299.2	0.20	79.5	42.94	36%	0.61	82.60	82.30	82.44	82.14	85.45	85.45	85.38	n/a	n/a	n/a
Jerome Jodoin	MH	5040	MH	5041	0.56	45.0	0.56	45	4.00	0.73							0.16	0.89	PVC	200	201.2	0.65	65.0	26.86	97%	0.84	84.65	84.45	84.23	84.03	85.38	85.38	85.38	85.72	0.34	YES
Jerome Jodoin	MH	5041	MH	5050	0.56	44.0	1.12	89	4.00	1.44							0.31	1.76	PVC	200	201.2	0.32	91.5	18.93	91%	0.60	84.23	84.03	83.93	83.73	85.38	85.38	85.38	85.74	0.36	YES
Decoeur Drive	MH	5050	MH	5051			21.50	1606	3.66	23.80			12.40	1772	1.50	10.77	9.49	44.06	CONC	450	457.2	0.11	15.0	98.65	55%	0.60	82.44	81.99	82.42	81.97	85.38	85.37	85.37	n/a	n/a	n/a
Decoeur Drive	MH	5051	MH	5052	0.61	38.0	22.11	1644	3.65	24.31			12.40	1772	1.50	10.77	9.66	44.74	CONC	450	457.2	0.11	105.0	98.38	55%	0.60	82.42	81.97	82.31	81.86	85.37	85.37	85.35	85.79	0.42	YES
Park	MH	Stub 42	MH	5052	3.78	54.0	3.78	54	4.00	0.88							1.06	1.93	PVC	200	201.2	0.32	16.5	18.93	90%	0.60	84.00	83.80	83.95	83.75	85.35	85.35	85.35	n/a	n/a	n/a
Decoeur Drive	MH	5052	MH	5055	0.53	31.0	26.42	1729	3.63	25.45			12.40	1772	1.50	10.77	10.87	47.09	CONC	450	457.2	0.11	97.0	98.65	52%	0.60	82.31	81.86	82.20	81.75	85.35	85.35	85.33	85.80	0.45	YES
Mountain Sorrel Way	MH	5000	MH	5002	0.37	41.0	0.37	41	4.00	0.66							0.10	0.77	PVC	200	201.2	0.65	118.5	26.86	97%	0.84	85.41	85.21	84.64	84.44	85.55	85.55	85.55	87.11	1.56	YES
Mountain Sorrel Way	MH	5001	MH	5002	0.27	19.0	0.27	19	4.00	0.31							0.08	0.38	PVC	200	201.2	1.00	76.0	33.31	99%	1.05	85.40	85.20	84.64	84.44	85.55	85.55	85.55	86.28	0.73	YES
Vendome Street	MH	5002	MH	5008	0.10	3.0	0.74	63	4.00	1.02							0.21	1.23	PVC	200	201.2	0.32	47.0	18.93	94%	0.60	84.58	84.38	84.43	84.23	85.55	85.55	85.55	86.20	0.65	YES
Mountain Sorrel Way	MH	5005	MH	5006	0.37	38.0	0.37	38	4.00	0.62							0.10	0.72	PVC	200	201.2	0.65	55.5	26.86	97%	0.84	85.41	85.21	85.05	84.85	85.55	85.55	85.55	86.17	0.62	YES
Mountain Sorrel Way	MH	5006	MH	5008	0.43	49.0	0.80	87	4.00	1.41							0.22	1.63	PVC	200	201.2	0.32	79.0	18.93	91%	0.60	85.05	84.85	84.79	84.59	85.55	85.55	85.55	86.08	0.53	YES
Vendome Street	MH	5008	MH	5013	0.34	27.0	1.88	177	4.00	2.87							0.53	3.39	PVC	200	201.2	0.32	81.5	18.93	82%	0.60	84.43	84.23	84.17	83.97	85.55	85.55	85.54	86.14	0.59	YES
Hyssop Street	MH	5010	MH	5011	0.27	22.0	0.27	22	4.00	0.36							0.08	0.43	PVC	200	201.2	0.65	53.0	26.86	98%	0.84	84.71	84.51	84.37	84.17	85.54	85.54	85.54	86.07	0.53	YES
Hyssop Street	MH	5011	MH	5012	0.29	25.0	0.56	47	4.00	0.76							0.16	0.92	PVC	200	201.2	0.32	47.5	18.93	95%	0.60	84.37	84.17	84.22	84.02	85.54	85.54	85.54	86.01	0.47	YES
Hyssop Street	MH	5012	MH	5013	0.25	25.0	0.81	72	4.00	1.17							0.23	1.39	PVC	200	201.2	0.32	34.5	18.93	93%	0.60	84.22	84.02	84.11	83.91	85.54	85.54	85.54	85.98	0.44	YES
Hyssop Street	MH	5013	MH	5017	0.31	25.0	3.00	274	4.00	4.44							0.84	5.28	PVC	200	201.2	0.32	76.0	18.93	72%	0.60	84.11	83.91	83.86	83.66	85.54	85.54	85.52	86.11	0.57	YES
Mountain Sorrel Way	MH	105001	MH	5017	0.84	81.0	0.84	81	4.00	1.31							0.24	1.55	PVC	200	201.2	1.00	125.5	33.31	95%	1.05	84.93	84.73	83.67	83.47	85.52	85.52	85.52	86.14	0.62	YES
Mountain Sorrel Way	MH	5017	MH	5024	0.35	30.0	4.19	385	4.00	6.24							1.17	7.41	PVC	200	201.2	0.32	76.0	18.93	61%	0.60	83.67	83.47	83.42	83.22	85.52	85.52	85.48	86.11	0.59	YES
June Grass Street	MH	5020	MH	5021	0.36	30.0	0.36	30	4.00	0.49							0.10	0.59	PVC	200	201.2	0.65	67.0	26.86	98%	0.84	85.22	85.02	84.78	84.58	85.48	85.48	85.48	86.15	0.67	YES
June Grass Street	MH	5021	MH	5022	0.11	6.0	0.47	36	4.00	0.58							0.13	0.71	PVC	200	201.2	0.32	11.0	18.93	96%	0.60	84.75	84.55	84.71	84.51	85.48	85.48	85.48	86.21	0.73	YES
June Grass Street	MH	5022	MH	5023	0.55	54.0	1.02	90	4.00	1.46							0.29	1.74	PVC	200	201.2	0.32	65.0	18.93	91%	0.60	84.68	84.48	84.47	84.27	85.48	85.48	85.48	86.08	0.60	YES
June Grass Street	MH	5023	MH	5024	0.40	38.0	1.42	128	4.00	2.07							0.40	2.47	PVC	200	201.2	0.32	72.0	18.93	87%	0.60	84.25	84.05	84.02	83.82	85.48	85.48	85.48	86.08	0.60	YES
Mountain Sorrel Way	MH	5024	MH	5025	0.31	30.0	5.92	543	3.96	8.70							1.66	10.36	PVC	200	201.2	0.32	41.0	18.93	45%	0.60	83.42	83.22	83.29	83.09	85.48	85.48	85.44	86.06	0.58	YES
Mountain Sorrel Way	MH	5025	MH	5035	0.21	14.0	6.13	557	3.95	8.91							1.72	10.63	PVC	200	201.2	0.32	51.0	18.93	44%	0.60	83.29	83.09	83.13	82.93	85.44	85.44	85.39	86.08	0.64	YES
School No.2	MH	Stub 22	MH	5030							2.86	409.0	2.86	409	1.50	2.49	0.80	3.29	PVC	200	201.2	0.65	13.5	26.86	88%	0.84	84.09	83.89	84.00	83.80	85.42	85.42	85.42	n/a	n/a	n/a
Décoeur Drive	MH	5030	MH	5031	0.42	30.0	0.42	30	4.00	0.49			2.86	409	1.50	2.49	0.92	3.89	PVC	200	201.2	0.65	79.0	26.86	86%	0.84	83.94	83.74	83.43	83.23	85.42	85.42	85.41	85.89	0.47	YES
Décoeur Drive	MH	5031	MH	5032	0.27	19.0	0.69	49	4.00	0.79			2.86	409	1.50	2.49	0.99	4.27	PVC	200	201.2	0.32	44.5	18.93	77%	0.60	83.43	83.23	83.29	83.09	85.41	85.41	85.40	86.01	0.60	YES
Décoeur Drive	MH	5032	MH	5035	0.31	19.0	1.00	68	4.00	1.10			2.86	409	1.50	2.49	1.08	4.67	PVC	200	201.2	0.32	49.5	18.93	75%	0.60	83.29	83.09	83.13	82.93	85.40	85.40	85.39	85.85	0.45	YES

SANITARY SEWER COMPUTATION FORM

Table 22

DATE: **March, 2018**
DESIGNED BY: PLM
CHECKED BY: AGS

PROJECT: Neighbourhood 5 - Avalon Encore - Stage 6
CLIENT: Minto Communities Inc.
PROJECT #: 170401
BY: ATREL ENGINEERING LTD

q= 350 l/cap.day
i= 0.28 l/ha.s
PVC/CONC N= 0.013
OTHER N= 0.024

Townhouse= 2.7 person/unit
Back to Back= 2.7 person/unit
Single Dwellings= 3.4 person/unit

STREET NAMES	LOCATION FROM (Up)		LOCATION TO (Down)		RESIDENTIAL INDIVIDUAL AREA (ha.)	RESIDENTIAL INDIVIDUAL POP.	RESIDENTIAL CUMULATIVE AREA (ha.)	RESIDENTIAL CUMULATIVE POP.	RESIDENTIAL PEAKING FACTOR M	RESIDENTIAL FLOW Q(p) (L/S)	COMMERCIAL , INSTITUTIONAL INDIVIDUAL AREA (ha.)	COMMERCIAL , INSTITUTIONAL INDIVIDUAL POP.	COMMERCIAL , INSTITUTIONAL CUMULATIVE AREA (ha.)	COMMERCIAL , INSTITUTIONAL CUMULATIVE POP.	COMMERCIAL , INSTITUTIONAL PEAKING FACTOR M	COMMERCIAL , INSTITUTIONAL FLOW Q(p) (L/S)	PEAK EXT.FLOW Q(i) (L/S)	**PEAK DES. Q(d) (L/S)**	SEWER DATA TYPE PIPE	DIA. (N0M) (mm)	DIA. (ACT) (MM)	SLOPE (%)	LENGTH (M)	CAP. (L/S)	Remaining Capacity (%)	VEL. (M/S)	UpStream Obv. (M)	UpStream Inv. (M)	DwnStream Obv. (M)	DwnStream Inv. (M)	HGL at UP-MH (M)	HGL Out UP-MH (M)	HGL at Down MH (M)	USF ELEV. (M)	FREEBOARD HGL (M)	FREEBOARD REQUIREMENT SATISFIED
Décoeur Drive	MH	5035	MH	5036	0.71	60.0	7.84	685	3.90	10.82			2.86	409	1.50	2.49	3.00	16.30	PVC	300	299.2	0.20	91.0	42.94	62%	0.61	83.13	82.83	82.95	82.65	85.39	85.39	85.36	86.04	0.65	YES
Décoeur Drive	MH	5036	MH	5055	0.58	34.0	8.42	719	3.89	11.32			2.86	409	1.50	2.49	3.16	16.97	PVC	300	299.2	0.20	108.5	42.94	60%	0.61	82.75	82.45	82.53	82.23	85.36	85.36	85.33	86.00	0.64	YES
L'esturgeon Street	MH	5055	MH	5056	0.10	4.0	34.94	2452	3.52	34.92			15.26	2181	1.50	13.25	14.06	62.23	CONC	450	457.2	0.11	46.0	98.65	37%	0.60	82.14	81.69	82.09	81.64	85.33	85.32	85.30	86.00	0.68	YES
L'esturgeon Street	MH	5056	MH	5070	0.74	58.0	35.68	2510	3.51	35.66			15.26	2181	1.50	13.25	14.26	63.17	CONC	450	457.2	0.11	100.0	98.65	36%	0.60	82.09	81.64	81.98	81.53	85.30	85.30	85.25	85.74	0.44	YES
L'esturgeon Street	MH	5060	MH	5063	0.39	21.0	0.39	21	4.00	0.34							0.11	0.45	PVC	200	201.2	0.65	72.5	26.86	98%	0.84	84.81	84.61	84.34	84.14	85.28	85.28	85.28	85.63	0.35	YES
Du Malachigan Cres.	MH	5061	MH	5062	0.10	4.0	0.10	4	4.00	0.06							0.03	0.09	PVC	200	201.2	0.65	9.0	26.86	100%	0.84	84.56	84.36	84.50	84.30	85.28	85.28	85.28	85.69	0.41	YES
Du Malachigan Cres.	MH	5062	MH	5063	0.69	48.0	0.79	52	4.00	0.84							0.22	1.06	PVC	200	201.2	0.46	91.0	22.59	95%	0.71	84.22	84.02	83.80	83.60	85.28	85.28	85.28	85.60	0.32	YES
L'esturgeon Street	MH	5063	MH	5066	0.36	21.0	1.54	94	4.00	1.52							0.43	1.95	PVC	200	201.2	0.32	76.0	18.93	90%	0.60	83.74	83.54	83.49	83.29	85.28	85.28	85.28	85.63	0.35	YES
Du Malachigan Cres.	MH	105061	MH	5064	0.43	24.0	0.43	24	4.00	0.39							0.12	0.51	PVC	200	201.2	0.65	61.5	26.86	98%	0.84	84.44	84.24	84.04	83.84	85.28	85.28	85.28	85.76	0.48	YES
Du Malachigan Cres.	MH	5064	MH	5065	0.18	7.0	0.61	31	4.00	0.50							0.17	0.67	PVC	200	201.2	0.32	13.0	18.93	96%	0.60	84.01	83.81	83.97	83.77	85.28	85.28	85.28	86.06	0.78	YES
Du Malachigan Cres.	MH	5065	MH	5066	0.74	51.0	1.35	82	4.00	1.33							0.38	1.71	PVC	200	201.2	0.32	107.0	18.90	91%	0.59	83.94	83.74	83.60	83.40	85.28	85.28	85.28	85.64	0.36	YES
L'esturgeon Street	MH	5066	MH	5067	0.31	17.0	3.20	193	4.00	3.13							0.90	4.02	PVC	200	201.2	0.64	67.0	26.65	85%	0.84	83.49	83.29	83.06	82.86	85.28	85.28	85.27	85.63	0.35	YES
L'esturgeon Street	MH	5067	MH	5068	0.28	7.0	3.48	200	4.00	3.24							0.97	4.22	PVC	200	201.2	0.32	16.0	18.93	78%	0.60	82.46	82.26	82.41	82.21	85.27	85.27	85.27	85.65	0.38	YES
L'esturgeon Street	MH	5068	MH	5070	0.58	38.0	4.06	238	4.00	3.86							1.14	4.99	PVC	200	201.2	0.32	82.0	18.93	74%	0.60	82.38	82.18	82.12	81.92	85.27	85.27	85.25	85.67	0.40	YES
Hepatica Way	MH	5070	MH	5083	0.30	17.0	40.04	2765	3.47	38.89			15.26	2181	1.50	13.25	15.48	67.63	CONC	450	457.2	0.11	75.0	98.65	31%	0.60	81.92	81.47	81.84	81.39	85.25	85.25	85.21	85.72	0.47	YES
Du Maskinongé Cres.	MH	5080	MH	5081	0.40	28.0	0.40	28	4.00	0.45							0.11	0.57	PVC	200	201.2	0.65	46.5	26.86	98%	0.84	85.11	84.91	84.81	84.61	85.21	85.21	85.21	85.77	0.56	YES
Du Maskinongé Cres.	MH	5081	MH	5083	0.75	48.0	1.15	76	4.00	1.23							0.32	1.55	PVC	200	201.2	0.32	110.0	18.93	92%	0.60	84.75	84.55	84.39	84.19	85.21	85.21	85.21	85.67	0.46	YES
Hepatica Way	MH	5083	MH	5087	0.35	21.0	41.54	2862	3.46	40.11			15.26	2181	1.50	13.25	15.90	69.27	CONC	450	457.2	0.11	78.0	98.65	30%	0.60	81.84	81.39	81.75	81.30	85.21	85.21	85.17	85.56	0.35	YES
Du Maskinongé Cres.	MH	105080	MH	5084	0.33	24.0	0.33	24	4.00	0.39							0.09	0.48	PVC	200	201.2	0.65	43.5	26.86	98%	0.84	85.15	84.95	84.87	84.67	85.17	85.17	85.17	85.81	0.64	YES
Du Maskinongé Cres.	MH	5084	MH	5085	0.27	11.0	0.60	35	4.00	0.57							0.17	0.74	PVC	200	201.2	0.32	14.0	18.93	96%	0.60	84.84	84.64	84.79	84.59	85.17	85.17	85.17	85.95	0.78	YES
Du Maskinongé Cres.	MH	5085	MH	5086	0.47	31.0	1.07	66	4.00	1.07							0.30	1.37	PVC	200	201.2	0.32	71.5	18.93	93%	0.60	84.76	84.56	84.53	84.33	85.17	85.17	85.17	85.67	0.50	YES
Du Maskinongé Cres.	MH	5086	MH	5087	0.43	28.0	1.50	94	4.00	1.52							0.42	1.94	PVC	200	201.2	0.32	71.5	18.93	90%	0.60	84.53	84.33	84.30	84.10	85.17	85.17	85.17	85.64	0.47	YES
Hepatica Way	MH	5087	MH	5088	0.89	62.0	43.93	3018	3.44	42.06			15.26	2181	1.50	13.25	16.57	71.88	CONC	450	457.2	0.11	120.0	98.65	27%	0.60	81.75	81.30	81.62	81.17	85.17	85.17	85.10	85.47	0.30	YES
Hepatica Way	MH	5088	MH	5089	0.21	14.0	44.14	3032	3.44	42.23			15.26	2181	1.50	13.25	16.63	72.12	CONC	450	457.2	0.11	30.5	98.65	27%	0.60	81.62	81.17	81.59	81.14	85.10	85.10	85.08	85.40	0.30	YES
Hepatica Way	MH	5089	MH	3271	0.26	14.0	44.40	3046	3.44	42.41			15.26	2181	1.50	13.25	16.70	72.36	CONC	450	457.2	0.11	51.0	98.65	27%	0.60	81.59	81.14	81.53	81.08	81.56	81.56	81.53	85.39	3.80	YES
Des Aubépine Drive	MH	3131	MH	3132	0.38	22.0	0.38	22	4.00	0.36							0.11	0.46	PVC	200	201.2	0.65	64.0	26.86	98%	0.84	84.83	84.63	84.41	84.21	84.41	84.41	84.41	85.94	1.11	YES
Des Aubépine Drive	MH	3132	MH	3140	0.32	19.0	0.70	41	4.00	0.66							0.20	0.86	PVC	200	201.2	0.65	64.0	26.86	97%	0.84	83.81	83.61	83.39	83.19	83.39	83.39	83.39	85.91	2.10	YES
Yellowcress Way	MH	4112	MH	3140	3.28	316.0	3.28	316	4.00	5.12							0.92	6.04	PVC	200	201.2	0.32	79.0	18.93	68%	0.60	83.66	83.46	83.40	83.20	83.43	83.43	83.40	85.87	2.21	YES
Des Aubépine Drive	MH	3140	MH	3141	0.38	25.0	4.36	382	4.00	6.19							1.22	7.41	PVC	250	251.5	0.24	69.5	29.59	75%	0.60	83.39	83.14	83.22	82.97	83.23	83.23	83.22	85.72	2.33	YES
Des Aubépine Drive	MH	3141	MH	3141B	0.33	22.0	4.69	404	4.00	6.55							1.31	7.86	PVC	250	251.5	0.24	59.0	29.59	73%	0.60	83.22	82.97	83.08	82.83	83.09	83.09	83.08	85.85	2.63	YES
School No.1	MH	Stub 101	MH	3141B							2.45	349.0	2.45	349	1.50	2.12	0.69	2.81	PVC	150	150.2	8.50	17.0	44.59	94%	2.52	85.03	84.88	83.58	83.43	83.59	83.59	83.58	n/a	n/a	n/a
Des Aubépine Drive	MH	3141B	MH	3142	0.45	12.0	5.14	416	4.00	6.74			2.45	349	1.50	2.12	2.13	10.99	PVC	250	251.5	0.24	61.0	29.59	63%	0.60	83.08	82.83	82.93	82.68	82.95	82.95	82.93	85.82	2.74	YES
Des Aubépine Drive	MH	3142	MH	3143	0.54	28.0	5.68	444	4.00	7.19			2.45	349	1.50	2.12	2.28	11.59	PVC	250	251.5	0.24	101.0	29.59	61%	0.60	82.93	82.68	82.69	82.44	82.73	82.73	82.69	85.43	2.51	YES
Des Aubépine Drive	MH	3143	MH	3271	0.76	48.0	6.44	492	3.98	7.93			2.45	349	1.50	2.12	2.49	12.54	PVC	250	251.5	0.24	119.5	29.59	58%	0.60	82.69	82.44	82.40	82.15	82.45	82.45	82.40	85.36	2.67	YES
Hepatica Way	MH	3271	MH	3272	0.68	45.0	51.52	3583	3.38	49.00			17.71	2530	1.50	15.37	19.38	83.75	CONC	525	533.4	0.11	99.5	148.80	44%	0.67	81.53	81.00	81.42	80.89	81.45	81.45	81.42	85.40	3.88	YES
Hepatica Way	MH	3272	MH	3273	0.83	58.0	52.35	3641	3.37	49.70			17.71	2530	1.50	15.37	19.62	84.69	CONC	525	533.4	0.11	120.0	149.48	43%	0.67	81.42	80.89	81.29	80.76	81.33	81.33	81.29	85.35	3.93	YES
Magnolia Street	MH	3124	MH	3273	8.46	571.0	8.46	571	3.94	9.12	4.78	683.0	4.78	683	1.50	4.15	3.71	16.98	PVC	300	299.2	0.19	79.0	41.86	59%	0.60	81.55	81.25	81.40	81.10	81.42	81.42	81.40	85.57	4.02	YES
Hepatica Way	MH	3273	MH	3274	0.49	31.0	61.30	4243	3.31	56.90			22.49	3213	1.50	19.52	23.46	99.88	CONC	525	533.4	0.11	79.0	149.48	33%	0.67	81.29	80.76	81.20	80.67	81.24	81.24	81.20	85.54	4.26	YES
Hepatica Way	MH	3274	MH	3275	0.60	38.0	61.90	4281	3.31	57.35			22.49	3213	1.50	19.52	23.63	100.50	CONC	525	533.4	0.11	89.0	149.48	33%	0.67	81.20	80.67	81.10	80.57	81.14	81.14	81.10	85.59	4.40	YES
Hepatica Way	MH	3275	MH	3276			61.90	4281	3.31	57.35			22.49	3213	1.50	19.52	23.63	100.50	CONC	525	533.4	0.11	8.5	149.48	33%	0.67	81.10	80.57	81.09	80.56	81.09	81.09	81.09	n/a	n/a	n/a
Hepatica Way	MH	3276	MH	15166			61.90	4281	3.31	57.35			22.49	3213	1.50	19.52	23.63	100.50	CONC	675	685.8	0.12	34.5	303.78	67%	0.82	81.09	80.41	81.05	80.37	81.05	81.05	81.05	n/a	n/a	n/a

Existing Sanitary Sewers
Proposed Avalon Encore Stage 6 Sanitary Sewers

LICENSED PROFESSIONAL ENGINEER
A. G. Y. SAUVE
100142393
Mar. 16, 2018
PROVINCE OF ONTARIO

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION									INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	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)
Service Block 24																											
				150	270	0.00	270	2.00	1.75	0.71	0.71		0.00		0.00	0.23	0.71	0.71	0.23	2.21							
	2A	3A	0.02		0	0.02	270	3.48	3.04		0.71		0.00		0.00	0.23	0.02	0.73	0.24	3.51	28.5	200	0.35	19.40	0.18	0.62	0.47
To STREET A, Pipe 3A - 4A						0.02	270				0.71		0.00		0.00			0.73									
STREET B																											
	5A	6A	0.39	22	60	0.39	60	3.64	0.71		0.00		0.00		0.00	0.00	0.39	0.39	0.13	0.84	90.5	200	0.65	26.44	0.03	0.84	0.38
To STREET A, Pipe 6A - 7A						0.39	60				0.00		0.00		0.00			0.39									
STREET F																											
	9A	10A	0.47	22	60	0.47	60	3.64	0.71		0.00		0.00		0.00	0.00	0.47	0.47	0.16	0.86	93.0	200	0.65	26.44	0.03	0.84	0.38
To STREET A, Pipe 10A - 12A						0.47	60				0.00		0.00		0.00			0.47									
STREET D																											
	11A	12A	0.45	16	44	0.45	44	3.66	0.52		0.00		0.00		0.00	0.00	0.45	0.45	0.15	0.67	91.0	200	0.65	26.44	0.03	0.84	0.35
To STREET A, Pipe 12A - 13A						0.45	44				0.00		0.00		0.00			0.45									
STREET C																											
	15A	16A	0.15	4	11	0.15	11	3.73	0.13		0.00		0.00		0.00	0.00	0.15	0.15	0.05	0.18	43.0	200	0.65	26.44	0.01	0.84	0.23
To STREET A, Pipe 16A - 17A						0.15	11				0.00		0.00		0.00			0.15									
STREET A																											
	1A	3A	0.39	19	52	0.39	52	3.65	0.61		0.00		0.00		0.00	0.00	0.39	0.39	0.13	0.74	78.0	200	0.65	26.44	0.03	0.84	0.37
Contribution From Service Block 24, Pipe 2A - 3A						0.02	270				0.71		0.00		0.00		0.73	1.12									
	3A	4A	0.16	4	11	0.57	333	3.45	3.72		0.71		0.00		0.00	0.23	0.16	1.28	0.42	4.37	16.5	200	0.35	19.40	0.23	0.62	0.50
	4A	6A	0.10	3	9	0.67	342	3.44	3.82		0.71		0.00		0.00	0.23	0.10	1.38	0.46	4.50	30.5	200	0.35	19.40	0.23	0.62	0.50
Contribution From STREET B, Pipe 5A - 6A						0.39	60				0.00		0.00		0.00		0.39	1.77									
	6A	7A	0.09	3	9	1.15	411	3.41	4.55		0.71		0.00		0.00	0.23	0.09	1.86	0.61	5.39	29.5	200	0.35	19.40	0.28	0.62	0.53
To Service Block 23, Pipe 7A - Ex. MH 6059						1.15	411				0.71		0.00		0.00			1.86									
Contribution From STREET F, Pipe 9A - 10A						0.47	60				0.00		0.00		0.00		0.47	0.47									
	10A	12A	0.24	7	19	0.71	79	3.62	0.93		0.00		0.00		0.00	0.00	0.24	0.71	0.23	1.16	60.0	200	0.35	19.40	0.06	0.62	0.34
Contribution From STREET D, Pipe 11A - 12A						0.45	44				0.00		0.00		0.00		0.45	0.45									
	12A	13A	0.20	6	17	1.36	140	3.56	1.62		0.00		0.00		0.00	0.00	0.20	1.36	0.45	2.06	48.5	200	0.35	19.40	0.11	0.62	0.40
	13A	14A	0.14	3	9	1.50	149	3.55	1.72		0.00		0.00		0.00	0.00	0.14	1.50	0.50	2.21	13.5	200	0.35	19.40	0.11	0.62	0.41
	14A	18A	0.13	5	14	1.63	163	3.54	1.87		0.00		0.00		0.00	0.00	0.13	1.63	0.54	2.41	20.0	200	0.35	19.40	0.12	0.62	0.42
To rue Sculpin Street, Pipe 18A - Ex. MH 6108						1.63	163				0.00		0.00		0.00			1.63									
Contribution From STREET C, Pipe 15A - 16A						0.15	11				0.00		0.00		0.00		0.15	0.15									
	16A	17A	0.05	1	3	0.20	14	3.72	0.17		0.00		0.00		0.00	0.00	0.05	0.20	0.07	0.23	10.5	200	0.35	19.40	0.01	0.62	0.21
	17A	18A	0.26	8	22	0.46	36	3.67	0.43		0.00		0.00		0.00	0.00	0.26	0.46	0.15	0.58	55.5	200	0.35	19.40	0.03	0.62	0.27
To rue Sculpin Street, Pipe 18A - Ex. MH 6108						0.46	36				0.00		0.00		0.00			0.46									
Service Block 23/Service Block																											
Contribution From STREET A, Pipe 6A - 7A						1.15	411				0.71		0.00		0.00		1.86	1.86									
	7A	Ex. MH 6059	0.04		0	1.19	411	3.41	4.55		0.71		0.00		0.00	0.23	0.04	1.90	0.63	5.40	25.5	200	0.35	19.40	0.28	0.62	0.53
rue Sculpin Street																											
Contribution From STREET A, Pipe 14A - 18A						1.63	163				0.00		0.00		0.00		1.63	1.63									
Contribution From STREET A, Pipe 17A - 18A						0.46	36				0.00		0.00		0.00		0.46	2.09									
	18A	Ex. MH 6108	0.05		0	2.14	199	3.52	2.27		0.00		0.00		0.00	0.00	0.05	2.14	0.71	2.98	28.5	200	0.35	19.40	0.15	0.62	0.44

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha				
Average Daily Flow =	280	l/p/day			Industrial Peak Factor = as per MOE Graph			
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha	Extraneous Flow =	0.330	L/s/ha	
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha	Minimum Velocity =	0.600	m/s	
Max Res. Peak Factor =	4.00				Manning's n = (Conc)	0.013	(Pvc)	0.013
Commercial/Inst./Park Peak Factor =	1.00				Townhouse coeff=	2.7		
Institutional =	0.32	l/s/Ha			Single house coeff=	3.4		

Designed: A.K.

Checked: W.L.

Dwg. Reference: Sanitary Drainage Plan, Dwgs. No.

PROJECT: **2275 Mer Bleue Road**

LOCATION: **City of Ottawa**

File Ref: 20-1214

Date: **Jun 2021**

Sheet No. 1 of 1

APPENDIX E

Stormwater Management

LEGEND

- MINOR SYSTEM FLOW RESTRICTOR
- 5 YR 10 MIN: 0.70ha. R=0.20 — FUTURE STORM DRAINAGE AREA
- RUNOFF COEFFICIENT
- PROPOSED STORM SEWER
- DRAINAGE AREA BOUNDARY
- MAJOR DRAINAGE SYSTEM
- EXISTING STORM SEWER
- OUTSIDE PROPOSED DEVELOPMENT
- SITE PLAN APPROVAL

FOR DISCUSSION PURPOSES ONLY MARCH 02/2018

AQUARIUM AVENUE
SCULPIN STREET
DAMSELFISH WALK
DECOEUR DRIVE
GUPPY GROVE
MER BLEUE ROAD
GARDENPOST TERRACE
JEROME JODOIN DRIVE
MALACHIGAN CRESCENT
L'ESTURGEON STREET

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 △-APPLIES WHEN DRAWING MODIFIED	DATE	BY

SCALE 1:750 (8m 0 24m)

DESIGN	PLM
CHECKED	AGS
DRAWN	PNC
CHECKED	PLM
APPROVED	AGS

ATREL Engineering Ltd. Ltée.
Engineers - Ingénieurs
1-2884 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4K 1M6
TEL.: (613) 446-7423

CITY OF OTTAWA
EAST URBAN COMMUNITY
AVALON ENCORE STAGE 6

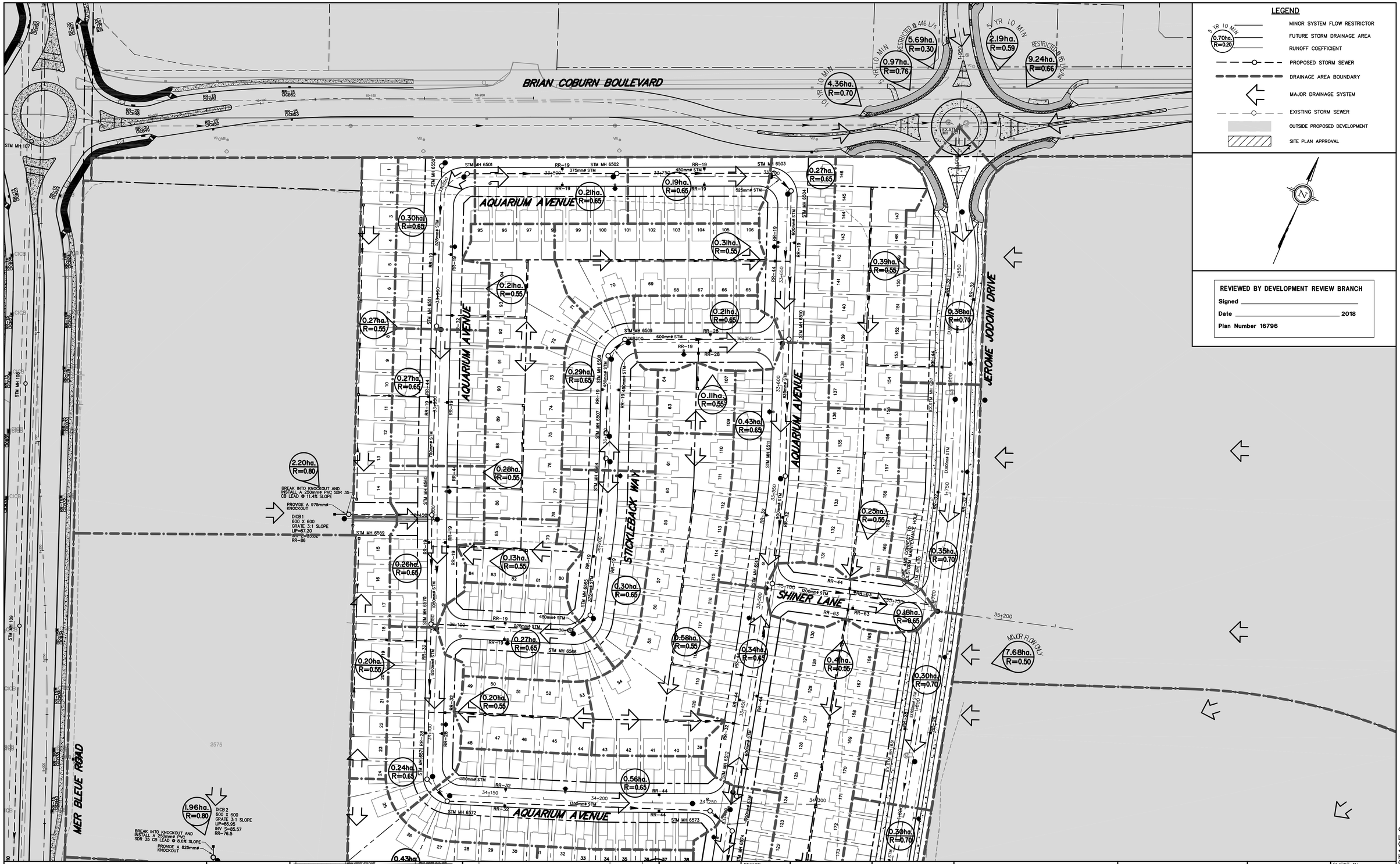
MINTO COMMUNITIES INC.

PLAN
STORM DRAINAGE AREA PLAN

CLIENT No.	148
PROJECT No.	170401
DRAWING No.	170401-STMI

D07-16-09-0018-STAGE 6

16796


BRIAN COBURN BOULEVARD
AQUARIUM AVENUE
AQUARIUM AVENUE
AQUARIUM AVENUE
AQUARIUM AVENUE
JEROME JODOIN DRIVE
STICKLEBACK WAY
SHINER LANE
MER BLEUE ROAD
5 YR 10 MIN RESTRICTED @ 446 L/s
5 YR 10 MIN RESTRICTED @ 65 L/s
10 YR 10 MIN
MAJOR FLOW ONLY
0.70ha. R=0.20
5.69ha. R=0.30
0.97ha. R=0.76
4.36ha. R=0.70
2.19ha. R=0.59
9.24ha. R=0.66
7.68ha. R=0.50
2.20ha. R=0.80
1.96ha. R=0.80
0.30ha. R=0.65
0.27ha. R=0.65
0.19ha. R=0.65
0.21ha. R=0.65
0.27ha. R=0.65
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0.38ha. R=0.70
0.21ha. R=0.55
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0.3ha. R=0.55
0.21ha. R=0.65
0.27ha. R=0.65
0.29ha. R=0.65
0.11ha. R=0.55
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BREAK INTO KNOCKOUT AND INSTALL A 250mmø PVC SDR 35 CB LEAD @ 11.4% SLOPE
PROVIDE A 975mmø KNOCKOUT
DICB 1
600 X 600
GRATE 3:1 SLOPE
LIP=87.20
INV IN=85.002
RR=86
BREAK INTO KNOCKOUT AND INSTALL A 250mmø PVC SDR 35 CB LEAD @ 8.6% SLOPE
PROVIDE A 825mmø KNOCKOUT
DICB 2
600 X 600
GRATE 3:1 SLOPE
LIP=86.95
INV S=85.57
RR=76.5
EX STM MH 6001
EX STM MH 6002
EX STM MH 6003
EX STM MH 6004
EX STM MH 6005
EX STM MH 6006
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STORM SEWER COMPUTATION FORM

DESIGNED BY: PLM
CHECKED BY: AGS

PROJECT: **Neighbourhood 5 - Avalon Encore - Western Trunk**
CLIENT: Minto Communities Inc.
PROJECT #: 170401
BY: ATREL ENGINEERING LTD
DATE: March, 2017

STORM FREQUENCY : 5 & 10 YEAR
RATIONAL METHOD Q= 2.78 AIR
PVC/CONC N= 0.013
CSP N= 0.024
CORR N= 0.021

Table 1

STREET NAMES	LOCATION FROM (Up)		TO (Down)		0.20	0.30	0.50	0.55	0.59	0.60	0.65	0.65	0.66	0.70	0.70	0.75	0.76	0.80	RATIONAL METHOD INDIV. 2.78AR	RATIONAL METHOD ACCUM. 2.78AR	5 YEAR TIME CONC. (MIN)	5 YEAR RAINF. INTENS. (MM/HR)	5 YEAR FLOW (L/S)	Rational Method 10 year ACCUM 2.78AR (L/S)	Rational Method 10 year RAINF. INTENS. (MM/HR)	Rational Method 10 year FLOW (L/S)	ACTUAL PIPE FLOW (L/S)	PIPE TYPE	PIPE DIA. (N0M) (mm)	SEWER DATA (ACT)	SLOPE (%)	LENGTH (M)	CAP. (L/S)	Remaining Capacity (%)	VEL. (M/S)	TIME OF FLOW (MIN)	UpStream Obv. (M)	UpStream Inv. (M)	DwStream Obv. (M)	DwStream Inv. (M)
Jerome Jodoin	MH	237	MH	607		5.69		0.39	2.19				9.24	0.38	4.26		0.97		23.03	23.03	23.59	63.25	1456.95	8.29	73.99	613.37	2070.33	CONC	1800	1828.8	0.10	120.0	3792.13	45%	1.44	1.39	85.61	83.81	85.49	83.69
Jerome Jodoin	MH	607	MH	630										0.35					0.68	23.72	24.97	60.94	1445.25	8.29	71.28	590.91	2036.16	CONC	1800	1828.8	0.10	97.5	3792.13	46%	1.44	1.13	85.49	83.69	85.39	83.59
																					26.10																			
Aquarium Avenue	MH	6501	MH	6502							0.21								0.38	0.38	10.00	104.19	39.54		122.14		39.54	PVC	375	366.4	0.26	68.5	84.05	53%	0.80	1.43	86.02	85.65	85.84	85.47
Aquarium Avenue	MH	6502	MH	6503							0.19								0.34	0.72	11.43	97.19	70.25		113.90		70.25	CONC	450	457.2	0.20	72.0	133.02	47%	0.81	1.48	85.84	85.39	85.70	85.25
Aquarium Avenue	MH	6503	MH	6504																0.72	12.91	90.97	65.75		106.57		65.75	CONC	525	533.4	0.16	11.5	179.46	63%	0.80	0.24	85.70	85.18	85.68	85.16
Aquarium Avenue	MH	6504	MH	6510				0.31			0.27								0.96	1.68	13.15	90.05	151.71		105.48		151.71	CONC	600	609.6	0.15	68.0	248.09	39%	0.85	1.33	85.68	85.08	85.58	84.98
																					14.49																			
Stickleback Way	MH	6507	MH	6508							0.29								0.52	0.52	10.00	104.19	54.60		122.14		54.60	CONC	450	457.2	0.20	35.5	133.02	59%	0.81	0.73	85.80	85.35	85.73	85.28
Stickleback Way	MH	6508	MH	6509																0.52	10.73	100.49	52.66		117.78		52.66	CONC	450	457.2	0.20	11.0	133.02	60%	0.81	0.23	85.70	85.25	85.68	85.23
Stickleback Way	MH	6509	MH	6510				0.11			0.21								0.55	1.07	10.96	99.40	106.53		116.49		106.53	CONC	600	609.6	0.13	75.0	233.61	54%	0.80	1.56	85.68	85.08	85.58	84.98
																					12.52																			
Aquarium Avenue	MH	6510	MH	6511																2.76	14.49	85.26	235.01		99.85		235.01	CONC	825	838.2	0.10	63.0	473.55	50%	0.86	1.22	85.58	84.76	85.52	84.70
Aquarium Avenue	MH	6511	MH	6513							0.43								0.78	3.53	15.71	81.33	287.37		95.24		287.37	CONC	900	914.4	0.10	50.0	597.22	52%	0.91	0.92	85.52	84.62	85.47	84.57
																					16.63																			
Aquarium Avenue	MH	6512	MH	6513				0.58			0.34								1.50	1.50	10.00	104.19	156.41		122.14		156.41	CONC	600	609.6	0.13	99.0	233.61	33%	0.80	2.06	85.60	85.00	85.47	84.87
																					12.06																			
Shiner Lane	MH	6513	MH	630				0.66			0.18								1.33	6.37	16.63	78.65	500.92		92.08		500.92	CONC	1200	1219.2	0.10	73.5	1286.19	61%	1.10	1.11	85.47	84.27	85.40	84.20
																					17.74																			
Jerome Jodoin	MH	630	MH	631										0.30					0.58	30.67	26.10	59.20	1815.59	8.29	69.23	573.91	2389.50	CONC	1950	1981.2	0.10	69.0	4694.42	49%	1.52	0.76	85.40	83.45	85.33	83.38
Jerome Jodoin	MH	631	MH	631A										0.30					0.58	31.25	26.85	58.09	1815.46	8.29	67.93	563.14	2378.59	CONC	1950	1981.2	0.10	75.5	4694.42	49%	1.52	0.83	85.33	83.38	85.25	83.30
Jerome Jodoin	MH	631A	MH	658										0.22					0.43	31.68	27.68	56.93	1803.58	8.29	66.57	551.86	2355.44	CONC	1950	1981.2	0.10	105.5	4694.42	50%	1.52	1.15	85.25	83.30	85.14	83.19
																					28.83																			
Aquarium Avenue	MH	6550	MH	6551				0.21			0.30								0.86	0.86	10.00	104.19	89.94		122.14		89.94	CONC	525	533.4	0.16	74.5	179.46	50%	0.80	1.55	85.98	85.46	85.86	85.34
Aquarium Avenue	MH	6551	MH	6560				0.55			0.27								1.33	2.19	11.55	96.68	211.93		113.29		211.93	CONC	750	762.0	0.10	86.5	367.27	42%	0.81	1.79	85.86	85.11	85.77	85.02
																					13.34																			
Commercial	MH	6559	MH	6560														2.20	4.89	4.89	15.00	83.56	408.84		97.85		408.84	CONC	975	990.6	0.10	38.0	739.33	45%	0.96	0.66	85.81	84.84	85.77	84.80
																					15.66																			
Aquarium Avenue	MH	6560	MH	6570				0.13			0.26								0.67	7.75	15.66	81.48	631.75		95.41		631.75	CONC	1050	1066.8	0.10	50.0	900.87	30%	1.01	0.83	85.77	84.72	85.72	84.67
																					16.49																			
Stickleback Way	MH	6564	MH	6565							0.30								0.54	0.54	10.00	104.19	56.48		122.14		56.48	PVC	375	366.4	0.26	72.0	84.05	33%	0.80	1.51	86.03	85.66	85.84	85.47
Stickleback Way	MH	6565	MH	6566																0.54	11.51	96.86	52.51		113.51		52.51	CONC	450	457.2	0.20	12.0	133.02	61%	0.81	0.25	85.84	85.39	85.82	85.37
Stickleback Way	MH	6566	MH	6570							0.27								0.49	1.03	11.75	95.77	98.64		112.22		98.64	CONC	525	533.4	0.16	64.0	179.46	45%	0.80	1.33	85.82	85.30	85.72	85.20
																					13.08																			
Aquarium Avenue	MH	6570	MH	6571				0.40			0.24								1.05	9.83	16.49	79.04	776.86		92.54		776.86	CONC	1200	1219.2	0.10	71.0	1286.19	40%	1.10	1.07	85.72	84.52	85.65	84.45
Aquarium Avenue	MH	6571	MH	6572																9.83	17.56	76.10	747.96		89.09		747.96	CONC	1350	1371.6	0.10	13.5	1760.81	58%	1.19	0.19	85.65	84.30	85.64	84.29
Aquarium Avenue	MH	6572	MH	6573							0.56								1.01	10.84	17.75	75.61	819.66		88.51		819.66	CONC	1350	1371.6	0.10	120.0	1760.81	53%	1.19	1.68	85.61	84.26	85.49	84.14
Aquarium Avenue	MH	6573	MH	6574																10.84	19.43	71.53	775.43		83.72		775.43	CONC	1350	1371.6	0.10	14.0	1760.81	56%	1.19	0.20	85.46	84.11	85.45	84.10
Aquarium Avenue	MH	6574	MH	6575						0.24				0.25					0.89	11.73	19.62	71.09	833.70		83.19		833.70	CONC	1350	1371.6	0.10	34.0	1760.81	53%	1.19	0.48	85.42	84.07	85.39	84.04
Aquarium Avenue	MH	6575	MH	6580																11.73	20.10	70.03	821.27		81.95		821.27	CONC	1350	1371.6	0.10	28.0	1760.81	53%	1.19	0.39	85.39	84.04	85.36	84.01
																					20.49																			
Damselfish Walk	MH	6578	MH	6579						0.43				0.64					1.96	1.96	10.00	104.19	204.49		122.14		204.49	CONC	675	685.8	0.15	120.0	339.63	40%	0.92	2.18	85.69	85.02	85.51	84.84
Damselfish Walk	MH	6579	MH	6580										0.27					0.53	2.49	12.18	93.95	233.76		110.08		233.76	CONC	750	762.0	0.15	101.5	449.81	48%	0.99	1.72	85.51	84.76	85.36	84.61
																					13.89																			
Aquarium Avenue	MH	6580	MH	6581						0.35				0.18					0.93	15.15	20.49	69.19	1048.20		80.97		1048.20	CONC	1500	1524.0	0.10	72.5	2378.21	56%	1.30	0.93	85.36	83.86	85.28	83.78
Aquarium Avenue	MH	6581	MH	6615																15.15	21.42	67.29	1019.42		78.73		1019.42	CONC	1500	1524.0	0.10	19.0	2332.02	56%	1.28	0.25	85.25	83.75	85.23	83.73
																					21.67																			
Decoeur Drive	MH	6605	MH	6610						0.27				0.27					0.98	0.98	10.00	104.19	101.67		122.14		101.67	CONC	525	533.4	0.20	71.0	200.65	49%	0.90	1.32	85.62	85.10	85.48	84.96
																					11.32																			
Sculpin Street	MH	6608	MH	6609						0.37				0.25				1.96	5.46	5.46	15.00	83.56	456.46		97.85		456.46	CONC	975	990.6	0.10	115.5	739.33	38%	0.96	2.01	85.68	84.71	85.56	84.59
Sculpin Street	MH	6609	MH	6610										0.05					0.10	5.56	17.01	77.59	431.40		90.83		431.40	CONC	1050	1066.8	0.10	18.0	900.87	52%	1.01	0.30	85.56	84.51	85.54	84.49
																					17.30																			
Decoeur Drive	MH	6610	MH	6611										0.27					0.53	7.06	17.30	76.78	542.16		89.89		542.16	CONC	1050	1066.8	0.10	51.5	900.87	40%	1.01	0.85	85.48	84.43	85.43	84.38
Decoeur Drive	MH	6611	MH	6612						0.38				0.29					1.20	8.26	18.16	74.58	615.98		87.29		615.98	CONC	1200	1219.2	0.10	86.5	1286.19	52%	1.10	1.31	85.43	84.23	85.34	84.14
Decoeur Drive	MH	6612	MH	6615										0.44					0.86	9.12	19.46	71.45	651.31		83.62		651.31	CONC	1200	1219.2	0.10	108.5	1286.19	49%	1.10	1.64	85.34	84.14	85.23	84.03
																					21.11																			
Decoeur Drive	MH	6615	MH	658						0.33				0.28					1.10	25.36	21.67	66.80	1694.08		78.15		1694.08	CONC	1650	1676.4	0.15	62.0	3731.42	55%	1.69	0.61	85.23	83.58	85.13	83.48
																					22.28																			
Jerome Jodoin	MH	658	MH	659						0.16				0.29					0.83	57.87	28.83	55.39	3205.55	8.29	64.76	536.86	3742.41	CONC	2250	2286.0	0.10	82.5	6875.59	46%	1.68	0.82	85.13	82.88	85.05	82.80
Jerome Jodoin	MH	659	MH	683						0.28				0.44					1.32	59.20	29.65	54.35	3217.28	8.29	63.54	526.74	3744.03	CONC	2250	2286.0	0.10	77.0	6875.59	46%	1.68	0.77	85.05	82.80	84.97	82.72
																					30.42																			
Mer Bleue	MH	Stub 2	MH	542	11.59	0.27						3.04				0.51			6.67	6.67	25.56	60.01	400.22	6.56	70.19	460.21	860.43	CONC	1050	1066.8	0.53	70.0	2073.95	59%	2.32	0.50	84.50	83.45	84.13	83.08
																					26.07																			
Gardenpost	MH	542	MH	543																6.67	26.07	59.25	395.15	6.56	69.29	454.31	849.46	CONC	1200	1219.2	0.15	11.5	1575.26	46%	1.35	0.14	84.22	83.02	84.20	83.00
Gardenpost	MH	543	MH	544										0.31					0.60	7.27	26.21	59.03	429.29	6.56	69.04	452.67	881.96	CONC	1200	1219.2	0.15	65.5	1575.26	44%	1.35	0.81	84.14	82.94	84.04	82.84
Gardenpost	MH	544	MH	550						0.24				0.40					1.18	8.45	27.02	57.86	488.99	6.56	67.66	443.62	932.61	CONC	1200	1219.2	0.15	85.5	1575.26	41%	1.35	1.06	84.04	82.84	83.91	82.71
Gardenpost	MH	550	MH	565						0.27				0.26					0.96	9.41	28.07	56.39	530.49	6.56	65.94	432.34	962.83	CONC	1500	1524.0	0.15	77.0	2856.14	66%	1.57	0.82	84.21	82.71	84.09	82.59
																					28.89																			
Gardenpost	MH	6625	MH	6627										0.19					0.37	0.37	10.00	104.19	38.52		122.14		38.52	CONC	450	457.2	0.20	34.5	133.02	71%	0.81	0.71	85.35	84.90	85.28	84.83
																					10.71																			
Site Plan	MH	6626	MH	6627														0.81	1.80	1.80	15.00	83.56	150.53		97.85		150.53	CONC	525	533.4	0.30	10.0	245.74	39%	1.10	0.15	85.16	84.64	85.13	84.61
																					15.15																			
Gardenpost	MH	6627	MH	6628																2.17	15.15	83.07	180.36		97.28		180.36	CONC	600	609.6	0.15	19.5	248.09	27%	0.85	0.38	85.13	84.53	85.10	84.50
Gardenpost	MH	6628	MH	6629																2.17	15.53	81.87	177.75		95.87		177.75	CONC	600	609.6	0.15	10.5	248.09	28%	0.85	0.21	85.07	84.47	85.05	84.45
Gardenpost	MH	6629	MH	6635						0.12									0.20	2.37	15.74	81.24	192.65		95.13		192.65	CONC	600	609.6	0.15	40.5	248.09	22%	0.85	0.79	85.02	84.42	84.96	84.36
																					16.53																			
Park	MH	6634	MH	6635		0.89													0.74	0.74	15.00	83.56	62.02		97.85		62.02	PVC	375	366.4	0.26	11.0	84.05	26%	0.80	0.23	84.99	84.62	84.96	84.59
																					15.23																			
Gardenpost	MH	6635	MH	6636						0.28				0.49					1.42	4.53	16.53	78.91	357.79		92.39		357.79	CONC	900	914.4	0.10	115.0	597.22	40%	0.91	2.11	84.96	84.06	84.84	83.94
Gardenpost	MH	6636	MH	6640										0.27					0.53	5.06	18.64	73.38	371.27		85.89		371.27	CONC	900	914.4	0.10	78.5	597.22	38%	0.91	1.44	84.84	83.94	84.76	83.86
																					20.08																			
Guppy Grove	MH	6639	MH	6640						0.26				0.17					0.76	0.76	10.00	104.19	79.65		122.14		79.65	CONC	450	457.2	0.20	63.0	133.02	40%	0.81	1.30	84.44	83.99	84.31	83.86
																					11.30																			
Guppy Grove	MH	6640	MH	565						0.29				0.23					0.93	6.76	20.08	70.08	473.42		82.00		473.42	CONC	1050	1066.8	0.10	74.0	900.87	47%	1.01	1.22	84.31	83.26	84.24	83.19
																					21.30																			
Gardenpost	MH	565	MH	683										0.18					0.35	16.51	28.89	55.32	913.51	6.56	64.67	424.02	1337.53	CONC	1650	1676.4	0.15	72.5	3682.64	64%	1.67	0.72	84.24	82.59	84.13	82.48
																					29.62																			
Jerome Jodoin	MH	683	MH	690		0.61								0.19					0.88	76.59	30.42	53.42	4091.30	14.85	62.45	927.17	5018.46	CONC	2550	2590.8	0.10	45.0	9599.83	48%	1.82	0.41	84.97	82.42	84.92	82.37
Unopen Road allowance	MH	690	MH	691																76.59	30.83	52.94	4054.53	14.85	61.88	918.71	4973.24	CONC	2550	2590.8	0.10	58.5	9599.83	48%	1.82	0.54	84.87	82.32	84.81	82.26
Unopen Road allowance	MH	691	MH	691A		0.21													0.18	76.76	31.37	52.32	4016.21	14.85	61.16	908.02	4924.23	CONC	2550	2590.8	0.10	120.0	9599.83	49%	1.82	1.10	84.81	82.26	84.69	82.14
Unopen Road allowance	MH	691A	MH	691B		0.16													0.13	76.90	32.47	51.10	3929.38	14.85	59.73	886.79	4816.17	CONC	2550	2590.8	0.10	49.5	9599.83	50%	1.82	0.45	84.64	82.09	84.59	82.04
																					32.92																			
Mattamy	MH	99	MH	691B									20.44						37.50	37.50	22.51	65.18	2444.47		76.26		2444.47	CONC	1950	1981.2	0.12	80.0	5142.48	52%	1.67	0.80	84.71	82.76	84.61	82.66
																					23.31																			
Unopen Road allowance	MH	691B	MH	W-FS		0.14								0.04					0.19	114.59	32.92	50.62	5800.74	14.85	59.16	878.32	6679.06	CONC	2700	SAME	0.10	49.5	15688.99	57%	1.94	0.43	84.61	81.91	84.56	81.86
																					20.04																			

Proposed storm sewers
Existing storm sewers

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Manning 0.013 Arterial Roads Return Frequency = 10 years

	LOCATION		AREA (Ha)																FLOW						SEWER DATA						
			2 YEAR				5 YEAR				10 YEAR				100 YEAR				Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO
			AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	Conc.	2 Year	5 Year	10 Year	100 Year										
Location	From Node	To Node	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(min)	(mm/h)	(mm/h)	(mm/h)	(mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	FLOW (min.)	Q/Q full
Service Block 24																																	
			0.02	0.70	0.04	0.04			0.00	0.00			0.00	0.00			0.00	0.00															
	2	3			0.00	0.04	0.71	0.80	1.58	1.58			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	168	525	525	CONC	0.35	25.5	254.4283	1.1753	0.3616	0.658
To STREET A, Pipe 3 - 4						0.04				1.58				0.00				0.00	10.36														
STREET B																																	
	5	6	0.40	0.80	0.89	0.89			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	68	375	375	PVC	0.30	91.5	96.0323	0.8695	1.7539	0.711
To STREET A, Pipe 6 - 7						0.89				0.00				0.00				0.00	11.75														
STREET F																																	
			0.20	0.80	0.44	0.44			0.00	0.00			0.00	0.00			0.00	0.00															
	9	10	0.28	0.70	0.54	0.99			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	76	375	375	PVC	0.35	93.0	103.7267	0.9392	1.6504	0.733
To STREET A, Pipe 10 - 12						0.99				0.00				0.00				0.00	11.65														
STREET D																																	
	11	12	0.46	0.70	0.90	0.90			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	69	375	375	PVC	0.30	95.5	96.0323	0.8695	1.8306	0.716
To STREET A, Pipe 12 - 13						0.90				0.00				0.00				0.00	11.83														
STREET C																																	
	15	16	0.15	0.70	0.29	0.29			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	22	375	375	PVC	0.30	45.5	96.0323	0.8695	0.8722	0.233
To STREET A, Pipe 12 - 13						0.29				0.00				0.00				0.00	10.87														
STREET A																																	
			0.15	0.80	0.33	0.33			0.00	0.00			0.00	0.00			0.00	0.00															
	1	3	0.23	0.70	0.45	0.78			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	60	375	375	PVC	0.30	78.0	96.0323	0.8695	1.4951	0.625
Contribution From Service Block 24, Pipe 2 - 3						0.04				1.58				0.00				0.00	10.36														
	3	4	0.15	0.70	0.29	1.11			0.00	1.58			0.00	0.00			0.00	0.00	11.50	71.50	96.91	113.56	165.96	233	675	675	CONC	0.15	17.5	325.5584	0.9098	0.3206	0.714
	4	6	0.10	0.70	0.19	1.31			0.00	1.58			0.00	0.00			0.00	0.00	11.82	70.47	95.49	111.89	163.51	243	675	675	CONC	0.15	28.5	325.5584	0.9098	0.5221	0.746
Contribution From STREET B, Pipe 5 - 6						0.89				0.00				0.00				0.00	11.75														
	6	7	0.09	0.70	0.18	2.37			0.00	1.58			0.00	0.00			0.00	0.00	12.34	68.86	93.28	109.29	159.68	311	750	750	CONC	0.15	29.5	431.1703	0.9760	0.5038	0.720
To Service Block 23, Pipe 7 - Ex. MH 6559						2.37				1.58				0.00				0.00	12.84														
Contribution From STREET F, Pipe 9 - 10						0.99				0.00				0.00				0.00	11.65														
	10	12	0.23	0.70	0.45	1.44			0.00	0.00			0.00	0.00			0.00	0.00	11.65	71.00	96.22	112.75	164.76	102	600	600	CONC	0.15	54.0	237.8056	0.8411	1.0701	0.429
Contribution From STREET A, Pipe 11 - 12						0.90				0.00				0.00				0.00	11.83														
	12	13	0.20	0.70	0.39	2.72			0.00	0.00			0.00	0.00			0.00	0.00	13.66	65.12	88.15	103.25	150.82	177	675	675	CONC	0.15	52.5	325.5584	0.9098	0.9618	0.544
	13	14	0.14	0.70	0.27	2.99			0.00	0.00			0.00	0.00			0.00	0.00	14.62	62.67	84.80	99.31	145.03	188	675	675	CONC	0.15	16.0	325.5584	0.9098	0.2931	0.576
	14	18	0.14	0.70	0.27	3.27			0.00	0.00			0.00	0.00			0.00	0.00	14.92	61.97	83.83	98.17	143.36	202	675	675	CONC	0.15	24.5	325.5584	0.9098	0.4488	0.622
To rue Sculpin Street, Pipe 18 - Ex. MH 6608						3.27				0.00				0.00				0.00	15.36														
Contribution From STREET C, Pipe 15 - 16						0.29				0.00				0.00				0.00	10.87														
	16	17	0.04	0.70	0.08	0.37			0.00	0.00			0.00	0.00			0.00	0.00	11.74	70.70	95.80	112.26	164.04	26	450	450	CONC	0.20	13.0	127.5033	0.8017	0.2703	0.205
	17	18	0.25	0.70	0.49	0.86			0.00	0.00			0.00	0.00			0.00	0.00	12.01	69.85	94.63	110.88	162.03	60	600	600	CONC	0.15	53.5	237.8056	0.8411	1.0602	0.251
To rue Sculpin Street, Pipe 18 - Ex. MH 6608						0.86				0.00				0.00				0.00	13.07														
Service Block 23																																	
Contribution From STREET A, Pipe 6 - 7						2.37				1.58				0.00				0.00	12.84														
	7	Ex. MH 6559	0.04	0.70	0.08	2.45			0.00	1.58			0.00	0.00			0.00	0.00	12.84	67.38	91.25	106.90	156.17	309	750	750	CONC	0.15	24.5	431.1703	0.9760	0.4184	0.717
rue Sculpin Street																																	
Contribution From STREET A, Pipe 14 - 18						3.27				0.00				0.00				0.00	15.36														
Contribution From STREET A, Pipe 17 - 18						0.86				0.00				0.00				0.00	13.07														
	18	Ex. MH 6608	0.04	0.70	0.08	4.20			0.00	0.00			0.00	0.00			0.00	0.00	15.36	60.92	82.40	96.49	140.89	256	675	675	CONC	0.15	24.0	325.5584	0.9098	0.4397	0.786

Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min. Velocity = 0.80 m/s

LICENSED PROFESSIONAL ENGINEER
W. LIU
100167932
21-06-08
PROVINCE OF ONTARIO

Designed: A.K.	PROJECT: 2275 Mer Bleue Road
Checked: W.L.	LOCATION: City of Ottawa
Dwg. Reference:	File Ref: 20-1214 / Date: Jun 2021 / Sheet No. SHEET 1 OF 1

J.F. Sabourin and Associates Inc.
WATER RESOURCES AND ENVIRONMENTAL CONSULTANTS

52 Springbrook Drive
Ottawa (Stittsville), ON K2S 1B9
TEL: (613) 836-3884
FAX: (613) 836-0332
WEB: www.jfsa.com

March 26, 2021

David Schaeffer Engineering Limited
120 Iber Road, Unit 103
Stittsville, Ontario K2S 1E9

Attention: **Ms. Jennifer Ailey, P.Eng.**

Subject: **2275 Mer Bleue Road / Preliminary Stormwater Management Design**

our file: 1102-13

As requested by your office, we have evaluated, based on the available information as described below, the preliminary hydraulic gradeline results for the storm sewer servicing the 2275 Mer Bleue Road site.

The 2275 Mer Bleue Road site is located within the Avalon West subdivision, and is serviced by a storm sewer through the Avalon West subdivision to the existing Avalon West Stormwater Management (SWM) facility, which discharges to McKinnon's Creek. The 2275 Mer Bleue Road site has been accounted for in the sizing of the Avalon West storm sewers and pond, as designed by IBI Group. Note that an interim expansion of the existing SWM facility has been constructed in support of the Summerside South Phase 1 subdivision, in advance of improvements to downstream McKinnon's Creek, as per the June 2019 *Design Brief for Interim Expansion of the Avalon West Stormwater Management Pond for the Summerside South Phase 1 Subdivision* by DSEL/JFSA.

Preliminary hydraulic gradeline calculations for the proposed storm sewer within the 2275 Mer Bleue Road site were performed using spreadsheet calculations and are presented in Table 1. Pipe data, storm sewer layout and Rational Method flows in the storm sewer are as provided by DSEL. The Rational Method flows were calculated based on the 2-, 5- or 10-year level of service requirements, and the 100-year flows in the hydraulic gradeline calculations were estimated as 14% greater than the Rational Method flows, to account for the additional flows captured by catchbasin grates, lead pipes and / or inlet control devices under the higher surface water depths of the 100-year storm.

The 100-year boundary hydraulic gradeline elevations at the two storm sewer outlets from the site to the Avalon West storm sewer were set to match the highest simulated under the 100-year 3-hour Chicago and 100-year 24-hour SCS Type II design storms, from either the design by IBI Group or the modelling completed in support of the interim pond expansion - that is, from the March 13, 2018 *Avalon West Stage 6 Major System Stormwater Analysis* memo by IBI Group or the June 2019 *SWM Report for Summerside South Phase 1* by JFSA (for which detailed modelling of the Avalon West subdivision was incorporated into the overall model by IBI Group on Sept. 6, 2018),

As may be seen in Table 1, a freeboard of 0.3 m between the hydraulic gradeline and the estimated underside of footing elevations (estimated as 1.8 m below ground level) has been provided throughout the proposed development.

Yours truly,
J.F. Sabourin and Associates Inc.

L. Pipkins

Laura Pipkins, P.Eng.

cc: J.F. Sabourin, M.Eng, P.Eng.
Director of Water Resources Projects

Table 1: Storm Sewer Hydraulic Gradeline Calculations

Pipe Parameters											Flow Characteristics			Friction and Minor Losses						HGL Computations			USF Check	
Manhole Number		Invert Elevation		Diameter	Length	MH Cover Elev. u/s	MH Cover Elev. d/s	Width	Slope	n	Qcap	Flow [1]	V actual Q/a	per Darcy-Weisbach f	per Darcy-Weisbach H_L	Friction Losses	Minor Loss Coefficient	Minor Losses	Losses	Surch. (u/s)	HGL (u/s)	HGL (d/s)	USF [2]	Freeboard To USF
(u/s)	(d/s)	(u/s) (m)	(d/s) (m)	(mm)	(m)	(m)	(m)	(mm)	(%)		(L/s)	(L/s)	(m/s)		(m)	(m)		(m)	(m)	(m)	(m)	(m)		(m)
1	3	85.95	85.71	375	78.5	88.45	88.42	N/A	0.30	0.013	96	68	0.949	0.029	0.119	0.119	0.39	0.018	0.137	-0.142	86.178	85.881	86.65	0.472
2	3	85.66	85.56	525	28.0	88.41	88.41	N/A	0.35	0.013	254	203	1.307	0.026	0.063	0.063	0.47	0.041	0.103	-0.171	86.011	85.881	86.61	0.599
3	4	85.41	85.39	675	16.0	88.42	88.52	N/A	0.15	0.013	326	273	1.022	0.024	0.017	0.017	0.39	0.021	0.038	-0.203	85.881	85.821	86.62	0.739
4	6	85.33	85.27	675	37.0	88.52	88.37	N/A	0.15	0.013	326	290	1.029	0.024	0.044	0.044	0.02	0.001	0.045	-0.179	85.821	85.713	86.72	0.899
5	6	85.82	85.57	375	82.0	88.35	88.35	N/A	0.30	0.013	96	72	0.955	0.029	0.138	0.138	1.33	0.062	0.200	-0.133	86.057	85.713	86.55	0.493
6	7	85.19	85.16	750	22.0	88.37	88.54	N/A	0.15	0.013	431	356	1.093	0.023	0.023	0.023	1.33	0.081	0.103	-0.231	85.713	85.496	86.57	0.857
7	Ex. MH 6559	84.94	84.90	750	24.0	88.60	88.37	N/A	0.15	0.013	431	355	1.096	0.023	0.024	0.024	0.02	0.001	0.026	-0.190	85.496	85.47	86.80	1.304
9	10	85.83	85.50	375	92.5	88.50	88.45	N/A	0.35	0.013	104	89	1.057	0.029	0.238	0.238	1.33	0.076	0.313	-0.108	86.095	85.702	86.70	0.605
10	12	85.28	85.20	600	52.5	88.61	88.32	N/A	0.15	0.013	238	118	0.847	0.025	0.020	0.020	0.02	0.001	0.020	-0.177	85.702	85.682	86.81	1.108
11	12	85.71	85.43	375	94.0	88.34	88.30	N/A	0.30	0.013	96	78	0.975	0.029	0.188	0.188	1.33	0.064	0.252	-0.119	85.963	85.682	86.54	0.577
12	13	85.13	85.04	675	54.5	88.32	88.35	N/A	0.15	0.013	326	212	0.973	0.024	0.035	0.035	0.39	0.019	0.054	-0.118	85.682	85.628	86.52	0.838
13	14	84.98	84.96	675	13.5	88.35	88.42	N/A	0.15	0.013	326	221	0.978	0.024	0.009	0.009	0.39	0.019	0.028	-0.030	85.628	85.600	86.55	0.922
14	18	84.90	84.86	675	26.0	88.42	88.30	N/A	0.15	0.013	326	239	0.999	0.024	0.021	0.021	1.33	0.068	0.089	0.022	85.600	85.511	86.62	1.020
15	16	85.35	85.22	375	44.5	88.28	88.07	N/A	0.30	0.013	96	26	0.743	0.029	0.009	0.009	0.39	0.011	0.020	-0.142	85.583	85.563	86.48	0.897
16	17	85.14	85.11	450	15.5	88.07	88.26	N/A	0.20	0.013	128	33	0.682	0.027	0.002	0.002	0.39	0.009	0.011	-0.028	85.563	85.552	86.27	0.707
17	18	84.96	84.88	600	54.0	88.26	88.30	N/A	0.15	0.013	238	71	0.743	0.025	0.007	0.007	1.19	0.034	0.041	-0.008	85.552	85.511	86.46	0.908
18	Ex. MH 6608	84.80	84.77	675	22.5	88.20	88.04	N/A	0.15	0.013	326	302	1.037	0.024	0.029	0.029	0.035	0.002	0.031	0.032	85.511	85.48	86.40	0.889

Note: 100-year HGL at existing MH 6608 and MH 6559 as modelled in the June 2019 *SWM Report for Summerside South Phase 1*, for which detailed modelling of the Avalon West subdivision was incorporated into the overall model by IBI Group on Sept. 6, 2018, or as per the March 13, 2018 *Avalon West Stage 6 Major System Stormwater Analysis* memo by IBI Group, whichever is higher.

[1] Flow set equal to Rational Method flows (per DSEL) + 14% to account for additional flows captured during the 100-year storm.

[2] USF estimated as 1.8 m below the upstream manhole cover elevation.