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# FUNCTIONAL SERVICING REPORT

*FOR*

# SUMMERSIDE WEST – PHASE 4/5/6
# 2464 TENTH LINE ROAD

# MATTAMY HOMES

CITY OF OTTAWA

**PROJECT NO.: 15-766**

**NOVEMBER 1, 2018**
**5TH SUBMISSION**
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**FUNCTIONAL SERVICING REPORT**
**FOR**
**SUMMERSIDE WEST – PHASE 4/5/6**
**2564 TENTH LINE ROAD**

**MATTAMY HOMES**

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# FUNCTIONAL SERVICING REPORT
# FOR
# SUMMERSIDE WEST – PHASE 4/5/6
# 2564 TENTH LINE ROAD

## MATTAMY HOMES

## PROJECT NO: 15-766

## 1.0 INTRODUCTION

This Functional Servicing Report (FSR) is submitted in support of Summerside West (SSW) Phase 4, 5 and 6 development on behalf of Mattamy Homes.

SSW Phase 4, 5 and 6 is located south of the existing SSW Phase 1, 2 and 3 development east of Mer Bleue Road and west of Tenth Line Road, as depicted on ***Figure 1***.

A Community Design Plan (CDP) for an urban expansion area south of the site is underway. The CDP area is known as Mer Bleue Urban Expansion Area 10 and referenced throughout this report.

The subject site is approximately 36 ha in size and will be comprised of a mix of residential dwellings (402 detached single homes and 336 townhomes), one (1) neighbourhood park, one (1) partial park area, one (1) parkette and one (1) school, as depicted on ***Figure 2***.

This FSR is prepared to demonstrate conformance with the design criteria of the City of Ottawa, background studies, including the Mer Bleue Urban Expansion Area 10 Master Servicing Study ***(Mer Bleue MSS)***, and general industry practice.

### 1.1 Existing Conditions

SSW Phase 4, 5 and 6 is comprised of approximately 36 ha of vacant land with grades between 86.0 m and 87.0 m, slightly below the elevation of Mer Bleue Road and Tenth Line Road. SSW is located within the McKinnon's Creek Watershed and is subject to regulations of the South Nation Conservation (SNC).

McKinnon's Creek currently bisects SSW, with Phase 4 to the east of the watercourse and Phases 5 and 6 to the west of the watercourse. Several shallow drainage ditches exist across the site for agricultural drainage purposes.

A geotechnical investigation has been undertaken by Paterson Group. The soil profile underlying the site consists primarily of an agriculturally disturbed organic layer overlying a stiff brown silty clay crust, followed by a deep, firm, grey, silty clay deposit. Based on the all of the information collected to date, including some surcharge test piles


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fitted with settling plates, the preliminary grade raise restriction has been recommended as 1.3 m for lots and 1.5 m for roads across the site.

## 1.2 Summary of Pre-consultation

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

### 1.2.1 City of Ottawa

A pre-consultation was held at the City of Ottawa on February 28, 2017 regarding the draft plan submission requirements for SSW Phase 4, 5 and 6. A copy of the pre-consultation minutes is enclosed in ***Appendix A*** for reference.

## 1.3 Existing Permits / Approvals

The existing permits and approvals relating to SSW Phase 4, 5 and 6 are presented in ***Table 1***.

**Table 1: Existing Permits/Approvals**

| Agency | Permit/Approval Required | Remarks |
|---|---|---|
| Ministry of the Environment, Conservation and Parks (MECP) | Environmental Compliance Approval #9069-A4YR6E (December 8, 2015) for SSW Phase 1 Sewers | The SSW Phase 1 sanitary sewers provide the outlet for SSW Phase 4. A copy of the ECA is enclosed in ***Appendix B***. |
| Ministry of the Environment, Conservation and Parks (MECP) | Environmental Compliance Approval #7375-A8QGEU (April 12, 2016) for the Tenth Line Pump Station | The Tenth Line Pump station provides the outlet for SSW Phase 4, 5 and 6. A copy of the ECA is enclosed in ***Appendix B***. |
| Ministry of the Environment, Conservation and Parks (MECP) | Environmental Compliance Approval #1339-A28J6Z (October 2, 2015) for the Avalon West, Neighbourhood 5 SWM Facility. | The Avalon West N5 Pond provides the outlet for SSW Phase 4 (with revisions). A copy of the ECA is enclosed in ***Appendix B***. |


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## 1.4 Required Permits / Approvals

The required permits and approvals relating to SSW Phase 4, 5 and 6 are presented in ***Table 2***:

**Table 2: Required Permits/Approvals**

| Agency | Permit/Approval Required | Trigger | Remarks |
|---|---|---|---|
| City of Ottawa | Commence Work Notification (CWN) | Construction of new sanitary and storm sewers throughout the subdivision. | The City of Ottawa will issue a commence work notification for construction of the sanitary and storm sewers once an ECA is issued by the MECP. |
| City of Ottawa | MOE Form 1 – Record of Watermains Authorized as a Future Alteration. | Construction of watermains throughout the subdivision. | The City of Ottawa to review the watermains on behalf of the MOE through Form 1 – Record of Watermains Authorized as a Future Alteration. |
| Ministry of the Environment, Conservation and Parks (MECP) | Environmental Compliance Approval | Construction of new sanitary and storm sewers throughout the subdivision. | The MECP will review the sanitary and storm sewer design through the City of Ottawa transfer of review process. |
| Ministry of the Environment, Conservation and Parks (MECP) | Environmental Compliance Approval Amendment | Construction of modifications to the existing Avalon West (N5) SWM Facility. | The MECP will review the stormwater management pond design through the City of Ottawa transfer of review process. |
| Ministry of the Environment, Conservation and Parks (MECP) | Environmental Compliance Approval | Construction of a new stormwater management pond (North SWM Pond per Mer Bleue MSS) | The MECP will review the stormwater management pond design through the City of Ottawa transfer of review process. |
| Ministry of the Environment, Conservation and Parks (MECP) | Environmental Compliance Approval Amendment | Construction of new sanitary sewers to the Tenth Line Pump Station. | The MECP will review the sanitary pump station design through the City of Ottawa transfer of review process. |
| Ministry of the Environment, Conservation and Parks (MECP) | Permit To Take Water (PTTW) | Any construction activity which requires pumping greater than 50,000 L/day. | |


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| Agency | Permit/Approval Required | Trigger | Remarks |
|---|---|---|---|
| South Nation Conservation (SNC) | Permit under Ontario Regulation 170/06, SNC's Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation. | Any work associated with McKinnon's Creek, construction of new pond outlet and infilling of existing tributaries. | The SNC will be required to sign off on the pond modifications prior to MECP approval. Subsequently, the SNC will review the pond outlet through the permit application review. |
| South Nation Conservation (SNC) | Permit required to complete with within the regulatory floodplain. | Any work within the current regulatory floodplain. | The SNC will be review and issue a permit to allow works within the regulatory floodplain. Once the grading work is compete, the updated analysis will be coordinated with the SNC and the mapping will be updated, accordingly. |
| Department of Fisheries and Oceans (DFO) | Self-assessment and potential request for review based on works associated with McKinnon's Creek or infill of any tributaries. | Any work within McKinnon's Creek or any infilling of existing tributaries. | The project biologist will coordinate and consult with the DFO to determine whether a request for review will be required. The request for review will determine if any compensation works are required. |


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# 2.0 GUIDELINES, PREVIOUS STUDIES, AND REPORTS

## 2.1 Existing Studies, Guidelines, and Reports

The following studies were utilized in the preparation of this 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)*
- **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**
  Greater Golden Horseshoe Area Conservation Authorities, December 2006
  *(E&S Guidelines)*
- **Geotechnical Investigation, Proposed Residential Development**,
  Summerside West – Phase 4 and 5 and 6 (PG4049-2)
  Paterson Group, May 14, 2018
  (Geotechnical Investigation)


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- **Mer Bleue Urban Expansion Area 10, Master Servicing Study**
  IBI Group, December 2017
  (Mer Bleue MSS)
- **Mer Bleue Area 10 Urban Expansion Study Area, Environmental Management Plan**
  Morrison Hershfield Limited, December 2017
  (Mer Blue EMP)
- **Design Brief for Summerside West – Phase 1**
  DSEL, August 7, 2015
  (SSW Phase 1 Design Brief)


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# 3.0 WATER SUPPLY SERVICING

## 3.1 Existing Water Supply Services

SSW Phase 4, 5 and 6 is located within Zone 2E of the City's water distribution system, which is fed by two booster pumping stations and the Innes Road elevated storage tank at Belcourt Boulevard, providing balancing, fire and emergency storage. As noted in the Mer Bleue MSS, there is a strong network of watermains which services the Neighbourhood 4 community to the northeast of the study area.

In the vicinity of the site, there is an existing waterman on Tenth Line Road, which is 152 mm in diameter and an existing watermain on Mer Bleue Road, which is 406 mm in diameter. There are also be existing watermains to the north within SSW Phase 1, 2 and 3. The existing watermains are depicted on ***Figure 3***.

## 3.2 Proposed Water Supply

As noted in the ***Mer Bleue MSS***, water supply to the site will be provided by connection to the municipal water system at Tenth Line Road, Mer Bleue Road and to SSW Phase 1, 2 and 3 to the north. Refer to the ***Figure 8.1A - Recommended Water Distribution System for Updated Demonstration Plan*** from the ***Mer Bleue MSS***, contained in ***Appendix C***.

The proposed development will be serviced internally by 152 mm, 203 mm and 305 mm diameter watermains designed in accordance with the ***Water Supply Guidelines*** as summarized in ***Table 3***. The proposed watermains are depicted on ***Figure 3***.

**Table 3: Water Supply Design Criteria**

| Design Parameter | Value |
|---|---|
| Residential - Single Family | 3.4 p/unit |
| Residential - Townhome | 2.7 p/unit |
| Residential – Average Daily Demand | 350 L/p/day |
| Residential - Maximum Daily Demand | 2.5 x Average Daily Demand |
| Residential - Maximum Hourly Demand | 2.2 x Maximum Daily Demand |
| Minimum Watermain Size | 152 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)* | |

The recommended system for the overall Mer Bleue Urban Expansion (MBESA) Area 10 was hydraulically modelled by Stantec and contained within the ***Mer Bleue MSS***. Based on the existing hydraulic grade line (HGL) in Zone 2E, operating pressures in the MBESA development are not anticipated to drop below 276 kPa (40 psi) or exceed 552


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kPa (80 psi). Hydraulic modeling results show that water supply is available during basic day and peak hour conditions as well as under emergency conditions while providing fire flow.

At the time of detailed design of SSW Phase 4, 5 and 6, 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. SSW Phase 4 will connect to existing SSW Phase 1 and will be looped to the existing watermain on Tenth Line Road. SSW Phase 5 will connect to existing SSW Phase 2 and 3. SSW Phase 6 will connect to Phase 2, 3 and 5 and loop to the existing watermain on Mer Bleue Road.

### 3.2.1 Fire Flow Demand

At the time of detailed design, detailed fire flow demand will be calculated in accordance with the Fire Underwriters Survey's Water Supply for Public Fire Protection Guideline (1999). If required, the City of Ottawa's cap of 10,000 L/min (167 L/s) as outlined in ISDTB-2014-02 will be applied. Firewalls will be implemented, as required, to meet the fire flow demand.

The existing and proposed watermains are presented in ***Figure 3***.

### 3.2.2 Boundary Conditions

Preliminary boundary conditions for the large study area were provided in the ***Mer Bleue MSS***; however, boundary conditions will be requested at the time of detailed design for specific locations and demands. Boundary conditions in the form of Hydraulic Grade Line (HGL) will be provided by the City of Ottawa for Peak Hour, Maximum Day Plus Fire Flow and Maximum HGL (high pressure check).

### 3.2.3 Water Demand Calculations

A summary of preliminary water demands for SSW Phase 4, 5 and 6 is presented in ***Table 3.1.***


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**Table 3.1: Summary of Water Demands**

| | Singles | Towns | Pop | Average Day | | Max Day | | Peak Hour | | Min Hour | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 2.5 x Avg Day | | 2.2 x Max Day | | 0.5 x Avg Day | |
| | | | | L/cap/ day | L/s | L/cap/ day | L/s | L/cap/ day | L/s | L/cap/ day | L/s |
| Phase 4 | 148 | 127 | 846 | 350 | 3.43 | 875 | 8.57 | 1925 | 18.85 | 175 | 1.71 |
| Phase 5 | 256 | 0 | 870 | 350 | 3.52 | 875 | 8.81 | 1925 | 19.38 | 175 | 1.76 |
| Phase 6 | 0 | 247 | 667 | 350 | 2.70 | 875 | 6.75 | 1925 | 14.86 | 175 | 1.35 |
| **Totals:** | **404** | **374** | **2383** | | **9.65** | | **24.13** | | **53.09** | | **4.82** |

## 3.3 Master Servicing Study

The proposed watermain network conforms to the ***Mer Bleue MSS*** aside from minor changes due to the updated road network. Refer to the ***Figure 8.1A - Recommended Water Distribution System for Updated Demonstration Plan*** from the ***Mer Bleue MSS***, contained in ***Appendix C***.

## 3.4 Water Supply Conclusion

SSW Phase 4, 5 and 6 will be serviced internally by 152 mm, 203 mm and 305 mm watermains, which will be looped to trunk watermains in Tenth Line Road and Mer Bleue Road, as well as to connections to SSW Phase 1, 2 and 3 to the north.

At the time of 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 Ministry of the Environment and Climate Change, City of Ottawa and Fire Underwriters criteria.

The proposed water supply conforms to the design in the ***Mer Bleue MSS*** aside from minor changes due to the updated road network.


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# 4.0 WASTEWATER SERVICING

## 4.1 Existing Wastewater Services

The proposed sanitary outlet for SSW Phase 4, 5 and 6 is the Tenth Line Road Pump Station (TLPS), which in turn outlets by forcemain to the Esprit Drive Collector. The TLPS is located above the north east corner of SSW Phase 1, at Tenth Line Road.

As noted in the ***Mer Bleue MSS***, Section 4.2.2, the TLPS is currently operating under interim conditions and is currently fitted up to accommodate approximately 50% of its approved capacity. The opportunity exists to upgrade the TLPS to full capacity to service these expansion lands. Noted further in Section 5.5.2.2, Stantec was commissioned by IBI Group to update their previous assessment of the TLPS. Stantec concluded that, with upgrading the pumps, the Mer Bleue Expansion Area 10 could be serviced by the TLPS. The ***Mer Bleue Community Design Plan – Tenth Line PS & Wastewater Servicing: Pump Station Capacity Assessment*** by Stantec dated August 26, 2016 is enclosed in ***Appendix D***.

As noted in the ***Mer Bleue MSS***, Section 5.5.2.2, the existing sanitary sewer catchment tributary to the TLPS is provided with emergency sanitary overflows, to minimize the risk of basement flooding in the event of a catastrophic failure within the TLPS.

Through the design of SSW Phase 1, SSW Phase 4 flows were included as external tributary flows. The current approval of the sanitary sewer through Phase 1, as well as the current tributary area to the TLPS includes SSW Phase 4. The current sanitary overflow configuration also accounts for the drainage from SSW Phase 4. Refer to ***Figure 4*** for a depiction of the existing sewers. The drainage area plan and design sheet for SSW Phase 1 is enclosed in ***Appendix E***.

## 4.2 Wastewater Design

SSW Phase 4, 5 and 6 will be serviced by new gravity sewers designed in accordance with City of Ottawa design criteria and will outlet through to the TLPS.

The proposed sanitary sewer layout and drainage areas are depicted on ***Figure 4***. Trunk 1B services SSW Phase 4 through existing SSW Phase 1 to the TLPS. Trunk 2 services SSW Phase 5 and 6 by crossing McKinnon's Creek to a trunk on Tenth Line Road, also outletting to the TLPS. Information for the proposed sanitary trunk sewer under McKinnon's Creek will be provided at the time of detailed design with the corresponding phase.

***Table 4*** summarizes the ***City Standards*** which have been used in the design of the proposed wastewater sewer system.


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**Table 4: Wastewater Design Criteria**

| Design Parameter | Value |
|---|---|
| Low Density Residential | 3.4 p/unit |
| 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 | 1.5 (ICI in contributing area is > 20%) |
| Infiltration and Inflow Allowance | 0.33 L/s/ha |
| Park Flows | 9,300 L/ha/day |
| 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* | |

The sanitary drainage area plans and design sheets for SSW Phase 4, 5 and 6 are enclosed in ***Appendix E***.

The peak sanitary flow from Trunk 1B (SSW Phase 4) to the existing SSW Phase 1 system is 17.08 L/s. As shown on the sanitary drainage area plan and design sheet from SSW Phase 1, this is generally the same flow that was anticipated in the downstream sewers. Additionally, the downstream sanitary sewers have significant residual capacity.

The peak sanitary flow from Trunk 2 to the future 750 mm Tenth Line Road trunk sewer is 59.95 L/s.

As noted in ***Section 4.1***, the ***Mer Bleue MSS*** has confirmed that with pump upgrades, the entire Mer Bleue Expansion Area 10 could be serviced by the TLPS. SSW Phase 4 has already been designed and approved under the current approvals for the TLPS. There is potential that SSW Phase 5 and 6 could also discharge to the TLPS without pump upgrades, given that the City of Ottawa is currently updating their demand criteria. Further analysis is required once the City of Ottawa releases the Technical Bulletin.


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## 4.3 Master Servicing Study

The wastewater design generally conforms to the ***Mer Bleue MSS***. Refer to ***Figure 8.2A: Recommended Waste Water System for Updated Demonstration Plan*** and the ***Sanitary Sewer Design Sheet*** from the ***Mer Bleue MSS***, contained in ***Appendix E***. The peak flows anticipated from SSW Phase 5 and 6 in the MSS are 71.91 L/s.

## 4.4 Wastewater Servicing Conclusion

SSW Phase 4 outlets to the TLPS via SSW Phase 1, where downstream infrastructure including the pump station and overflows were sized for the flows. SSW Phase 5, 6 is serviced by a trunk sewer under McKinnon's Creek to a sanitary trunk sewer on Tenth Line Road and ultimately to the TLPS.

An analysis by Stantec is contained in the ***Mer Bleue MSS*** which confirms that with pump upgrades the entire Mer Bleue Expansion Area 10 could be serviced by the TLPS. SSW Phase 5 and 6 will require further analysis to confirm that the TLPS has capacity for the flows without pump upgrades.

The sanitary sewers have been designed in accordance with City of Ottawa standards and conform to the ***Mer Bleue MSS***.


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# 5.0 STORMWATER CONVEYANCE

## 5.1 Existing Conditions

SSW Phase 4, 5 and 6 is comprised of approximately 36 ha of vacant land with grades between 86.0 m and 87.0 m, slightly below the elevation of Mer Bleue Road and Tenth Line Road. SSW is located within the McKinnon's Creek Watershed and is subject to regulations of the South Nation Conservation (SNC).

McKinnon's Creek currently bisects SSW, with Phase 4 to the east of the watercourse and Phases 5 and 6 to the west of the watercourse. Several shallow drainage ditches exist across the site for agricultural drainage purposes.

## 5.2 Proposed Stormwater Management Strategy

This FSR proposes to have stormwater flows conveyed through SSW Phase 4, 5 and 6 by way of an underground sewer network. The stormwater runoff will be treated to provide an Enhanced Level of Protection (80% TSS removal) before ultimately being released into McKinnon's Creek. The proposed stormwater management design is shown on ***Figure 5***.

The stormwater management designs consists of:

- A storm sewer system designed to capture at least the minimum design capture events required under PIETB-2016-01;
- Expansion of the existing Avalon West SWM Facility for SSW Phase 4 to provide an Enhanced Level of Protection per MECP guidelines, via treatment of the stormwater captured by the storm sewer network;
- A new Mer Bleue Northern SWM Facility for SSW Phase 5 and 6 to provide an Enhanced Level of Protection per MECP guidelines via treatment of the stormwater captured by the storm sewer network;
- An on-site road network designed to maximize the available storage in the on-site road network for the 100-year design event, where possible, with controlled release of stormwater to the minor storm system; and,
- An overland flow route designed to safely convey stormwater runoff flows in excess of the on-site road storage.
- Quantity control in downstream sections of McKinnon's Creek (downstream of Wall Road) to pre-development levels.


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## 5.3 Post-Development Stormwater Management Targets

Stormwater management requirements for the stormwater management scheme have been adopted from the ***Mer Bleue MSS***, ***City Standards***, and the ***MECP SWMP Manual***.

Given the general criteria mentioned above, the following specific standards are expected to be required for stormwater management within the subject property:

- Enhanced quality treatment will be provided for stormwater runoff from the subject property, corresponding to a long-term average Total Suspended Solid removal efficiency of 80%, as defined by the MECP prescribed treatment levels.
- Downstream receiving watercourses will be assessed for responses to planned stormwater management outflows, and stabilization mitigation measures will be planned as required.
- Downstream receiving drainage features, culverts, and sewers will be assessed for responses to planned stormwater management outflows, and infrastructure rehabilitation or capacity improvement measures will be planned as required.
- 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.
- Storm sewers on collector roads are to be designed to provide at least a 5-year level of service without any ponding per the City's latest Technical Bulletin PIEDTB-2016-01.
- Storm sewers on arterial roads are to be designed to provide at least 1 10-year level of service without any ponding per the City's latest Technical Bulletin PIEDTB-2016-01.
- For arterial roads, the lateral spread during a 100-year even should keep one late free of ponding in each direction.
- For less frequent storms (i.e. larger than 2-year or 5-year), 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


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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 catchbasins 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

Per the ***Mer Bleue MSS***, it is recommended that SWM facilities tributary to McKinnon's Creek be designed to provide an Enhanced Level of Protection, or 80% removal of Total Suspended Solids (TSS) in accordance with the MOE Stormwater Management Planning and Design Manual (March, 2003).

### 5.3.2 Quantity Control Targets

Per the Mer Bleue MSS, McKinnon's Creek is the recipient of surface runoff from the subject site and McKinnon's Creek also accommodates flows from existing external stormwater management systems within Avalon South (N4) and Avalon West (N5) developments.

It is recommended that the proposed SWM system for the Mer Bleue Expansion Study Area control peak flows in the downstream sections of McKinnon's Creek (downstream of Wall Road) to pre-development levels. An excerpt from the ***Mer Bleue MSS***, Table 7.6, shows the pre-development peak flow rates is enclosed in ***Appendix F***. The corresponding pre-development drainage area plan ***Figure 5.3 – Pre-Development Drainage Area Plan*** is also enclosed in ***Appendix F***.

## 5.4 Stormwater Management Design

The stormwater runoff from SSW Phase 4 is proposed to be treated by the expansion of the Avalon West SWM Facility, which will provide an Enhanced Level of Protection (80% TSS removal) and discharges to McKinnon's Creek as shown on ***Figure 8***. This is further discussed in ***Section 5.8.1*** of this report.

The stormwater runoff from SSW Phase 5 and 6 is proposed to be treated by a new Mer Bleue Northern SWM Facility, which will provide an Enhanced Level of Protection (80% TSS removal) and discharges to McKinnon's Creek.

The proposed stormwater management design is shown in ***Figure 5***.


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### 5.4.1 External Drainage

Referring to the MSS ***Figure 8.3 – Recommended Storm Trunk Servicing***, enclosed in ***Appendix G***, Tenth Line Road drainage south to the intersection at Wall Road was planned to be collected and directed north through SS West Phase 4 to the Avalon West SWM Facility expansion.

Currently, Tenth Line Road is a rural road; however, in the future it is expected to be urbanized and should be considered as a 10-year capture road in the post-development condition.

Upon review of the existing grades along Tenth Line Road, it is not feasible for the entire length of Tenth Line Road to Wall Road to drain back to the Avalon West SWM Facility. Based on City of Ottawa 2k aerial topographic mapping, the lowest existing road elevation near the intersection of Wall Road is 85.50 m, resulting in a storm sewer obvert of approximately 83.70 m (assuming 1.8 m cover), which is lower than the downstream manhole 2040 in Phase 4 (obvert 84.92) proposed in the MSS.

We have attempted to maximize the drainage to the Avalon West SWM Facility by raising the grade along Tenth Line Road while remaining consistent with the intention of the MSS proposed grading. As shown on the markup of MSS ***Figure 9.1 – Macro Grading***, enclosed in ***Appendix G***, the highest proposed grade that is illustrated in the MSS for lands to be serviced by the Avalon West SWM Facility, at the southern boundary of SS West Phase 4, is 88.40 m. Since proposed grading within SS West Phase 4 is expected to be lower than the grading design shown in the MSS, and for the purpose of evaluating a feasible southern drainage boundary for the Avalon West SWM Facility, the 88.40 m finished grade elevation has been shifted to the southern limit of the development block immediately south of SS West Phase 4. It is assumed that Tenth Line Road will be raised to the same elevation as the proposed grade within these adjacent development lands in the future, and that Tenth Line Road will then be sloped down to match the existing road elevation at McKinnon's Creek crossing, avoiding excessive grade raise within Tenth Line Road. Based on this anticipated development and Tenth Line Road grading scenario, and the proposed obvert elevation of storm sewers within SS West Phase 4, it will not be feasible to extend storm sewer drainage to the Avalon West SWM Facility along Tenth Line Road further than the southern limit of development due to inadequate cover over the storm sewer within Tenth Line Road. Refer to attached sketch for illustration of finished grades and storm sewer obvert elevations.

It is proposed that the remainder of Tenth Line Road, south of the adjacent development lands with finished grade elevation of 88.40 m, be treated independently from the Avalon West SWM Facility, potentially via Oil Grit Separator Unit or other BMP for quality control, and underground or surface detention for quantity/erosion control prior to release to McKinnon's Creek.


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The external drainage described is shown on ***Figure 5***.

## 5.5 Proposed Minor System

SSW Phase 4, 5 and 6 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. The drainage will be conveyed within the underground piped sewer system to stormwater management facilities.

It is noted in the ***Mer Bleue MSS*** Section 8.3.3 that a portion of the subject property obtained special status to proceed in advance of the CDP and MSS and have identified the existing pond as its outlet to allow the development to proceed in advance of the downstream works. Refer to ***Mer Bleue MSS Figure 8.3.10.1 – Potential Development in Advance of McKinnon's Creek Enhancement***, enclosed in ***Appendix F***, which identifies SSW Phase 4 as a potential development in advance of McKinnon's Creek enhancement.

The SSW Phase 4 storm sewers will outlet to the expanded Avalon West (N5) SWM Facility and the SSW Phase 5 and 6 sewers will outlet to a new SWM pond identified in the ***Mer Bleue MSS***.

The proposed inlet from SSW Phase 4 to the expanded Avalon West (N5) SWM Facility is submerged for approximately 200 m as the inverts for the 1800 mm trunk are lower than the permanent pool elevation of 83.15 m. At the inlet, the 1800 mm trunk is submerged by approximately 35% and this is reduced as the inverts are higher as you go upstream. At the time of detailed design, the submergence will be modelled to consider the standard sedimentation requirement. The guidelines require that the modelling be completed to address the 10-year hydraulic grade line plus 25% sediment accumulation.

Street catchbasins will collect drainage from the streets and front yards, while rear yard catchbasins 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 preliminary rational method design of the minor system captures drainage for storm events up to and including the 2-year (local), 5-year (collector) event and 10-year (arterial) event, assuming the use of inlet control devices (ICD) for all catch basins within the subject property. ***Table 5*** summarizes the standards that will be employed in the detailed design of the storm sewer network.


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**Table 5: Storm Sewer Design Criteria**

| Design Parameter | Value |
|---|---|
| Minor System Design Return Period | 1:2 year (PIEDTB-2016-01) for local roads, without ponding<br>1:5 year (PIEDTB-2016-01) for collector roads, without ponding<br>1:10 year (PIEDTB-2016-01) for arterial roads, without ponding |
| Major System Design Return Period | |
| Intensity Duration Frequency Curve (IDF) 5-year storm event.<br>A = 998.071<br>B = 6.053<br>C = 0.814 | $i = \frac{A}{(t_c + B)^C}$ |
| Initial Time of Concentration | 10 minutes |
| Rational Method | $Q = CiA$ |
| 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 | $Q = \frac{1}{n} AR^{2/3} S^{1/2}$ |
| 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* | |

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 plan and storm sewer design sheet are enclosed in ***Appendix G*** for reference. The peak flow based on the Rational Method from the Trunk 2 (SSW Phase 4) to the SWM Facility is 2273 L/s. The peak flow based on the Rational method from Trunk 4 (SSW Phase 5 and 6) to the new Mer Bleue Northern SWM Facility is 4612 L/s.

Inlet control devices (ICDs) will be employed to ensure that storm flows entering the minor system are limited to the 2-year peak storm flow. At the time of detailed design, a hydraulic grade line (HGL) analysis has been completed and underside of footing elevations will be set at a minimum of 0.30 m above the HGL elevation.

## 5.6 Hydraulic Grade Line Analysis

A detailed hydraulic grade line (HGL) modelling analysis will be completed for the proposed system at the detailed design level, based on the 100-year 3-hour Chicago, 12-hour SCS, and 24-hour SCS design storms, including historical design storms and


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climate change stress test as required. Detailed grading design and storm sewer design will be modified as required to achieve the freeboard requirements set out in ***Section 5.3*** (per PIEDTB-2016-01).

## 5.7 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 and service easements towards the proposed outlets, as shown in ***Figure 5***. A composite servicing plan is shown on ***Figure 6***.

The grading design shown in ***Figure 7*** will include a saw-toothed-road design with 0.10% minimum grade from highpoint to highpoint, in order to maximize available surface storage for management of flows up to the 100-year design event where possible.

Given the elements above and the minor storm system described in ***Section 5.5***, the proposed drainage systems are expected to safely capture and convey all storms up to and including the 100-year event in accordance with the requirements of the City standards.

The overland flows from SSW Phase 4 are conveyed along the road to the Avalon West SWM Facility. The overland flows from SSW Phase 5 and 6 are conveyed along the road to the new Mer Bleue Northern SWM Facility.

## 5.8 Conceptual SWM Facilities

### 5.8.1 Avalon West SWM Facility Expansion

Per the ***Mer Bleue MSS***, the Mer Bleue Expansion Lands southeast of the existing Avalon West SWM Facility (SSW Phase 4) would require a separate inlet into the facility. It is proposed that the minor flow from these lands be conveyed to the facility via an 1800 mm diameter storm sewer, entering at the existing eastern sediment forebay, on its south side. Refer to ***Figure 8*** which shows the SWM Pond Expansion. An analysis for the pond expansion has been completed by J.F. Sabourin and Associates Inc. The ***Summerside West Phase 4 / Avalon West Stormwater Management Pond Expansion*** memo dated September 26, 2018 by JFSA is contained in ***Appendix H***.

### 5.8.2 Mer Bleue Northern SWM Facility

Per the ***Mer Bleue MSS***, the proposed Mer Bleue Northern SWM Facility is proposed to service 100 ha of the Mer Bleue Expansion lands, including SSW Phase 5 and 6. Refer to ***Figure 8.3.12 Drainage Area Plan*** from the ***Mer Bleue MSS***, contained in ***Appendix***


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***H.*** This facility is a new wet pond which will provide an Enhanced Level of Protection (80% TSS removal). Minor storm sewer flow wil be conveyed to the facility via two separate trunks. SSW Phase 5 and 6 will be conveyed via the northern trunk. The facility will discharge into a storm sewer which will eventually discharge to McKinnon's Creek.

As part of the recommended storm system in the Mer Bleue MSS, it was determined that McKinnon's Creek channel improvements were required between approximately Point B to Point D1. The McKinnon's Creek channel improvements are not required for the development of SSW Phase 4.

## 5.9 Master Servicing Study

The stormwater conveyance design generally conforms to the stormwater design included in the ***Mer Bleue MSS***. Refer to ***Figure 8.3A Recommended Storm Trunk Servicing for Updated Demonstration Plan*** from the ***Mer Bleue MSS*** and ***Storm Sewer Design Sheet,*** contained in ***Appendix G***. The peak flows based on the Rational Method from Trunk 2 (SSW Phase 4) to the SWM Facility is 2346 L/s. The peak flow based on the Rational method from Trunk 4 (SSW Phase 5 and 6) to the new Mer Bleue Northern SWM Facility is 4445 L/s. Detailed modelling at the time of detailed design will confirm capacity in the trunk sewers and the SWM facilities.

## 5.10 Stormwater Conclusions

The major and minor flows from SSW Phase 4 are conveyed to the Avalon West SWM Facility, which requires expansion. The major and minor flows from SSW Phase 5 and 6 are conveyed to the new Mer Bleue Northern SWM Facility.

The stormwater design has been completed with conformance to the MECP and City of Ottawa Guidelines. The minor system is designed capture the minimum 2-year flow, 5-year flow and 10-year flow on local roads, collector roads and arterial roads, respectively.

An Enhanced Level of Protection (80% TSS removal) will be provided for stormwater runoff from the subject property before being discharged to McKinnon's Creek. The peak flows will be controlled in the downstream sections of McKinnon's Creek (downstream of Wall Road) to pre-development levels.

The design of the stormwater conveyance system generally conforms to the ***Mer Bleue MSS***.


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# 6.0 SITE GRADING

## 6.1 Master Grading

SSW Phase 4, 5 and 6 is constrained by grade raise restrictions, downstream infrastructure (outlets), existing grades on surrounding properties and roads.

The site is subject to grade raise restrictions of 1.3 m for lots and 1.5 m for roads based on the information provided in the ***Geotechnical Investigation*** by Paterson Group, dated May 14, 2018, which has been increased from the recommendations in the ***Mer Bleue MSS***.

The detailed grading plans will be forwarded to the geotechnical consultant for review and recommendations. Final signoff for SSW Phase 4, 5 and 6 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; and
- Perforated pipe will be required for drainage swales if they are less than 1.5% in slope.
- Swales are to be 0.15m deep with 3:1 side slopes unless otherwise indicated on the drawings;


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## 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.

A detailed erosion and sediment control plan will be implemented for the SSW Phase 4, 5 and 6 prior to construction to ensure there are no negative impacts on the natural areas, including McKinnon's Creek.


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## 8.0 CONCLUSION AND RECOMMENDATIONS

A summary of the Functional Servicing Report for SSW Phase 4, 5 and 6 is as follows:

- Pre-Consultation with the City of Ottawa, South Nation Conservation and Ministry of the Environment and Climate Change will be required. Approvals will be required from the City of Ottawa and MECP and SNC.
- Watermains are designed as per the City of Ottawa guidelines and connect to a watermain on Tenth Line Road and Mer Bleue Road, as well as to existing watermains in SSW Phase 1, 2 and 3. A detailed hydraulic analysis will be completed at the time of detailed design to confirm that the proposed water network can deliver all domestic and fire flows as per the MECP, City of Ottawa and Fire Underwriters criteria.
- Sanitary sewers are designed as per the City of Ottawa guidelines. Sanitary sewers will discharge to the Tenth Line Road Pump Station (TLPS). SSW Phase 4 will discharge through SSW Phase 1 to the TLPS. The downstream infrastructure was designed and approved for the SSW Phase 4 lands. SSW Phase 5 and 6 will discharge via a new trunk under McKinnon's Creek and up Tenth Line Road to the TLPS. Upgrades to the TLPS are not required for SSW Phase 4 and further analysis will be completed to confirm that they are also not required for Phase 5 and 6.
- Storm sewers are designed as per the City of Ottawa guidelines and will outlet to SWM facilities prior to discharge to McKinnon's Creek. The major overland flows will also be conveyed to the SWM facilities.
- SSW Phase 4 discharges to an expanded Avalon West SWM Facility where the stormwater runoff is treated for quality and quantity control. SSW Phase 5 and 6 discharges to the proposed Mer Bleue Northern SWM Facility where stormwater runoff is treated for quality control and quantity control.
- The SWM facilities will be designed to provide an Enhanced Level of Protection (80% TSS removal). There is also a requirement to control peak flows downstream of Wall Road in McKinnon's Creek to pre-development levels.
- The watermain design, wastewater design and stormwater management design all conform to the Mer Bleue MSS.
- The site is subject to a grade raise restriction of 1.3 m in the lots and 1.5 m in the roads. 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. McKinnon's Creek will be protected from any negative impacts from construction.


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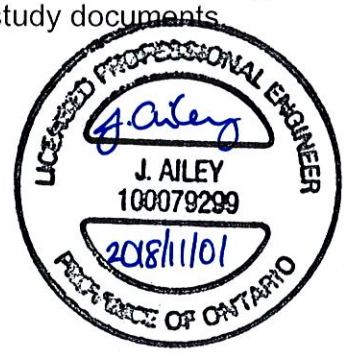
- The design for SSW Phase 4, 5 and 6 will be completed in general conformance with the City of Ottawa Design Guidelines and criteria presented in other background study documents.




Prepared by,
**David Schaeffer Engineering Ltd.**

Per: Jennifer Ailey, P.Eng.

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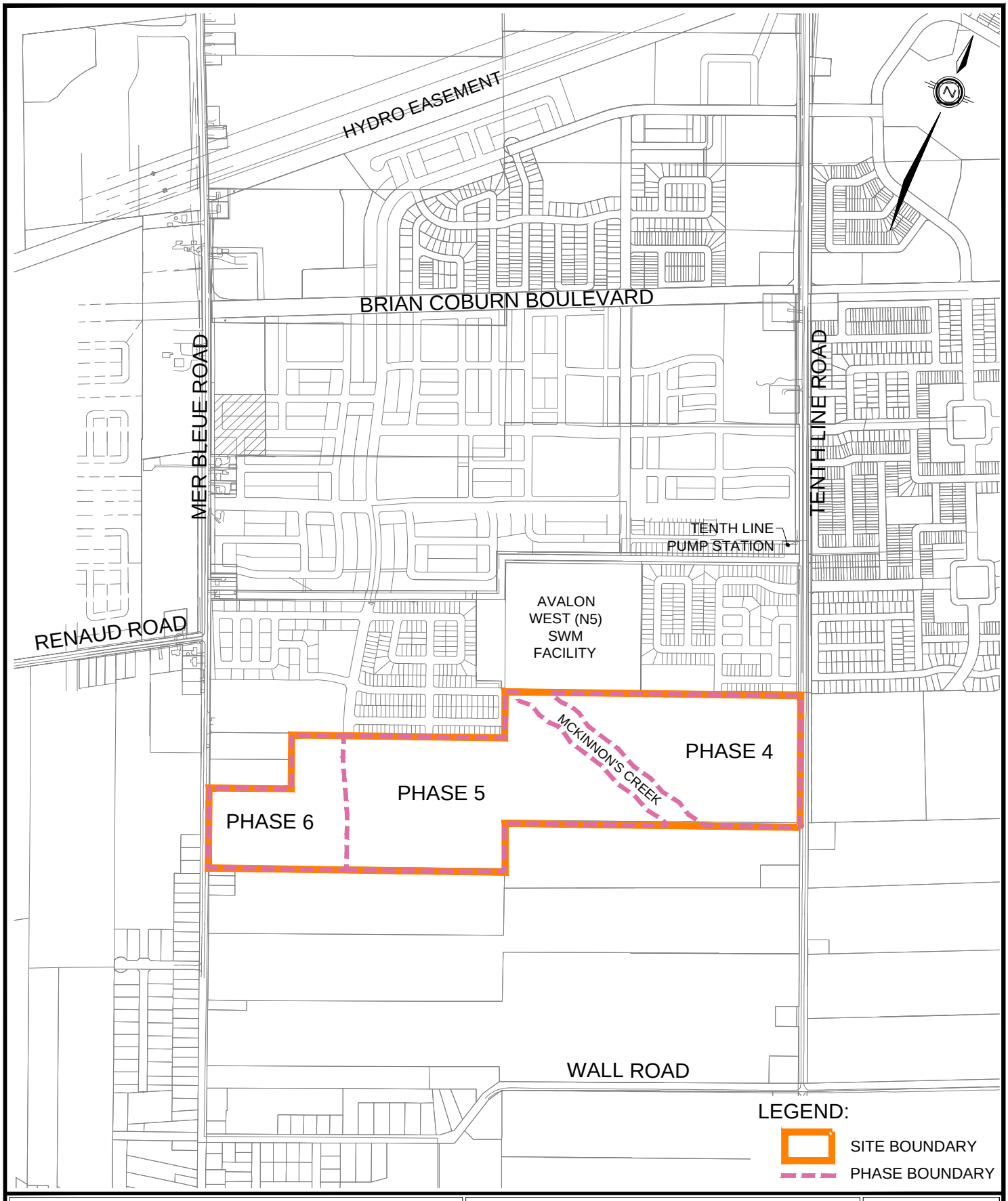


SUMMERSIDE WEST PHASES 4, 5 & 6

# KEY PLAN

DATE: NOV. 2018

SCALE: 1:12000

PROJECT No.: 15-766

FIGURE: 1

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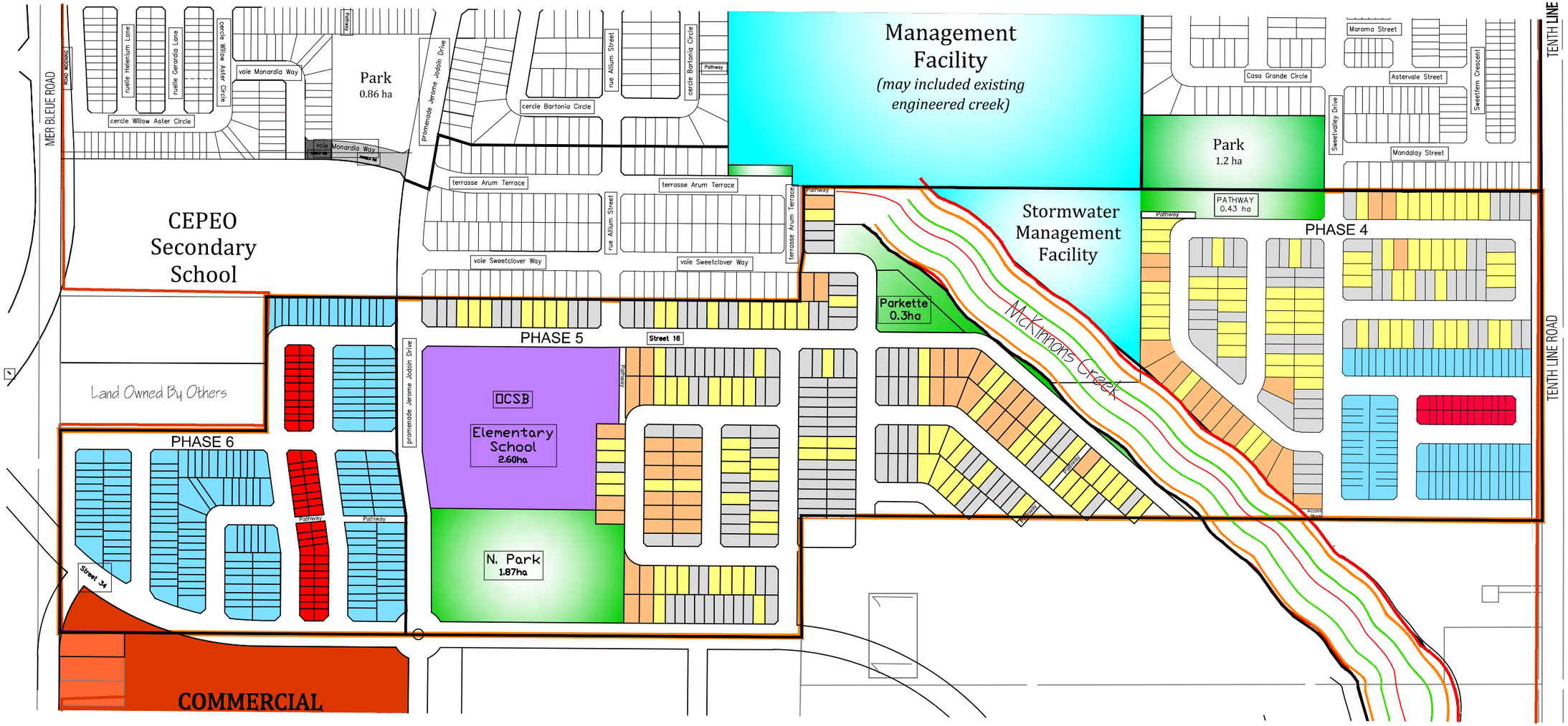


## LEGEND:

SITE BOUNDARY


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# SUMMERSIDE WEST PHASES 4, 5 & 6
# SUBDIVISON PLAN
# CITY OF OTTAWA

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| SCALE: | 1:4000 |
| DATE: | NOVEMBER 2018 |
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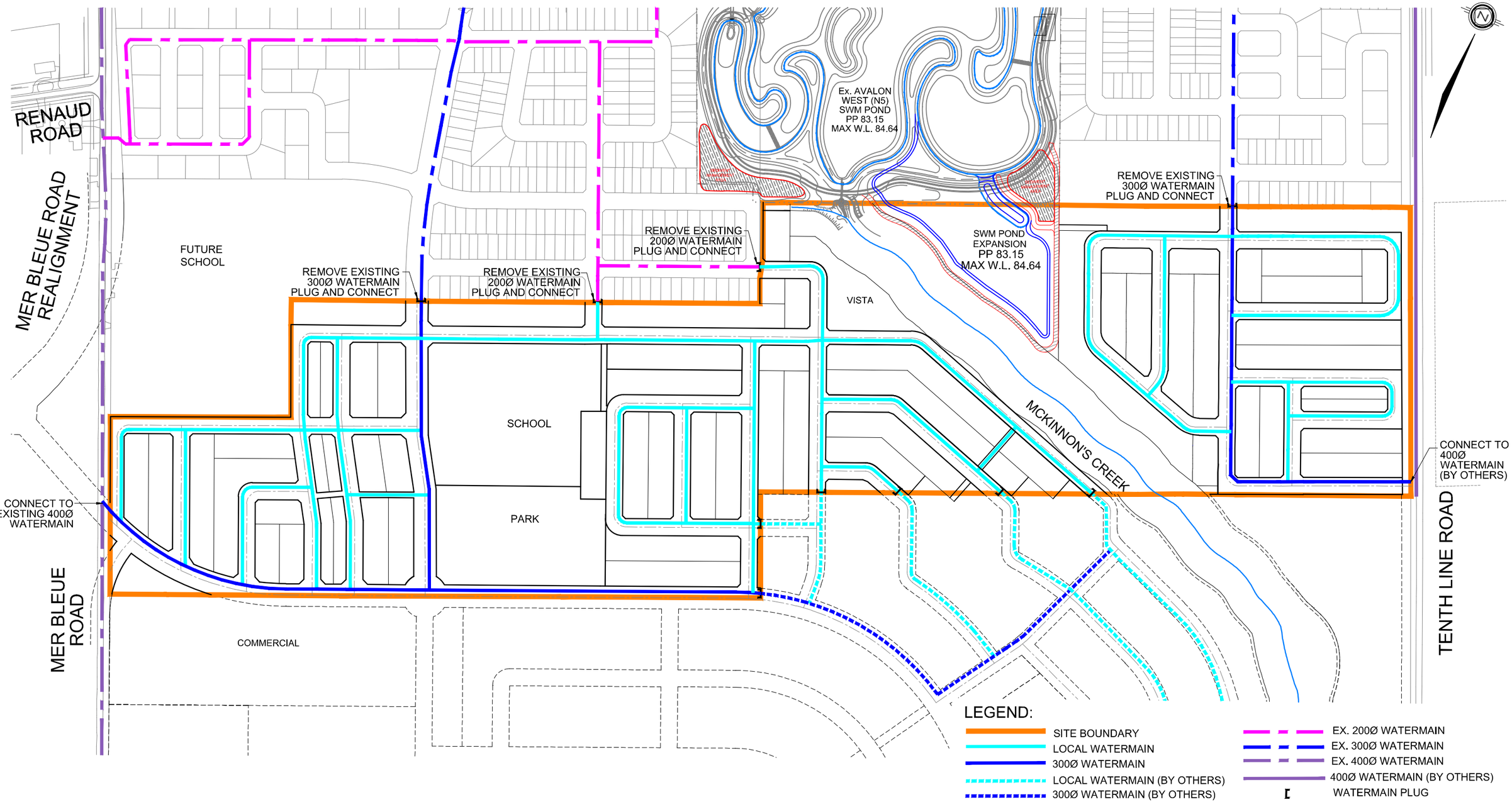


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# SUMMERSIDE WEST PHASES 4, 5 & 6
# WATER SERVICING PLAN
# CITY OF OTTAWA

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| SCALE: | 1:4000 |
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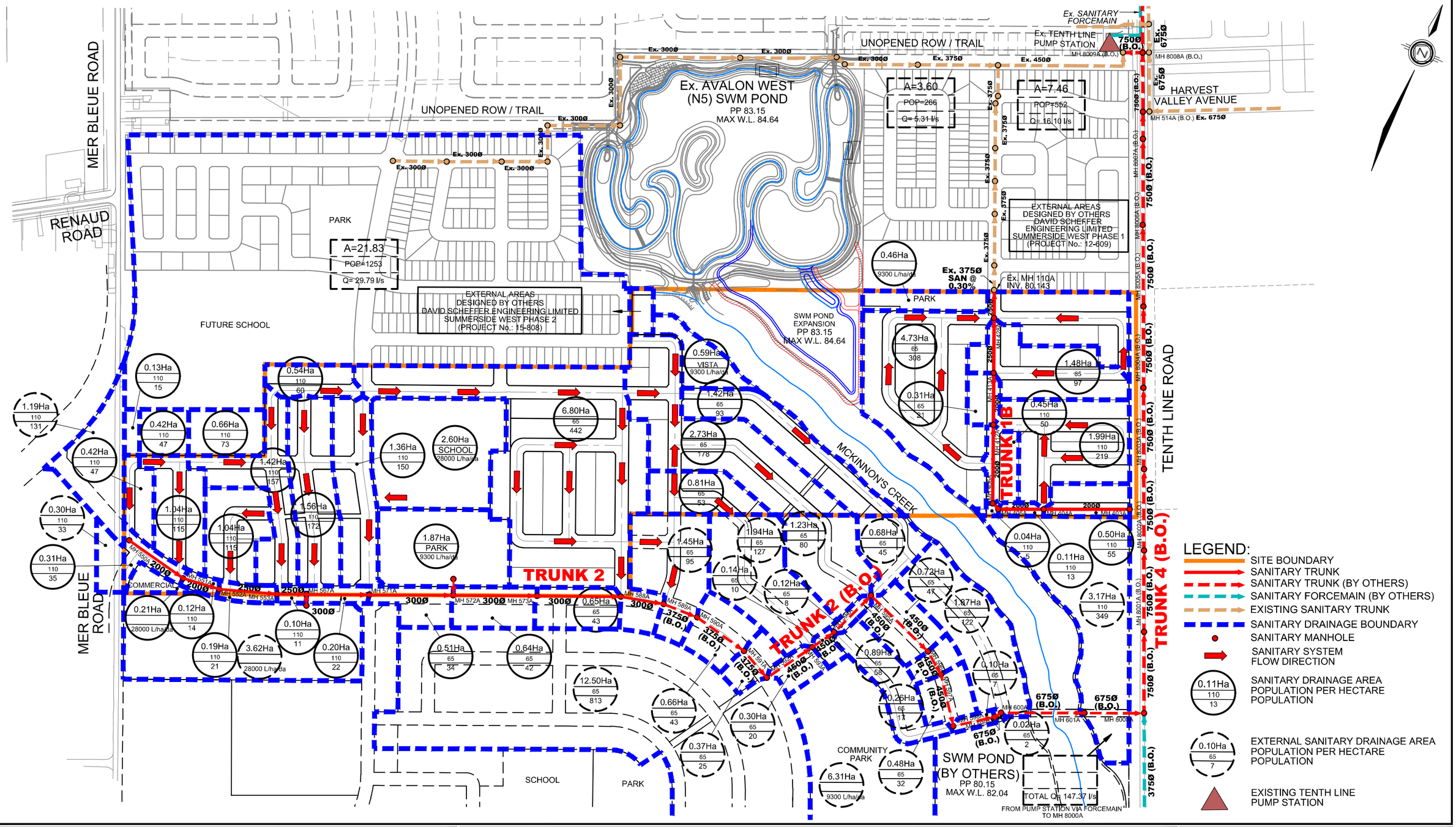


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# SUMMERSIDE WEST PHASES 4, 5 & 6
# CONCEPTUAL SANITARY SERVICING
# CITY OF OTTAWA

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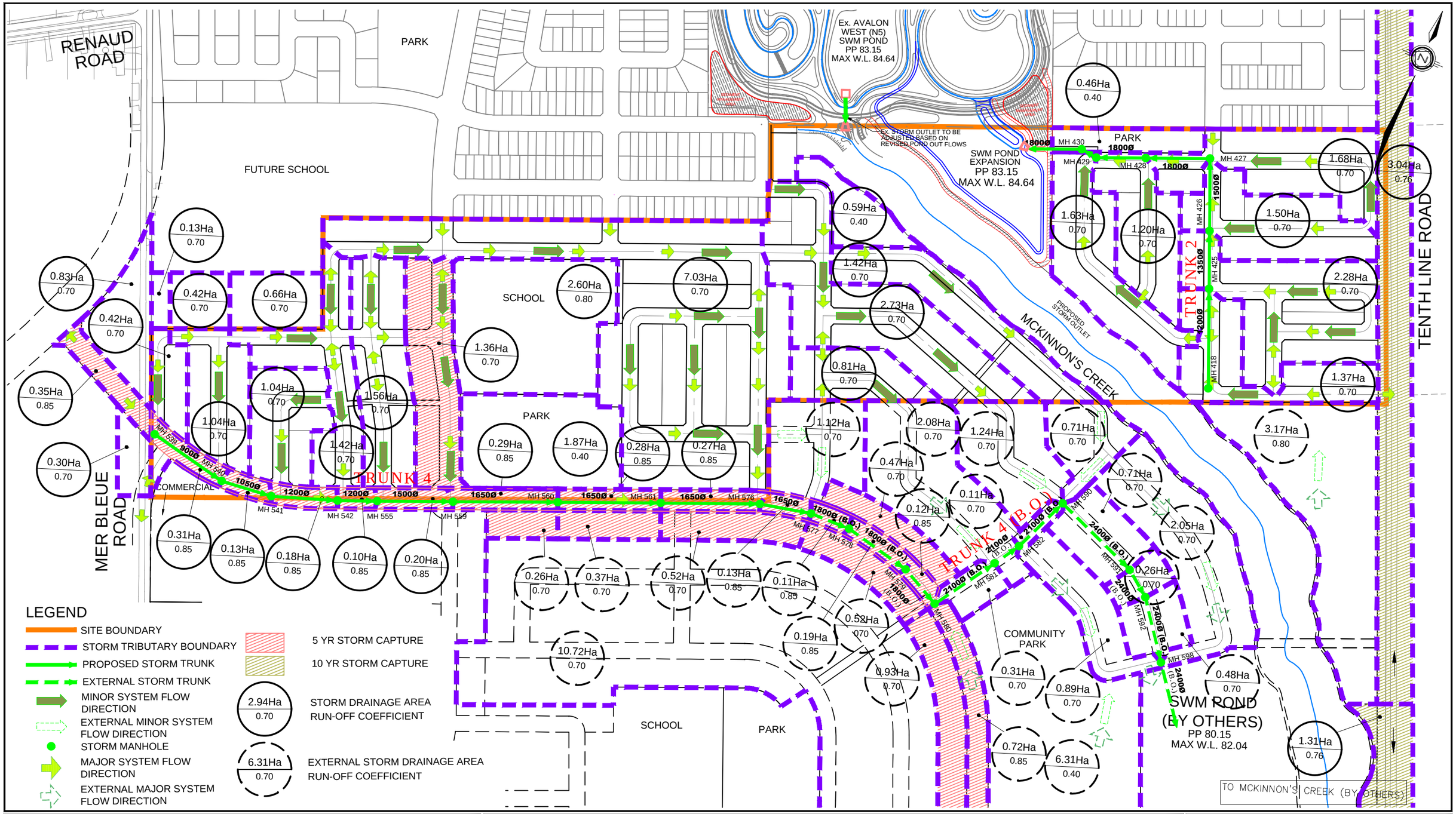


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# SUMMERSIDE WEST PHASES 4, 5 & 6
# STORM SERVICING PLAN
# CITY OF OTTAWA

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| PROJECT No.: | 15-766 |
| SCALE: | 1:4000 |
| DATE: | NOVEMBER 2018 |
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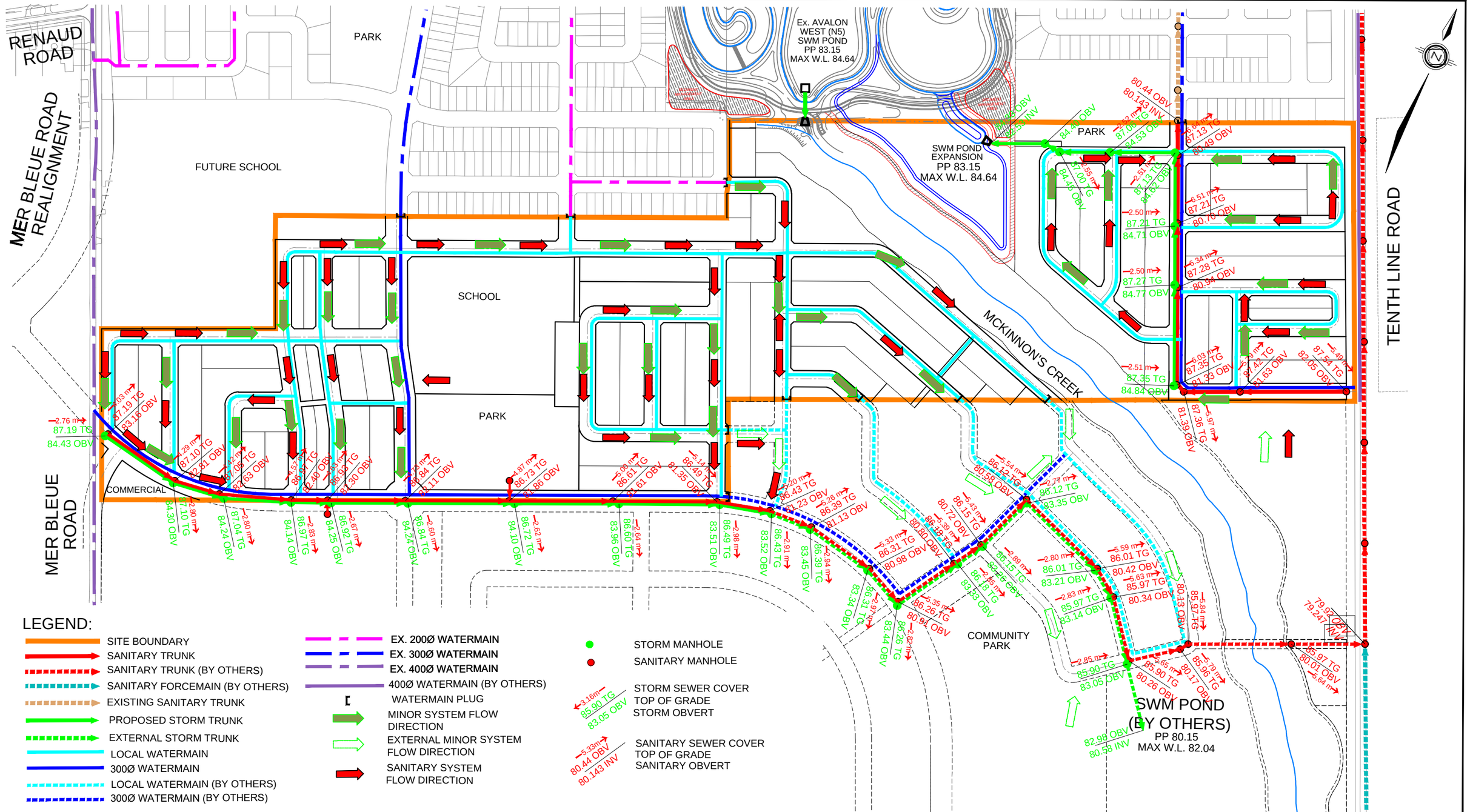



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# SUMMERSIDE WEST PHASES 4, 5 & 6
# COMPOSITE SERVICING PLAN
# CITY OF OTTAWA

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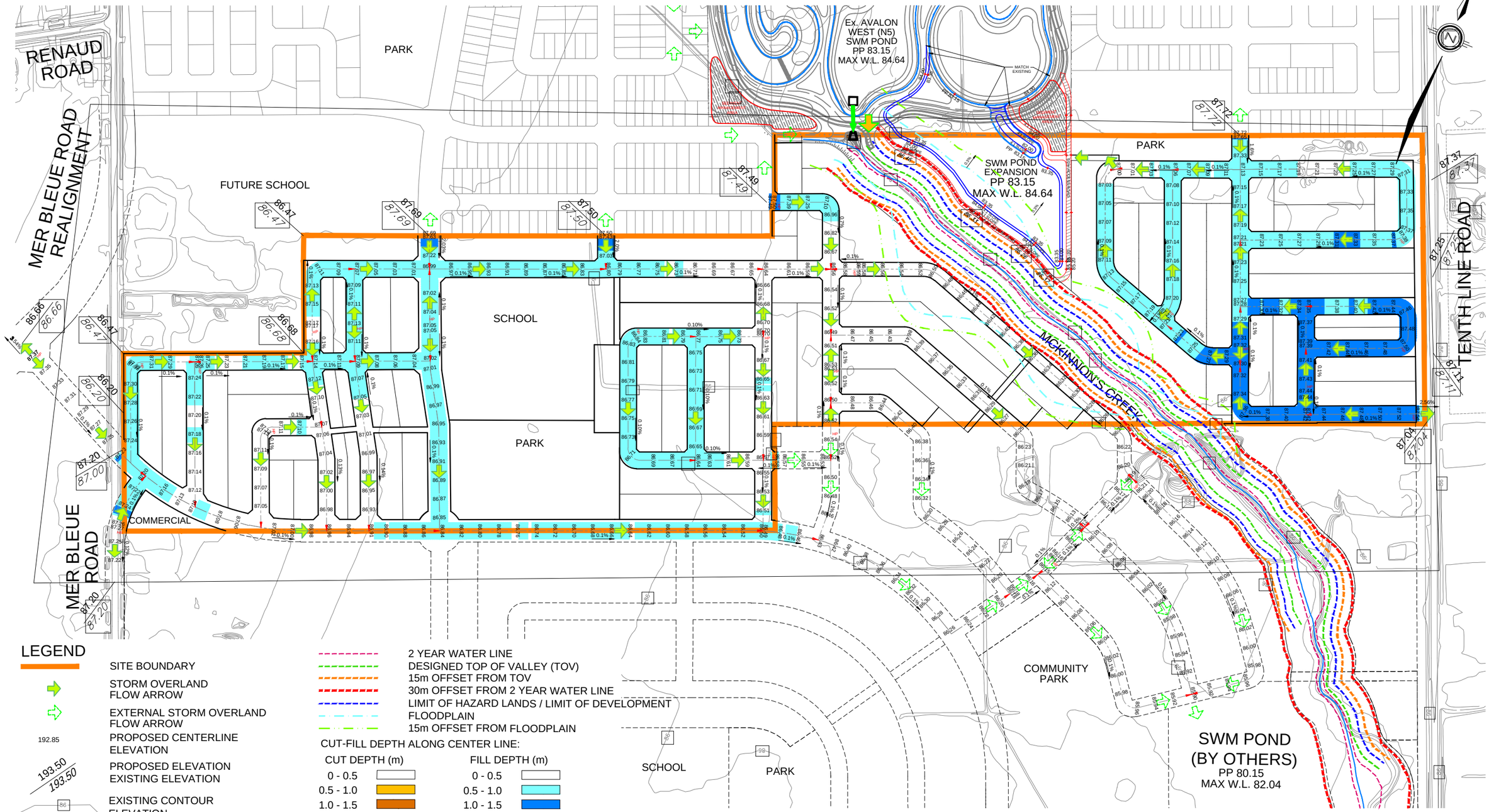
| DATE: | NOVEMBER 2018 |
| FIGURE: | 6 |





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# SUMMERSIDE WEST PHASES 4, 5 & 6
## PRELIMINARY GRADING PLAN
## CITY OF OTTAWA

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| PROJECT No.: | 15-766 |
| SCALE: | 1:4000 |
| DATE: | NOVEMBER 2018 |
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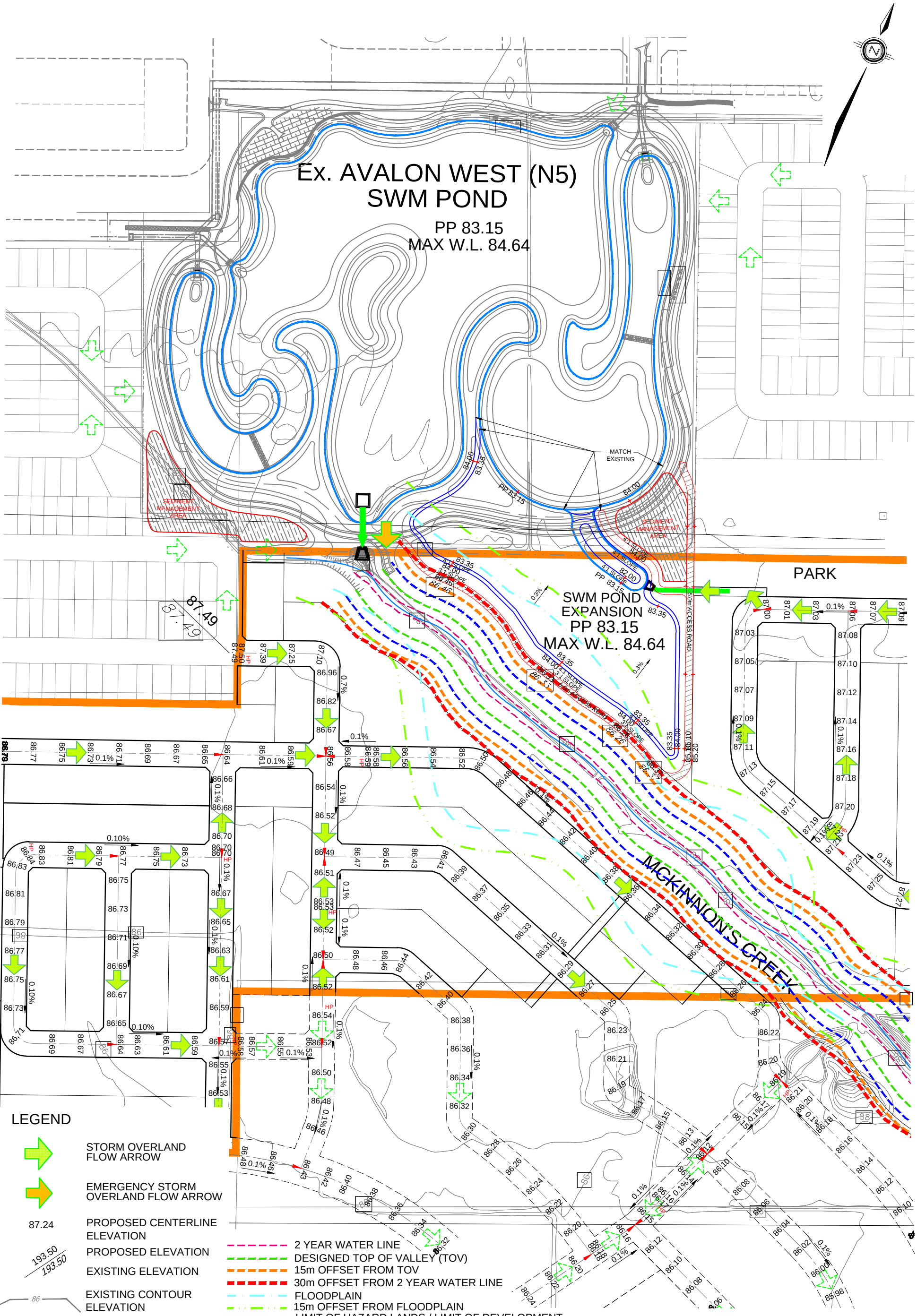


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# SUMMERSIDE WEST PHASES 4, 5 & 6
## SWM POND EXPANSION
## CITY OF OTTAWA

DATE: NOV. 2018
SCALE: 1:2500
PROJECT No.: 15-766
FIGURE: 8

# APPENDIX A

## PRE-CONSULTATION MEETING MINUTES

FINAL

February 28, 2017

Summer Side West – Phase 4 & 5 meeting

**Present:** Shoma Murshid, Asad Yousfani, Taavi Siitam, Sami Rehman, Mark Young, Max Walker, Isaac Wong, Alain Miguelez, Julie Lebrun, Frank Cairo, Christopher Gordon, Sarah Button, Vicky Villeneuve, Jillian Normand, Micaela Butron-Gutierrez, Julie Carrara, Jeff McEwen;

**Regrets:** Mark Richardson, Ingrid Coney, Michael Boughton, Wendy Tse, William Curry; Andrew Finnson

- ACTION ITEMS

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Community Design Plan (CDP) background detailed by Taavi Siitam. CDP Concept plan has been evolving over the last one and half years. So, demonstration concept plan has changed from that available on City website which shows the December 2015, open house version. Modifications have continued to take place, for example, since November 2016 when the last full landowners meeting was held and in January/February of this year. We need to review those changes and have them reflected in the draft subdivision plan for Summerside West Phase 4 and 5. Mer Bleue Expansion CDP and related OP amendment approval at Planning Committee were originally estimated to be Q1 2017 but have now been re-targeted for early Q2 2017 until issues primarily related to geo-fluvial, geotechnical (Grade raise constraints and hydraulics), McKinnon's Creek headwater issue (SNCA), and the Drainage Act process are resolved.

Concern was raised by City Staff that client was ready to invest so much, in terms of development application submission requirements for the Zoning By-law Amendment and Subdivision applications, before CDP/OP Amendment was Council approved. CDP Project (and OP amendment) is still in review mode and has yet to be approved.

Client recognised and appreciates our concerns and embraces the opportunity to meet and discuss.

Client would like to see a concept plan dialogue format that will be facilitated. Alain Miguelez recommends that key team stakeholders be involved in a series of focus group discussions to resolve each of the following topics (per focus group):

- McKinnons Creek and the public street along it and street network
- School sites
- Parks and the possibility to return some of the dry pond areas to development
- Street layout issues including how to configure back-to-back blocks.
- Location of various types of dwelling types

Stakeholders should, for example, include:

- BBSS
- OC Transpo / LRT
- School Boards
- Development Review Branch
- Parks

School boards are actively involved at BBSS due to their operational requirements.

Copy of the Summerside draft subdivision plan provided to attendees of this meeting. Wendy Nott has been provided a lot of the policy requirements from Alain and Taavi in order to revise the draft concept for the CDP and this should be reflected in the draft subdivision plan.

- Taavi will forward to Shoma Murshid the chain of discussions that took place with Urban Designers.
- Area to the north of Summerside West Ph 4 and 5, subdivision (registration) has been approved but several changes were not made to accommodate School Boards operational requirements or aligned with principles of the CDP or BBSS. Under this current subdivision's concept plan and overall CDP, we must maximize all frontage options for school blocks.
- Where there are back lots and side lots along proposed collectors, have these residential lots re-oriented to face/front (front yards) onto the collector...
- Focus on achieving more of a grid pattern throughout this area in order to maximize unit output and minimize suburban circuitous routes.
- Mixing up narrow width lots with wide width lots on the same block maximizes on-street parking potential.
- Single loading along McKinnon's Creek, with a ROW abutting the creek, to create community identify and improve use/safety.
- Repetition of narrow lots – issues with parking

Julie Cararra mentioned that CDP is a high level exercise of land use planning but from this current discussion that policy (Alain and Taavi) are presenting, there seems to be specific details that must be heeded at the subdivision draft plan stage. Carrarra's question: is the City changing the role of a CDP's level of detail into draft planning subdivisions? Answer: The BBSS principles are being worked into the Mer Bleue Area CDP.

Client: detailing plan around single loading / concern around concept, this would be challenging for all of us to achieve an excellent final product.

CDP approvals targeting – May / June 2017 to Planning Committee / pushing for Council approval.

- Master Servicing Study has outstanding issues with Headwater/SNCA (geofluvial peer review almost complete)
- Geotechnical (peer review almost complete)
- Environmental Master Plan is currently being conducted – which will further detail setback requirements to McKinnon's Creek and refine scope of the required EIS under subdivision process.
- Drainage Act (average 2 year process), and must be completed before Draft Plans of Subdivision applications can be approved.
- CDP concept Plan is still evolving meanwhile does not match this proposal – implementation of BBSS is required. The current concept plan for this subdivision does not depict the BBSS principles.

-Some of the parks that are shown on the subdivision's concept draft plan may be superfluous to City requirements (i.e. the southwest parkette), but without the CDP or the Master Servicing Studies being completed, identification of appropriate location and size of parks and information on how to design the parks and its resulting parks management plan within this subdivision cannot be informed. Therefore, CDP must be completed/approved first.

-OC Transpo – must be involved to ensure smooth transition service provided and wants client to ensure there is a vehicular or pedestrian connection between the two proposed phases within this draft plan of subdivision.

Mattamy wants to get subdivision and zoning by-law amendment applications filed with City in order to begin receiving comments to expedite timelines. Mattamy would like the subdivision and zoning by-law amendment applications deemed complete immediately following CDP approval/OP Amendment.

Concept Plan:

- Increase school block (OCSB) and park frontages along ROWs: Remove residential lots along north side of OCSB elementary school; Have unobstructed street frontage for CEPEO high school on its southern boundary (to facilitate school bus drive in and drop off)
- Move towards adding more public access to McKinnons Creek; Mattamy is arguing that there is not that much value to having a single loaded road in this location given that the Creek is not a typical river, like it is downstream. They have created vistas in the concept plan instead.
- Alain Miguelez noted that the Back to back blocks along Tenth Line and the townhouse blocks in the other sections of draft plan should be reconfigured, however, Mark Young indicated that the proposed layout is good design as it allows for street parking adjacent to the Tenth Line ROW and the back-to-backs prevent the need for a noise wall.
- Ensure there are pedestrian and biking connection throughout subdivision, especially towards park and school blocks

Taavi brought up that the Drainage Act needs to be approved prior to the OPA amendment/CDP approval. F. Cairo clarified that Drainage Act approval is not required for the proposed Phase 4 area of this subdivision as it will use the existing stormwater facility.

Policy has recommended that several focus groups are required to refine the Summerside West Phases 4 and 5 concept plan and prior to Development Services Unit being able to provide the final list of plans and reports required for Subdivision/Zoning submission packages. The focus group is to be composed of subject matters experts and Development Services Unit to discuss the concept design, keeping in mind BBSS initiatives and marketing issues.

OC Transpo (Max Walker) provided a comment that Phase 4 and 5 need road, or at the very least, pedestrian connections, over MacKinnon's Creek.

Some of the Required Studies:
EIS –scope still to be determined, species at risk component will be required, though.
Archeological Assessment – N.B. Not required
Transportation Impact Assessment / Including Area Traffic Management requirements – scope to be determined; TIA has been submitted in support of CDP (Dillon or Justin Dade IBI)
Geotechnical Study –scope to be confirmed
Functional Servicing Report's scope will be established once MSS is completed

The City is open to have more discussion meanwhile we must follow high level principles.

Client was made aware that the required studies and plans to deem the Zoning Amendment and Subdivision applications complete would be identified down the road after the focus group meetings refined the draft subdivision plan, based on the details from 'close to finalization' of the Mer Bleue CDP, master servicing and EMP.

Suggestion to provide to client other studies that was made in the past in the development area;

- Shoma to provide, if & when possible.

Next Steps:

- Policy to schedule the first focus group meeting at the end of March 2017 with certain key members (focus group). McKinnons Creek street frontage was suggested as first topic.
- Suggestion from City to have on board other team members (planning and marketing) from client's firm – opportunity for innovation.
- Draft Plan of Subdivision to be processed as soon as the CDP, Master Servicing and EMP details are more firm*** high level of priority; knowing that final approval is dependent on the completion and approval of the Drainage Act process.
- Shoma will provide a list of studies, reports and subdivision and zoning categories plus applicable City fees, after the draft subdivision concept plan aligns closer to the final CDP and MSS and EMP.

  Other note: Frank Cairo, during several instances throughout the meeting, expressed his desire to have the list of studies, reports and City fees identified for the specific categories of the Zoning Amendment and Subdivision applications. City staff expressed they would provide these to the best of their ability now, i.e. what is typically required, with the caveat that the CDP process, and what it will recommend, has not be completed yet so it's possible some items could be added or modified.

# APPENDIX B

## EXISTING APPROVALS

Ontario

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

## AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER 9069-A4YR6E
Issue Date: December 8, 2015

Mattamy (Mer Bleue) Limited
50 Hines Road, Suite 100
Ottawa, Ontario
K2K 2M5

Site Location: Summerside West Subdivision, Phase 1
2496 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:*

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

- sanitary sewers on Sweetvalley Drive (from Station 0+002.010 to Station 0+440.000), Maroma Street (from Station 0+000.000 to Station 0+050.780), Broadleaf Street (from Station 0+000.000 to Station 0+147.775), Astervale Street (from Station 0+000.000 to Station 0+133.239), Mandalay Street (from Station 0+000.000 to Station 0+180.520), Sweetfern Crescent (from Station 0+000.000 to Station 0+304.890), Casa Grande Circle (from Station 0+000.000 to Station 0+484.090), Block 166 (from Station 0+000.000 to Station 0+042.000), Block 168 (from Station 0+005.680 to Station 0+047.770), Untravelled Road Allowance (from Station 0+732.560 to Station 1+625.000) and Untravelled Road Allowance (from Station 0+000.000 to Station 1+018.500); and
- storm sewers on Sweetvalley Drive (from Station 0+033.930 to Station 0+102.059 and from Station 0+145.435 to Station 0+440.700), Broadleaf Street (from Station 0+001.990 to Station 0+149.770), Astervale Street (from Station 0+002.280 to Station 0+131.250), Mandalay Street (from Station 0+002.210 to Station 0+180.000), Sweetfern Crescent (from Station 0+001.990 to Station 0+172.650), Casa Grande Circle (from Station 0+002.280 to Station 0+485.010), Block 165 (form Station 0-003.000 to Station 0+025.090), Block 167 (from Station 0+002.070 to Station 0+061.560), Pond Block (from Station 0+001.000 to Station 0+065.715) and Untravelled Road Allowance (from Station 1+227.000 to Station 1+660.800);

all in accordance with the application from Mattamy (Mer Bleue) Limited, dated November 17, 2015, including final plans and specifications prepared by David Schaeffer Engineering Ltd.

**Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). 4559-9Y3JNZ**

**issued on July 13, 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:*

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 8th day of December, 2015

Gregory Zimmer, P.Eng.
Director

appointed for the purposes of Part II.1 of the
*Environmental Protection Act*

YH/

c: District Manager, MOECC Ottawa District Office
M. Rick O'Connor, Clerk, City of Ottawa
Charles Warnock, P.Eng., Program Manager, City of Ottawa (File No. D07-16-14-0011)
Linda Carkner, Program Manager, Infrastructure Services, City of Ottawa
Jennifer Ailey, P.Eng., 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**

## AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER 1339-A28J6Z
Issue Date: October 2, 2015

Minto Communities Inc.
180 Kent St, No. 200
Ottawa, Ontario
K1P 0B6

Site Location: Avalon West, Neighbourhood 5
Lot 2 and 3, Part of Lot 4, Concession 11 (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:*

an amendment of the stormwater management Works located between Mer Bleue Road and Tenth Line Road, south of Innes Road and the Hydro Easement, serving the Avalon West Neighbourhood 5 residential subdivision in the East Urban Community of the City of Ottawa, providing Enhanced Level water quality control and erosion protection and attenuating post-development peak flows to pre-development levels for all storm events up to and including the 100-year storm event, to increase the drainage area discharging to the existing Avalon West Neighbourhood 5 Pond to accommodate stormwater run-off from an additional approximately 32 hectares from the Mattamy Summerside West Subdivision located to the east of the Avalon West Neighbourhood 5 Pond, south of Brian Coburn Boulevard, west of Tenth Line Road, and draining via McKinnon's Creek, and the South Nation River to the Ottawa River, consisting of the following:

**Proposed Works:**

**stormwater management facility (Avalon West Neighbourhood 5 Pond - catchment area 329.54 hectares):**
- an increase in the drainage area discharging to the existing Avalon West Neighbourhood 5 wet pond, having two (2) sediment forebays, a permanent pool volume of 110,786 $m^3$, an extended detention volume of 23,213 $m^3$ and a total storage volume of approximately 221,900 $m^3$, including the permanent pool volume, at a total depth of approximately 3.73 m for the 100 year storm event, receiving inflow from the existing Avalon West Neighbourhood 5 Western Trunk Storm Sewer and the Avalon West Neighbourhood 5 Eastern Trunk Storm Sewer, and discharging via McKinnon's Creek and the South Nation River to the Ottawa River;

**Previous Works:**

**stormwater management facility (Avalon West Neighbourhood 5 Pond - catchment area 297.7 hectares):** - one (1) wet pond with two (2) sediment forebays, having a permanent pool volume of 110,786 $m^3$, an extended detention volume of 19,363 $m^3$ and a total storage volume of approximately 221,900 $m^3$, including the permanent pool volume, at a total depth of approximately 3.6 m for the 100 year storm event, receiving inflow from the existing Avalon West Neighbourhood 5 Western Trunk Storm Sewer and the Avalon West Neighbourhood 5 Eastern Trunk Storm Sewer, and discharging to McKinnon's Creek;

**grassed swale:** - a 300 m 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 m, a bottom width of 1 m, a top width of 24 m, and 3:1 side slopes, complete with an inlet rip-rap lined 20 m long and 10 m 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 supporting documents listed in Schedule "A" forming part of this Approval.

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

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

"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;

"District Manager" means the District Manager of the Ottawa office of the Ministry;

"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;

"Owner" means Minto Communities Inc. and includes their successors and assignees;

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

"Water Supervisor" means the Water Supervisor of the Ottawa office of the Ministry;

"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) The designation of the City of Ottawa as the operating authority of the site on the application for approval of the Works does not relieve the Owner from the responsibility of complying with any and all of the Conditions of this Approval.

(3) 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.

(4) 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.

(5) 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.

(6) 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.

(7) 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.

(8) This Approval includes the treatment and disposal of stormwater run-off from approximately 329.54

hectares of existing and proposed development draining to the Avalon West Neighbourhood 5 Pond, assuming an average imperviousness of 42%, including approximately 103.4 hectares of external undeveloped land located to the west of Mer Bleue Road. Any changes within the drainage areas that might increase the flows to or from the stormwater management facility or any structural/physical changes to the stormwater management facility including the inlets or outlets will require an amendment to 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 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;

(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 in ownership to the municipal, i.e. assumption of the Works, the Owner shall notify the succeeding owner in writing of the existence of this Approval, and a copy of such notice shall be forwarded to the District Manager and the Director.

(3) Notwithstanding any other requirements in this Approval, upon transfer of the ownership of the Works to a municipality, if applicable, any reference to the "District Manager" within the Terms and Conditions of this Approval shall be replaced with "Water Supervisor".

4. OPERATION AND MAINTENANCE

(1) The Owner shall ensure that the design minimum required liquid retention volume in the permanent pool is maintained at all times.

(2) The Owner shall inspect the Works at least **once a year** and, if necessary, clean and maintain the Works to prevent the excessive build-up of sediments and/or vegetation.

(3) The Owner shall maintain a record of the results of these inspections and identify any cleaning and maintenance operations undertaken, and shall make the record available for inspection by the Ministry. The record 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.

5. MONITORING AND REPORTING

(1) The Owner shall carry out a monitoring program and evaluate the performance of the stormwater management Works commencing at the initial completion of construction of the Works.

(2) 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 streams over the time period being monitored.

(3) Samples shall be collected and analysed at the following sampling points, at the sampling frequencies and using the sample type specified for each parameter listed:

| **Table 1 - Stormwater Inflow Monitoring**<br>(Samples to be collected at the eastern and western first flush inlet structures to the Avalon West Neighbourhood 5 Pond) | |
|---|---|
| **Frequency** | Four (4) wet* rainfall events during the period between April 15 and September 15 of each calendar year |
| **Sample Type** | Composite** |
| **Parameters** | Total Suspended Solids (mg/L) and Total Phosphorus (mg/L) |

* A wet rainfall event is defined as a minimum of 15 mm or rain in the previous 24 hours.
** A composite blend of at least four (4) equal volume grab samples of influent flow, with collection of the aliquots distributed throughout the duration of the rainfall event.

| **Table 2 - Stormwater Effluent Monitoring**<br>(Samples to be collected at the rip rap protected outlet zone of the Avalon West Neighbourhood 5 Pond) | |
|---|---|
| **Frequency** | Four (4) wet* rainfall events during the period between April 15 and September 15 of each calendar year |
| **Sample Type** | Composite** |
| **Parameters** | Total Suspended Solids (mg/L) and Total Phosphorus (mg/L) |

* A wet rainfall event is defined as a minimum of 15 mm or rain in the previous 24 hours.
** A composite blend of at least four (4) equal volume grab samples of influent flow, with collection of the aliquots distributed throughout the duration of the rainfall event.

(4) 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.

(5) The Owner shall submit to the District Manager, **every year**, a copy of the test results as per Condition 5, Subsection (3), above.

(6) The Owner shall submit to the District Manager, **every five (5) years**, a Performance Assessment Report addressing the following:

(a) a description of any operating problems encountered and corrective actions taken during the reporting period and the need for further investigations in the following reporting period for system refinements or ways of improving the performance of the Works;

(b) measurement of the mass of accumulated sediment removed when undertaking maintenance of the Works as per Condition 4, Subsection (3), above;

(7) The measurement frequency specified in Condition 5, Subsection (3) and reporting frequency specified in Condition 5, Subsections (5) and (6), above, may, **after five (5) years** of monitoring in accordance with this Condition, be modified by the District Manager in writing from time to time.

(8) The Owner shall copy the District Manager on any and all reports submitted to the City of Ottawa and/or the South Nation Conservation Authority related to the monitoring and maintenance program for the Works.

6. 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.

7. RECORD KEEPING

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"**

1. 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;

2. 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;

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

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

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

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

7. Letter from Ted Phillips of Taggart Investments to the Ministry, dated December 18, 2007;

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

9. 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;

10. 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;

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

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

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

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

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

16. Application for Environmental Compliance Approval, dated November 1, 2013 and received on January

7, 2014, submitted by the City of Ottawa;

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

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

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

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

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

22. Stormwater Management Report for Summerside West Phase 1, dated June 2015, prepared by J.F. Sabourin and Associates Inc.;

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

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

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

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

27. 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 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.

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 approved Works and to ensure that any subsequent Owner of the Works is made aware of the Approval and continue to operate the Works in compliance with it.

4. Condition 4 is included to require that the Works be properly operated and maintained such that the environment is protected.

5. Condition 5 is included to enable the Owner to evaluate and demonstrate the performance of the Works on a continual basis, so that the Works are properly operated and maintained at a level which is consistent with the design objectives specified in the Approval and that the Works do not cause any impairment of the receiving watercourse.

6. Condition 6 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.

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). 6000-9LTGHZ issued on July 31, 2014.**

*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 2nd day of October, 2015

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

DC/

c: District Manager, MOECC Ottawa office
Water Supervisor, MOECC Ottawa office
Peter Deir, IBI Group
Jennifer Ailey, David Schaeffer Engineering Ltd.

# APPENDIX C

## FIGURE 8.1A RECOMMENDED WATER DISTRIBUTION FROM THE MER BLEUE MSS (IBI GROUP, JUNE 2017)

N

Multiples
Secondary School
Park
Multiples
Commercial
School
Park
Elementary School
Park
Park
FIRE STATION
400Ø
EXISTING Pump Station
Parkette 0.9ha
300Ø
Approved Stormwater Management Facility 11.1ha
Neighbourhood Park 1.7ha
Existing Residential
CEPEO Elementary School /Secondary School 5.9ha
0.57ha Parkette
Stormwater Management Facility Expansion 4.0ha
OCSB Elementary School 2.4ha
N. Park 1.2ha
Dry Pond 0.8ha
300Ø
300Ø
300Ø
300Ø
McKinnon's Creek
400Ø
MER BLEUE ROAD
OCDSB Elementary School 3.1ha
N. Park 1.5ha
Dry Pond 0.9ha
Community Park 6.5ha
Stormwater Management Facility 5.5ha
TENTH LINE ROAD
300Ø
300Ø
300Ø
300Ø
300Ø
Dry Pond 0.5ha
Existing Residential
CECCE Elem. School 2.1ha
Dry Pond 0.8ha
N. Park 1.4ha
NEW Pump Station
Stormwater Management Facility 4.3ha
Vegetation Community/ Woodlot 5.1ha
NAVAN ROAD
Meters
50 0 50 100
1:4000

LEGEND:

300Ø PROPOSED TRUNK WATERMAIN INCLUDING APPROXIMATE DIAMETER

PROPOSED WATERMAIN

EXISTING WATERMAIN

J:\34739-CumbServReport\5.9 Drawings\59civil\layouts\MSS-Apr2017\Preferred Option\Figure 8.1A Recommended Water Distribution System.dwg Layout Name: Figure 8.1A Recommended Water Distribution System Last Saved By: ddore Last Saved At: Jun. 27, 17

Sheet No.

FIGURE 8.1A
JUNE 2017

Drawing Title

RECOMMENDED WATER DISTRIBUTION SYSTEM FOR UPDATED DEMONSTRATION PLAN

Project Title

MER BLEUE
MASTER SERVICING STUDY

IBI

# APPENDIX D

## MER BLEUE CDP – TENTH LINE PS & WASTEWATER SERVICING: PUMP STATION CAPACITY ASSESSMENT (STANTEC, AUGUST 26, 2016)

Stantec

# Memo

| | | | |
|---|---|---|---|
| To: | Bob Wingate / Demetrius Yannoulopoulos<br>IBI Group, Ottawa | From: | Marc Telmosse<br>Stantec, Ottawa |
| File: | 1634-01269 | Date: | August 26, 2016 |

**Reference: Mer Bleue Community Design Plan – Tenth Line PS & Wastewater Servicing: Pump Station Capacity Assessment**

The existing capacity of the Tenth Line pumping station (TLPS) was previously reviewed and presented in a memo dated October 10, 2014. That memo considered the findings of the 2013 Infrastructure Master Plan (IMP) and provided a discussion on the capacity available under existing and future (2031 and 2060 buildout) conditions at the TLPS and downstream sanitary collection system. The original memo was resubmitted on March 2, 2015. The current version of the memo encompasses further revisions based on City review comments on the March 2, 2015 submission.

A meeting was subsequently held with the City where the peak existing wet weather flow rate was discussed. Higher flows were seen at the TLPS during the June 24-25, 2014 rainfall event than were reported in the 2013 IMP report and the City requested that these be considered. This memo documents the findings of the flow analysis completed and also presents the influence of these on the Mer Bleue and TLPS flow projections.

An assessment of the pump station upgrade capacity was completed and a summary of our findings is included.

## BACKGROUND

An update to the community design plan (CDP) for the TLPS servicing area was provided and this was used as a basis to develop updated flow projections. The differences between the 2013 IMP and updated CDP under the 2031 scenario are shown in **Table 1**.

### Table 1: Growth Comparison - 2031

| Area | Gross Growth Area (ha) | 2013 IMP | | 2016 CDP Update | |
|---|---|---|---|---|---|
| | | Growth Population (ppl) | Growth ICI | Growth Population (ppl) | Growth ICI |
| Mer Bleue (10A, 10B, 10C) | 213 | 9,639 | 607 employees | 10,840 | 17ha school |
| Minto (10D, 10E) | 28 | 1,276 | 7 employees | 1,819 | 7 employees |
| Existing | 169 | 7,624 | 2,573 employees | 7,624 | 2,573 employees |
| Total Growth | 410 | 18,539 | 3,187 employees | 20,774 | 2,580 employees + 1 school |

**Reference: Mer Bleue Community Design Plan – Tenth Line PS & Wastewater Servicing: Pump Station Capacity Assessment**

The 2013 IMP also included a 2060 scenario which included growth areas beyond the City's current official plan (OP). The 2060 scenario had a reduction in population for the "existing" area. For these reasons, only the 2031 scenario is considered without consideration for areas outside the existing OP (see **Figure 1**).

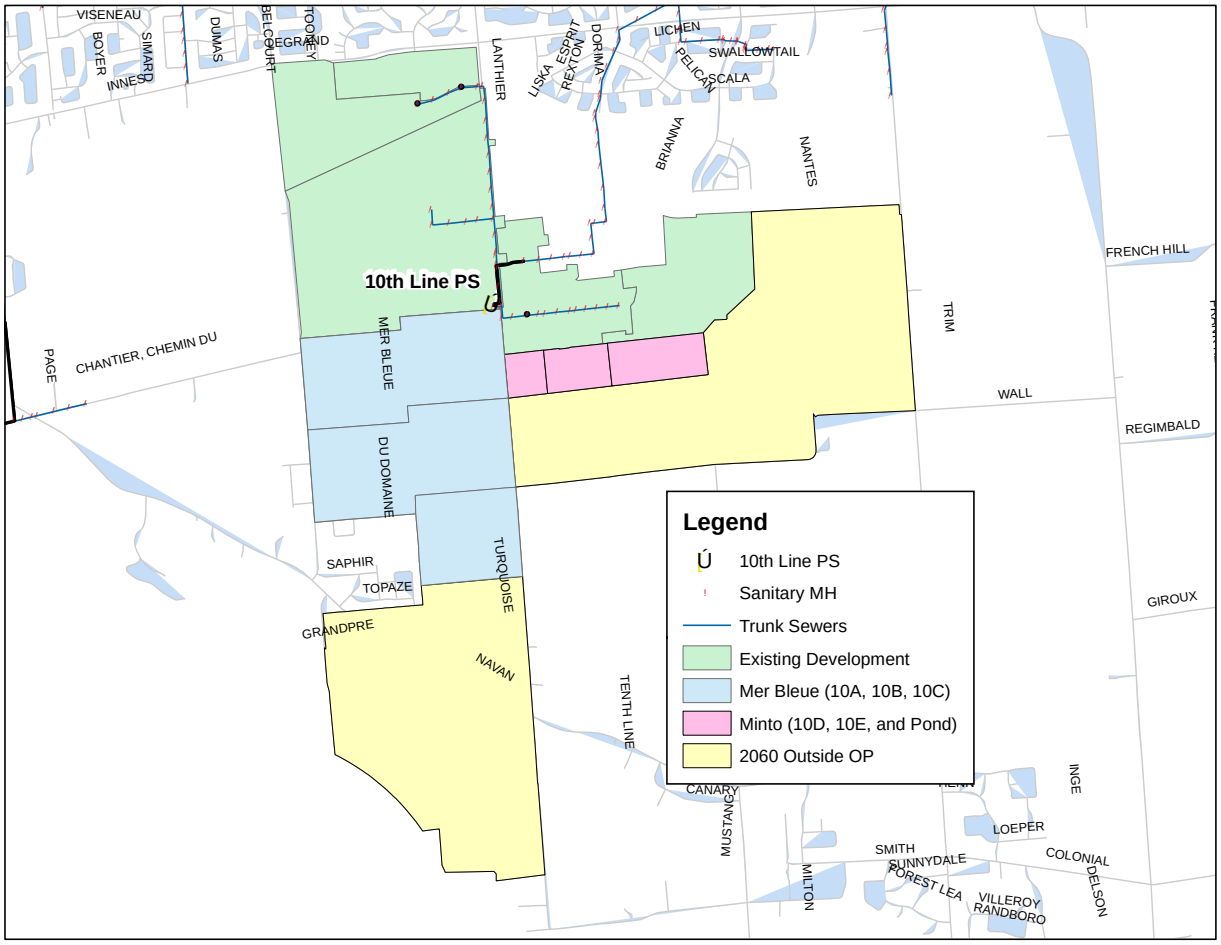


**Figure 1: TLPS Servicing Area**

Results from the 2013 IMP using the 100 year design storm were considered for the existing flows at the TLPS. This result showed a projected peak wet weather flow of 86L/s. This modeled flow is less than the peak wet weather flow of 108L/s seen at the TLPS during the June 24-25th, 2014 event and the City requested that the higher flow be considered. All design event scenarios are estimates as they are not based on actual system responses. With this consideration in mind, more emphasis was placed on the June 24-25th, 2014 event that was recorded.

**Reference: Mer Bleue Community Design Plan – Tenth Line PS & Wastewater Servicing: Pump Station Capacity Assessment**

## REVISED FLOW ANALYSIS

The City provided water consumption and flow monitoring data which were used in conjunction with landuse area shapefiles to assess the flows observed at the TLPS. The assessment focused on quantifying and qualifying the I/I observed at the TLPS.

As per Section 4.4 of the Ottawa Sewer Design Guidelines, we adopted the approach suggested in the guidelines:

- Standard Peak Flow Design Parameters: Applied for establishing peak design capacity (used for the design of sewers and pumping stations)
    - (i.e. for Growth related flows)
- Operational Flow Parameters: Derived from monitoring data and used for establishing the range of operational flows (used in sewer analysis and pumping station design)
    - (i.e. for Existing flows using the June 24-25 2014 event flow)

However, in addition to this approach, we also considered the scenario where the City's standard peak flow parameters were applied to existing development.

### Dry Weather Flow Analysis

The 2014 water consumption records were assessed and compared to the dry weather flow monitoring data recorded at the TLPS. The goal of this analysis was to confirm that these two data sets were comparable, as well as establish the quantity of ground water infiltration seen in the system.

The annual water consumption data was provided and it was determined that 535,252 $m^3$ was consumed in 2014 and equates to an approximate average flow rate of 17L/s. The flow monitoring data was also assessed and showed that an approximate average flow of 20L/s was seen during the DWF in June of 2014 as illustrated on

**Figure 2**. A peak DWF rate of approximately 32L/s was also seen during this same period.

The 3L/s difference between the water consumption records and flow monitoring data average DWF findings is assumed to be the result of dry weather groundwater infiltration (GWI). Taken over the existing 201ha of development, this 3L/s corresponds to a gross unit rate of 0.015L/ha/s. This rate is representative of a new developed area with limited dry weather flow conditions inflow and is also less than the City of Ottawa Design Guideline Operational GWI rate of 0.05-0.08L/ha/s.

### Wet Weather Flow Analysis

A wet weather flow analysis was completed on the flow monitoring data collected during the June 24-25 2014 rainfall event. As shown on **Figure 3**, the peak flow seen during the event was approximately 108L/s, with a rainfall derived inflow/infiltration (RDII) component of 81L/s. This rate corresponds to a gross area flow of approximately 0.40L/ha/s over the 201 ha gross area currently serviced by the TLPS.

**Reference: Mer Bleue Community Design Plan – Tenth Line PS & Wastewater Servicing: Pump Station Capacity Assessment**

The corresponding operational design RDII flow can be also approximated as 53L/s using the servicing area (201ha) and City's design guideline rate of 0.265L/ha/s (0.28L/ha/s – 0.015L/ha/s). This 53L/s represents the WWF contribution that was considered in developing the flow projection scenarios as the "design/operational" existing WWF.

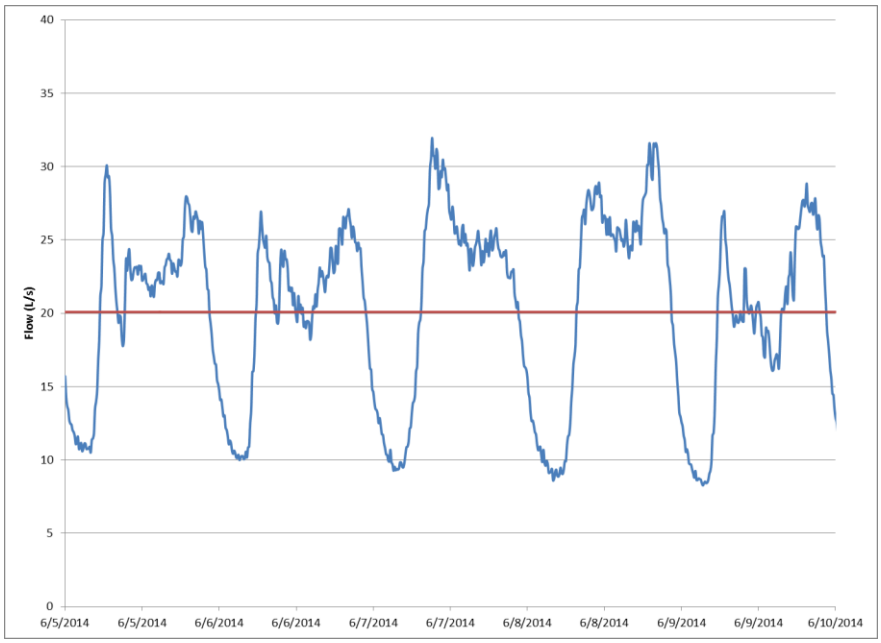


**Figure 2: June 2014 TLPS Dry Weather Flow**

**Reference: Mer Bleue Community Design Plan – Tenth Line PS & Wastewater Servicing: Pump Station Capacity Assessment**

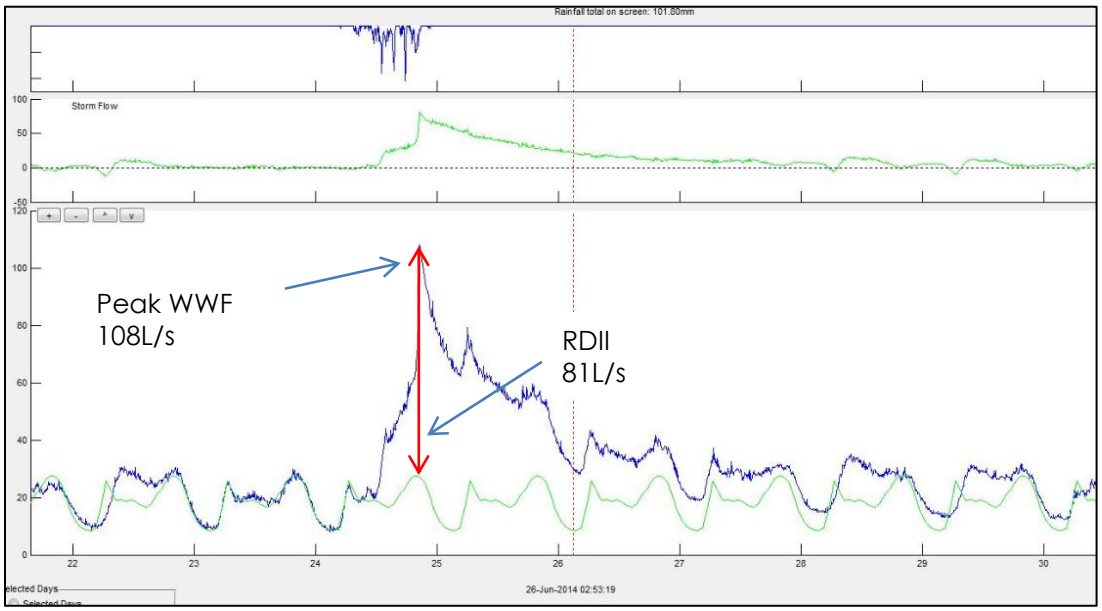


**Figure 3: June 24-25, 2014 TLPS Flow**

**Reference: Mer Bleue Community Design Plan – Tenth Line PS & Wastewater Servicing: Pump Station Capacity Assessment**

Discussion

The RDII rate observed during the June 24-25, 2014 event is significantly higher than the 0.265 L/ha/s operational/design I/I rate specified in the City of Ottawa Sewer Design Guidelines. This high RDII rate is not expected in a newer developed area such as that serviced by the TLPS. This result was discussed with the City and it was agreed that the RDII seen was irregularly high. Several possibilities were suggested as being responsible for such a high rate:

- Foundation excavations of partially constructed houses may have drained to the sanitary collection system through un-capped service laterals. This has occurred in other areas in the City during construction of newer developments.

- The storm water collection system could have influenced the sanitary system. This is unlikely as it is our understanding that backflow preventers (duckbills) are in place.

Although the RDII rate seen is considered irregularly high, it was requested that it be considered in our flow projections as it may be representative of future interim flows.

## REVISED TENTH LINE PS PROJECTED FLOWS

The City requested that both design and observed conditions be considered in the TLPS flow projections. Four (4) scenarios were therefore considered involving a combination of observed, operational/design, and design flow conditions.

### EXISTING FLOWS

The existing flows were considered based on the flow monitored data provided and considered both the June 24-25, 2014 event and the City's Sewer Design Guideline parameters. The DWF was taken as the 32 L/s observed during the peak overall wet weather flow of the June 24-25, 2014 event for all scenarios. This 32 L/s includes the 0.015 L/ha/s GWI estimated from the flow monitoring data.

The WWF projections considered the peak 108 L/s of which 81 L/s is considered to be due to RDII sources, as well as an Operational/Design Guideline rate approach where a 53 L/s RDII (201 ha x 0.265 L/ha/s) is used and added to the observed peak DWF of 32 L/s for a total of 85 L/s.

### GROWTH FLOWS

The growth flows were considered based on the design and operational rates provided in the City's Design Guidelines. Considering both of these sets of parameters provides a range of possible flows and identifies the sensitivity of the area to these parameters. We have adopted these parameters with the exception of using an employee generation rate of 83 L/employee/day for growth in existing areas (taken from the 2013 IMP), as well as maintaining a "K" value of 1 for use with the Harmon equation for all scenarios.

**Reference: Mer Bleue Community Design Plan – Tenth Line PS & Wastewater Servicing: Pump Station Capacity Assessment**

From the City of Ottawa Sewer Design Guidelines:

Peak Flow Design Parameters Summary

AVERAGE WASTEWATER FLOWS:
Residential Average Flow: 350 L/c/day

Commercial/Institutional Flow: 50,000 L/gross ha/d

PEAKING FACTORS:
Residential Peak factor: Harmon Equation

$$P.F. = 1 + \left( \frac{14}{4 + \left(\frac{P}{1000}\right)^{\frac{1}{2}}} \right) * K$$

Where: P = Population

K = Correction Factor = 1

Commercial/Institutional Peak factor: 1.5

PEAK EXTRANEOUS FLOWS: (design event)
Infiltration Allowance: 0.28 L/s/effective gross ha (for all areas)

Operational Parameters Summary (Example)

AVERAGE WASTEWATER FLOWS:
Residential Average Flow: 300 L/c/day

Commercial Flow: 17,000 L/gross ha/d

Institutional Flow: 10,000 L/gross ha/d

PEAKING FACTORS:
Residential Peak factor: Harmon Equation

$$P.F. = 1 + \left( \frac{14}{4 + \left(\frac{P}{1000}\right)^{\frac{1}{2}}} \right) * K$$

Where: P = Population

K = Correction Factor = 0.4 to 0.6

Commercial/Institutional Peak factor: 1 (non-coincident peak)

EXTRANEOUS FLOWS: (Typical values for separated sewers)

| | |
|---|---|
| Dry Weather Groundwater infiltration: | 0.05-0.08 L/s/gross ha (example range) |
| Wet Weather Extraneous Flow: | 0.15-0.2 L/s/ gross ha (typical events) |
| (includes Dry weather GWI) | 0.28 L/s/effective gross ha (large event – typical of annual event) |
| | 0.30-0.50 L/s/gross ha (extreme event) |

**ASSESSMENT FINDINGS**

The flow projection scenarios were considered using the various flow generation components for existing and growth areas as described above. The various spreadsheets used in the assessment are provided as an attachment to this document, while the overall findings are summarized in **Table 2**, and show that a flow range between 381 L/s and 447 L/s is expected.

## Table 2: TLPS Flow Projections (2031) - Scenario Summaries

| Scenario | Description | Existing Flow | Growth Flow | Total Flow |
|---|---|---|---|---|
| A | Existing – June 24-25, 2014<br>Growth – Operational | 108 L/s | 296 L/s | 404 L/s |
| B | Existing – Operational/Design Guidelines<br>Growth – Operational | 85 L/s | 296 L/s | 381 L/s |
| C | Existing – June 24-25, 2014<br>Growth – Design Guidelines | 108 L/s | 339 L/s | 447 L/s |
| D | Existing – Operational/Design Guidelines<br>Growth – Design Guidelines | 85 L/s | 339 L/s | 424 L/s |

## TLPS CAPACITY

The TLPS currently has a firm capacity of approximately 290 L/s and was originally designed for an ultimate peak flow of 425 L/s. The forcemain was extended during construction however and this resulted in the peak ultimate firm capacity being reduced to 405 L/s.

The maximum flow that could be sent through the existing 300/400 mm forcemains is limited to 445 L/s based on keeping velocities under 2.5 m/s. Higher flow would require larger or additional forcemains.

A pump selection of three (3) Xylem NP 3301 MT 3~ 636 pumps (2 duty / 1 standby) would provide 445 L/s at 17.9 m TDH. These MT pumps would replace the existing LT pumps and would fit in the wet well without modification to the benching. An adapter on the pump outlet would be required due to the difference in outlet size (300 mm to 250 mm).

**Reference: Mer Bleue Community Design Plan – Tenth Line PS & Wastewater Servicing: Pump Station Capacity Assessment**

### Electrical Considerations

The new MT pumps would each require a power input of 52.7 kW for a total of 105.4 kW for two pumps running. Additional electrical considerations are as follows:

- The pump softstarter manufacturer (Benshaw) confirms that the existing two existing 60 HP softstarters internal components are suitable for the proposed larger 70 HP pumps. Some programmed parameters will need to be modified in the softstarter control module to reflect the new pump motor nameplate data. The thermal trip setting on the stoftstarter disconnect switch breaker will also need to be adjusted.

- The existing Distribution Panel 100 A feeder breakers (2) and power cables are suitable for the new larger 70 HP pumps.

- The existing power factor correction capacitors (2) will not be perfectly matched to the proposed larger 70 HP pumps, but will still correct the power factor to above 0.9 which is acceptable to Hydro Ottawa and will still avoid utility billing penalty charges.

- The existing 230 kW standby power generator is sized to feed the existing station base electrical loads and will allow operation of two proposed 70 HP pumps simultaneously (in a 2 duty / 1 standby configuration), without the need for any modifications to the emergency power system.

- The station currently has two sewage pumps. The installation of the third 70 HP sewage pump will require a new softstarter, new capacitor bank, new feeder breaker, new power wiring, and new control/monitoring wiring back to the station RPU.

- The existing station RPU control panel has reserved spare I/O points for the future third sewage pump, and therefore would not require any additional I/O modules.

- During the station upgrade's construction and testing phase, the City SCADA programmers will need to make programming changes to the pump station RPU control panel, as well as on the SCADA HMI pump duty table.

### Additional Storage Considerations

The highest flow projected in our flow assessment is 447 L/s from Scenario C and is 2L/s beyond the upgrade conveyance capacity established for the TLPS. Since increasing the conveyance could not be established without essentially replacing the entire pump station and forcemains, the remaining alternative is to add a storage component to offset this conveyance need.

We have assumed the same hydrograph distribution as the June 24-25, 2014 event to estimate this storage volume requirement while maintaining the upgraded conveyance rate at 445 L/s. The required volume is then obtained by calculating the difference between the Scenario C hydrograph and the TLPS conveyance and is estimated as 4 $m^3$ (see **Figure 4**).

**Reference: Mer Bleue Community Design Plan – Tenth Line PS & Wastewater Servicing: Pump Station Capacity Assessment**

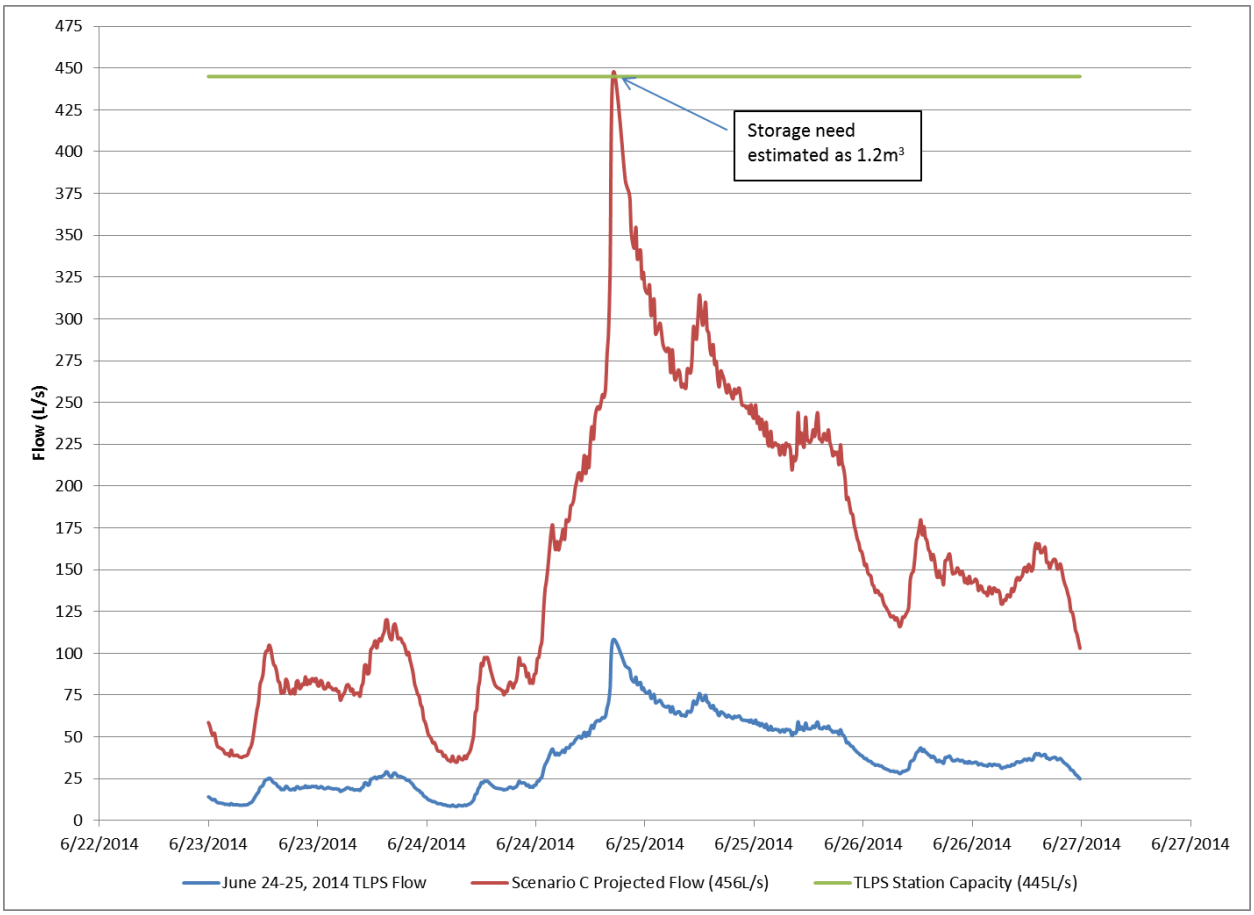


**Figure 4: TLPS Estimated Storage Upgrade Need**

This storage need is negligibly small and it is assumed that the upstream collection system could handle the backwater condition that could occur without adding additional storage at the TLPS.

## SUMMARY & RECOMMENDATIONS

A revision to the flow projections for the TLPS was completed following a meeting with the City. This revision was requested because the monitored peak existing flows into the pump station during the June 24-25, 2014 event were greater than the 100-year design flows previously used and obtained from the City's 2013 IMP wastewater model. We also reviewed the TLPS upgrade potential and identified that a capacity increase to approximately 445 L/s could be achieved by replacing the existing pumps and modifying some electrical components.

The findings of this revision showed that the RDII rate observed during the June 24-25, 2014 event was higher than that provided in the City's Sewer Design Guidelines. We suspect this high rate was due to inflow caused by partially constructed homes where sewer laterals may not have been

**Reference: Mer Bleue Community Design Plan – Tenth Line PS & Wastewater Servicing: Pump Station Capacity Assessment**

capped. This high RDII rate is not considered to be reflective of normal system responses; however the rate was still considered in our revised flow projections to provide a range of expected flows.

The revised flow projections considered the June 24-25, 2014 event and design rates for existing development and operational and design rates (from the City of Ottawa Sewer Design Guidelines) for growth. A range of flows between 381-447 L/s was obtained using this approach, with the highest estimated flow corresponding to the RDII rates observed during the June 24-25, 2014 event. We have estimated that a negligibly small amount of storage (1.2m$^3$) could be needed should this highest flow projection be attained while maintaining the 445 L/s capacity at the TLPS. We reiterate that we suspect irregular inflow conditions were responsible for the June 24-25, 2014 event and that the high RDII seen is not typical for newer developments.

Nonetheless, we recommend that a flow monitoring analysis be completed on the TLPS flow data once 50% of the anticipated growth is in place to confirm RDII rates and the projected conveyance and/or storage upgrade needs. This amount of growth corresponds to an additional flow of 170 L/s for a total wet weather flow of 278 L/s (108 L/s+170 L/s) and is within the stations existing capacity of 290 L/s. This flow monitoring analysis will help identify when and confirm what type of upgrades will be needed at the TLPS.

**STANTEC CONSULTING LTD.**

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c. Stephane D'Aoust; James Ricker

Attach: TLPS Scenario Summaries

**SCENARIO A**

FLOW PROJECTION

| Interest | Area | IMP Catch ID | Catchment Area (GIS) | 2031 Population | Growth | 2031 ICI (ha) | Growth | 2031 Employees | Growth | 2031 Area (ha) | Growth | Res (300L/c/d) | PF (Harmon) | P_RES | Emp (83L/emp/d) | PF | P_Emp | I/I (90% of area) | Total Growth Flow | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | NW | 568 | 28 | 0 | 0 | 22.3 | 0 | 1046 | 0 | 28 | 0 | 0.0 | 4.00 | 0.0 | 0.0 | 1 | 0.0 | 0.0 | 0.0 | |
| Existing | NE | 601 | 59.4 | 1236 | 1199 | 0 | 0 | 0 | 0 | 59.4 | 18.4 | 4.2 | 3.75 | 15.6 | 0.0 | 1 | 0.0 | 4.6 | 20.2 | |
| Existing | NE | 602 | 55.4 | 2442 | -227 | 0 | 0 | 5 | 0 | 55.4 | 0.1 | -0.8 | #NUM! | 0.0 | 0.0 | 1 | 0.0 | 0.0 | 0.0 | |
| Existing | NW | 603 | 60.9 | 8 | -1 | 35.4 | 35.4 | 2080 | 2073 | 60.9 | 35.4 | 0.0 | #NUM! | 0.0 | 2.0 | 1 | 2.0 | 8.9 | 10.9 | |
| Existing | NW | 604 | 177.9 | 7098 | 6653 | 0.1 | 0 | 508 | 500 | 177.9 | 115.2 | 23.1 | 3.13 | 72.3 | 0.5 | 1 | 0.5 | 29.0 | 101.8 | |
| MER BLEUE | 10A | 632 | 88.5 | | 10840 | 17 | 17 | 0 | 0 | 78.7 | 78.7 | 37.6 | 2.92 | 109.9 | 3.3 | 1 | 3.3 | 19.8 | 133.1 | |
| | 10B | 633 | 88.8 | | | 0 | 0 | 0 | 0 | 79.8 | 79.8 | 0.0 | 4.00 | 0.0 | 0.0 | 1 | 0.0 | 20.1 | 20.1 | |
| | 10C | 634 | 44 | | | 0 | 0 | 0 | 0 | 54.6 | 54.6 | 0.0 | 4.00 | 0.0 | 0.0 | 1 | 0.0 | 13.8 | 13.8 | |
| MINTO | 10D | 635 | 8.3 | | 1819 | 0 | 0 | 7 | 7 | 8.3 | 8.3 | 6.3 | 3.62 | 22.8 | 0.0 | 1 | 0.0 | 2.1 | 24.9 | |
| | POND | 636 | 13.4 | | | 0 | 0 | 0 | 0 | 13.4 | 0 | 0.0 | 4.00 | 0.0 | 0.0 | 1 | 0.0 | 0.0 | 0.0 | |
| | 10E | 637 | 19.9 | | | 0 | 0 | 0 | 0 | 19.9 | 19.9 | 0.0 | 4.00 | 0.0 | 0.0 | 1 | 0.0 | 5.0 | 5.0 | |
| Outside OP | S - 2060 | 647 | 232.9 | 86 | -9 | 0 | 0 | 90 | 0 | 0 | 0 | 0.0 | #NUM! | 0.0 | 0.0 | 1 | 0.0 | 0.0 | 0.0 | |
| Outside OP | E - 2060 | 648 | 286.4 | 0 | 0 | 0 | 0 | 26 | 0 | 0 | 0 | 0.0 | 4.00 | 0.0 | 0.0 | 1 | 0.0 | 0.0 | 0.0 | Including 108L/s from Existing |
| | | **TOTAL** | **1,163.80** | **21,855** | **20,274** | **57.7** | **52** | **4,401** | **2,580** | **636.2** | **410** | **70.4** | **2.65** | **186.3** | **5.8** | **1** | **5.8** | **103.4** | **295.5** | **404** |

| | | |
|---|---|---|
| RESIDENTIAL RATE | 300 L/c/d | |
| COMMERCIAL RATE | 17000 L/ha/d | or 83L/emp/d |
| I/I RATE | 0.28 L/s/ha | |

| | |
|---|---|
| RESIDENTIAL PEAK FACTOR | Harmon (K=1) |
| COMMERCIAL PEAK FACTOR | 1 |

**SCENARIO B** FLOW PROJECTION

| Interest | Area | IMP Catch ID | Catchment Area (GIS) | 2031 Population | Growth | 2031 ICI (ha) | Growth | 2031 Employees | Growth | 2031 Area (ha) | Growth | Res (300L/c/d) | PF (Harmon) | P_RES | Emp (83L/emp/d) | PF | P_Emp | I/I (90% of area) | Total Growth Flow | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | NW | 568 | 28 | 0 | 0 | 22.3 | 0 | 1046 | 0 | 28 | 0 | 0.0 | 4.00 | 0.0 | 0.0 | 1 | 0.0 | 0.0 | 0.0 | |
| Existing | NE | 601 | 59.4 | 1236 | 1199 | 0 | 0 | 0 | 0 | 59.4 | 18.4 | 4.2 | 3.75 | 15.6 | 0.0 | 1 | 0.0 | 4.6 | 20.2 | |
| Existing | NE | 602 | 55.4 | 2442 | -227 | 0 | 0 | 5 | 0 | 55.4 | 0.1 | -0.8 | #NUM! | 0.0 | 0.0 | 1 | 0.0 | 0.0 | 0.0 | |
| Existing | NW | 603 | 60.9 | 8 | -1 | 35.4 | 35.4 | 2080 | 2073 | 60.9 | 35.4 | 0.0 | #NUM! | 0.0 | 2.0 | 1 | 2.0 | 8.9 | 10.9 | |
| Existing | NW | 604 | 177.9 | 7098 | 6653 | 0.1 | 0 | 508 | 500 | 177.9 | 115.2 | 23.1 | 3.13 | 72.3 | 0.5 | 1 | 0.5 | 29.0 | 101.8 | |
| MER BLEUE | 10A | 632 | 88.5 | | 10840 | 17 | 17 | 0 | 0 | 78.7 | 78.7 | 37.6 | 2.92 | 109.9 | 3.3 | 1 | 3.3 | 19.8 | 133.1 | |
| | 10B | 633 | 88.8 | | | 0 | 0 | 0 | 0 | 79.8 | 79.8 | 0.0 | 4.00 | 0.0 | 0.0 | 1 | 0.0 | 20.1 | 20.1 | |
| | 10C | 634 | 44 | | | 0 | 0 | 0 | 0 | 54.6 | 54.6 | 0.0 | 4.00 | 0.0 | 0.0 | 1 | 0.0 | 13.8 | 13.8 | |
| MINTO | 10D | 635 | 8.3 | | 1819 | 0 | 0 | 7 | 7 | 8.3 | 8.3 | 6.3 | 3.62 | 22.8 | 0.0 | 1 | 0.0 | 2.1 | 24.9 | |
| | POND | 636 | 13.4 | | | 0 | 0 | 0 | 0 | 13.4 | 0 | 0.0 | 4.00 | 0.0 | 0.0 | 1 | 0.0 | 0.0 | 0.0 | |
| | 10E | 637 | 19.9 | | | 0 | 0 | 0 | 0 | 19.9 | 19.9 | 0.0 | 4.00 | 0.0 | 0.0 | 1 | 0.0 | 5.0 | 5.0 | |
| Outside OP | S - 2060 | 647 | 232.9 | 86 | -9 | 0 | 0 | 90 | 0 | 0 | 0 | 0.0 | #NUM! | 0.0 | 0.0 | 1 | 0.0 | 0.0 | 0.0 | |
| Outside OP | E - 2060 | 648 | 286.4 | 0 | 0 | 0 | 0 | 26 | 0 | 0 | 0 | 0.0 | 4.00 | 0.0 | 0.0 | 1 | 0.0 | 0.0 | 0.0 | Including 85L/s from Existing |
| | | **TOTAL** | **1,163.80** | **21,855** | **20,274** | **57.7** | **52** | **4,401** | **2,580** | **636.2** | **410** | **70.4** | **2.65** | **186.3** | **5.8** | **1** | **5.8** | **103.4** | **295.5** | **381** |

RESIDENTIAL RATE 300 L/c/d
COMMERCIAL RATE 17000 L/ha/d or 83L/emp/d
I/I RATE 0.28 L/s/ha

RESIDENTIAL PEAK FACTOR Harmon (K=1)
COMMERCIAL PEAK FACTOR 1

**SCENARIO C**

FLOW PROJECTION

| Interest | Area | IMP Catch ID | Catchment Area (GIS) | 2031 Population | Growth | 2031 ICI (ha) | Growth | 2031 Employees | Growth | 2031 Area (ha) | Growth | Res (350L/c/d) | PF (Harmon) | P_RES | Emp (83L/emp/d) | PF | P_Emp | I/I (90% of area) | Total Growth Flow | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | NW | 568 | 28 | 0 | 0 | 22.3 | 0 | 1046 | 0 | 28 | 0 | 0.0 | 4.00 | 0.0 | 0.0 | 1.5 | 0.0 | 0.0 | 0.0 | |
| Existing | NE | 601 | 59.4 | 1236 | 1199 | 0 | 0 | 0 | 0 | 59.4 | 18.4 | 4.9 | 3.75 | 18.2 | 0.0 | 1.5 | 0.0 | 4.6 | 22.8 | |
| Existing | NE | 602 | 55.4 | 2442 | -227 | 0 | 0 | 5 | 0 | 55.4 | 0.1 | -0.9 | #NUM! | 0.0 | 0.0 | 1.5 | 0.0 | 0.0 | 0.0 | |
| Existing | NW | 603 | 60.9 | 8 | -1 | 35.4 | 35.4 | 2080 | 2073 | 60.9 | 35.4 | 0.0 | #NUM! | 0.0 | 2.0 | 1.5 | 3.0 | 8.9 | 11.9 | |
| Existing | NW | 604 | 177.9 | 7098 | 6653 | 0.1 | 0 | 508 | 500 | 177.9 | 115.2 | 27.0 | 3.13 | 84.3 | 0.5 | 1.5 | 0.7 | 29.0 | 114.0 | |
| MER BLEUE | 10A | 632 | 88.5 | | 10840 | 17 | 17 | 0 | 0 | 78.7 | 78.7 | 43.9 | 2.92 | 128.2 | 9.8 | 1.5 | 14.8 | 19.8 | 162.8 | |
| | 10B | 633 | 88.8 | | | 0 | 0 | 0 | 0 | 79.8 | 79.8 | 0.0 | 4.00 | 0.0 | 0.0 | 1.5 | 0.0 | 20.1 | 20.1 | |
| | 10C | 634 | 44 | | | 0 | 0 | 0 | 0 | 54.6 | 54.6 | 0.0 | 4.00 | 0.0 | 0.0 | 1.5 | 0.0 | 13.8 | 13.8 | |
| MINTO | 10D | 635 | 8.3 | | 1819 | 0 | 0 | 7 | 7 | 8.3 | 8.3 | 7.4 | 3.62 | 26.7 | 0.0 | 1.5 | 0.0 | 2.1 | 28.8 | |
| | POND | 636 | 13.4 | | | 0 | 0 | 0 | 0 | 13.4 | 0 | 0.0 | 4.00 | 0.0 | 0.0 | 1.5 | 0.0 | 0.0 | 0.0 | |
| | 10E | 637 | 19.9 | | | 0 | 0 | 0 | 0 | 19.9 | 19.9 | 0.0 | 4.00 | 0.0 | 0.0 | 1.5 | 0.0 | 5.0 | 5.0 | |
| Outside OP | S - 2060 | 647 | 232.9 | 86 | -9 | 0 | 0 | 90 | 0 | 0 | 0 | 0.0 | #NUM! | 0.0 | 0.0 | 1.5 | 0.0 | 0.0 | 0.0 | |
| Outside OP | E - 2060 | 648 | 286.4 | 0 | 0 | 0 | 0 | 26 | 0 | 0 | 0 | 0.0 | 4.00 | 0.0 | 0.0 | 1.5 | 0.0 | 0.0 | 0.0 | Including 108L/s from Existing |
| | | **TOTAL** | **1,163.80** | **21,855** | **20,274** | **57.7** | **52** | **4,401** | **2,580** | **636.2** | **410** | **82.1** | **2.65** | **217.4** | **12.3** | **1.5** | **18.5** | **103.4** | **339.3** | **447** |

RESIDENTIAL RATE 350 L/c/d
COMMERCIAL RATE 50000 L/ha/d or 83L/emp/d
I/I RATE 0.28 L/s/ha

RESIDENTIAL PEAK FACTOR Harmon (K=1)
COMMERCIAL PEAK FACTOR 1.5

**SCENARIO D**

FLOW PROJECTION

| Interest | Area | IMP Catch ID | Catchment Area (GIS) | 2031 Population | Growth | 2031 ICI (ha) | Growth | 2031 Employees | Growth | 2031 Area (ha) | Growth | Res (350L/c/d) | PF (Harmon) | P_RES | Emp (83L/emp/d) | PF | P_Emp | I/I (90% of area) | Total Growth Flow | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | NW | 568 | 28 | 0 | 0 | 22.3 | 0 | 1046 | 0 | 28 | 0 | 0.0 | 4.00 | 0.0 | 0.0 | 1.5 | 0.0 | 0.0 | 0.0 | |
| Existing | NE | 601 | 59.4 | 1236 | 1199 | 0 | 0 | 0 | 0 | 59.4 | 18.4 | 4.9 | 3.75 | 18.2 | 0.0 | 1.5 | 0.0 | 4.6 | 22.8 | |
| Existing | NE | 602 | 55.4 | 2442 | -227 | 0 | 0 | 5 | 0 | 55.4 | 0.1 | -0.9 | #NUM! | 0.0 | 0.0 | 1.5 | 0.0 | 0.0 | 0.0 | |
| Existing | NW | 603 | 60.9 | 8 | -1 | 35.4 | 35.4 | 2080 | 2073 | 60.9 | 35.4 | 0.0 | #NUM! | 0.0 | 2.0 | 1.5 | 3.0 | 8.9 | 11.9 | |
| Existing | NW | 604 | 177.9 | 7098 | 6653 | 0.1 | 0 | 508 | 500 | 177.9 | 115.2 | 27.0 | 3.13 | 84.3 | 0.5 | 1.5 | 0.7 | 29.0 | 114.0 | |
| MER BLEUE | 10A | 632 | 88.5 | | 10840 | 17 | 17 | 0 | 0 | 78.7 | 78.7 | 43.9 | 2.92 | 128.2 | 9.8 | 1.5 | 14.8 | 19.8 | 162.8 | |
| | 10B | 633 | 88.8 | | | 0 | 0 | 0 | 0 | 79.8 | 79.8 | 0.0 | 4.00 | 0.0 | 0.0 | 1.5 | 0.0 | 20.1 | 20.1 | |
| | 10C | 634 | 44 | | | 0 | 0 | 0 | 0 | 54.6 | 54.6 | 0.0 | 4.00 | 0.0 | 0.0 | 1.5 | 0.0 | 13.8 | 13.8 | |
| MINTO | 10D | 635 | 8.3 | | 1819 | 0 | 0 | 7 | 7 | 8.3 | 8.3 | 7.4 | 3.62 | 26.7 | 0.0 | 1.5 | 0.0 | 2.1 | 28.8 | |
| | POND | 636 | 13.4 | | | 0 | 0 | 0 | 0 | 13.4 | 0 | 0.0 | 4.00 | 0.0 | 0.0 | 1.5 | 0.0 | 0.0 | 0.0 | |
| | 10E | 637 | 19.9 | | | 0 | 0 | 0 | 0 | 19.9 | 19.9 | 0.0 | 4.00 | 0.0 | 0.0 | 1.5 | 0.0 | 5.0 | 5.0 | |
| Outside OP | S - 2060 | 647 | 232.9 | 86 | -9 | 0 | 0 | 90 | 0 | 0 | 0 | 0.0 | #NUM! | 0.0 | 0.0 | 1.5 | 0.0 | 0.0 | 0.0 | |
| Outside OP | E - 2060 | 648 | 286.4 | 0 | 0 | 0 | 0 | 26 | 0 | 0 | 0 | 0.0 | 4.00 | 0.0 | 0.0 | 1.5 | 0.0 | 0.0 | 0.0 | Including 85L/s from Existing |
| | | **TOTAL** | **1,163.80** | **21,855** | **20,274** | **57.7** | **52** | **4,401** | **2,580** | **636.2** | **410** | **82.1** | **2.65** | **217.4** | **12.3** | **1.5** | **18.5** | **103.4** | **339.3** | **424** |

RESIDENTIAL RATE 350 L/c/d
COMMERCIAL RATE 50000 L/ha/d or 83L/emp/d
I/I RATE 0.28 L/s/ha

RESIDENTIAL PEAK FACTOR Harmon (K=1)
COMMERCIAL PEAK FACTOR 1.5

# APPENDIX E

## SSW PHASE 1 DRAINAGE AREA PLAN AND DESIGN SHEETS (DSEL, AUGUST 7, 2015)

## SSW PHASE 4, 5 AND 6 SANITARY DESIGN SHEETS (DSEL, NOVEMBER 2018)

## FIGURE 8.2A RECOMMENDED WASTEWATER SYSTEM FROM THE MER BLEUE MSS (IBI GROUP, DECEMBER 2017)

## SANITARY DESIGN SHEET FROM THE MER BLEUE MSS (IBI GROUP, DECEMBER 2017)

AVALON WEST STAGE 3
REFER TO
ATREL ENGINEERING LTD.
PROJECT No. 131004

AVALON - STAGE 10B
(REG. PLAN 4M-1332)

TENTH LINE ROAD WIDENING
REFER TO
MMM GROUP
CONTRACT No. ISD12-5174

KEY PLAN
SCALE 1:10000

FUTURE PHASE
PHASE 1

## LEGEND

SANITARY DRAINAGE BOUNDARY

UPSTREAM MH TO DOWNSTREAM MH — 43A-44A
AREA IN HECTARES — 0.78
POPULATION — 61

UPSTREAM MH TO DOWNSTREAM MH — 43A-44A
AREA IN OTHER PHASES IN HECTARES — 0.78
POPULATION — 61

MAINTENANCE HOLE — 200mm ø SAN MH202A
CAP

REVIEWED BY DEVELOPMENT REVIEW BRANCH

SIGNED _____

DATE _____

PLAN NUMBER _____

## TOPOGRAPHIC INFORMATION

TOPOGRAPHIC INFORMATION PROVIDED BY J.D. BARNES LIMITED,
PROJECT No. 8-10-989-02. SURVEY DATED AUGUST 27, 2013.

## LEGAL INFORMATION

CALCULATED M-PLAN PROVIDED BY J.D. BARNES LIMITED,
PROJECT No. 8-10-989-00 (PHASE 1), RECEIVED ON APRIL 9, 2015.

## BENCH MARK No. 01919680229

ELEVATION = 86.120 m

ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE NCC BENCH MARK No. 01919680229 HAVING A PUBLISHED ELEVATION OF 86.120 METRES.

TOWNSHIP: CUMBERLAND

CONCRETE MONUMENT ON THE EAST SIDE OF MER BLEUE ROAD, 0.15KM NORTH OF ROAD INTERSECTION WITH NAVAN ROAD.

| No. | DATE | BY | DESCRIPTION |
|---|---|---|---|
| 4. | 15-08-07 | Z.L. | 3rd SUBMISSION |
| 3. | 15-06-16 | Z.L. | MOE SUBMISSION |
| 2. | 15-04-30 | Z.L. | 2nd SUBMISSION |
| 1. | 15-02-13 | Z.L. | 1st SUBMISSION |

CITY OF OTTAWA

PROJECT No. 12-609

PROFESSIONAL ENGINEER — Z. LI — 15-08-07 — PROVINCE OF ONTARIO

# SANITARY DRAINAGE PLAN

© DSEL

MATTAMY (MER BLEUE) LIMITED

SUMMERSIDE WEST
PHASE 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

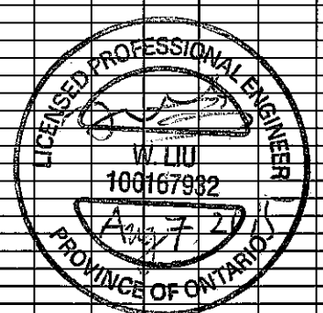

| | | | |
|---|---|---|---|
| DRAWN BY: C.M/W.L | CHECKED BY: K.M. | DRAWING NO. | SHEET NO. |
| DESIGNED BY: K.M. | CHECKED BY: Z.L. | | 36 |
| SCALE: 1:1000 | DATE: JUNE 2015 | | |

CITY FILE No. D07-16-14-0011 CITY PLAN No. 16839

# SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

| LOCATION | | | RESIDENTIAL AREA AND POPULATION | | | | | | COMM | | 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 Nominal (mm) | DIA Actual (mm) | SLOPE (%) | CAP. (FULL) (l/s) | RATIO Q act/Q cap | VEL. (FULL) (m/s) |
| **cercle Casa Grande Circle** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 24A | 25A | 0.91 | 21 | 71.4 | 0.91 | 71.4 | 4.00 | 1.16 | | | | | | | | 0.91 | 0.91 | 0.255 | 1.42 | 119.5 | 200 | 200 | 0.65 | 26.44 | 0.05 | 0.84 |
| | 25A | 26A | 0.23 | 3 | 10.2 | 1.14 | 81.6 | 4.00 | 1.32 | | | | | | | | 0.23 | 1.14 | 0.319 | 1.64 | 13.0 | 200 | 200 | 0.40 | 20.74 | 0.08 | 0.66 |
| | 26A | 27A | 0.43 | 10 | 34.0 | 1.57 | 115.6 | 4.00 | 1.87 | | | | | | | | 0.43 | 1.57 | 0.440 | 2.31 | 71.5 | 200 | 200 | 0.40 | 20.74 | 0.11 | 0.66 |
| | 27A | 28A | 0.56 | 13 | 44.2 | 2.13 | 159.8 | 4.00 | 2.59 | | | | | | | | 0.56 | 2.13 | 0.596 | 3.19 | 72.0 | 200 | 200 | 0.40 | 20.74 | 0.15 | 0.66 |
| | 28A | 29A | 0.17 | 2 | 6.8 | 2.30 | 166.6 | 4.00 | 2.70 | | | | | | | | 0.17 | 2.30 | 0.644 | 3.34 | 12.5 | 200 | 200 | 0.40 | 20.74 | 0.16 | 0.66 |
| | 29A | 33A | 0.11 | 2 | 6.8 | 2.41 | 173.4 | 4.00 | 2.81 | | | | | | | | 0.11 | 2.41 | 0.675 | 3.49 | 29.0 | 200 | 200 | 1.20 | 35.93 | 0.10 | 1.14 |
| To BLOCK 166 (Servicing & Walkway BLOCK) , Pipe 33A - 52A | | | | | | 2.41 | 173.4 | | | | | | | | | | | | | | | | | | | | |
| | 30A | 31A | 0.89 | 23 | 78.2 | 0.89 | 78.2 | 4.00 | 1.27 | | | | | | | | 0.89 | 0.89 | 0.249 | 1.52 | 113.5 | 200 | 200 | 1.10 | 34.40 | 0.04 | 1.09 |
| | 31A | 32A | 0.16 | 2 | 6.8 | 1.05 | 85.0 | 4.00 | 1.38 | | | | | | | | 0.16 | 1.05 | 0.294 | 1.67 | 13.0 | 200 | 200 | 1.50 | 40.17 | 0.04 | 1.28 |
| | 32A | 33A | 0.10 | 2 | 6.8 | 1.15 | 91.8 | 4.00 | 1.49 | | | | | | | | 0.10 | 1.15 | 0.322 | 1.81 | 25.5 | 200 | 200 | 2.00 | 46.38 | 0.04 | 1.48 |
| To BLOCK 166 (Servicing & Walkway BLOCK) , Pipe 33A - 52A | | | | | | 1.15 | 91.8 | | | | | | | | | | | | | | | | | | | | |
| **BLOCK 166 (Servicing & Walkway BLOCK)** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Contribution From cercle Casa Grande Circle, Pipe 29A - 33A | | | | | | 2.41 | 173.4 | | | | | | | | | | 2.41 | 2.41 | | | | | | | | | |
| Contribution From cercle Casa Grande Circle, Pipe 32A - 33A | | | | | | 1.15 | 91.8 | | | | | | | | | | 1.15 | 3.56 | | | | | | | | | |
| | 33A | 52A | 0.04 | 0 | 0.0 | 3.60 | 265.2 | 4.00 | 4.30 | | | | | | | | 0.04 | 3.60 | 1.008 | 5.31 | 42.0 | 200 | 200 | 0.40 | 20.74 | 0.26 | 0.66 |
| To ROAD ALLOWANCE (TRUNK), Pipe 52A - 53A | | | | | | 3.60 | 265.2 | | | | | | | | | | | | | | | | | | | | |
| **croissant Sweetfern Crescent** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 6A | 9A | 0.34 | 16 | 43.2 | 0.34 | 43.2 | 4.00 | 0.70 | | | | | | | | 0.34 | 0.34 | 0.095 | 0.80 | 70.5 | 200 | 200 | 0.65 | 26.44 | 0.03 | 0.84 |
| To rue Mandalay Street, Pipe 9A - 10A | | | | | | 0.34 | 43.2 | | | | | | | | | | | | | | | | | | | | |
| | 1A | 7A | 0.24 | 12 | 32.4 | 0.24 | 32.4 | 4.00 | 0.53 | | | | | | | | 0.24 | 0.24 | 0.067 | 0.60 | 86.5 | 200 | 200 | 1.00 | 32.80 | 0.02 | 1.04 |
| | 7A | 8A | 0.05 | 1 | 2.7 | 0.29 | 35.1 | 4.00 | 0.57 | | | | | | | | 0.05 | 0.29 | 0.081 | 0.65 | 11.0 | 200 | 200 | 1.00 | 32.80 | 0.02 | 1.04 |
| To rue Mandalay Street, Pipe 8A - 9A | | | | | | 0.29 | 35.1 | | | | | | | | | | | | | | | | | | | | |
| | 1A | 2A | 0.10 | 5 | 13.5 | 0.10 | 13.5 | 4.00 | 0.22 | | | | | | | | 0.10 | 0.10 | 0.028 | 0.25 | 38.0 | 200 | 200 | 1.00 | 32.80 | 0.01 | 1.04 |
| | 2A | 3A | 0.06 | 1 | 2.7 | 0.16 | 16.2 | 4.00 | 0.26 | | | | | | | | 0.06 | 0.16 | 0.045 | 0.31 | 11.0 | 200 | 200 | 1.00 | 32.80 | 0.01 | 1.04 |
| | 3A | 4A | 0.12 | 4 | 10.8 | 0.28 | 27.0 | 4.00 | 0.44 | | | | | | | | 0.12 | 0.28 | 0.078 | 0.52 | 28.5 | 200 | 200 | 1.00 | 32.80 | 0.02 | 1.04 |
| | 4A | 5A | 0.18 | 4 | 10.8 | 0.46 | 37.8 | 4.00 | 0.61 | | | | | | | | 0.18 | 0.46 | 0.129 | 0.74 | 11.0 | 200 | 200 | 1.00 | 32.80 | 0.02 | 1.04 |
| | 5A | 6A | 0.32 | 15 | 40.5 | 0.78 | 78.3 | 4.00 | 1.27 | | | | | | | | 0.32 | 0.78 | 0.218 | 1.49 | 62.0 | 200 | 200 | 0.90 | 31.12 | 0.05 | 0.99 |
| To rue Astervale Street, Pipe 6A - 13A | | | | | | 0.78 | 78.3 | | | | | | | | | | | | | | | | | | | | |
| **rue Mandalay Street** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Contribution From croissant Sweetfern Crescent, Pipe 7A - 8A | | | | | | 0.29 | 35.1 | | | | | | | | | | 0.29 | 0.29 | | | | | | | | | |
| | 8A | 9A | 0.18 | 6 | 16.2 | 0.47 | 51.3 | 4.00 | 0.83 | | | | | | | | 0.18 | 0.47 | 0.132 | 0.96 | 36.5 | 200 | 200 | 1.50 | 40.17 | 0.02 | 1.28 |
| Contribution From croissant Sweetfern Crescent, Pipe 6A - 9A | | | | | | 0.34 | 43.2 | | | | | | | | | | 0.34 | 0.81 | | | | | | | | | |
| | | | 0.03 | 1 | 2.7 | | | | | | | | | | | | 0.03 | 0.84 | | | | | | | | | |
| | 9A | 10A | 0.34 | 9 | 30.6 | 1.18 | 127.8 | 4.00 | 2.07 | | | | | | | | 0.34 | 1.18 | 0.330 | 2.40 | 67.5 | 200 | 200 | 0.40 | 20.74 | 0.12 | 0.66 |
| | 10A | 11A | 0.43 | 11 | 37.4 | 1.61 | 165.2 | 4.00 | 2.68 | | | | | | | | 0.43 | 1.61 | 0.451 | 3.13 | 66.5 | 200 | 200 | 0.40 | 20.74 | 0.15 | 0.66 |
| To promenade Sweetvalley Drive, Pipe 11A - 150A | | | | | | 1.61 | 165.2 | | | | | | | | | | | | | | | | | | | | |




## DESIGN PARAMETERS

| | | | | | |
|---|---|---|---|---|---|
| Average Daily Flow = | 350 | l/p/day | Industrial Peak Factor = | as per MOE Graph | |
| Commercial/Institution Flow = | 50000 | L/ha/da | Extraneous Flow = | 0.280 | L/s/ha |
| Industrial Flow = | 35000 | L/ha/da | Minimum Velocity = | 0.60 | m/s |
| Max Res. Peak Factor = | 4.00 | | Manning's n = | 0.013 | |
| Commercial/Institution/Park Peak Factor = | 1.50 | | Townhouse coeff= | 2.7 | |
| Park Average Flow = | 9300 | L/ha/da | Single house coeff= | 3.4 | |

Designed: K.M.

Checked: Z.L.

Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 35 and 36

PROJECT: **SUMMERSIDE WEST PHASE 1**

LOCATION: **City of Ottawa**

File Ref: 12-609 | Date: August, 2015 | Sheet No. 1 of 3

# SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

| LOCATION | | | RESIDENTIAL AREA AND POPULATION | | | | | | COMM | | 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 Nominal (mm) | DIA Actual (mm) | SLOPE (%) | CAP. (FULL) (l/s) | RATIO Q act/Q cap | VEL. (FULL) (m/s) |
| **rue Astervale Street** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Contribution From croissant Sweetfern Crescent, Pipe 5A - 6A | | | | | | 0.78 | 78.3 | | | | | | | | | | 0.78 | 0.78 | | | | | | | | | |
| | 6A | 13A | 0.20 | 5 | 13.5 | 0.98 | 91.8 | 4.00 | 1.49 | | | | | | | | 0.20 | 0.98 | 0.274 | 1.76 | 69.0 | 200 | 200 | 0.40 | 20.74 | 0.08 | 0.66 |
| Contribution From rue Broadleaf Street, Pipe 12A - 13A | | | | | | 0.33 | 27.0 | | | | | | | | | | 0.33 | 1.31 | | | | | | | | | |
| | 13A | 15A | 0.31 | 13 | 35.1 | 1.62 | 153.9 | 4.00 | 2.49 | | | | | | | | 0.31 | 1.62 | 0.454 | 2.94 | 64.0 | 200 | 200 | 0.40 | 20.74 | 0.14 | 0.66 |
| To promenade Sweetvalley Drive , Pipe 15A - 17A | | | | | | 1.62 | 153.9 | | | | | | | | | | | | | | | | | | | | |
| **rue Maroma Street** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 16A | 17A | 0.21 | 12 | 32.4 | 0.21 | 32.4 | 4.00 | 0.53 | | | | | | | | 0.21 | 0.21 | 0.059 | 0.59 | 51.0 | 200 | 200 | 0.65 | 26.44 | 0.02 | 0.84 |
| To promenade Sweetvalley Drive , Pipe 17A - 18A | | | | | | 0.21 | 32.4 | | | | | | | | | | | | | | | | | | | | |
| **rue Broadleaf Street** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 12A | 14A | 0.12 | 3 | 8.1 | 0.12 | 8.1 | 4.00 | 0.13 | | | | | | | | 0.12 | 0.12 | 0.034 | 0.16 | 11.0 | 200 | 200 | 1.00 | 32.80 | 0.00 | 1.04 |
| | 14A | 18A | 0.32 | 13 | 35.1 | 0.44 | 43.2 | 4.00 | 0.70 | | | | | | | | 0.32 | 0.44 | 0.123 | 0.82 | 55.5 | 200 | 200 | 1.00 | 32.80 | 0.03 | 1.04 |
| To promenade Sweetvalley Drive , Pipe 18A - 19A | | | | | | 0.44 | 43.2 | | | | | | | | | | | | | | | | | | | | |
| | 12A | 13A | 0.33 | 10 | 27.0 | 0.33 | 27.0 | 4.00 | 0.44 | | | | | | | | 0.33 | 0.33 | 0.092 | 0.53 | 62.5 | 200 | 200 | 1.60 | 41.49 | 0.01 | 1.32 |
| To rue Astervale Street, Pipe 13A - 15A | | | | | | 0.33 | 27.0 | | | | | | | | | | | | | | | | | | | | |
| **promenade Sweetvalley Drive** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 20A | 21A | 0.40 | 8 | 27.2 | 0.40 | 27.2 | 4.00 | 0.44 | | | | | | | | 0.40 | 0.40 | 0.112 | 0.55 | 36.0 | 200 | 200 | 0.65 | 26.44 | 0.02 | 0.84 |
| | 21A | 22A | 0.44 | 9 | 30.6 | 0.84 | 57.8 | 4.00 | 0.94 | | | | | | | | 0.44 | 0.84 | 0.235 | 1.18 | 53.0 | 200 | 200 | 0.40 | 20.74 | 0.06 | 0.66 |
| | 22A | 23A | 0.62 | 16 | 54.4 | 1.46 | 112.2 | 4.00 | 1.82 | | | | | | | | 0.62 | 1.46 | 0.409 | 2.23 | 85.5 | 200 | 200 | 0.60 | 25.41 | 0.09 | 0.81 |
| To BLOCK 168 (Servicing & Walkway BLOCK) , Pipe 23A - 53A | | | | | | 1.46 | 112.2 | | | | | | | | | | | | | | | | | | | | |
| Contribution From South Area | | | | | | 15.57 | 1108.0 | | | | | | | | | | 15.57 | 15.57 | | | | | | | | | |
| | 110A | 11A | 0.06 | 0 | 0.0 | 15.63 | 1108.0 | 3.77 | 16.92 | | | | | | | | 0.06 | 15.63 | 4.376 | 21.30 | 33.5 | 375 | 375 | 0.30 | 96.03 | 0.22 | 0.87 |
| Contribution From rue Mandalay Street, Pipe 10A - 11A | | | | | | 1.61 | 165.2 | | | | | | | | | | 1.61 | 17.24 | | | | | | | | | |
| | 11A | 150A | 0.03 | 0 | 0.0 | 17.27 | 1273.2 | 3.73 | 19.24 | | | | | | | | 0.03 | 17.27 | 4.836 | 24.08 | 21.0 | 375 | 375 | 0.30 | 96.03 | 0.25 | 0.87 |
| Contribution from BLOCK 163 (PARK) | | | | | | | | | | | | | | | | | | | | 5.00 | Block 163 (Park) Splash Pad 5.0 L/s Flow Allowance | | | | | | |
| San Control MH 1A | | 150A | | | | | | | | | | | | 1.19 | 1.19 | 0.19 | 1.19 | 1.19 | 0.333 | 5.52 | 11.0 | 200 | 200 | 1.00 | 32.80 | 0.17 | 1.04 |
| | 150A | 15A | 0.08 | 0 | 0.0 | 17.35 | 1273.2 | 3.73 | 19.24 | | | | | | 1.19 | 0.19 | 0.08 | 18.54 | 5.191 | 29.62 | 49.5 | 375 | 375 | 0.30 | 96.03 | 0.31 | 0.87 |
| Contribution From rue Astervale Street, Pipe 13A - 15A | | | | | | 1.62 | 153.9 | | | | | | | | | | 1.62 | 20.16 | | | | | | | | | |
| | 15A | 17A | 0.09 | 1 | 3.4 | 19.06 | 1430.5 | 3.69 | 21.38 | | | | | | 1.19 | 0.19 | 0.09 | 20.25 | 5.670 | 32.24 | 45.0 | 375 | 375 | 0.30 | 96.03 | 0.34 | 0.87 |
| Contribution From rue Maroma Street, Pipe 16A - 17A | | | | | | 0.21 | 32.4 | | | | | | | | | | 0.21 | 20.46 | | | | | | | | | |
| | 17A | 18A | 0.19 | 5 | 17.0 | 19.46 | 1479.9 | 3.68 | 22.06 | | | | | | 1.19 | 0.19 | 0.19 | 20.65 | 5.782 | 33.03 | 45.0 | 375 | 375 | 0.30 | 96.03 | 0.34 | 0.87 |

## DESIGN PARAMETERS

| | | | |
|---|---|---|---|
| Average Daily Flow = | 350 l/p/day | Industrial Peak Factor = | as per MOE Graph |
| Commercial/Institution Flow = | 50000 L/ha/da | Extraneous Flow = | 0.280 L/s/ha |
| Industrial Flow = | 35000 L/ha/da | Minimum Velocity = | 0.60 m/s |
| Max Res. Peak Factor = | 4.00 | Manning's n = | 0.013 |
| Commercial/Institution/Park Peak Factor = | 1.50 | Townhouse coeff= | 2.7 |
| Park Average Flow = | 9300 L/ha/da | Single house coeff= | 3.4 |

Designed: K.M.

Checked: Z.L.

Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 35 and 36

PROJECT: **SUMMERSIDE WEST PHASE 1**

LOCATION: **City of Ottawa**

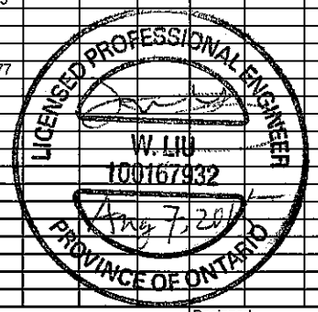
File Ref: 12-609 | Date: August, 2015 | Sheet No. 2 of 3

LICENSED PROFESSIONAL ENGINEER
W. LIU
100167932
PROVINCE OF ONTARIO

## SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

| LOCATION | | | RESIDENTIAL AREA AND POPULATION | | | | | | | COMM | | 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 Nominal (mm) | DIA Actual (mm) | SLOPE (%) | CAP. (FULL) (l/s) | RATIO Q act/Q cap | VEL. (FULL) (m/s) |
| Contribution From rue Broadleaf Street, Pipe 14A - 18A | | | | | | 0.44 | 43.2 | | | | | | | | | | 0.44 | 21.09 | | | | | | | | | |
| | 18A | 19A | 0.33 | 6 | 20.4 | 20.23 | 1543.5 | 3.67 | 22.95 | | | | | | 1.19 | 0.19 | 0.33 | 21.42 | 5.998 | 34.14 | 61.5 | 375 | 375 | 0.30 | 96.03 | 0.36 | 0.87 |
| | 19A | 23A | 0.11 | 1 | 3.4 | 20.34 | 1546.9 | 3.67 | 23.00 | | | | | | 1.19 | 0.19 | 0.11 | 21.53 | 6.028 | 34.22 | 11.0 | 375 | 375 | 0.30 | 96.03 | 0.36 | 0.87 |
| To BLOCK 168 (Servicing & Walkway BLOCK) , Pipe 23A - 53A | | | | | | 20.34 | 1546.9 | | | | | | | | 1.19 | | | | | | | | | | | | |
| **BLOCK 168 (Servicing & Walkway BLOCK)** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Contribution From promenade Sweetvalley Drive, Pipe 22A - 23A | | | | | | 1.46 | 112.2 | | | | | | | | | | 1.46 | 1.46 | | | | | | | | | |
| Contribution From promenade Sweetvalley Drive, Pipe 19A - 23A | | | | | | 20.34 | 1546.9 | | | | | | | | 1.19 | 0.19 | 21.53 | 22.99 | | | | | | | | | |
| | 23A | 53A | 0.04 | 0 | 0.0 | 21.84 | 1659.1 | 3.65 | 24.53 | | | | | | 1.19 | 0.19 | 0.04 | 23.03 | 6.448 | 36.17 | 42.0 | 375 | 375 | 0.30 | 96.03 | 0.38 | 0.87 |
| To ROAD ALLOWANCE (TRUNK), Pipe 53A - 54A | | | | | | 21.84 | 1659.1 | | | | | | | | 1.19 | | | | | | | | | | | | |
| **TRUNK** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Contribution From FUTURE RESIDENTIAL AREA | | | | | | 9.70 | 679.0 | | | | | | | | | | 9.70 | 9.70 | | | | | | | | | |
| | | | | | | 10.55 | 950.0 | | | | | | | | | | 10.55 | 20.25 | | | | | | | | | |
| | Plug | 46A | 0.00 | 0 | 0.0 | 20.25 | 1629.0 | 3.65 | 24.09 | | | | | | | | 0.00 | 20.25 | 5.670 | 29.76 | 13.0 | 300 | 300 | 0.20 | 43.25 | 0.69 | 0.61 |
| | 46A | 47A | 0.22 | 0 | 0.0 | 20.47 | 1629.0 | 3.65 | 24.09 | | | | | | | | 0.22 | 20.47 | 5.732 | 29.82 | 102.0 | 300 | 300 | 0.20 | 43.25 | 0.69 | 0.61 |
| | 47A | 48A | 0.19 | 0 | 0.0 | 20.66 | 1629.0 | 3.65 | 24.09 | | | | | | | | 0.19 | 20.66 | 5.785 | 29.88 | 93.5 | 300 | 300 | 0.20 | 43.25 | 0.69 | 0.61 |
| | 48A | 49A | 0.15 | 0 | 0.0 | 20.81 | 1629.0 | 3.65 | 24.09 | | | | | | | | 0.15 | 20.81 | 5.827 | 29.92 | 78.0 | 300 | 300 | 0.20 | 43.25 | 0.69 | 0.61 |
| | 49A | 50A | 0.24 | 0 | 0.0 | 21.05 | 1629.0 | 3.65 | 24.09 | | | | | | | | 0.24 | 21.05 | 5.894 | 29.98 | 120.0 | 300 | 300 | 0.20 | 43.25 | 0.69 | 0.61 |
| | 50A | 51A | 0.20 | 0 | 0.0 | 21.25 | 1629.0 | 3.65 | 24.09 | | | | | | | | 0.20 | 21.25 | 5.950 | 30.04 | 98.5 | 300 | 300 | 0.20 | 43.25 | 0.69 | 0.61 |
| | 51A | 510A | 0.02 | 0 | 0.0 | 21.27 | 1629.0 | 2.00 | 13.20 | | | | | | | | 0.02 | 21.27 | 5.956 | 19.16 | 13.0 | 300 | 300 | 0.20 | 43.25 | 0.44 | 0.61 |
| | 510A | 52A | 0.20 | 0 | 0.0 | 21.47 | 1629.0 | 3.65 | 24.09 | | | | | | | | 0.20 | 21.47 | 6.012 | 30.10 | 101.0 | 300 | 300 | 0.20 | 43.246 | 0.70 | 0.61 |
| Contribution From BLOCK 166 (Servicing & Walkway), Pipe 33A - 52A | | | | | | 3.60 | 265.2 | | | | | | | | | | 3.60 | 25.07 | | | | | | | | | |
| | 52A | 53A | 0.22 | 0 | 0.0 | 25.29 | 1894.2 | 3.60 | 27.62 | | | | | | | | 0.22 | 25.29 | 7.081 | 34.70 | 110.0 | 375 | 375 | 0.20 | 78.410 | 0.44 | 0.71 |
| Contribution From BLOCK 168 (Servicing & Walkway), Pipe 23A - 53A | | | | | | 21.84 | 1659.1 | | | | | | | | 1.19 | | 23.03 | 48.32 | | | | | | | | | |
| | 53A | 54A | 0.21 | 0 | 0.0 | 47.34 | 3553.3 | 3.38 | 48.65 | | | | | | 1.19 | 0.19 | 0.21 | 48.53 | 13.588 | 67.43 | 105.5 | 450 | 450 | 0.20 | 127.503 | 0.53 | 0.80 |
| | 54A | 55A | 0.18 | 0 | 0.0 | 47.52 | 3553.3 | 3.38 | 48.65 | | | | | | 1.19 | 0.19 | 0.18 | 48.71 | 13.639 | 67.48 | 101.0 | 450 | 450 | 0.20 | 127.503 | 0.53 | 0.80 |
| Contribution From Existing Alavon South | | | | | | 98.22 | 6997.0 | | | | | | | | | | 98.22 | 146.93 | | | | | | | | | |
| Contribution From AREA 10 (TENTH LINE) | | | | | | 117.93 | 10240.0 | | | | | | | | | | 117.93 | 264.86 | | | | | | | | | |
| Contribution From URBAN EXPANSION AREA | | | | | | 26.60 | 1785.0 | | | | | | | | | | 26.60 | 291.46 | | | | | | | | | |
| | 55A | Ex. 10128 | 0.00 | 0 | 0.0 | 290.27 | 22575.3 | 2.60 | 237.77 | | | | | | 1.19 | 0.19 | 0.00 | 291.46 | 81.609 | 324.57 | 19.0 | 675 | 675 | 0.50 | 594.386 | 0.55 | 1.66 |
| To PUMPING STATION, Pipe Ex. 10128 - Pumping Station | | | | | | 290.27 | 22575.3 | | | | | | | | 1.19 | | | | | | | | | | | | |




DESIGN PARAMETERS

| | | | | | |
|---|---|---|---|---|---|
| Average Daily Flow = | 350 | l/p/day | Industrial Peak Factor = as per MOE Graph | | |
| Commercial/Institution Flow = | 50000 | L/ha/da | Extraneous Flow = | 0.280 | L/s/ha |
| Industrial Flow = | 35000 | L/ha/da | Minimum Velocity = | 0.60 | m/s |
| Max Res. Peak Factor = | 4.00 | | Manning's n = | 0.013 | |
| Commercial/institution/Park Peak Factor = | 1.50 | | Townhouse coeff= | 2.7 | |
| Park Average Flow = | 9300 | L/ha/da | Single house coeff= | 3.4 | |

Designed: K.M.

Checked: Z.L.

Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 35 and 36

PROJECT: **SUMMERSIDE WEST PHASE 1**

LOCATION: **City of Ottawa**

File Ref: 12-609 | Date: August, 2015 | Sheet No. 3 of 3

# SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

| LOCATION | | | | RESIDENTIAL AREA AND POPULATION | | | | | | COMM | | INSTIT | | PARK | | C+I+I | INFILTRATION | | | | | PIPE | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STREET | | FROM M.H. | TO M.H. | AREA (ha) | 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) |
| **TRUNK 2** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 0.30 | 33 | 0.30 | 33 | | | 0.21 | 0.21 | | | | | | 0.51 | 0.51 | | | | | | | | | | |
| | | | | 0.42 | 47 | 0.72 | 80 | | | | 0.21 | | | | | | 0.42 | 0.93 | | | | | | | | | | |
| | | | | 0.13 | 15 | 0.85 | 95 | | | | 0.21 | | | | | | 0.13 | 1.06 | | | | | | | | | | |
| | | | | 0.31 | 35 | 1.16 | 130 | | | | 0.21 | | | | | | 0.31 | 1.37 | | | | | | | | | | |
| | | 550A | 551A | 1.19 | 131 | 2.35 | 261 | 3.28 | 2.78 | | 0.21 | | | | | 0.10 | 1.19 | 2.56 | 0.84 | 3.72 | 90.0 | 200 | 0.35 | 19.40 | 0.19 | 0.62 | 0.47 |
| | | | | 0.42 | 47 | 2.77 | 308 | | | | 0.21 | | | | | | 0.42 | 2.98 | | | | | | | | | | |
| | | | | 1.04 | 115 | 3.81 | 423 | | | | 0.21 | | | | | | 1.04 | 4.02 | | | | | | | | | | |
| | | 551A | 552A | 0.12 | 14 | 3.93 | 437 | 3.20 | 4.54 | | 0.21 | | | | | 0.10 | 0.12 | 4.14 | 1.37 | 6.00 | 51.5 | 200 | 0.35 | 19.40 | 0.31 | 0.62 | 0.54 |
| | | | | 0.19 | 21 | 4.12 | 458 | | | | 0.21 | | | | | | 0.19 | 4.33 | | | | | | | | | | |
| | | | | 0.66 | 73 | 4.78 | 531 | | | | 0.21 | | | | | | 0.66 | 4.99 | | | | | | | | | | |
| | | 552A | 553A | 1.04 | 115 | 5.82 | 646 | 3.13 | 6.56 | | 0.21 | | | | | 0.10 | 1.04 | 6.03 | 1.99 | 8.65 | 79.5 | 250 | 0.25 | 29.73 | 0.29 | 0.61 | 0.52 |
| | | | | 1.42 | 157 | 7.24 | 803 | | | | 0.21 | | | | | | 1.42 | 7.45 | | | | | | | | | | |
| | | 553A | 567A | 0.10 | 11 | 7.34 | 814 | 3.08 | 8.14 | | 0.21 | | | | | 0.10 | 0.10 | 7.55 | 2.49 | 10.73 | 40.5 | 250 | 0.25 | 29.73 | 0.36 | 0.61 | 0.56 |
| | | | | 0.20 | 22 | 7.54 | 836 | 2.00 | 5.42 | 3.62 | 3.83 | | | | | | 3.82 | 11.37 | | | | | | | | | | |
| | | 567A | 571A | 1.56 | 172 | 9.10 | 1008 | 3.04 | 9.92 | | 3.83 | | | | | 1.86 | 1.56 | 12.93 | 4.27 | 16.05 | 86.0 | 300 | 0.20 | 43.25 | 0.37 | 0.61 | 0.57 |
| | | | | 0.51 | 34 | 9.61 | 1042 | | | | 3.83 | | | | | | 0.51 | 13.44 | | | | | | | | | | |
| | | 571A | 572A | 1.36 | 150 | 10.97 | 1192 | 3.00 | 11.59 | | 3.83 | 2.60 | 2.60 | | | 3.13 | 3.96 | 17.40 | 5.74 | 20.46 | 115.0 | 300 | 0.20 | 43.25 | 0.47 | 0.61 | 0.60 |
| | | 572A | 573A | 0.64 | 42 | 11.61 | 1234 | 2.99 | 11.96 | | 3.83 | | 2.60 | 1.87 | 1.87 | 3.43 | 2.51 | 19.91 | 6.57 | 21.96 | 115.0 | 300 | 0.20 | 43.25 | 0.51 | 0.61 | 0.61 |
| | | 573A | 588A | 0.65 | 43 | 12.26 | 1277 | 2.98 | 12.35 | | 3.83 | | 2.60 | | 1.87 | 3.43 | 0.65 | 20.56 | 6.78 | 22.56 | 115.0 | 300 | 0.20 | 43.25 | 0.52 | 0.61 | 0.62 |
| **TRUNK 2 (BY OTHERS)** | | | | 0.54 | 60 | 12.80 | 1337 | | | | 3.83 | | 2.60 | | 1.87 | | 0.54 | 21.10 | | | | | | | | | | |
| | | 588A | 589A | 6.80 | 442 | 19.60 | 1779 | 2.90 | 16.72 | | 3.83 | | 2.60 | | 1.87 | 3.43 | 6.80 | 27.90 | 9.21 | 29.35 | 59.5 | 300 | 0.20 | 43.25 | 0.68 | 0.61 | 0.66 |
| | | 589A | 590A | 1.45 | 95 | 21.05 | 1874 | 2.89 | 17.53 | | 3.83 | | 2.60 | | 1.87 | 3.43 | 1.45 | 29.35 | 9.69 | 30.64 | 49.5 | 375 | 0.15 | 67.91 | 0.45 | 0.61 | 0.60 |
| | | 590A (B.O.) | 591A (B.O.) | 0.66 | 43 | 21.71 | 1917 | 2.88 | 17.89 | | 3.83 | | 2.60 | | 1.87 | 3.43 | 0.66 | 30.01 | 9.90 | 31.22 | 79.0 | 375 | 0.15 | 67.91 | 0.46 | 0.61 | 0.60 |
| | | 591A (B.O.) | 592A (B.O.) | 0.37 | 25 | 22.08 | 1942 | 2.88 | 18.10 | | 3.83 | | 2.60 | | 1.87 | 3.43 | 0.37 | 30.38 | 10.03 | 31.56 | 48.0 | 375 | 0.15 | 67.91 | 0.46 | 0.61 | 0.60 |
| | | | | 0.30 | 20 | 22.38 | 1962 | | | | 3.83 | | 2.60 | 6.31 | 8.18 | | 6.61 | 36.99 | | | | | | | | | | |
| | | 592A (B.O.) | 593A (B.O.) | 12.50 | 813 | 34.88 | 2775 | 2.78 | 24.97 | | 3.83 | | 2.60 | | 8.18 | 4.45 | 12.50 | 49.49 | 16.33 | 45.75 | 75.0 | 450 | 0.12 | 98.76 | 0.46 | 0.62 | 0.61 |
| | | | | 0.14 | 10 | 35.02 | 2785 | | | | 3.83 | | 2.60 | | 8.18 | | 0.14 | 49.63 | | | | | | | | | | |
| | | | | 0.81 | 53 | 35.83 | 2838 | | | | 3.83 | | 2.60 | | 8.18 | | 0.81 | 50.44 | | | | | | | | | | |
| | | 593A (B.O.) | 594A (B.O.) | 1.94 | 127 | 37.77 | 2965 | 2.76 | 26.50 | | 3.83 | | 2.60 | | 8.18 | 4.45 | 1.94 | 52.38 | 17.29 | 48.23 | 36.5 | 450 | 0.12 | 98.76 | 0.49 | 0.62 | 0.62 |
| | | 594A | 595A | 0.12 | 8 | 37.89 | 2973 | 2.76 | 26.56 | | 3.83 | | 2.60 | | 8.18 | 4.45 | 0.12 | 52.50 | 17.33 | 48.33 | 71.0 | 450 | 0.12 | 98.76 | 0.49 | 0.62 | 0.62 |
| | | | | 0.68 | 45 | 38.57 | 3018 | | | | 3.83 | | 2.60 | 0.59 | 8.77 | | 1.27 | 53.77 | | | | | | | | | | |
| | | | | 0.72 | 47 | 39.29 | 3065 | | | | 3.83 | | 2.60 | | 8.77 | | 0.72 | 54.49 | | | | | | | | | | |
| | | | | 1.23 | 80 | 40.52 | 3145 | | | | 3.83 | | 2.60 | | 8.77 | | 1.23 | 55.72 | | | | | | | | | | |
| | | | | 1.42 | 93 | 41.94 | 3238 | | | | 3.83 | | 2.60 | | 8.77 | | 1.42 | 57.14 | | | | | | | | | | |
| | | 595A (B.O.) | 596A (B.O.) | 2.73 | 178 | 44.67 | 3416 | 2.72 | 30.06 | | 3.83 | | 2.60 | | 8.77 | 4.54 | 2.73 | 59.87 | 19.76 | 54.36 | 109.5 | 450 | 0.12 | 98.76 | 0.55 | 0.62 | 0.63 |
| | | 596A (B.O.) | 597A (B.O.) | 0.26 | 17 | 44.93 | 3433 | 2.71 | 30.19 | | 3.83 | | 2.60 | | 8.77 | 4.54 | 0.26 | 60.13 | 19.84 | 54.57 | 36.0 | 450 | 0.12 | 98.76 | 0.55 | 0.62 | 0.64 |
| | | 597A (B.O.) | 598A (B.O.) | 0.48 | 32 | 45.41 | 3465 | 2.71 | 30.44 | | 3.83 | | 2.60 | | 8.77 | 4.54 | 0.48 | 60.61 | 20.00 | 54.98 | 72.5 | 450 | 0.12 | 98.76 | 0.56 | 0.62 | 0.64 |
| | | | | 0.10 | 7 | 45.51 | 3472 | | | | 3.83 | | 2.60 | | 8.77 | | 0.10 | 60.71 | | | | | | | | | | |
| | | 598A (B.O.) | 599A (B.O.) | 0.89 | 58 | 46.40 | 3530 | 2.71 | 30.95 | | 3.83 | | 2.60 | | 8.77 | 4.54 | 0.89 | 61.60 | 20.33 | 55.82 | 58.0 | 675 | 0.10 | 265.82 | 0.21 | 0.74 | 0.59 |
| | | 599A (B.O.) | 600A (B.O.) | 0.02 | 2 | 46.42 | 3532 | 2.70 | 30.96 | | 3.83 | | 2.60 | | 8.77 | 4.54 | 0.02 | 61.62 | 20.33 | 55.84 | 10.5 | 675 | 0.10 | 265.82 | 0.21 | 0.74 | 0.59 |
| | | 600A (B.O.) | 601A (B.O.) | 1.87 | 122 | 48.29 | 3654 | 2.69 | 31.91 | | 3.83 | | 2.60 | | 8.77 | 4.54 | 1.87 | 63.49 | 20.95 | 57.40 | 114.0 | 675 | 0.10 | 265.82 | 0.22 | 0.74 | 0.59 |
| | | 601A (B.O.) | 8000A (B.O.) | | | 48.29 | 3654 | 2.69 | 31.91 | | 3.83 | | 2.60 | | 8.77 | 4.54 | 0.00 | 63.49 | 20.95 | 57.40 | 81.5 | 675 | 0.10 | 265.82 | 0.22 | 0.74 | 0.59 |
| **TRUNK 4 (BY OTHERS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Contribution from Pump Station (via Forcemain) | | | | | | | | | | | | | | | | | | | Fixed Flow = | 147.37 | | | | | | | | |
| | | 8000A (B.O.) | 8001A (B.O.) | | | 48.29 | 3654 | 2.69 | 31.91 | | 3.83 | | 2.60 | | 8.77 | 4.54 | 0.00 | 63.49 | 20.95 | 204.77 | 111.50 | 750 | 0.10 | 352.05 | 0.58 | 0.80 | 0.83 |
| | | 8001A (B.O.) | 8002A (B.O.) | | | 48.29 | 3654 | 2.69 | 31.91 | | 3.83 | | 2.60 | | 8.77 | 4.54 | 0.00 | 63.49 | 20.95 | 204.77 | 111.50 | 750 | 0.10 | 352.05 | 0.58 | 0.80 | 0.83 |
| | | 8002A (B.O.) | 8003A (B.O.) | | | 48.29 | 3654 | 2.69 | 31.91 | | 3.83 | | 2.60 | | 8.77 | 4.54 | 0.00 | 63.49 | 20.95 | 204.77 | 111.50 | 750 | 0.10 | 352.05 | 0.58 | 0.80 | 0.83 |
| | | 8003A (B.O.) | 8004A (B.O.) | | | 48.29 | 3654 | 2.69 | 31.91 | | 3.83 | | 2.60 | | 8.77 | 4.54 | 0.00 | 63.49 | 20.95 | 204.77 | 111.50 | 750 | 0.10 | 352.05 | 0.58 | 0.80 | 0.83 |
| | | 8004A (B.O.) | 8005A (B.O.) | | | 48.29 | 3654 | 2.69 | 31.91 | | 3.83 | | 2.60 | | 8.77 | 4.54 | 0.00 | 63.49 | 20.95 | 204.77 | 111.50 | 750 | 0.10 | 352.05 | 0.58 | 0.80 | 0.83 |
| | | 8005A (B.O.) | 8006A (B.O.) | | | 48.29 | 3654 | 2.69 | 31.91 | | 3.83 | | 2.60 | | 8.77 | 4.54 | 0.00 | 63.49 | 20.95 | 204.77 | 111.50 | 750 | 0.10 | 352.05 | 0.58 | 0.80 | 0.83 |
| | | 8006A (B.O.) | 8007A (B.O.) | | | 48.29 | 3654 | 2.69 | 31.91 | | 3.83 | | 2.60 | | 8.77 | 4.54 | 0.00 | 63.49 | 20.95 | 204.77 | 117.98 | 750 | 0.10 | 352.05 | 0.58 | 0.80 | 0.83 |
| | | 8007A (B.O.) | 514A (B.O.) | | | 48.29 | 3654 | 2.69 | 31.91 | | 3.83 | | 2.60 | | 8.77 | 4.54 | 0.00 | 63.49 | 20.95 | 204.77 | 370.07 | 750 | 0.10 | 352.05 | 0.58 | 0.80 | 0.83 |
| | | 514A (B.O.) | 8008A (B.O.) | | | 48.29 | 3654 | 2.69 | 31.91 | | 3.83 | | 2.60 | | 8.77 | 4.54 | 0.00 | 63.49 | 20.95 | 204.77 | 81.06 | 750 | 0.10 | 352.05 | 0.58 | 0.80 | 0.83 |
| | | | | | | 48.29 | 3654 | | | | | | | | | | | 63.49 | | 204.77 | | | | | | | | |
| **TRUNK 1B** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 0.50 | 55 | 0.50 | 55 | | | | | | | | | | 0.50 | 0.50 | | | | | | | | | | |
| | | 403A | 404A | 3.17 | 349 | 3.67 | 404 | 3.22 | 4.21 | | | | | | | | 3.17 | 3.67 | 1.21 | 5.42 | 118.0 | 200 | 0.34 | 19.12 | 0.28 | 0.61 | 0.52 |
| | | 404A | 405A | 0.11 | 13 | 3.78 | 417 | 3.21 | 4.34 | | | | | | | | 0.11 | 3.78 | 1.25 | 5.59 | 62.0 | 200 | 0.34 | 19.12 | 0.29 | 0.61 | 0.53 |
| | | 405A | 406A | 0.04 | 5 | 3.82 | 422 | 3.21 | 4.39 | | | | | | | | 0.04 | 3.82 | 1.26 | 5.65 | 11.0 | 200 | 0.34 | 19.12 | 0.30 | 0.61 | 0.53 |
| | | 406A | 412A | 0.45 | 50 | 4.27 | 472 | 3.19 | 4.88 | | | | | | | | 0.45 | 4.27 | 1.41 | 6.29 | 108.0 | 200 | 0.34 | 19.12 | 0.33 | 0.61 | 0.54 |
| | | | | 1.99 | 219 | 6.26 | 691 | | | | | | | | | | 1.99 | 6.26 | | | | | | | | | | |
| | | 412A | 413A | 0.31 | 21 | 6.57 | 712 | 3.11 | 7.18 | | | | | | | | 0.31 | 6.57 | 2.17 | 9.35 | 71.0 | 200 | 0.34 | 19.12 | 0.49 | 0.61 | 0.60 |
| | | 413A | 428A | 1.48 | 97 | 8.05 | 809 | 3.09 | 8.09 | | | | | | | | 1.48 | 8.05 | 2.66 | 10.75 | 76.0 | 250 | 0.25 | 29.73 | 0.36 | 0.61 | 0.56 |
| | | 428A | *Ex. 110A* | 4.73 | 308 | 12.78 | 1117 | 3.01 | 10.91 | | | | | 0.46 | 0.46 | 0.07 | 5.19 | 13.24 | 4.37 | 15.36 | 38.5 | 250 | 0.25 | 29.73 | 0.52 | 0.61 | 0.61 |
| | | *Ex. 110A* | *Ex. 11A* | 0.06 | | 12.84 | 1117 | 3.01 | 10.91 | | | | | | 0.46 | 0.07 | 0.06 | 13.30 | 4.39 | 15.38 | *33.5* | *375* | *0.30* | 96.03 | 0.16 | 0.87 | 0.64 |
| | | | | | | 12.84 | 1117 | | | | | | | | | | | 13.30 | | 15.38 | | | | | | | | |

DESIGN PARAMETERS

| | | | |
|---|---|---|---|
| Park Flow = | 9300 | L/ha/day | Industrial Peak Factor = as per MOE Graph |
| Average Daily Flow = | 280 | L/p/day | Extraneous Flow = 0.330 L/s/ha |
| Comm/Inst Flow = | 28000 | L/ha/day | Minimum Velocity = 0.600 m/s |
| Industrial Flow = | 35000 | L/ha/day | Manning's n = (Conc) 0.013 (Pvc) 0.013 |
| Max Res. Peak Factor = | 4.00 | | Townhouse coeff= 110 PPHa |
| Commercial/Inst./Park Peak Factor = | 1.50 | | Single house coeff= 65 PPHa |

Designed: P.P

Checked: C.M.K.

Dwg. Reference: Sanitary Servicing Plan, Figure No. 4

PROJECT: **Summerside West Phases 4, 5 & 6**

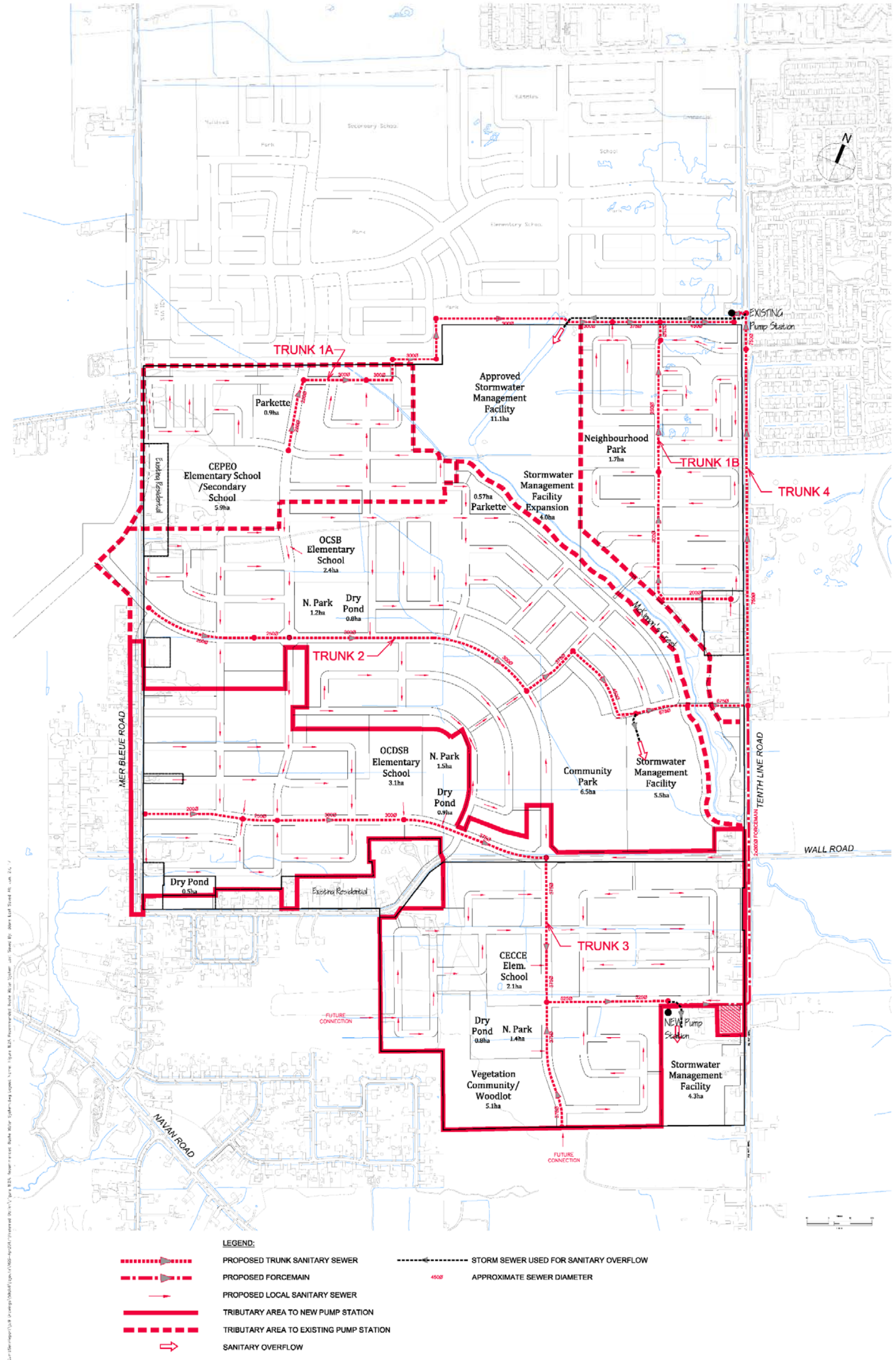
LOCATION: **City of Ottawa**

File Ref: 15-766

Date: November, 2018

Sheet No. 1 of 1

766_San4.xlsx




Sheet No.
FIGURE 8.2A
JUNE 2017

Drawing Title
RECOMMENDED WASTE WATER SYSTEM FOR UPDATED DEMONSTRATION PLAN

Project Title
MER BLEUE
MASTER SERVICING STUDY

IBI

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

**SANITARY SEWER DESIGN SHEET**
**MER BLEUE Urban Expansion Area**
MSS Preferred Concept
CITY OF OTTAWA
Owners Group

| LOCATION | | | | RESIDENTIAL | | | | | | | | ICI AREAS | | | | | | | INFILTRATION ALLOWANCE | | | FIXED FLOW | TOTAL FLOW | PROPOSED SEWER DESIGN | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | AREA (Ha) | AREA w/o units (pp/Ha) | | | POPULATION | | PEAK FACTOR | PEAK FLOW (L/s) | AREA (Ha) | | | | | | PEAK FLOW (L/s) | AREA (Ha) | | FLOW (L/s) | (L/s) | (L/s) | CAPACITY (L/s) | LENGTH (m) | DIA (mm) | SLOPE (%) | VELOCITY (full) (m/s) | AVAILABLE CAPACITY | |
| STREET | AREA ID | FROM MH | TO MH | | LOW 65 | MED 110 | HIGH 85 | IND | CUM | | | INSTITUTIONAL IND | INSTITUTIONAL CUM | COMMERCIAL IND | COMMERCIAL CUM | INDUSTRIAL IND | INDUSTRIAL CUM | | IND | CUM | | | | | | | | L/s | (%) |
| Northern Outlet - Bisson North-West, and lands North-East of McKinnon's Creek - To Existing Pump Station | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1002A | MH1002A | MH1003A | 0.39 | | | | 27.0 | 27.0 | 4.00 | 0.44 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.39 | 0.39 | 0.11 | 0.00 | 0.55 | 27.59 | 72.47 | 200 | 0.65 | 0.851 | 27.04 | 98.02% |
| | 1003A | MH1003A | MH1004A | 0.29 | | | | 24.3 | 51.3 | 4.00 | 0.83 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.29 | 0.68 | 0.19 | 0.00 | 1.02 | 20.24 | 56.87 | 200 | 0.35 | 0.624 | 19.22 | 94.95% |
| | 1004A | MH1004A | MH1005A | 0.10 | | | | 5.4 | 56.7 | 4.00 | 0.92 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.10 | 0.78 | 0.22 | 0.00 | 1.14 | 20.24 | 10.98 | 200 | 0.35 | 0.624 | 19.11 | 94.38% |
| | 1005A | MH1005A | MH1050A | 0.23 | | | | 27.0 | 83.7 | 4.00 | 1.36 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.23 | 1.01 | 0.28 | 0.00 | 1.64 | 20.24 | 41.48 | 200 | 0.35 | 0.624 | 18.60 | 91.90% |
| | 1205A | MH1205A | MH1206A | 0.55 | | | | 48.6 | 48.6 | 4.00 | 0.79 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.55 | 0.55 | 0.15 | 0.00 | 0.94 | 27.59 | 74.65 | 200 | 0.65 | 0.851 | 26.64 | 96.59% |
| | 1206A | MH1206A | MH1006A | 0.14 | | | | 8.1 | 56.7 | 4.00 | 0.92 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.14 | 0.69 | 0.19 | 0.00 | 1.11 | 20.24 | 10.04 | 200 | 0.35 | 0.624 | 19.13 | 94.51% |
| | 1006A | MH1006A | MH1050A | 0.24 | | | | 18.9 | 75.6 | 4.00 | 1.23 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.24 | 0.93 | 0.26 | 0.00 | 1.49 | 20.24 | 60.93 | 200 | 0.35 | 0.624 | 18.76 | 92.66% |
| | 1050A | MH1050A | MH1202A | 0.19 | | | | 21.6 | 180.9 | 4.00 | 2.93 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.19 | 2.13 | 0.60 | 0.00 | 3.53 | 20.24 | 67.60 | 200 | 0.35 | 0.624 | 16.72 | 82.57% |
| | 1001A | MH1001A | MH1000A | 0.37 | | | | 35.1 | 35.1 | 4.00 | 0.57 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.37 | 0.37 | 0.10 | 0.00 | 0.67 | 27.59 | 95.08 | 200 | 0.65 | 0.851 | 26.91 | 97.56% |
| | 1000A | MH1000A | MH1200A | 0.07 | | | | 2.7 | 37.8 | 4.00 | 0.61 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.07 | 0.44 | 0.12 | 0.00 | 0.74 | 20.24 | 8.89 | 200 | 0.35 | 0.624 | 19.51 | 96.37% |
| | 1200A | MH1200A | MH1201A | 0.18 | | | | 16.2 | 54.0 | 4.00 | 0.88 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.18 | 0.62 | 0.17 | 0.00 | 1.05 | 20.24 | 44.00 | 200 | 0.35 | 0.624 | 19.19 | 94.82% |
| | 1030A | MH1030A | MH1201A | 0.46 | | | | 70.2 | 70.2 | 4.00 | 1.14 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.46 | 0.46 | 0.13 | 0.00 | 1.27 | 27.59 | 101.95 | 200 | 0.65 | 0.851 | 26.32 | 95.41% |
| | 1201A | MH1201A | MH1201B | 0.17 | | | | 13.5 | 137.7 | 4.00 | 2.23 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.17 | 1.25 | 0.35 | 0.00 | 2.58 | 20.24 | 45.00 | 200 | 0.35 | 0.624 | 17.66 | 87.25% |
| | 1040A | MH1040A | MH1201B | 0.46 | | | | 70.2 | 70.2 | 4.00 | 1.14 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.46 | 0.46 | 0.13 | 0.00 | 1.27 | 27.59 | 101.94 | 200 | 0.65 | 0.851 | 26.32 | 95.41% |
| | 1201B | MH1201B | MH1202A | 0.20 | | | | 18.9 | 226.8 | 4.00 | 3.68 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.20 | 1.91 | 0.53 | 0.00 | 4.21 | 20.24 | 45.00 | 200 | 0.35 | 0.624 | 16.03 | 79.20% |
| | 1202A | MH1202A | MH1203A | 0.78 | | | | 78.3 | 486.0 | 3.98 | 7.84 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.78 | 4.82 | 1.35 | 0.00 | 9.19 | 20.24 | 119.64 | 200 | 0.35 | 0.624 | 11.06 | 54.62% |
| | 1203A | MH1203A | MH1070A | 0.62 | | | | 56.7 | 542.7 | 3.96 | 8.70 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.62 | 5.44 | 1.52 | 0.00 | 10.22 | 20.24 | 95.78 | 200 | 0.35 | 0.624 | 10.02 | 49.52% |
| | 1101A | MH1101A | MH1060A | 0.29 | | | | 20.4 | 20.4 | 4.00 | 0.33 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.29 | 0.29 | 0.08 | 0.00 | 0.41 | 36.69 | 42.63 | 200 | 1.15 | 1.131 | 36.28 | 98.88% |
| SCHOOL | 1100A | MH1100A | MH1060A | | | | | 0.0 | 0.0 | 4.00 | 0.00 | 5.24 | 5.24 | | 0.00 | | 0.00 | 4.55 | 5.24 | 5.24 | 1.47 | 0.00 | 6.02 | 24.19 | 19.50 | 200 | 0.50 | 0.746 | 18.18 | 75.14% |
| | 1060A | MH1060A | MH1020A | 0.64 | | | | 27.2 | 47.6 | 4.00 | 0.77 | | 5.24 | | 0.00 | | 0.00 | 4.55 | 0.64 | 6.17 | 1.73 | 0.00 | 7.05 | 20.24 | 120.00 | 200 | 0.35 | 0.624 | 13.20 | 65.19% |
| PARK | 1207A | MH1207A | MH1020A | 0.86 | | | | 0.0 | 0.0 | 4.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.86 | 0.86 | 0.24 | 0.00 | 0.24 | 34.22 | 13.88 | 200 | 1.00 | 1.055 | 33.98 | 99.30% |
| | 1020A | MH1020A | MH1070A | 0.12 | | | | 3.4 | 51.0 | 4.00 | 0.83 | | 5.24 | | 0.00 | | 0.00 | 4.55 | 0.12 | 7.15 | 2.00 | 0.00 | 7.38 | 20.24 | 44.87 | 200 | 0.35 | 0.624 | 12.87 | 63.56% |
| | 1070A | MH1070A | MH1080A | 0.46 | | | | 34.0 | 627.7 | 3.92 | 9.97 | | 5.24 | | 0.00 | | 0.00 | 4.55 | 0.46 | 13.05 | 3.65 | 0.00 | 18.17 | 45.12 | 73.81 | 300 | 0.20 | 0.618 | 26.94 | 59.72% |
| | 1800A | MH1800A | MH1081A | 0.19 | | | | 6.8 | 6.8 | 4.00 | 0.11 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.19 | 0.19 | 0.05 | 0.00 | 0.16 | 27.59 | 11.60 | 200 | 0.65 | 0.851 | 27.42 | 99.41% |
| | 1801A | MH1801A | MH1080A | 0.40 | | | | 23.8 | 30.6 | 4.00 | 0.50 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.40 | 0.59 | 0.17 | 0.00 | 0.66 | 20.24 | 92.15 | 200 | 0.35 | 0.624 | 19.58 | 96.73% |
| | 1080A | MH1080A | MH1090A | 0.50 | | | | 44.2 | 702.5 | 3.89 | 11.08 | | 5.24 | | 0.00 | | 0.00 | 4.55 | 0.50 | 14.14 | 3.96 | 0.00 | 19.59 | 45.12 | 75.20 | 300 | 0.20 | 0.618 | 25.53 | 56.58% |
| | 1930A | MH1930A | MH1090A | 0.49 | | | | 30.6 | 30.6 | 4.00 | 0.50 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.49 | 0.49 | 0.14 | 0.00 | 0.63 | 27.59 | 100.61 | 200 | 0.65 | 0.851 | 26.95 | 97.71% |
| | 1090A | MH1090A | MH1091A | 0.26 | | | | 17.0 | 750.1 | 3.88 | 11.78 | | 5.24 | | 0.00 | | 0.00 | 4.55 | 0.26 | 14.89 | 4.17 | 0.00 | 20.50 | 45.12 | 62.83 | 300 | 0.20 | 0.618 | 24.62 | 54.56% |
| | 1900A | MH1900A | MH1901A | 0.94 | | | | 61.2 | 61.2 | 4.00 | 0.99 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.94 | 0.94 | 0.26 | 0.00 | 1.25 | 27.59 | 90.84 | 200 | 0.65 | 0.851 | 26.33 | 95.45% |
| | 1901A | MH1901A | MH1910A | 0.57 | | | | 47.6 | 108.8 | 4.00 | 1.76 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.57 | 1.51 | 0.42 | 0.00 | 2.19 | 20.24 | 81.75 | 200 | 0.35 | 0.624 | 18.06 | 89.20% |
| | 1903A | MH1903A | MH1904A | 0.40 | | | | 30.6 | 30.6 | 4.00 | 0.50 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.40 | 0.40 | 0.11 | 0.00 | 0.61 | 27.59 | 55.56 | 200 | 0.65 | 0.851 | 26.98 | 97.80% |
| | 1904A | MH1904A | MH1910A | 0.80 | | | | 64.6 | 95.2 | 4.00 | 1.54 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.80 | 1.20 | 0.34 | 0.00 | 1.88 | 20.24 | 115.79 | 200 | 0.35 | 0.624 | 18.36 | 90.72% |
| | 1910A | MH19010A | MH1920A | 0.11 | | | | 0.0 | 204.0 | 4.00 | 3.31 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.11 | 2.82 | 0.79 | 0.00 | 4.10 | 20.24 | 72.00 | 200 | 0.35 | 0.624 | 16.15 | 79.77% |
| | 1101B | MH1101A | MH1102A | 0.38 | | | | 34.0 | 34.0 | 4.00 | 0.55 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.38 | 0.38 | 0.11 | 0.00 | 0.66 | 28.63 | 57.79 | 200 | 0.70 | 0.883 | 27.97 | 97.70% |
| | 1102A | MH1102A | MH1920A | 0.53 | | | | 47.6 | 81.6 | 4.00 | 1.32 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.53 | 0.91 | 0.25 | 0.00 | 1.58 | 28.63 | 80.89 | 200 | 0.70 | 0.883 | 27.05 | 94.49% |
| | 1923A/1903B | MH1903A | MH1924A | 0.27 | | | | 20.4 | 20.4 | 4.00 | 0.33 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.27 | 0.27 | 0.08 | 0.00 | 0.41 | 27.59 | 64.27 | 200 | 0.65 | 0.851 | 27.18 | 98.53% |
| | 1924A | MH1924A | MH1925A | 0.02 | | | | 0.0 | 20.4 | 4.00 | 0.33 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.02 | 0.29 | 0.08 | 0.00 | 0.41 | 20.24 | 10.96 | 200 | 0.35 | 0.624 | 19.83 | 97.97% |
| | 1925A | MH1925A | MH1926A | 0.50 | | | | 34.0 | 54.4 | 4.00 | 0.88 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.50 | 0.79 | 0.22 | 0.00 | 1.10 | 20.24 | 91.37 | 200 | 0.35 | 0.624 | 19.14 | 94.55% |
| | 1926A | MH1926A | MH1920A | 0.47 | | | | 40.8 | 95.2 | 4.00 | 1.54 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.47 | 1.26 | 0.35 | 0.00 | 1.90 | 20.24 | 71.89 | 200 | 0.35 | 0.624 | 18.35 | 90.64% |
| | 1920A | MH1920A | MH1930A | 0.11 | | | | 0.0 | 380.8 | 4.00 | 6.17 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.11 | 5.10 | 1.43 | 0.00 | 7.60 | 20.24 | 72.00 | 200 | 0.35 | 0.624 | 12.64 | 62.46% |
| | 1800B | MH1800A | MH1930A | 0.55 | | | | 44.2 | 44.2 | 4.00 | 0.72 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.55 | 0.55 | 0.15 | 0.00 | 0.87 | 43.95 | 82.09 | 200 | 1.65 | 1.355 | 43.08 | 98.02% |
| | 1930B | MH1930A | MH1932A | 0.25 | | | | 17.0 | 442.0 | 4.00 | 7.16 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.25 | 5.90 | 1.65 | 0.00 | 8.81 | 20.24 | 64.59 | 200 | 0.35 | 0.624 | 11.43 | 56.46% |
| | 1932A | MH1932A | MH1940A | 0.16 | | | | 6.8 | 448.8 | 4.00 | 7.27 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.16 | 6.06 | 1.70 | 0.00 | 8.97 | 20.24 | 11.54 | 200 | 0.35 | 0.624 | 11.28 | 55.71% |
| | 1940A | MH1940A | MH1941A | 0.66 | | | | 47.6 | 496.4 | 3.98 | 7.99 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.66 | 6.72 | 1.88 | 0.00 | 9.88 | 20.24 | 85.55 | 200 | 0.35 | 0.624 | 10.37 | 51.21% |
| | 1941A | MH1941A | MH1091A | 0.18 | | | | 6.8 | 503.2 | 3.97 | 8.10 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.18 | 6.90 | 1.93 | 0.00 | 10.03 | 20.24 | 11.70 | 200 | 0.35 | 0.624 | 10.21 | 50.45% |

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**SANITARY SEWER DESIGN SHEET**
**MER BLEUE Urban Expansion Area**
MSS Preferred Concept
CITY OF OTTAWA
Owners Group

| LOCATION | | | | RESIDENTIAL | | | | | | | | ICI AREAS | | | | | | | INFILTRATION ALLOWANCE | | | FIXED FLOW | TOTAL FLOW | PROPOSED SEWER DESIGN | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | AREA (Ha) | AREA w/o units (pp/Ha) | | | POPULATION | | PEAK FACTOR | PEAK FLOW (L/s) | AREA (Ha) | | | | | | PEAK FLOW (L/s) | AREA (Ha) | | FLOW (L/s) | (L/s) | (L/s) | CAPACITY (L/s) | LENGTH (m) | DIA (mm) | SLOPE (%) | VELOCITY (full) (m/s) | AVAILABLE CAPACITY | |
| STREET | AREA ID | FROM MH | TO MH | | LOW 65 | MED 110 | HIGH 85 | IND | CUM | | | INSTITUTIONAL IND | INSTITUTIONAL CUM | COMMERCIAL IND | COMMERCIAL CUM | INDUSTRIAL IND | INDUSTRIAL CUM | | IND | CUM | | | | | | | | L/s | (%) |
| | 1091A | MH1091A | MH7000A | 0.04 | | | | 0.0 | 1253.3 | 3.73 | 18.96 | | 5.24 | | 0.00 | | 0.00 | 4.55 | 0.04 | 21.83 | 6.11 | 0.00 | 29.62 | 45.12 | 49.41 | 300 | 0.20 | 0.618 | 15.49 | 34.34% |
| | | MH7000A | MH7001A | | | | | 0.0 | 1253.3 | 3.73 | 18.96 | | 5.24 | | 0.00 | | 0.00 | 4.55 | 0.00 | 21.83 | 6.11 | 0.00 | 29.62 | 45.12 | 99.51 | 300 | 0.20 | 0.618 | 15.49 | 34.34% |
| | | MH7001A | MH7002A | | | | | 0.0 | 1253.3 | 3.73 | 18.96 | | 5.24 | | 0.00 | | 0.00 | 4.55 | 0.00 | 21.8 | 6.11 | 0.00 | 29.62 | 36.37 | 93.75 | 300 | 0.13 | 0.498 | 6.75 | 18.56% |
| | | MH7002A | MH7003A | | | | | 0.0 | 1253.3 | 3.73 | 18.96 | | 5.24 | | 0.00 | | 0.00 | 4.55 | 0.00 | 21.8 | 6.11 | 0.00 | 29.62 | 45.12 | 120.00 | 300 | 0.20 | 0.618 | 15.49 | 34.34% |
| | | MH7003A | MH7004A | | | | | 0.0 | 1253.3 | 3.73 | 18.96 | | 5.24 | | 0.00 | | 0.00 | 4.55 | 0.00 | 21.8 | 6.11 | 0.00 | 29.62 | 45.12 | 120.00 | 300 | 0.20 | 0.618 | 15.49 | 34.34% |
| | | MH7004A | MH7005A | | | | | 0.0 | 1253.3 | 3.73 | 18.96 | | 5.24 | | 0.00 | | 0.00 | 4.55 | 0.00 | 21.8 | 6.11 | 0.00 | 29.62 | 59.68 | 56.58 | 300 | 0.35 | 0.818 | 30.06 | 50.37% |
| | | MH7005A | MH7006A | | | | | 0.0 | 1253.3 | 3.73 | 18.96 | | 5.24 | | 0.00 | | 0.00 | 4.55 | 0.00 | 21.8 | 6.11 | 0.00 | 29.62 | 42.80 | 14.74 | 300 | 0.18 | 0.587 | 13.18 | 30.79% |
| | | MH7006A | MH7007A | | | | | 0.0 | 1253.3 | 3.73 | 18.96 | | 5.24 | | 0.00 | | 0.00 | 4.55 | 0.00 | 21.8 | 6.11 | 0.00 | 29.62 | 45.12 | 99.79 | 300 | 0.20 | 0.618 | 15.49 | 34.34% |
| | 3026A | MH3026A | MH3027A | | 0.67 | | | 43.6 | 43.6 | 4.00 | 0.71 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.67 | 0.7 | 0.19 | 0.00 | 0.89 | 20.24 | 119.73 | 200 | 0.35 | 0.624 | 19.35 | 95.59% |
| | | MH3027A | MH3023A | | | | | 0.0 | 43.6 | 4.00 | 0.71 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.7 | 0.19 | 0.00 | 0.89 | 20.24 | 13.12 | 200 | 0.35 | 0.624 | 19.35 | 95.59% |
| | 3023A | MH3023A | MH3024A | | 1.08 | | | 70.2 | 113.8 | 4.00 | 1.84 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.08 | 1.8 | 0.49 | 0.00 | 2.33 | 20.24 | 71.39 | 200 | 0.35 | 0.624 | 17.91 | 88.47% |
| | | MH3024A | MH3025A | | | | | 0.0 | 113.8 | 4.00 | 1.84 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.8 | 0.49 | 0.00 | 2.33 | 20.24 | 71.97 | 200 | 0.35 | 0.624 | 17.91 | 88.47% |
| | | MH3025A | MH3324A | | | | | 0.0 | 113.8 | 4.00 | 1.84 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.8 | 0.49 | 0.00 | 2.33 | 20.24 | 12.85 | 200 | 0.35 | 0.624 | 17.91 | 88.47% |
| | | MH3324A | MH3325A | | | | | 0.0 | 113.8 | 4.00 | 1.84 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.8 | 0.49 | 0.00 | 2.33 | 20.24 | 28.75 | 200 | 0.35 | 0.624 | 17.91 | 88.47% |
| | 3320A | MH3320A | MH3322A | | 1.03 | | | 67.0 | 67.0 | 4.00 | 1.08 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.03 | 1.0 | 0.29 | 0.00 | 1.37 | 20.24 | 113.47 | 200 | 0.35 | 0.624 | 18.87 | 93.22% |
| | | MH3322A | MH3323A | | | | | 0.0 | 67.0 | 4.00 | 1.08 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.0 | 0.29 | 0.00 | 1.37 | 20.24 | 12.88 | 200 | 0.35 | 0.624 | 18.87 | 93.22% |
| | | MH3323A | MH3325A | | | | | 0.0 | 67.0 | 4.00 | 1.08 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.0 | 0.29 | 0.00 | 1.37 | 20.24 | 25.74 | 200 | 0.35 | 0.624 | 18.87 | 93.22% |
| | 3325A | MH3325A | MH7007A | | 0.73 | | | 47.5 | 228.2 | 4.00 | 3.70 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.73 | 3.5 | 0.98 | 0.00 | 4.68 | 20.24 | 42.56 | 200 | 0.35 | 0.624 | 15.56 | 76.88% |
| | | MH7007A | MH7008A | | | | | 0.0 | 1481.5 | 3.68 | 22.11 | | 5.24 | | 0.00 | | 0.00 | 4.55 | 0.00 | 25.3 | 7.10 | 0.00 | 33.75 | 81.80 | 110.11 | 375 | 0.20 | 0.717 | 48.05 | 58.74% |
| | 2000A | MH2000A | MH2001A | | | | 2.41 | 204.9 | 204.9 | 4.00 | 3.32 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 2.41 | 2.4 | 0.67 | 0.00 | 3.99 | 20.24 | 29.67 | 200 | 0.35 | 0.624 | 16.25 | 80.27% |
| | 2001A | MH2001A | MH2002A | | 0.87 | | | 56.6 | 261.4 | 4.00 | 4.24 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.87 | 3.3 | 0.92 | 0.00 | 5.15 | 20.24 | 73.57 | 200 | 0.35 | 0.624 | 15.09 | 74.54% |
| | | MH2002A | MH2003A | | | | | 0.0 | 261.4 | 4.00 | 4.24 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 3.3 | 0.92 | 0.00 | 5.15 | 20.24 | 81.60 | 200 | 0.35 | 0.624 | 15.09 | 74.54% |
| | | MH2003A | MH2004A | | | | | 0.0 | 261.4 | 4.00 | 4.24 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 3.3 | 0.92 | 0.00 | 5.15 | 20.24 | 20.25 | 200 | 0.35 | 0.624 | 15.09 | 74.54% |
| | | MH2004A | MH2010A | | | | | 0.0 | 261.4 | 4.00 | 4.24 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 3.3 | 0.92 | 0.00 | 5.15 | 20.24 | 58.54 | 200 | 0.35 | 0.624 | 15.09 | 74.54% |
| | 2100A | MH2100A | MH2101A | | 1.34 | | | 87.1 | 87.1 | 4.00 | 1.41 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.34 | 1.3 | 0.38 | 0.00 | 1.79 | 20.24 | 56.95 | 200 | 0.35 | 0.624 | 18.46 | 91.17% |
| | | MH2101A | MH2102A | | | | | 0.0 | 87.1 | 4.00 | 1.41 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.3 | 0.38 | 0.00 | 1.79 | 20.24 | 8.41 | 200 | 0.35 | 0.624 | 18.46 | 91.17% |
| | | MH2102A | MH2103A | | | | | 0.0 | 87.1 | 4.00 | 1.41 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.3 | 0.38 | 0.00 | 1.79 | 20.24 | 120.00 | 200 | 0.35 | 0.624 | 18.46 | 91.17% |
| | | MH2103A | MH2010A | | | | | 0.0 | 87.1 | 4.00 | 1.41 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.3 | 0.38 | 0.00 | 1.79 | 20.24 | 53.73 | 200 | 0.35 | 0.624 | 18.46 | 91.17% |
| | 2111A | MH2111A | MH2112A | | 0.47 | | | 30.6 | 30.6 | 4.00 | 0.50 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.47 | 0.5 | 0.13 | 0.00 | 0.63 | 20.24 | 15.34 | 200 | 0.35 | 0.624 | 19.62 | 96.90% |
| | | MH2112A | MH2010A | | | | | 0.0 | 30.6 | 4.00 | 0.50 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.5 | 0.13 | 0.00 | 0.63 | 20.24 | 29.01 | 200 | 0.35 | 0.624 | 19.62 | 96.90% |
| | 2010A | MH2010A | MH2020A | | 0.12 | | | 7.8 | 386.9 | 4.00 | 6.27 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.12 | 5.2 | 1.46 | 0.00 | 7.73 | 20.24 | 72.03 | 200 | 0.35 | 0.624 | 12.52 | 61.83% |
| | 2200A | MH2200A | MH2201A | | 1.39 | | | 90.4 | 90.4 | 4.00 | 1.46 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.39 | 1.4 | 0.39 | 0.00 | 1.85 | 20.24 | 84.16 | 200 | 0.35 | 0.624 | 18.39 | 90.85% |
| | | MH2201A | MH2020A | | | | | 0.0 | 90.4 | 4.00 | 1.46 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.4 | 0.39 | 0.00 | 1.85 | 20.24 | 100.01 | 200 | 0.35 | 0.624 | 18.39 | 90.85% |
| | 2211A | MH2211A | MH2212A | | 1.14 | | | 74.1 | 74.1 | 4.00 | 1.20 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.14 | 1.1 | 0.32 | 0.00 | 1.52 | 20.24 | 16.38 | 200 | 0.35 | 0.624 | 18.72 | 92.49% |
| | | MH2212A | MH2020A | | | | | 0.0 | 74.1 | 4.00 | 1.20 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.1 | 0.32 | 0.00 | 1.52 | 20.24 | 106.82 | 200 | 0.35 | 0.624 | 18.72 | 92.49% |
| | 2020A | MH2020A | MH2030A | | 0.12 | | | 7.8 | 559.1 | 3.95 | 8.94 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.12 | 7.9 | 2.20 | 0.00 | 11.14 | 20.24 | 74.99 | 200 | 0.35 | 0.624 | 9.10 | 44.95% |
| | 2300A | MH2300A | MH2301A | | 1.21 | | | 78.7 | 78.7 | 4.00 | 1.27 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.21 | 1.2 | 0.34 | 0.00 | 1.61 | 20.24 | 84.80 | 200 | 0.35 | 0.624 | 18.63 | 92.03% |
| | | MH2301A | MH2030A | | | | | 0.0 | 78.7 | 4.00 | 1.27 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.2 | 0.34 | 0.00 | 1.61 | 20.24 | 85.21 | 200 | 0.35 | 0.624 | 18.63 | 92.03% |
| | 2502A | MH2502A | MH2501A | | 1.04 | | | 67.6 | 67.6 | 4.00 | 1.10 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.04 | 1.0 | 0.29 | 0.00 | 1.39 | 20.24 | 66.06 | 200 | 0.35 | 0.624 | 18.86 | 93.15% |
| | | MH2501A | MH2030A | | | | | 0.0 | 67.6 | 4.00 | 1.10 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.0 | 0.29 | 0.00 | 1.39 | 20.24 | 69.39 | 200 | 0.35 | 0.624 | 18.86 | 93.15% |
| | 2030A | MH2030A | MH2040A | | 0.11 | | | 7.2 | 712.5 | 3.89 | 11.23 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.11 | 10.2 | 2.86 | 0.00 | 14.09 | 20.24 | 72.02 | 200 | 0.35 | 0.624 | 6.15 | 30.40% |
| | 2400A | MH2400A | MH2401A | | 1.62 | | | 105.3 | 105.3 | 4.00 | 1.71 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.62 | 1.6 | 0.45 | 0.00 | 2.16 | 20.24 | 60.15 | 200 | 0.35 | 0.624 | 18.08 | 89.33% |
| | | MH2401A | MH2402A | | | | | 0.0 | 105.3 | 4.00 | 1.71 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.6 | 0.45 | 0.00 | 2.16 | 20.24 | 8.40 | 200 | 0.35 | 0.624 | 18.08 | 89.33% |
| | | MH2402A | MH2403A | | | | | 0.0 | 105.3 | 4.00 | 1.71 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.6 | 0.45 | 0.00 | 2.16 | 20.24 | 89.66 | 200 | 0.35 | 0.624 | 18.08 | 89.33% |
| | | MH2403A | MH2040A | | | | | 0.0 | 105.3 | 4.00 | 1.71 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.6 | 0.45 | 0.00 | 2.16 | 20.24 | 80.03 | 200 | 0.35 | 0.624 | 18.08 | 89.33% |
| | 2503A | MH2503A | MH2504A | | 1.01 | | | 65.7 | 65.7 | 4.00 | 1.06 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.01 | 1.0 | 0.28 | 0.00 | 1.35 | 20.24 | 56.43 | 200 | 0.35 | 0.624 | 18.90 | 93.35% |
| | | MH2504A | MH2042A | | | | | 0.0 | 65.7 | 4.00 | 1.06 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.0 | 0.28 | 0.00 | 1.35 | 20.24 | 9.22 | 200 | 0.35 | 0.624 | 18.90 | 93.35% |
| | | MH2042A | MH2041A | | | | | 0.0 | 65.7 | 4.00 | 1.06 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.0 | 0.28 | 0.00 | 1.35 | 20.24 | 68.83 | 200 | 0.35 | 0.624 | 18.90 | 93.35% |
| | | MH2041A | MH2040A | | | | | 0.0 | 65.7 | 4.00 | 1.06 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.0 | 0.28 | 0.00 | 1.35 | 20.24 | 68.79 | 200 | 0.35 | 0.624 | 18.90 | 93.35% |
| | 2040A | MH2040A | MH3100A | | 0.12 | | | 7.8 | 891.3 | 3.83 | 13.83 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.12 | 13.0 | 3.63 | 0.00 | 17.47 | 31.02 | 38.69 | 250 | 0.25 | 0.612 | 13.55 | 43.70% |
| | | MH3100A | MH3010A | | | | | 0.0 | 891.3 | 3.83 | 13.83 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 13.0 | 3.63 | 0.00 | 17.47 | 31.02 | 33.71 | 250 | 0.25 | 0.612 | 13.55 | 43.70% |

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| LOCATION | | | | RESIDENTIAL | | | | | | | | ICI AREAS | | | | | | | INFILTRATION ALLOWANCE | | | FIXED FLOW | TOTAL FLOW | PROPOSED SEWER DESIGN | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | AREA (Ha) | AREA w/o units (pp/Ha) | | | POPULATION | | PEAK FACTOR | PEAK FLOW (L/s) | AREA (Ha) | | | | | | PEAK FLOW (L/s) | AREA (Ha) | | FLOW | | | CAPACITY | LENGTH | DIA | SLOPE | VELOCITY (full) (m/s) | AVAILABLE CAPACITY | |
| STREET | AREA ID | FROM MH | TO MH | | LOW | MED | HIGH | IND | CUM | | | INSTITUTIONAL | | COMMERCIAL | | INDUSTRIAL | | | IND | CUM | (L/s) | (L/s) | (L/s) | (L/s) | (m) | (mm) | (%) | | L/s | (%) |
| | | | | | 65 | 110 | 85 | | | | | IND | CUM | IND | CUM | IND | CUM | | | | | | | | | | | | | |
| | 3004A | MH3004A | MH3000A | | | 0.39 | | 42.9 | 42.9 | 4.00 | 0.70 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.39 | 0.4 | 0.11 | 0.00 | 0.80 | 20.24 | 86.37 | 200 | 0.35 | 0.624 | 19.44 | 96.03% |
| | | MH3000A | MH3001A | | | | | 0.0 | 42.9 | 4.00 | 0.70 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.4 | 0.11 | 0.00 | 0.80 | 20.24 | 11.07 | 200 | 0.35 | 0.624 | 19.44 | 96.03% |
| | | MH3001A | MH3002A | | | | | 0.0 | 42.9 | 4.00 | 0.70 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.4 | 0.11 | 0.00 | 0.80 | 20.24 | 36.40 | 200 | 0.35 | 0.624 | 19.44 | 96.03% |
| | 3210B | MH3210A | MH3002A | | | 0.33 | | 36.3 | 36.3 | 4.00 | 0.59 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.33 | 0.3 | 0.09 | 0.00 | 0.68 | 20.24 | 70.50 | 200 | 0.35 | 0.624 | 19.56 | 96.64% |
| | 3002A | MH3002A | MH3003A | | 0.62 | | | 40.3 | 119.5 | 4.00 | 1.94 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.62 | 1.3 | 0.38 | 0.00 | 2.31 | 20.24 | 67.53 | 200 | 0.35 | 0.624 | 17.93 | 88.58% |
| | | MH3003A | MH3010A | | | | | 0.0 | 119.5 | 4.00 | 1.94 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.3 | 0.38 | 0.00 | 2.31 | 20.24 | 66.37 | 200 | 0.35 | 0.624 | 17.93 | 88.58% |
| | 3010A | MH3010A | MH3011A | | 0.11 | | | 7.2 | 1017.9 | 3.80 | 15.65 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.11 | 14.4 | 4.04 | 0.00 | 19.69 | 31.02 | 20.97 | 250 | 0.25 | 0.612 | 11.33 | 36.54% |
| PARK | 3101A | MH3101A | MH3011A | 1.66 | | | | 0.0 | 0.0 | 4.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.66 | 1.7 | 0.46 | 0.00 | 0.46 | 20.24 | 11.00 | 200 | 0.35 | 0.624 | 19.78 | 97.70% |
| | | MH3011A | MH3020A | | | | | 0.0 | 1017.9 | 3.80 | 15.65 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 16.1 | 4.50 | 0.00 | 20.15 | 31.02 | 49.53 | 250 | 0.25 | 0.612 | 10.87 | 35.04% |
| | 3004B | MH3004A | MH3201A | | | 0.79 | | 86.9 | 86.9 | 4.00 | 1.41 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.79 | 0.8 | 0.22 | 0.00 | 1.63 | 20.24 | 38.08 | 200 | 0.35 | 0.624 | 18.61 | 91.95% |
| | | MH3201A | MH3202A | | | | | 0.0 | 86.9 | 4.00 | 1.41 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.8 | 0.22 | 0.00 | 1.63 | 20.24 | 10.91 | 200 | 0.35 | 0.624 | 18.61 | 91.95% |
| | | MH3202A | MH3203A | | | | | 0.0 | 86.9 | 4.00 | 1.41 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.8 | 0.22 | 0.00 | 1.63 | 20.24 | 28.73 | 200 | 0.35 | 0.624 | 18.61 | 91.95% |
| | | MH3203A | MH3204A | | | | | 0.0 | 86.9 | 4.00 | 1.41 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.8 | 0.22 | 0.00 | 1.63 | 20.24 | 11.04 | 200 | 0.35 | 0.624 | 18.61 | 91.95% |
| | | MH3204A | MH3210A | | | | | 0.0 | 86.9 | 4.00 | 1.41 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.8 | 0.22 | 0.00 | 1.63 | 20.24 | 61.76 | 200 | 0.35 | 0.624 | 18.61 | 91.95% |
| | 3210A | MH3210A | MH3220A | | | 0.20 | | 22.0 | 108.9 | 4.00 | 1.76 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.20 | 1.0 | 0.28 | 0.00 | 2.04 | 20.24 | 69.00 | 200 | 0.35 | 0.624 | 18.20 | 89.91% |
| | 3221A | MH3221A | MH3220A | | | 0.41 | | 45.1 | 45.1 | 4.00 | 0.73 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.41 | 0.4 | 0.11 | 0.00 | 0.85 | 20.24 | 82.28 | 200 | 0.35 | 0.624 | 19.40 | 95.82% |
| | 3220A | MH3220A | MH3020A | | | 0.31 | | 34.1 | 188.1 | 4.00 | 3.05 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.31 | 1.7 | 0.48 | 0.00 | 3.53 | 20.24 | 64.23 | 200 | 0.35 | 0.624 | 16.72 | 82.58% |
| | 3020A | MH3020A | MH3022A | | 0.17 | | | 11.1 | 1217.1 | 3.74 | 18.46 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.17 | 18.0 | 5.03 | 0.00 | 23.48 | 31.02 | 45.00 | 250 | 0.25 | 0.612 | 7.54 | 24.29% |
| | 3021A | MH3021A | MH3022A | | | 0.21 | | 23.1 | 23.1 | 4.00 | 0.37 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.21 | 0.2 | 0.06 | 0.00 | 0.43 | 20.24 | 50.78 | 200 | 0.35 | 0.624 | 19.81 | 97.86% |
| | 3022A | MH3022A | MH3313A | | 0.19 | | | 12.4 | 1252.5 | 3.73 | 18.95 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.19 | 18.4 | 5.14 | 0.00 | 24.09 | 31.02 | 45.00 | 250 | 0.25 | 0.612 | 6.93 | 22.34% |
| | 3221B | MH3221A | MH3314A | | | 0.35 | | 38.5 | 38.5 | 4.00 | 0.62 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.35 | 0.4 | 0.10 | 0.00 | 0.72 | 20.24 | 10.93 | 200 | 0.35 | 0.624 | 19.52 | 96.43% |
| | | MH3314A | MH3313A | | | | | 0.0 | 38.5 | 4.00 | 0.62 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.4 | 0.10 | 0.00 | 0.72 | 20.24 | 55.68 | 200 | 0.35 | 0.624 | 19.52 | 96.43% |
| | 3313A | MH3313A | MH3315A | | 0.26 | | | 16.9 | 1307.9 | 3.72 | 19.72 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.26 | 19.0 | 5.31 | 0.00 | 25.03 | 31.02 | 61.31 | 250 | 0.25 | 0.612 | 5.99 | 19.31% |
| | | MH3315A | MH3303A | | | | | 0.0 | 1307.9 | 3.72 | 19.72 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 19.0 | 5.31 | 0.00 | 25.03 | 31.02 | 11.50 | 250 | 0.25 | 0.612 | 5.99 | 19.31% |
| | 3300A | MH3300A | MH3301A | | 1.67 | | | 108.6 | 108.6 | 4.00 | 1.76 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.67 | 1.7 | 0.47 | 0.00 | 2.23 | 27.59 | 34.76 | 200 | 0.65 | 0.851 | 25.36 | 91.93% |
| | | MH3301A | MH3302A | | | | | 0.0 | 108.6 | 4.00 | 1.76 | | 0.00 | | 0.00 | | 0.00 | 0.00 | | 1.7 | 0.47 | 0.00 | 2.23 | 21.64 | 53.37 | 200 | 0.40 | 0.667 | 19.41 | 89.71% |
| | | MH3302A | MH3303A | | | | | 0.0 | 108.6 | 4.00 | 1.76 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.7 | 0.47 | 0.00 | 2.23 | 26.50 | 85.36 | 200 | 0.60 | 0.817 | 24.28 | 91.60% |
| | | MH3303A | MH7008A | | | | | 0.0 | 1416.5 | 3.70 | 21.22 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 20.6 | 5.78 | 0.00 | 26.99 | 100.18 | 42.38 | 375 | 0.30 | 0.879 | 73.19 | 73.05% |
| | | MH7008A | MH7009A | | | | | 0.0 | 2897.9 | 3.46 | 40.56 | | 5.24 | | 0.00 | | 0.00 | 4.55 | 0.00 | 46.0 | 12.87 | 0.00 | 57.98 | 133.02 | 105.62 | 450 | 0.20 | 0.810 | 75.03 | 56.41% |
| | | MH7009A | MH7010A | | | | | 0.0 | 2897.9 | 3.46 | 40.56 | | 5.24 | | 0.00 | | 0.00 | 4.55 | 0.00 | 46.0 | 12.87 | 0.00 | 57.98 | 133.02 | 65.50 | 450 | 0.20 | 0.810 | 75.03 | 56.41% |
| | | MH7010A | MH8009A | | | | | 0.0 | 2897.9 | 3.46 | 40.56 | | 5.24 | | 0.00 | | 0.00 | 4.55 | 0.00 | 46.0 | 12.87 | 0.00 | 57.98 | 133.02 | 18.21 | 450 | 0.20 | 0.810 | 75.03 | 56.41% |
| | | | | 18.25 | 17.09 | 2.99 | 2.41 | 1644.6 | FALSE | | | 5.24 | TRUE | 0.00 | TRUE | 0.00 | TRUE | | 45.98 | TRUE | | | | | | | | | | |
| | | | | | | | | 40.7 | | | | | | | | | | | 45.98 | TRUE | | | | | | | | | | |

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**SANITARY SEWER DESIGN SHEET**
**MER BLEUE Urban Expansion Area**
MSS Preferred Concept
CITY OF OTTAWA
Owners Group

| LOCATION | | | | RESIDENTIAL | | | | | | | | ICI AREAS | | | | | | | INFILTRATION ALLOWANCE | | | FIXED FLOW | TOTAL FLOW | PROPOSED SEWER DESIGN | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | AREA (Ha) | AREA w/o units (pp/Ha) | | | POPULATION | | PEAK FACTOR | PEAK FLOW (L/s) | AREA (Ha) | | | | | | PEAK FLOW (L/s) | AREA (Ha) | | FLOW (L/s) | | | CAPACITY (L/s) | LENGTH (m) | DIA (mm) | SLOPE (%) | VELOCITY (full) (m/s) | AVAILABLE CAPACITY | |
| STREET | AREA ID | FROM MH | TO MH | | LOW 65 | MED 110 | HIGH 85 | IND | CUM | | | INSTITUTIONAL IND | INSTITUTIONAL CUM | COMMERCIAL IND | COMMERCIAL CUM | INDUSTRIAL IND | INDUSTRIAL CUM | | IND | CUM | | | | | | | | L/s | (%) |
| Central Outlet - Lands Immediately South-West of McKinnon's Creek (Gravity to Tenth Line) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 4000A/B/C | MH4000A | MH4001A | 0.40 | | 2.57 | | 282.7 | 282.7 | 4.00 | 4.58 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 2.97 | 2.97 | 0.83 | 0.00 | 5.41 | 20.24 | 34.46 | 200 | 0.35 | 0.624 | 14.83 | 73.26% |
| | | MH4001A | MH4002A | | | | | 0.0 | 282.7 | 4.00 | 4.58 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 2.97 | 0.83 | 0.00 | 5.41 | 20.24 | 44.39 | 200 | 0.35 | 0.624 | 14.83 | 73.26% |
| | | MH4002A | MH4010A | | | | | 0.0 | 282.7 | 4.00 | 4.58 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 2.97 | 0.83 | 0.00 | 5.41 | 20.24 | 45.99 | 200 | 0.35 | 0.624 | 14.83 | 73.26% |
| | 4010A | MH4010A | MH4011A | 0.52 | | | | 0.0 | 282.7 | 4.00 | 4.58 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.52 | 3.49 | 0.98 | 0.00 | 5.56 | 20.24 | 42.82 | 200 | 0.35 | 0.624 | 14.68 | 72.54% |
| | | MH4011A | MH4012A | | | | | 0.0 | 282.7 | 4.00 | 4.58 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 3.49 | 0.98 | 0.00 | 5.56 | 20.24 | 93.46 | 200 | 0.35 | 0.624 | 14.68 | 72.54% |
| | 4107A | MH4107A | MH4101A | | | 1.61 | | 177.1 | 177.1 | 4.00 | 2.87 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.61 | 1.61 | 0.45 | 0.00 | 3.32 | 20.24 | 82.00 | 200 | 0.35 | 0.624 | 16.92 | 83.60% |
| | | MH4101A | MH4102A | | | | | 0.0 | 177.1 | 4.00 | 2.87 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.61 | 0.45 | 0.00 | 3.32 | 20.24 | 43.88 | 200 | 0.35 | 0.624 | 16.92 | 83.60% |
| | | MH4102A | MH4103A | | | | | 0.0 | 177.1 | 4.00 | 2.87 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.61 | 0.45 | 0.00 | 3.32 | 20.24 | 47.64 | 200 | 0.35 | 0.624 | 16.92 | 83.60% |
| | | MH4103A | MH4104A | | | | | 0.0 | 177.1 | 4.00 | 2.87 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.61 | 0.45 | 0.00 | 3.32 | 20.24 | 53.38 | 200 | 0.35 | 0.624 | 16.92 | 83.60% |
| | | MH4104A | MH4105A | | | | | 0.0 | 177.1 | 4.00 | 2.87 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.61 | 0.45 | 0.00 | 3.32 | 20.24 | 33.45 | 200 | 0.35 | 0.624 | 16.92 | 83.60% |
| | | MH4105A | MH4106A | | | | | 0.0 | 177.1 | 4.00 | 2.87 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.61 | 0.45 | 0.00 | 3.32 | 20.24 | 45.81 | 200 | 0.35 | 0.624 | 16.92 | 83.60% |
| | | MH4106A | MH4122A | | | | | 0.0 | 177.1 | 4.00 | 2.87 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.61 | 0.45 | 0.00 | 3.32 | 20.24 | 92.95 | 200 | 0.35 | 0.624 | 16.92 | 83.60% |
| | 4110A | MH4110A | MH4111A | | | 0.94 | | 103.4 | 103.4 | 4.00 | 1.68 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.94 | 0.94 | 0.26 | 0.00 | 1.94 | 20.24 | 79.93 | 200 | 0.35 | 0.624 | 18.30 | 90.42% |
| | | MH4111A | MH4112A | | | | | 0.0 | 103.4 | 4.00 | 1.68 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.94 | 0.26 | 0.00 | 1.94 | 20.24 | 5.53 | 200 | 0.35 | 0.624 | 18.30 | 90.42% |
| | | MH4112A | MH4113A | | | | | 0.0 | 103.4 | 4.00 | 1.68 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.94 | 0.26 | 0.00 | 1.94 | 20.24 | 37.11 | 200 | 0.35 | 0.624 | 18.30 | 90.42% |
| | | MH4113A | MH4121A | | | | | 0.0 | 103.4 | 4.00 | 1.68 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.94 | 0.26 | 0.00 | 1.94 | 20.24 | 42.35 | 200 | 0.35 | 0.624 | 18.30 | 90.42% |
| | 4120A | MH4120A | MH4121A | | | 1.15 | | 126.5 | 126.5 | 4.00 | 2.05 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.15 | 1.15 | 0.32 | 0.00 | 2.37 | 20.24 | 106.98 | 200 | 0.35 | 0.624 | 17.87 | 88.28% |
| | | MH4121A | MH4131A | | | | | 0.0 | 229.9 | 4.00 | 3.73 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 2.09 | 0.59 | 0.00 | 4.31 | 20.24 | 78.00 | 200 | 0.35 | 0.624 | 15.93 | 78.71% |
| | | MH4132A | MH4131A | | | | | 0.0 | 0.0 | 4.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 20.24 | 67.17 | 200 | 0.35 | 0.624 | 20.24 | 100.00% |
| | 4130A | MH4130A | MH4131A | | | 1.28 | | 140.8 | 140.8 | 4.00 | 2.28 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.28 | 1.28 | 0.36 | 0.00 | 2.64 | 20.24 | 107.13 | 200 | 0.35 | 0.624 | 17.60 | 86.96% |
| | | MH4131A | MH4122A | | | | | 0.0 | 370.7 | 4.00 | 6.01 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 3.37 | 0.94 | 0.00 | 6.95 | 20.24 | 72.00 | 200 | 0.35 | 0.624 | 13.29 | 65.67% |
| | | MH4122A | MH4012A | | | | | 0.0 | 547.8 | 3.95 | 8.77 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 4.98 | 1.39 | 0.00 | 10.17 | 20.24 | 17.08 | 200 | 0.35 | 0.624 | 10.08 | 49.77% |
| COMMERCIAL | 4013A | MH4013A | MH4012A | | | | | 0.0 | 0.0 | 4.00 | 0.00 | | 0.00 | 3.83 | 3.83 | | 0.00 | 3.32 | 3.83 | 3.83 | 1.07 | 2.00 | 6.40 | 31.02 | 15.00 | 250 | 0.25 | 0.612 | 24.62 | 79.38% |
| | | MH4012A | MH4020A | | | | | 0.0 | 830.5 | 3.85 | 12.95 | | 0.0 | | 3.8 | | 0.0 | 3.32 | 0.00 | 12.30 | 3.44 | 0.00 | 19.72 | 31.02 | 80.97 | 250 | 0.25 | 0.612 | 11.30 | 36.42% |
| | 4200A | MH4200A | MH4201A | | | 1.20 | | 132.0 | 132.0 | 4.00 | 2.14 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.20 | 1.20 | 0.34 | 0.00 | 2.47 | 20.24 | 105.31 | 200 | 0.35 | 0.624 | 17.77 | 87.77% |
| | | MH4201A | MH4202A | | | | | 0.0 | 132.0 | 4.00 | 2.14 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.20 | 0.34 | 0.00 | 2.47 | 20.24 | 104.56 | 200 | 0.35 | 0.624 | 17.77 | 87.77% |
| | 4202A | MH4202A | MH4204A | | | 0.68 | | 74.8 | 206.8 | 4.00 | 3.35 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.68 | 1.88 | 0.53 | 0.00 | 3.88 | 20.24 | 82.35 | 200 | 0.35 | 0.624 | 16.37 | 80.85% |
| | | MH4204A | MH4220A | | | | | 0.0 | 206.8 | 4.00 | 3.35 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.88 | 0.53 | 0.00 | 3.88 | 20.24 | 19.14 | 200 | 0.35 | 0.624 | 16.37 | 80.85% |
| SCHOOL | 4221A | MH4221A | MH4220A | | | | | 0.0 | 0.0 | 4.00 | 0.00 | 2.54 | 2.54 | | 0.00 | | 0.00 | 2.20 | 2.54 | 2.54 | 0.71 | 0.00 | 2.92 | 31.02 | 18.00 | 250 | 0.25 | 0.612 | 28.10 | 90.60% |
| | 4220A | MH4220A | MH4222A | | | 1.02 | | 112.2 | 319.0 | 4.00 | 5.17 | | 2.54 | | 0.00 | | 0.00 | 2.20 | 1.02 | 5.44 | 1.52 | 0.00 | 8.90 | 31.02 | 30.28 | 250 | 0.25 | 0.612 | 22.12 | 71.32% |
| | | MH4222A | MH4223A | | | | | 0.0 | 319.0 | 4.00 | 5.17 | | 2.54 | | 0.00 | | 0.00 | 2.20 | 0.00 | 5.44 | 1.52 | 0.00 | 8.90 | 31.02 | 8.09 | 250 | 0.25 | 0.612 | 22.12 | 71.32% |
| | | MH4223A | MH4224A | | | | | 0.0 | 319.0 | 4.00 | 5.17 | | 2.54 | | 0.00 | | 0.00 | 2.20 | 0.00 | 5.44 | 1.52 | 0.00 | 8.90 | 31.02 | 80.83 | 250 | 0.25 | 0.612 | 22.12 | 71.32% |
| | | MH4224A | MH4020A | | | | | 0.0 | 319.0 | 4.00 | 5.17 | | 2.54 | | 0.00 | | 0.00 | 2.20 | 0.00 | 5.44 | 1.52 | 0.00 | 8.90 | 31.02 | 89.00 | 250 | 0.25 | 0.612 | 22.12 | 71.32% |
| | 4020A | MH4020A | MH4021A | | 0.92 | | | 59.8 | 1209.3 | 3.75 | 18.35 | | 2.54 | | 3.83 | | 0.0 | 5.53 | 0.92 | 18.66 | 5.22 | 0.00 | 29.10 | 45.12 | 91.23 | 300 | 0.20 | 0.618 | 16.01 | 35.50% |
| | | MH4021A | MH4022A | | | | | 0.0 | 1209.3 | 3.75 | 18.35 | | 2.54 | | 3.83 | | 0.00 | 5.53 | 0.00 | 18.66 | 5.22 | 0.00 | 29.10 | 45.12 | 95.08 | 300 | 0.20 | 0.618 | 16.01 | 35.50% |
| PARK | 4023A | MH4023A | MH4022A | 2.04 | | | | 0.0 | 0.0 | 4.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 2.04 | 2.04 | 0.57 | 0.00 | 0.57 | 20.24 | 25.00 | 200 | 0.35 | 0.624 | 19.67 | 97.18% |
| | 4022A | MH4022A | MH4024A | | 0.89 | | | 57.9 | 1267.2 | 3.73 | 19.15 | | 2.54 | | 3.83 | | 0.00 | 5.53 | 0.89 | 21.59 | 6.05 | 0.00 | 30.73 | 45.12 | 71.34 | 300 | 0.20 | 0.618 | 14.39 | 31.89% |
| | | MH4024A | MH4025A | | | | | 0.0 | 1267.2 | 3.73 | 19.15 | | 2.54 | | 3.83 | | 0.00 | 5.53 | 0.00 | 21.59 | 6.05 | 0.00 | 30.73 | 45.12 | 74.44 | 300 | 0.20 | 0.618 | 14.39 | 31.89% |
| | 4025A | MH4025A | MH4026A | | 1.07 | | | 69.6 | 1336.7 | 3.72 | 20.12 | | 2.54 | | 3.83 | | 0.00 | 5.53 | 1.07 | 22.66 | 6.34 | 0.00 | 31.99 | 45.12 | 43.97 | 300 | 0.20 | 0.618 | 13.12 | 29.09% |
| | | MH4026A | MH4030A | | | | | 0.0 | 1336.7 | 3.72 | 20.12 | | 2.54 | | 3.83 | | 0.00 | 5.53 | 0.00 | 22.66 | 6.34 | 0.00 | 31.99 | 45.12 | 58.67 | 300 | 0.20 | 0.618 | 13.12 | 29.09% |
| | 4600A | MH4600A | MH4601A | | 1.40 | | | 91.0 | 91.0 | 4.00 | 1.47 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.40 | 1.40 | 0.39 | 0.00 | 1.87 | 20.24 | 115.00 | 200 | 0.35 | 0.624 | 18.38 | 90.78% |
| | | MH4601A | MH4602A | | | | | 0.0 | 91.0 | 4.00 | 1.47 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.40 | 0.39 | 0.00 | 1.87 | 20.24 | 115.00 | 200 | 0.35 | 0.624 | 18.38 | 90.78% |
| | 4602A | MH4602A | MH4603A | | 1.33 | | | 86.5 | 177.5 | 4.00 | 2.88 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.33 | 2.73 | 0.76 | 0.00 | 3.64 | 20.24 | 107.53 | 200 | 0.35 | 0.624 | 16.60 | 82.02% |
| | | MH4603A | MH4604A | | | | | 0.0 | 177.5 | 4.00 | 2.88 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 2.73 | 0.76 | 0.00 | 3.64 | 20.24 | 108.47 | 200 | 0.35 | 0.624 | 16.60 | 82.02% |
| | 4605A | MH4605A | MH4606A | | 0.62 | | | 40.3 | 40.3 | 4.00 | 0.65 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.62 | 0.62 | 0.17 | 2.00 | 2.83 | 20.24 | 85.60 | 200 | 0.35 | 0.624 | 17.42 | 86.04% |
| | | MH4606A | MH4607A | | | | | 0.0 | 40.3 | 4.00 | 0.65 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.62 | 0.17 | 3.00 | 3.83 | 20.24 | 11.40 | 200 | 0.35 | 0.624 | 16.42 | 81.10% |
| | | MH4607A | MH4604A | | | | | 0.0 | 40.3 | 4.00 | 0.65 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.62 | 0.17 | 4.00 | 4.83 | 20.24 | 63.11 | 200 | 0.35 | 0.624 | 15.42 | 76.16% |
| | 4604A | MH4604A | MH4610A | | 0.26 | | | 16.9 | 234.7 | 4.00 | 3.80 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.26 | 3.61 | 1.01 | 0.00 | 4.81 | 20.24 | 64.53 | 200 | 0.35 | 0.624 | 15.43 | 76.22% |
| | 4611A | MH4611A | MH4612A | | 0.93 | | | 60.5 | 60.5 | 4.00 | 0.98 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.93 | 0.93 | 0.26 | 0.00 | 1.24 | 20.24 | 68.77 | 200 | 0.35 | 0.624 | 19.00 | 93.87% |
| | | MH4612A | MH4610A | | | | | 0.0 | 60.5 | 4.00 | 0.98 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.93 | 0.26 | 0.00 | 1.24 | 20.24 | 70.00 | 200 | 0.35 | 0.624 | 19.00 | 93.87% |

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# SANITARY SEWER DESIGN SHEET

**MER BLEUE Urban Expansion Area**
MSS Preferred Concept
CITY OF OTTAWA
Owners Group

| LOCATION | | | | RESIDENTIAL | | | | | | | | ICI AREAS | | | | | | | INFILTRATION ALLOWANCE | | | FIXED FLOW | TOTAL FLOW | PROPOSED SEWER DESIGN | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | AREA (Ha) | AREA w/o units (pp/Ha) | | | POPULATION | | PEAK FACTOR | PEAK FLOW (L/s) | AREA (Ha) | | | | | | PEAK FLOW (L/s) | AREA (Ha) | | FLOW | | | CAPACITY | LENGTH | DIA | SLOPE | VELOCITY (full) | AVAILABLE CAPACITY | |
| | | | | | | | | | | | | INSTITUTIONAL | | COMMERCIAL | | INDUSTRIAL | | | | | | | | | | | | | |
| STREET | AREA ID | FROM MH | TO MH | | LOW 65 | MED 110 | HIGH 85 | IND | CUM | | | IND | CUM | IND | CUM | IND | CUM | | IND | CUM | (L/s) | (L/s) | (L/s) | (L/s) | (m) | (mm) | (%) | (m/s) | L/s | (%) |
| | 4610A | MH4610A | MH4620A | | 0.32 | | | 20.8 | 315.9 | 4.00 | 5.12 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.32 | 4.86 | 1.36 | 0.00 | 6.48 | 20.24 | 72.00 | 200 | 0.35 | 0.624 | 13.76 | 67.99% |
| | 4620A | MH4620A | MH4660A | | 0.42 | | | 27.3 | 343.2 | 4.00 | 5.56 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.42 | 5.28 | 1.48 | 0.00 | 7.04 | 20.24 | 66.50 | 200 | 0.35 | 0.624 | 13.20 | 65.22% |
| | 4630A | MH4630A | MH4631A | | 1.82 | | | 118.3 | 118.3 | 4.00 | 1.92 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.82 | 1.82 | 0.51 | 0.00 | 2.43 | 20.24 | 94.12 | 200 | 0.35 | 0.624 | 17.82 | 88.01% |
| | | MH4631A | MH4632A | | | | | 0.0 | 118.3 | 4.00 | 1.92 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.82 | 0.51 | 0.00 | 2.43 | 20.24 | 90.57 | 200 | 0.35 | 0.624 | 17.82 | 88.01% |
| | | MH4632A | MH4633A | | | | | 0.0 | 118.3 | 4.00 | 1.92 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.82 | 0.51 | 0.00 | 2.43 | 20.24 | 11.60 | 200 | 0.35 | 0.624 | 17.82 | 88.01% |
| | | MH4633A | MH4640A | | | | | 0.0 | 118.3 | 4.00 | 1.92 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.82 | 0.51 | 0.00 | 2.43 | 20.24 | 63.80 | 200 | 0.35 | 0.624 | 17.82 | 88.01% |
| | 4343A | MH4343A | MH4341A | | 0.93 | | | 60.5 | 60.5 | 4.00 | 0.98 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.93 | 0.93 | 0.26 | 0.00 | 1.24 | 20.24 | 61.38 | 200 | 0.35 | 0.624 | 19.00 | 93.87% |
| | | MH4341A | MH4640A | | | | | 0.0 | 60.5 | 4.00 | 0.98 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.93 | 0.26 | 0.00 | 1.24 | 20.24 | 58.82 | 200 | 0.35 | 0.624 | 19.00 | 93.87% |
| | 4640A | MH4640A | MH4650A | | 0.32 | | | 20.8 | 199.6 | 4.00 | 3.23 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.32 | 3.07 | 0.86 | 0.00 | 4.09 | 20.24 | 72.00 | 200 | 0.35 | 0.624 | 16.15 | 79.78% |
| | 4651A | MH4651A | MH4652A | | 1.37 | | | 89.1 | 89.1 | 4.00 | 1.44 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.37 | 1.37 | 0.38 | 0.00 | 1.83 | 20.24 | 55.86 | 200 | 0.35 | 0.624 | 18.42 | 90.98% |
| | | MH4652A | MH4653A | | | | | 0.0 | 89.1 | 4.00 | 1.44 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.37 | 0.38 | 0.00 | 1.83 | 20.24 | 7.10 | 200 | 0.35 | 0.624 | 18.42 | 90.98% |
| | | MH4653A | MH4654A | | | | | 0.0 | 89.1 | 4.00 | 1.44 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.37 | 0.38 | 0.00 | 1.83 | 20.24 | 63.45 | 200 | 0.35 | 0.624 | 18.42 | 90.98% |
| | | MH4654A | MH4650A | | | | | 0.0 | 89.1 | 4.00 | 1.44 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.37 | 0.38 | 0.00 | 1.83 | 20.24 | 62.73 | 200 | 0.35 | 0.624 | 18.42 | 90.98% |
| | 4650A | MH4650A | MH4660A | | 0.33 | | | 21.5 | 310.1 | 4.00 | 5.02 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.33 | 4.77 | 1.34 | 0.00 | 6.36 | 20.24 | 71.98 | 200 | 0.35 | 0.624 | 13.88 | 68.58% |
| | | MH4660A | MH4663A | | | | | 0.0 | 653.3 | 3.91 | 10.35 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 10.05 | 2.81 | 0.00 | 13.17 | 20.24 | 39.65 | 200 | 0.35 | 0.624 | 7.08 | 34.96% |
| | | MH4663A | MH4662A | | | | | 0.0 | 653.3 | 3.91 | 10.35 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 10.05 | 2.81 | 0.00 | 13.17 | 20.24 | 18.36 | 200 | 0.35 | 0.624 | 7.08 | 34.96% |
| | 4662A | MH4662A | MH4030A | | 0.36 | | | 23.4 | 676.7 | 3.90 | 10.70 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.36 | 10.41 | 2.91 | 0.00 | 13.61 | 20.24 | 39.58 | 200 | 0.35 | 0.624 | 6.63 | 32.75% |
| | 4030A | MH4030A | MH4031A | | 1.13 | | | 73.5 | 2086.8 | 3.57 | 30.19 | | 2.54 | | 3.83 | | 0.00 | 5.53 | 1.13 | 34.20 | 9.58 | 0.00 | 45.30 | 45.12 | 40.86 | 300 | 0.20 | 0.618 | -0.18 | -0.40% |
| | | MH4031A | MH4032A | | | | | 0.0 | 2086.8 | 3.57 | 30.19 | | 2.54 | | 3.83 | | 0.00 | 5.53 | 0.00 | 34.20 | 9.58 | 0.00 | 45.30 | 45.12 | 48.57 | 300 | 0.20 | 0.618 | -0.18 | -0.40% |
| | | MH4032A | MH4040A | | | | | 0.0 | 2086.8 | 3.57 | 30.19 | | 2.54 | | 3.83 | | 0.00 | 5.53 | 0.00 | 34.20 | 9.58 | 0.00 | 45.30 | 45.12 | 56.87 | 300 | 0.20 | 0.618 | -0.18 | -0.40% |
| | 4400A | MH4400A | MH4401A | | 1.93 | | | 125.5 | 125.5 | 4.00 | 2.03 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.93 | 1.93 | 0.54 | 0.00 | 2.57 | 20.24 | 64.93 | 200 | 0.35 | 0.624 | 17.67 | 87.29% |
| | | MH4401A | MH4402A | | | | | 0.0 | 125.5 | 4.00 | 2.03 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.93 | 0.54 | 0.00 | 2.57 | 20.24 | 10.75 | 200 | 0.35 | 0.624 | 17.67 | 87.29% |
| | | MH4402A | MH4403A | | | | | 0.0 | 125.5 | 4.00 | 2.03 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.93 | 0.54 | 0.00 | 2.57 | 20.24 | 85.88 | 200 | 0.35 | 0.624 | 17.67 | 87.29% |
| | | MH4403A | MH4404A | | | | | 0.0 | 125.5 | 4.00 | 2.03 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.93 | 0.54 | 0.00 | 2.57 | 20.24 | 85.84 | 200 | 0.35 | 0.624 | 17.67 | 87.29% |
| | 4404A | MH4404A | MH4405A | | 2.20 | | | 143.0 | 268.5 | 4.00 | 4.35 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 2.20 | 4.13 | 1.16 | 0.00 | 5.51 | 20.24 | 90.60 | 200 | 0.35 | 0.624 | 14.74 | 72.80% |
| | | MH4405A | MH4406A | | | | | 0.0 | 268.5 | 4.00 | 4.35 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 4.13 | 1.16 | 0.00 | 5.51 | 20.24 | 41.28 | 200 | 0.35 | 0.624 | 14.74 | 72.80% |
| | | MH4406A | MH4407A | | | | | 0.0 | 268.5 | 4.00 | 4.35 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 4.13 | 1.16 | 0.00 | 5.51 | 20.24 | 29.48 | 200 | 0.35 | 0.624 | 14.74 | 72.80% |
| | | MH4407A | MH4408A | | | | | 0.0 | 268.5 | 4.00 | 4.35 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 4.13 | 1.16 | 0.00 | 5.51 | 20.24 | 43.01 | 200 | 0.35 | 0.624 | 14.74 | 72.80% |
| | | MH4408A | MH4440A | | | | | 0.0 | 268.5 | 4.00 | 4.35 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 4.13 | 1.16 | 0.00 | 5.51 | 20.24 | 34.11 | 200 | 0.35 | 0.624 | 14.74 | 72.80% |
| | 4410A | MH4410A | MH4411A | | 1.79 | | | 116.4 | 116.4 | 4.00 | 1.89 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.79 | 1.79 | 0.50 | 0.00 | 2.39 | 20.24 | 100.87 | 200 | 0.35 | 0.624 | 17.86 | 88.21% |
| | | MH4411A | MH4412A | | | | | 0.0 | 116.4 | 4.00 | 1.89 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.79 | 0.50 | 0.00 | 2.39 | 20.24 | 98.47 | 200 | 0.35 | 0.624 | 17.86 | 88.21% |
| | 4412A | MH4412A | MH4413A | | 1.28 | | | 83.2 | 199.6 | 4.00 | 3.23 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.28 | 3.07 | 0.86 | 0.00 | 4.09 | 20.24 | 100.13 | 200 | 0.35 | 0.624 | 16.15 | 79.78% |
| | | MH4413A | MH4414A | | | | | 0.0 | 199.6 | 4.00 | 3.23 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 3.07 | 0.86 | 0.00 | 4.09 | 20.24 | 36.11 | 200 | 0.35 | 0.624 | 16.15 | 79.78% |
| | | MH4414A | MH4415A | | | | | 0.0 | 199.6 | 4.00 | 3.23 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 3.07 | 0.86 | 0.00 | 4.09 | 20.24 | 24.79 | 200 | 0.35 | 0.624 | 16.15 | 79.78% |
| | | MH4415A | MH4425A | | | | | 0.0 | 199.6 | 4.00 | 3.23 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 3.07 | 0.86 | 0.00 | 4.09 | 20.24 | 22.00 | 200 | 0.35 | 0.624 | 16.15 | 79.78% |
| | 4420A | MH4420A | MH4421A | | 1.03 | | | 67.0 | 67.0 | 4.00 | 1.08 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.03 | 1.03 | 0.29 | 0.00 | 1.37 | 20.24 | 42.02 | 200 | 0.35 | 0.624 | 18.87 | 93.22% |
| | | MH4421A | MH4422A | | | | | 0.0 | 67.0 | 4.00 | 1.08 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.03 | 0.29 | 0.00 | 1.37 | 20.24 | 75.67 | 200 | 0.35 | 0.624 | 18.87 | 93.22% |
| | | MH4422A | MH4423A | | | | | 0.0 | 67.0 | 4.00 | 1.08 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.03 | 0.29 | 0.00 | 1.37 | 20.24 | 12.07 | 200 | 0.35 | 0.624 | 18.87 | 93.22% |
| | | MH4423A | MH4425A | | | | | 0.0 | 67.0 | 4.00 | 1.08 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.03 | 0.29 | 0.00 | 1.37 | 20.24 | 35.65 | 200 | 0.35 | 0.624 | 18.87 | 93.22% |
| | | MH4425A | MH4440A | | | | | 0.0 | 266.5 | 4.00 | 4.32 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 4.10 | 1.15 | 0.00 | 5.47 | 20.24 | 82.28 | 200 | 0.35 | 0.624 | 14.78 | 73.00% |
| | 4430A | MH4430A | MH4431A | | 1.28 | | | 83.2 | 83.2 | 4.00 | 1.35 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.28 | 1.28 | 0.36 | 0.00 | 1.71 | 20.24 | 70.51 | 200 | 0.35 | 0.624 | 18.54 | 91.57% |
| | | MH4431A | MH4432A | | | | | 0.0 | 83.2 | 4.00 | 1.35 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.28 | 0.36 | 0.00 | 1.71 | 20.24 | 10.59 | 200 | 0.35 | 0.624 | 18.54 | 91.57% |
| | | MH4432A | MH4433A | | | | | 0.0 | 83.2 | 4.00 | 1.35 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.28 | 0.36 | 0.00 | 1.71 | 20.24 | 73.98 | 200 | 0.35 | 0.624 | 18.54 | 91.57% |
| | 4433A | MH4433A | MH4434A | | 1.38 | | | 89.7 | 172.9 | 4.00 | 2.80 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.38 | 2.66 | 0.74 | 0.00 | 3.55 | 20.24 | 80.18 | 200 | 0.35 | 0.624 | 16.70 | 82.48% |
| | | MH4434A | MH4435A | | | | | 0.0 | 172.9 | 4.00 | 2.80 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 2.66 | 0.74 | 0.00 | 3.55 | 20.24 | 54.23 | 200 | 0.35 | 0.624 | 16.70 | 82.48% |
| | | MH4435A | MH4440A | | | | | 0.0 | 172.9 | 4.00 | 2.80 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 2.66 | 0.74 | 0.00 | 3.55 | 20.24 | 34.77 | 200 | 0.35 | 0.624 | 16.70 | 82.48% |
| | | MH4440A | MH4040A | | | | | 0.0 | 707.9 | 3.89 | 11.16 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 10.89 | 3.05 | 0.00 | 14.21 | 20.24 | 85.99 | 200 | 0.35 | 0.624 | 6.03 | 29.81% |

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| LOCATION | | | | RESIDENTIAL | | | | | | | | ICI AREAS | | | | | | | INFILTRATION ALLOWANCE | | | FIXED FLOW | TOTAL FLOW | PROPOSED SEWER DESIGN | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | AREA (Ha) | AREA w/o units (pp/Ha) | | | POPULATION | | PEAK FACTOR | PEAK FLOW (L/s) | AREA (Ha) | | | | | | PEAK FLOW (L/s) | AREA (Ha) | | FLOW (L/s) | (L/s) | (L/s) | CAPACITY (L/s) | LENGTH (m) | DIA (mm) | SLOPE (%) | VELOCITY (full) (m/s) | AVAILABLE CAPACITY | |
| STREET | AREA ID | FROM MH | TO MH | | LOW 65 | MED 110 | HIGH 85 | IND | CUM | | | INSTITUTIONAL IND | INSTITUTIONAL CUM | COMMERCIAL IND | COMMERCIAL CUM | INDUSTRIAL IND | INDUSTRIAL CUM | | IND | CUM | | | | | | | | L/s | (%) |
| | 4450A | MH4450A | MH4451A | | 1.52 | | | 98.8 | 98.8 | 4.00 | 1.60 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.52 | 1.52 | 0.43 | 0.00 | 2.03 | 20.24 | 87.00 | 200 | 0.35 | 0.624 | 18.22 | 89.99% |
| | | MH4451A | MH4452A | | | | | 0.0 | 98.8 | 4.00 | 1.60 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.52 | 0.43 | 0.00 | 2.03 | 20.24 | 78.30 | 200 | 0.35 | 0.624 | 18.22 | 89.99% |
| | | MH4452A | MH4453A | | | | | 0.0 | 98.8 | 4.00 | 1.60 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.52 | 0.43 | 0.00 | 2.03 | 20.24 | 64.29 | 200 | 0.35 | 0.624 | 18.22 | 89.99% |
| | | MH4453A | MH4040A | | | | | 0.0 | 98.8 | 4.00 | 1.60 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.52 | 0.43 | 0.00 | 2.03 | 20.24 | 52.25 | 200 | 0.35 | 0.624 | 18.22 | 89.99% |
| | 4040A | MH4040A | MH4050A | | 0.29 | | | 18.9 | 2912.3 | 3.45 | 40.74 | | 2.54 | | 3.83 | | 0.00 | 5.53 | 0.29 | 46.90 | 13.13 | 0.00 | 59.40 | 68.44 | 75.01 | 375 | 0.14 | 0.600 | 9.04 | 13.20% |
| | 4500A | MH4500A | MH4501A | | 1.68 | | | 109.2 | 109.2 | 4.00 | 1.77 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.68 | 1.68 | 0.47 | 0.00 | 2.24 | 20.24 | 104.50 | 200 | 0.35 | 0.624 | 18.00 | 88.94% |
| | | MH4501A | MH4502A | | | | | 0.0 | 109.2 | 4.00 | 1.77 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.68 | 0.47 | 0.00 | 2.24 | 20.24 | 41.24 | 200 | 0.35 | 0.624 | 18.00 | 88.94% |
| | | MH4502A | MH4503A | | | | | 0.0 | 109.2 | 4.00 | 1.77 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.68 | 0.47 | 0.00 | 2.24 | 20.24 | 41.82 | 200 | 0.35 | 0.624 | 18.00 | 88.94% |
| | | MH4503A | MH4050A | | | | | 0.0 | 109.2 | 4.00 | 1.77 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.68 | 0.47 | 0.00 | 2.24 | 20.24 | 38.81 | 200 | 0.35 | 0.624 | 18.00 | 88.94% |
| | 4050A | MH4050A | MH4051A | | 0.41 | | | 26.7 | 3048.2 | 3.44 | 42.43 | | 2.540 | | 3.830 | | 0.000 | 5.53 | 0.41 | 48.99 | 13.72 | 0.00 | 61.68 | 68.44 | 36.42 | 375 | 0.14 | 0.600 | 6.76 | 9.88% |
| | | MH4070B | MH4724A | | | | | 0.0 | 0.0 | 4.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 20.24 | 57.50 | 200 | 0.35 | 0.624 | 20.24 | 100.00% |
| PARK | 4725A | MH4725A | MH4724A | 6.31 | | | | 0.0 | 0.0 | 4.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 6.31 | 6.31 | 1.77 | 0.00 | 1.77 | 20.24 | 18.47 | 200 | 0.35 | 0.624 | 18.48 | 91.27% |
| | 4724A | MH4724A | MH4723A | | 0.82 | | | 53.3 | 53.3 | 4.00 | 0.86 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.82 | 7.13 | 2.00 | 0.00 | 2.86 | 20.24 | 11.59 | 200 | 0.35 | 0.624 | 17.38 | 85.87% |
| | | MH4723A | MH4722A | | | | | 0.0 | 53.3 | 4.00 | 0.86 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 7.13 | 2.00 | 0.00 | 2.86 | 20.24 | 48.05 | 200 | 0.35 | 0.624 | 17.38 | 85.87% |
| | | MH4722A | MH4721A | | | | | 0.0 | 53.3 | 4.00 | 0.86 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 7.13 | 2.00 | 0.00 | 2.86 | 20.24 | 21.91 | 200 | 0.35 | 0.624 | 17.38 | 85.87% |
| | | MH4721A | MH4051A | | | | | 0.0 | 53.3 | 4.00 | 0.86 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 7.13 | 2.00 | 0.00 | 2.86 | 20.24 | 102.20 | 200 | 0.35 | 0.624 | 17.38 | 85.87% |
| | | MH4051A | MH4060A | | | | | 0.0 | 3101.5 | 3.43 | 43.09 | | 2.54 | | 3.830 | | 0.000 | 5.53 | 0.00 | 56.12 | 15.71 | 0.00 | 64.34 | 68.44 | 72.00 | 375 | 0.14 | 0.600 | 4.10 | 5.99% |
| | 4620B | MH4620B | MH4621A | | 0.29 | | | 18.9 | 18.9 | 4.00 | 0.31 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.29 | 0.29 | 0.08 | 0.00 | 0.39 | 20.24 | 64.31 | 200 | 0.35 | 0.624 | 19.86 | 98.09% |
| | 4621A | MH4621A | MH4622A | | 0.51 | | | 33.2 | 52.0 | 4.00 | 0.84 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.51 | 0.80 | 0.22 | 0.00 | 1.07 | 20.24 | 65.69 | 200 | 0.35 | 0.624 | 19.18 | 94.73% |
| | 4624A | MH4624A | MH4622A | | 0.25 | | | 16.3 | 16.3 | 4.00 | 0.26 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.25 | 0.25 | 0.07 | 0.00 | 0.33 | 20.24 | 64.78 | 200 | 0.35 | 0.624 | 19.91 | 98.35% |
| | | MH4710A | MH4622A | | | | | 0.0 | 0.0 | 4.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 19.66 | 41.58 | 200 | 0.33 | 0.606 | 19.66 | 100.00% |
| | 4622A | MH4622A | MH4625A | | 0.18 | | | 11.7 | 80.0 | 4.00 | 1.30 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.18 | 1.23 | 0.34 | 0.00 | 1.64 | 19.66 | 81.19 | 200 | 0.33 | 0.606 | 18.02 | 91.66% |
| | 4625A | MH4625A | MH4624A | | 1.22 | | | 79.3 | 159.3 | 4.00 | 2.58 | | 0.000 | | 0.000 | | 0.000 | 0.00 | 1.22 | 2.45 | 0.69 | 0.00 | 3.27 | 20.24 | 31.91 | 200 | 0.35 | 0.624 | 16.98 | 83.86% |
| | | MH4626A | MH4060A | | | | | 0.0 | 159.3 | 4.00 | 2.58 | | 0.000 | | 0.000 | | 0.000 | 0.00 | 0.00 | 2.45 | 0.69 | 0.00 | 3.27 | 20.24 | 81.69 | 200 | 0.35 | 0.624 | 16.98 | 83.86% |
| | 4060A | MH4060A | MH4061A | | 1.49 | | | 96.9 | 3357.6 | 3.40 | 46.25 | | 2.54 | | 3.83 | | 0.00 | 5.53 | 1.49 | 60.06 | 16.82 | 0.00 | 68.60 | 103.03 | 91.37 | 450 | 0.12 | 0.628 | 34.44 | 33.42% |
| | | MH4061A | MH4062A | | | | | 0.0 | 3357.6 | 3.40 | 46.25 | | 2.54 | | 3.83 | | 0.00 | 5.53 | 0.00 | 60.06 | 16.82 | 0.00 | 68.60 | 103.03 | 35.73 | 450 | 0.12 | 0.628 | 34.44 | 33.42% |
| | | MH4062A | MH4063A | | | | | 0.0 | 3357.6 | 3.40 | 46.25 | | 2.54 | | 3.83 | | 0.00 | 5.53 | 0.00 | 60.06 | 16.82 | 0.00 | 68.60 | 103.03 | 35.73 | 450 | 0.12 | 0.628 | 34.44 | 33.42% |
| | | MH4063A | MH4070A | | | | | 0.0 | 3357.6 | 3.40 | 46.25 | | 2.54 | | 3.83 | | 0.00 | 5.53 | 0.00 | 60.06 | 16.82 | 0.00 | 68.60 | 103.03 | 54.62 | 450 | 0.12 | 0.628 | 34.44 | 33.42% |
| OVERFLOW | | MH4070A | | | | | | 0.0 | 0.0 | 4.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 392.18 | 21.82 | 675 | 0.20 | 1.062 | 392.18 | 100.00% |
| | 4070A | MH4070A | MH4716A | | | | | 0.0 | 3357.6 | 3.40 | 46.25 | | 2.54 | | 3.83 | | 0.00 | 5.53 | 0.00 | 60.06 | 16.82 | 0.00 | 68.60 | 277.31 | 72.00 | 675 | 0.10 | 0.751 | 208.71 | 75.26% |
| | 4711A | MH4711A | MH4712A | | 1.01 | | | 65.7 | 65.7 | 4.00 | 1.06 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.01 | 1.01 | 0.28 | 0.00 | 1.35 | 19.66 | 110.54 | 200 | 0.33 | 0.606 | 18.31 | 93.15% |
| | 4712A | MH4712A | MH4713A | | 1.13 | | | 73.5 | 139.1 | 4.00 | 2.25 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.13 | 2.14 | 0.60 | 0.00 | 2.85 | 19.66 | 114.75 | 200 | 0.33 | 0.606 | 16.80 | 85.48% |
| | | MH4713A | MH4714A | | | | | 0.0 | 139.1 | 4.00 | 2.25 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 2.14 | 0.60 | 0.00 | 2.85 | 19.66 | 47.60 | 200 | 0.33 | 0.606 | 16.80 | 85.48% |
| | 4714A | MH4714A | MH4715A | | 0.95 | | | 61.8 | 200.9 | 4.00 | 3.25 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.95 | 3.09 | 0.87 | 0.00 | 4.12 | 19.66 | 43.38 | 200 | 0.33 | 0.606 | 15.54 | 79.04% |
| | | MH4715A | MH4716A | | | | | 0.0 | 200.9 | 4.00 | 3.25 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 3.09 | 0.87 | 0.00 | 4.12 | 19.66 | 66.78 | 200 | 0.33 | 0.606 | 15.54 | 79.04% |
| | | | | | | | | 0.0 | | | | | | | | | | | | | | | | | | | | | | |
| | | MH4716A | MH15001A | | | | | 0.0 | 3558.4 | 3.38 | 48.70 | | 2.54 | | 3.83 | | 0.00 | 5.53 | 0.00 | 63.15 | 17.68 | 0.00 | 71.91 | 277.31 | 25.87 | 675 | 0.10 | 0.751 | 205.40 | 74.07% |
| | | MH15001A | MH15002A | | | | | 0.0 | 3558.4 | 3.38 | 48.70 | | 2.54 | | 3.83 | | 0.00 | 5.53 | 0.00 | 63.15 | 17.68 | 0.00 | 71.91 | 277.31 | 88.19 | 675 | 0.10 | 0.751 | 205.40 | 74.07% |
| | | MH15002A | MH8000A | | | | | 0.0 | 3558.4 | 3.38 | 48.70 | | 2.54 | | 3.83 | | 0.00 | 5.53 | 0.00 | 63.15 | 17.68 | 0.00 | 71.91 | 277.31 | 75.00 | 675 | 0.10 | 0.751 | 205.40 | 74.07% |
| | | | | 9.27 | 37.06 | 10.45 | 0.00 | 3558.4 | TRUE | | | 2.54 | TRUE | 3.83 | TRUE | 0.00 | TRUE | | 63.15 | TRUE | | | | | | | | | | |
| | | | | | | | | 56.8 | | | | | | | | | | | 63.15 | TRUE | | | | | | | | | | |

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**SANITARY SEWER DESIGN SHEET**
**MER BLEUE Urban Expansion Area**
MSS Preferred Concept
CITY OF OTTAWA
Owners Group

| LOCATION | | | | RESIDENTIAL | | | | | | | | ICI AREAS | | | | | | | INFILTRATION ALLOWANCE | | | FIXED FLOW | TOTAL FLOW | PROPOSED SEWER DESIGN | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | AREA (Ha) | AREA w/o units (pp/Ha) | | | POPULATION | | PEAK FACTOR | PEAK FLOW (L/s) | AREA (Ha) | | | | | | PEAK FLOW (L/s) | AREA (Ha) | | FLOW (L/s) | | | CAPACITY (L/s) | LENGTH (m) | DIA (mm) | SLOPE (%) | VELOCITY (full) (m/s) | AVAILABLE CAPACITY | |
| STREET | AREA ID | FROM MH | TO MH | | LOW 65 | MED 110 | HIGH 85 | IND | CUM | | | INSTITUTIONAL IND | INSTITUTIONAL CUM | COMMERCIAL IND | COMMERCIAL CUM | INDUSTRIAL IND | INDUSTRIAL CUM | | IND | CUM | | | | | | | | L/s | (%) |
| **Southern Outlet - Lands on and South of Wall Road (Gravity to Pump Station)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5000A/B | MH5000A | MH5001A | | 1.99 | 0.89 | | 227.3 | 227.3 | 4.00 | 3.68 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 2.88 | 2.88 | 0.81 | 0.00 | 4.49 | 20.24 | 76.00 | 200 | 0.35 | 0.624 | 15.75 | 77.83% |
| | | MH5001A | MH5002A | | | | | 0.0 | 227.3 | 4.00 | 3.68 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 2.88 | 0.81 | 0.00 | 4.49 | 20.24 | 75.89 | 200 | 0.35 | 0.624 | 15.75 | 77.83% |
| | | MH5002A | MH5010A | | | | | 0.0 | 227.3 | 4.00 | 3.68 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 2.88 | 0.81 | 0.00 | 4.49 | 20.24 | 74.86 | 200 | 0.35 | 0.624 | 15.75 | 77.83% |
| | 5110A | MH5110A | MH5111A | | 1.36 | | | 88.4 | 88.4 | 4.00 | 1.43 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.36 | 1.36 | 0.38 | 0.00 | 1.81 | 20.24 | 70.85 | 200 | 0.35 | 0.624 | 18.43 | 91.04% |
| | | MH5111A | MH5112A | | | | | 0.0 | 88.4 | 4.00 | 1.43 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.36 | 0.38 | 0.00 | 1.81 | 20.24 | 70.85 | 200 | 0.35 | 0.624 | 18.43 | 91.04% |
| | | MH5112A | MH5121A | | | | | 0.0 | 88.4 | 4.00 | 1.43 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.36 | 0.38 | 0.00 | 1.81 | 20.24 | 60.05 | 200 | 0.35 | 0.624 | 18.43 | 91.04% |
| | 5120A | MH5120A | MH5121A | | 0.32 | | | 20.8 | 20.8 | 4.00 | 0.34 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.32 | 0.32 | 0.09 | 0.00 | 0.43 | 20.24 | 57.51 | 200 | 0.35 | 0.624 | 19.82 | 97.89% |
| | 5121A | MH5121A | MH5122A | | 0.21 | | | 13.7 | 122.9 | 4.00 | 1.99 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.21 | 1.89 | 0.53 | 0.00 | 2.52 | 20.24 | 8.39 | 200 | 0.35 | 0.624 | 17.72 | 87.55% |
| | | MH5122A | MH5010A | | | | | 0.0 | 122.9 | 4.00 | 1.99 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.89 | 0.53 | 0.00 | 2.52 | 20.24 | 44.71 | 200 | 0.35 | 0.624 | 17.72 | 87.55% |
| MED RES | 5012A | MH5012A | MH5010A | | | 6.20 | | 682.0 | 682.0 | 3.90 | 10.78 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 6.20 | 6.20 | 1.74 | 0.00 | 12.51 | 31.02 | 17.00 | 250 | 0.25 | 0.612 | 18.51 | 59.66% |
| | 5010A | MH5010A | MH5020A | | 0.18 | | | 11.7 | 1043.8 | 3.79 | 16.02 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.18 | 11.15 | 3.12 | 0.00 | 19.14 | 31.02 | 80.09 | 250 | 0.25 | 0.612 | 11.88 | 38.30% |
| | 5210A | MH5210A | MH5211A | | 0.84 | | | 54.6 | 54.6 | 4.00 | 0.88 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.84 | 0.84 | 0.24 | 0.00 | 1.12 | 20.24 | 62.75 | 200 | 0.35 | 0.624 | 19.12 | 94.47% |
| | | MH5211A | MH5212A | | | | | 0.0 | 54.6 | 4.00 | 0.88 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.84 | 0.24 | 0.00 | 1.12 | 20.24 | 8.29 | 200 | 0.35 | 0.624 | 19.12 | 94.47% |
| | | MH5212A | MH5220A | | | | | 0.0 | 54.6 | 4.00 | 0.88 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.84 | 0.24 | 0.00 | 1.12 | 20.24 | 105.26 | 200 | 0.35 | 0.624 | 19.12 | 94.47% |
| | 5220A | MH5220A | MH5221A | 0.53 | 1.64 | | | 106.6 | 161.2 | 4.00 | 2.61 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 2.17 | 3.01 | 0.84 | 0.00 | 3.45 | 20.24 | 103.43 | 200 | 0.35 | 0.624 | 16.79 | 82.93% |
| | | MH5221A | MH5222A | | | | | 0.0 | 161.2 | 4.00 | 2.61 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 3.01 | 0.84 | 0.00 | 3.45 | 20.24 | 82.49 | 200 | 0.35 | 0.624 | 16.79 | 82.93% |
| | | MH5222A | MH5223A | | | | | 0.0 | 161.2 | 4.00 | 2.61 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 3.01 | 0.84 | 0.00 | 3.45 | 20.24 | 9.25 | 200 | 0.35 | 0.624 | 16.79 | 82.93% |
| | | MH5223A | MH5230A | | | | | 0.0 | 161.2 | 4.00 | 2.61 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 3.01 | 0.84 | 0.00 | 3.45 | 20.24 | 25.96 | 200 | 0.35 | 0.624 | 16.79 | 82.93% |
| | 5231A | MH5231A | MH5230A | | 0.74 | | | 48.1 | 48.1 | 4.00 | 0.78 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.74 | 0.74 | 0.21 | 0.00 | 0.99 | 20.24 | 106.08 | 200 | 0.35 | 0.624 | 19.26 | 95.13% |
| | 5230A | MH5230A | MH5020A | | 0.40 | | | 26.0 | 235.3 | 4.00 | 3.81 | | 0.0 | | 0.0 | | 0.0 | 0.00 | 0.40 | 4.2 | 1.16 | 0.00 | 4.97 | 20.24 | 87.16 | 200 | 0.35 | 0.624 | 15.27 | 75.42% |
| | 5261A | MH5261A | MH5263A | | | 0.85 | | 93.5 | 93.5 | 4.00 | 1.52 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.85 | 0.85 | 0.24 | 0.00 | 1.75 | 20.24 | 74.22 | 200 | 0.35 | 0.624 | 18.49 | 91.34% |
| | | MH5263A | MH5200A | | | | | 0.0 | 93.5 | 4.00 | 1.52 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.85 | 0.24 | 0.00 | 1.75 | 20.24 | 102.94 | 200 | 0.35 | 0.624 | 18.49 | 91.34% |
| HIGH RES | 5260A | MH5260A | MH5200A | | | | 2.79 | 237.2 | 237.2 | 4.00 | 3.84 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 2.79 | 2.79 | 0.78 | 0.00 | 4.62 | 31.02 | 15.00 | 250 | 0.25 | 0.612 | 26.40 | 85.09% |
| | 5200A | MH5200A | MH5201A | | 0.58 | | | 37.7 | 368.4 | 4.00 | 5.97 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.58 | 4.2 | 1.18 | 0.00 | 7.15 | 31.02 | 43.71 | 250 | 0.25 | 0.612 | 23.87 | 76.95% |
| | | MH5201A | MH5202A | | | | | 0.0 | 368.4 | 4.00 | 5.97 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 4.22 | 1.18 | 0.00 | 7.15 | 31.02 | 95.34 | 250 | 0.25 | 0.612 | 23.87 | 76.95% |
| | | MH5202A | MH5020A | | | | | 0.0 | 368.4 | 4.00 | 5.97 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 4.22 | 1.18 | 0.00 | 7.15 | 31.02 | 67.87 | 250 | 0.25 | 0.612 | 23.87 | 76.95% |
| | 5020A | MH5020A | MH5021A | | 1.40 | | | 91.0 | 1738.5 | 3.63 | 25.58 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.40 | 20.92 | 5.86 | 0.00 | 31.44 | 45.12 | 86.19 | 300 | 0.20 | 0.618 | 13.68 | 30.32% |
| | | MH5021A | MH5030A | | | | | 0.0 | 1738.5 | 3.63 | 25.58 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 20.92 | 5.86 | 0.00 | 31.44 | 45.12 | 86.19 | 300 | 0.20 | 0.618 | 13.68 | 30.32% |
| | 5310A | MH5310A | MH5311A | | 1.35 | | | 87.8 | 87.8 | 4.00 | 1.42 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.35 | 1.35 | 0.38 | 0.00 | 1.80 | 20.24 | 67.06 | 200 | 0.35 | 0.624 | 18.44 | 91.11% |
| | | MH5311A | MH5312A | | | | | 0.0 | 87.8 | 4.00 | 1.42 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.35 | 0.38 | 0.00 | 1.80 | 20.24 | 54.91 | 200 | 0.35 | 0.624 | 18.44 | 91.11% |
| | | MH5312A | MH5313A | | | | | 0.0 | 87.8 | 4.00 | 1.42 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.35 | 0.38 | 0.00 | 1.80 | 20.24 | 11.10 | 200 | 0.35 | 0.624 | 18.44 | 91.11% |
| | | MH5313A | MH5314A | | | | | 0.0 | 87.8 | 4.00 | 1.42 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.35 | 0.38 | 0.00 | 1.80 | 20.24 | 75.73 | 200 | 0.35 | 0.624 | 18.44 | 91.11% |
| | 5315A | MH5315A | MH5316A | | 1.13 | | | 73.5 | 73.5 | 4.00 | 1.19 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.13 | 1.13 | 0.32 | 0.00 | 1.51 | 20.24 | 13.67 | 200 | 0.35 | 0.624 | 18.74 | 92.56% |
| | | MH5316A | MH5317A | | | | | 0.0 | 73.5 | 4.00 | 1.19 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.13 | 0.32 | 0.00 | 1.51 | 20.24 | 72.66 | 200 | 0.35 | 0.624 | 18.74 | 92.56% |
| | | MH5317A | MH5314A | | | | | 0.0 | 73.5 | 4.00 | 1.19 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.13 | 0.32 | 0.00 | 1.51 | 20.24 | 69.08 | 200 | 0.35 | 0.624 | 18.74 | 92.56% |
| | 5314A | MH5314A | MH5030A | | 0.14 | | | 9.1 | 170.3 | 4.00 | 2.76 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.14 | 2.62 | 0.73 | 0.00 | 3.49 | 20.24 | 86.38 | 200 | 0.35 | 0.624 | 16.75 | 82.74% |
| | 5300A | MH5300A | MH5301A | | 0.98 | | | 63.7 | 63.7 | 4.00 | 1.03 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.98 | 0.98 | 0.27 | 0.00 | 1.31 | 20.24 | 53.88 | 200 | 0.35 | 0.624 | 18.94 | 93.55% |
| | | MH5301A | MH5302A | | | | | 0.0 | 63.7 | 4.00 | 1.03 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.98 | 0.27 | 0.00 | 1.31 | 20.24 | 9.26 | 200 | 0.35 | 0.624 | 18.94 | 93.55% |
| | | MH5302A | MH5030A | | | | | 0.0 | 63.7 | 4.00 | 1.03 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.98 | 0.27 | 0.00 | 1.31 | 20.24 | 81.73 | 200 | 0.35 | 0.624 | 18.94 | 93.55% |
| | 5030A | MH5030A | MH5031A | | 1.26 | | | 81.9 | 2054.4 | 3.58 | 29.77 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.26 | 25.78 | 7.22 | 0.00 | 36.98 | 45.12 | 120.00 | 300 | 0.20 | 0.618 | 8.13 | 18.02% |
| SCHOOL | 5034A | MH5034A | MH5031A | | | | | 0.0 | 0.0 | 4.00 | 0.00 | 2.92 | 2.92 | | 0.00 | | 0.00 | 2.53 | 2.92 | 2.92 | 0.82 | 0.00 | 3.35 | 31.02 | 15.00 | 250 | 0.25 | 0.612 | 27.67 | 89.19% |
| | | MH5031A | MH5032A | | | | | 0.0 | 2054.4 | 3.58 | 29.77 | | 2.92 | | 0.00 | | 0.00 | 2.53 | 0.00 | 28.70 | 8.04 | 0.00 | 40.34 | 70.84 | 45.59 | 375 | 0.15 | 0.621 | 30.51 | 43.06% |
| | | MH5032A | MH5033A | | | | | 0.0 | 2054.4 | 3.58 | 29.77 | | 2.92 | | 0.00 | | 0.00 | 2.53 | 0.00 | 28.70 | 8.04 | 0.00 | 40.34 | 70.84 | 44.24 | 375 | 0.15 | 0.621 | 30.51 | 43.06% |
| PARK | 5035A | MH5035A | MH5033A | 2.18 | | | | 0.0 | 0.0 | 4.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 2.18 | 2.18 | 0.61 | 0.00 | 0.61 | 20.24 | 20.00 | 200 | 0.35 | 0.624 | 19.63 | 96.98% |
| | | MH5033A | MH5040A | | | | | 0.0 | 2054.4 | 3.58 | 29.77 | | 2.92 | | 0.00 | | 0.00 | 2.53 | 0.00 | 30.88 | 8.65 | 0.00 | 40.95 | 70.84 | 43.69 | 375 | 0.15 | 0.621 | 29.89 | 42.20% |
| | 5040A | MH5040A | MH5041A | | 2.23 | | | 145.0 | 2199.3 | 3.55 | 31.66 | | 2.92 | | 0.00 | | 0.00 | 2.53 | 2.23 | 33.11 | 9.27 | 0.00 | 43.46 | 70.84 | 60.00 | 375 | 0.15 | 0.621 | 27.38 | 38.65% |
| | | MH5041A | MH5042A | | | | | 0.0 | 2199.3 | 3.55 | 31.66 | | 2.92 | | 0.00 | | 0.00 | 2.53 | 0.00 | 33.11 | 9.27 | 0.00 | 43.46 | 70.84 | 60.00 | 375 | 0.15 | 0.621 | 27.38 | 38.65% |
| | | MH5042A | MH5043A | | | | | 0.0 | 2199.3 | 3.55 | 31.66 | | 2.92 | | 0.00 | | 0.00 | 2.53 | 0.00 | 33.11 | 9.27 | 0.00 | 43.46 | 70.84 | 36.32 | 375 | 0.15 | 0.621 | 27.38 | 38.65% |
| | | MH5043A | MH5050A | | | | | 0.0 | 2199.3 | 3.55 | 31.66 | | 2.92 | | 0.00 | | 0.00 | 2.53 | 0.00 | 33.11 | 9.27 | 0.00 | 43.46 | 70.84 | 53.99 | 375 | 0.15 | 0.621 | 27.38 | 38.65% |
| | 5500A | MH5500A | MH5050A | | 0.59 | | | 38.4 | 38.4 | 4.00 | 0.62 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.59 | 0.59 | 0.17 | 0.00 | 0.79 | 20.24 | 120.00 | 200 | 0.35 | 0.624 | 19.46 | 96.11% |

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**SANITARY SEWER DESIGN SHEET**
**MER BLEUE Urban Expansion Area**
MSS Preferred Concept
CITY OF OTTAWA
Owners Group

| LOCATION | | | | RESIDENTIAL | | | | | | | ICI AREAS | | | | | | | INFILTRATION ALLOWANCE | | | FIXED FLOW | TOTAL FLOW | PROPOSED SEWER DESIGN | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | AREA (Ha) | AREA w/o units (pp/Ha) | | | POPULATION | | PEAK FACTOR | PEAK FLOW (L/s) | AREA (Ha) | | | | | | PEAK FLOW (L/s) | AREA (Ha) | | FLOW (L/s) | (L/s) | (L/s) | CAPACITY (L/s) | LENGTH (m) | DIA (mm) | SLOPE (%) | VELOCITY (full) (m/s) | AVAILABLE CAPACITY | |
| STREET | AREA ID | FROM MH | TO MH | | LOW 65 | MED 110 | HIGH 85 | IND | CUM | | | INSTITUTIONAL IND | INSTITUTIONAL CUM | COMMERCIAL IND | COMMERCIAL CUM | INDUSTRIAL IND | INDUSTRIAL CUM | | IND | CUM | | | | | | | | L/s | (%) |
| | 5600A | MH5600A | MH5601A | | 1.64 | | | 106.6 | 106.6 | 4.00 | 1.73 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.64 | 1.64 | 0.46 | 0.00 | 2.19 | 20.24 | 120.00 | 200 | 0.35 | 0.624 | 18.06 | 89.20% |
| | | MH5601A | MH5052A | | | | | 0.0 | 106.6 | 4.00 | 1.73 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.64 | 0.46 | 0.00 | 2.19 | 20.24 | 104.00 | 200 | 0.35 | 0.624 | 18.06 | 89.20% |
| | 5052A | MH5052A | MH5051A | | 1.22 | | | 79.3 | 185.9 | 4.00 | 3.01 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.22 | 2.86 | 0.80 | 0.00 | 3.81 | 20.24 | 115.00 | 200 | 0.35 | 0.624 | 16.43 | 81.16% |
| | | MH5051A | MH5050A | | | | | 0.0 | 185.9 | 4.00 | 3.01 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 2.86 | 0.80 | 0.00 | 3.81 | 20.24 | 110.22 | 200 | 0.35 | 0.624 | 16.43 | 81.16% |
| | 5050A | MH5050A | MH6010A | | 0.30 | | | 19.5 | 2443.1 | 3.52 | 34.80 | | 2.92 | | 0.00 | | 0.00 | 2.53 | 0.30 | 36.86 | 10.32 | 0.00 | 47.66 | 70.84 | 84.63 | 375 | 0.15 | 0.621 | 23.18 | 32.73% |
| | 6100A | MH6100A | MH6101A | | 1.66 | | | 107.9 | 107.9 | 4.00 | 1.75 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.66 | 1.66 | 0.46 | 0.00 | 2.21 | 20.24 | 75.42 | 200 | 0.35 | 0.624 | 18.03 | 89.07% |
| | | MH6101A | MH6010A | | | | | 0.0 | 107.9 | 4.00 | 1.75 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.66 | 0.46 | 0.00 | 2.21 | 20.24 | 94.08 | 200 | 0.35 | 0.624 | 18.03 | 89.07% |
| | 6010A | MH6010A | MH6020A | | 0.41 | | | 26.7 | 2577.6 | 3.50 | 36.52 | | 2.92 | | 0.00 | | 0.00 | 2.53 | 0.41 | 38.93 | 10.90 | 0.00 | 49.96 | 70.84 | 82.00 | 375 | 0.15 | 0.621 | 20.89 | 29.48% |
| EXTERNAL | 6200A | MH6200A | MH6201A | | 24.74 | | | 510.0 | 510.0 | 3.97 | 8.20 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 24.74 | 24.74 | 6.93 | 0.00 | 15.13 | 20.24 | 40.96 | 200 | 0.35 | 0.624 | 5.11 | 25.26% |
| Approximate unit count of 150x3.4=510pp | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | MH6202A | MH6201A | | | | | 0.0 | 0.0 | 4.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 20.24 | 31.64 | 200 | 0.35 | 0.624 | 20.24 | 100.00% |
| | 6201A | MH6201A | MH6203A | | 2.44 | | | 158.6 | 668.6 | 3.91 | 10.58 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 2.44 | 27.18 | 7.61 | 0.00 | 18.19 | 20.24 | 94.07 | 200 | 0.35 | 0.624 | 2.05 | 10.14% |
| | | MH6203A | MH6204A | | | | | 0.0 | 668.6 | 3.91 | 10.58 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 27.18 | 7.61 | 0.00 | 18.19 | 20.24 | 98.76 | 200 | 0.35 | 0.624 | 2.05 | 10.14% |
| | | MH6204A | MH6205A | | | | | 0.0 | 668.6 | 3.91 | 10.58 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 27.18 | 7.61 | 0.00 | 18.19 | 20.24 | 9.97 | 200 | 0.35 | 0.624 | 2.05 | 10.14% |
| | | MH6205A | MH6210A | | | | | 0.0 | 668.6 | 3.91 | 10.58 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 27.18 | 7.61 | 0.00 | 18.19 | 20.24 | 74.95 | 200 | 0.35 | 0.624 | 2.05 | 10.14% |
| | 6211A | MH6211A | MH6212A | | 1.90 | | | 123.5 | 123.5 | 4.00 | 2.00 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.90 | 1.90 | 0.53 | 0.00 | 2.53 | 20.24 | 64.38 | 200 | 0.35 | 0.624 | 17.71 | 87.49% |
| | | MH6212A | MH6213A | | | | | 0.0 | 123.5 | 4.00 | 2.00 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.90 | 0.53 | 0.00 | 2.53 | 20.24 | 11.49 | 200 | 0.35 | 0.624 | 17.71 | 87.49% |
| | | MH6213A | MH6214A | | | | | 0.0 | 123.5 | 4.00 | 2.00 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.90 | 0.53 | 0.00 | 2.53 | 20.24 | 73.20 | 200 | 0.35 | 0.624 | 17.71 | 87.49% |
| Woodlot (infil only) | 6214A | MH6214A | MH6215A | 1.20 | | | | 0.0 | 123.5 | 4.00 | 2.00 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.20 | 3.10 | 0.87 | 0.00 | 2.87 | 20.24 | 78.55 | 200 | 0.35 | 0.624 | 17.37 | 85.83% |
| | | MH6215A | MH6210A | | | | | 0.0 | 123.5 | 4.00 | 2.00 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 3.10 | 0.87 | 0.00 | 2.87 | 20.24 | 78.21 | 200 | 0.35 | 0.624 | 17.37 | 85.83% |
| | 6210A | MH6210A | MH6220A | | 0.19 | | | 12.4 | 804.5 | 3.86 | 12.58 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.19 | 30.47 | 8.53 | 0.00 | 21.11 | 31.02 | 82.00 | 250 | 0.25 | 0.612 | 9.91 | 31.96% |
| | 6222A | MH6222A | MH6220A | | 0.53 | | | 34.5 | 34.5 | 4.00 | 0.56 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.53 | 0.53 | 0.15 | 0.00 | 0.71 | 20.24 | 75.45 | 200 | 0.35 | 0.624 | 19.54 | 96.51% |
| | 6223A | MH6223A | MH6224A | | 1.24 | | | 80.6 | 80.6 | 4.00 | 1.31 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.24 | 1.24 | 0.35 | 0.00 | 1.65 | 20.24 | 61.03 | 200 | 0.35 | 0.624 | 18.59 | 91.83% |
| | | MH6224A | MH6225A | | | | | 0.0 | 80.6 | 4.00 | 1.31 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.24 | 0.35 | 0.00 | 1.65 | 20.24 | 13.90 | 200 | 0.35 | 0.624 | 18.59 | 91.83% |
| | | MH6225A | MH6220A | | | | | 0.0 | 80.6 | 4.00 | 1.31 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.24 | 0.35 | 0.00 | 1.65 | 20.24 | 89.28 | 200 | 0.35 | 0.624 | 18.59 | 91.83% |
| | 6220A | MH6220A | MH6221A | | 0.81 | | | 52.7 | 972.2 | 3.81 | 15.00 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.81 | 33.05 | 9.25 | 0.00 | 24.25 | 31.02 | 81.86 | 250 | 0.25 | 0.612 | 6.77 | 21.82% |
| | | MH6221A | MH6020A | | | | | 0.0 | 972.2 | 3.81 | 15.00 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 33.05 | 9.25 | 0.00 | 24.25 | 31.02 | 98.37 | 250 | 0.25 | 0.612 | 6.77 | 21.82% |
| | 6020A | MH6020A | MH6030A | | 0.85 | | | 55.3 | 3605.0 | 3.37 | 49.26 | | 2.92 | | 0.00 | | 0.00 | 2.53 | 0.85 | 72.83 | 20.39 | 0.00 | 72.19 | 107.24 | 82.00 | 450 | 0.13 | 0.653 | 35.05 | 32.68% |
| | 6300A | MH6300A | MH6030A | | | | | 0.0 | 0.0 | 4.00 | 0.00 | 2.22 | 2.22 | | 0.00 | | 0.00 | 1.93 | 2.22 | 2.22 | 0.62 | 0.00 | 2.55 | 20.24 | 15.00 | 200 | 0.35 | 0.624 | 17.69 | 87.41% |
| | 6030A | MH6030A | MH6040A | | | | | 0.0 | 3605.0 | 3.37 | 49.26 | | 5.14 | | 0.00 | | 0.00 | 4.46 | 0.00 | 75.05 | 21.01 | 0.00 | 74.74 | 107.24 | 85.37 | 450 | 0.13 | 0.653 | 32.50 | 30.31% |
| EXT TO SOUTH | 6400A | MH6400A | MH6401A | | 50.53 | | | 3284.5 | 3284.5 | 3.41 | 45.35 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 50.53 | 50.53 | 14.15 | 0.00 | 59.50 | 70.84 | 27.46 | 375 | 0.15 | 0.621 | 11.34 | 16.01% |
| Woodlot (infil only) | 6401A | MH6401A | MH6402A | 3.98 | | | | 0.0 | 3284.5 | 3.41 | 45.35 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 3.98 | 54.51 | 15.26 | 0.00 | 60.62 | 70.84 | 13.59 | 375 | 0.15 | 0.621 | 10.23 | 14.43% |
| | 6400B | MH6402A | MH6403A | | 1.43 | | | 93.0 | 3377.4 | 3.40 | 46.49 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.43 | 55.94 | 15.66 | 0.00 | 62.16 | 70.84 | 23.25 | 375 | 0.15 | 0.621 | 8.69 | 12.26% |
| | | MH6403A | MH6404A | | | | | 0.0 | 3377.4 | 3.40 | 46.49 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 55.94 | 15.66 | 0.00 | 62.16 | 70.84 | 59.64 | 375 | 0.15 | 0.621 | 8.69 | 12.26% |
| | | MH6404A | MH6405A | | | | | 0.0 | 3377.4 | 3.40 | 46.49 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 55.94 | 15.66 | 0.00 | 62.16 | 70.84 | 27.32 | 375 | 0.15 | 0.621 | 8.69 | 12.26% |
| | | MH6405A | MH6406A | | | | | 0.0 | 3377.4 | 3.40 | 46.49 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 55.94 | 15.66 | 0.00 | 62.16 | 70.84 | 29.25 | 375 | 0.15 | 0.621 | 8.69 | 12.26% |
| PARK | 6407A | MH6407A | MH6406A | 2.03 | | | | 0.0 | 0.0 | 4.00 | 0.00 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 2.03 | 2.03 | 0.57 | 0.00 | 0.57 | 20.24 | 16.29 | 200 | 0.35 | 0.624 | 19.67 | 97.19% |
| | | MH6406A | MH6040A | | | | | 0.0 | 3377.4 | 3.40 | 46.49 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 57.97 | 16.23 | 0.00 | 62.72 | 70.84 | 114.04 | 375 | 0.15 | 0.621 | 8.12 | 11.46% |
| | 6040A | MH6040A | MH6050A | | 0.18 | | | 11.7 | 6994.1 | 3.11 | 88.03 | | 5.14 | | 0.00 | | 0.00 | 4.46 | 0.18 | 133.20 | 37.30 | 0.00 | 129.79 | 148.80 | 85.00 | 525 | 0.11 | 0.666 | 19.02 | 12.78% |
| | 6500A | MH6500A | MH6501A | | 1.92 | | | 124.8 | 124.8 | 4.00 | 2.02 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.92 | 1.92 | 0.54 | 0.00 | 2.56 | 20.24 | 92.49 | 200 | 0.35 | 0.624 | 17.68 | 87.35% |
| | | MH6501A | MH6502A | | | | | 0.0 | 124.8 | 4.00 | 2.02 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.92 | 0.54 | 0.00 | 2.56 | 20.24 | 72.40 | 200 | 0.35 | 0.624 | 17.68 | 87.35% |
| | | MH6502A | MH6503A | | | | | 0.0 | 124.8 | 4.00 | 2.02 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.92 | 0.54 | 0.00 | 2.56 | 20.24 | 9.76 | 200 | 0.35 | 0.624 | 17.68 | 87.35% |
| | | MH6503A | MH6504A | | | | | 0.0 | 124.8 | 4.00 | 2.02 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.92 | 0.54 | 0.00 | 2.56 | 20.24 | 67.50 | 200 | 0.35 | 0.624 | 17.68 | 87.35% |
| | | MH6504A | MH6505A | | | | | 0.0 | 124.8 | 4.00 | 2.02 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.92 | 0.54 | 0.00 | 2.56 | 20.24 | 10.79 | 200 | 0.35 | 0.624 | 17.68 | 87.35% |
| | 6505A | MH6505A | MH6506A | | 1.52 | | | 98.8 | 223.6 | 4.00 | 3.62 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.52 | 3.44 | 0.96 | 0.00 | 4.59 | 20.24 | 53.66 | 200 | 0.35 | 0.624 | 15.66 | 77.34% |
| | | MH6506A | MH6507A | | | | | 0.0 | 223.6 | 4.00 | 3.62 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 3.44 | 0.96 | 0.00 | 4.59 | 20.24 | 61.34 | 200 | 0.35 | 0.624 | 15.66 | 77.34% |
| | | MH6507A | MH6508A | | | | | 0.0 | 223.6 | 4.00 | 3.62 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 3.44 | 0.96 | 0.00 | 4.59 | 20.24 | 8.00 | 200 | 0.35 | 0.624 | 15.66 | 77.34% |
| | | MH6508A | MH6509A | | | | | 0.0 | 223.6 | 4.00 | 3.62 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 3.44 | 0.96 | 0.00 | 4.59 | 20.24 | 29.46 | 200 | 0.35 | 0.624 | 15.66 | 77.34% |
| | | MH6509A | MH6510A | | | | | 0.0 | 223.6 | 4.00 | 3.62 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 3.44 | 0.96 | 0.00 | 4.59 | 20.24 | 48.43 | 200 | 0.35 | 0.624 | 15.66 | 77.34% |
| | 6511A | MH6511A | MH6512A | | 1.60 | | | 104.0 | 104.0 | 4.00 | 1.69 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.60 | 1.60 | 0.45 | 0.00 | 2.13 | 20.24 | 64.85 | 200 | 0.35 | 0.624 | 18.11 | 89.46% |
| | | MH6512A | MH6513A | | | | | 0.0 | 104.0 | 4.00 | 1.69 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.60 | 0.45 | 0.00 | 2.13 | 20.24 | 9.89 | 200 | 0.35 | 0.624 | 18.11 | 89.46% |
| | | MH6513A | MH6514A | | | | | 0.0 | 104.0 | 4.00 | 1.69 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.60 | 0.45 | 0.00 | 2.13 | 20.24 | 63.44 | 200 | 0.35 | 0.624 | 18.11 | 89.46% |
| | | MH6514A | MH6510A | | | | | 0.0 | 104.0 | 4.00 | 1.69 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.60 | 0.45 | 0.00 | 2.13 | 20.24 | 67.62 | 200 | 0.35 | 0.624 | 18.11 | 89.46% |
| | 6510A | MH6510A | MH6050A | | 0.37 | | | 24.1 | 351.7 | 4.00 | 5.70 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.37 | 5.41 | 1.51 | 0.00 | 7.21 | 20.24 | 85.00 | 200 | 0.35 | 0.624 | 13.03 | 64.37% |

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**SANITARY SEWER DESIGN SHEET**
**MER BLEUE Urban Expansion Area**
MSS Preferred Concept
CITY OF OTTAWA
Owners Group

| LOCATION | | | | RESIDENTIAL | | | | | | | | ICI AREAS | | | | | | | INFILTRATION ALLOWANCE | | | FIXED FLOW | TOTAL FLOW | PROPOSED SEWER DESIGN | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | AREA (Ha) | AREA w/o units (pp/Ha) | | | POPULATION | | PEAK FACTOR | PEAK FLOW (L/s) | AREA (Ha) | | | | | | PEAK FLOW (L/s) | AREA (Ha) | | FLOW (L/s) | (L/s) | (L/s) | CAPACITY (L/s) | LENGTH (m) | DIA (mm) | SLOPE (%) | VELOCITY (full) (m/s) | AVAILABLE CAPACITY | |
| STREET | AREA ID | FROM MH | TO MH | | LOW 65 | MED 110 | HIGH 85 | IND | CUM | | | INSTITUTIONAL IND | INSTITUTIONAL CUM | COMMERCIAL IND | COMMERCIAL CUM | INDUSTRIAL IND | INDUSTRIAL CUM | | IND | CUM | | | | | | | | L/s | (%) |
| | 6520A | MH6520A | MH6521A | | 1.62 | | | 105.3 | 105.3 | 4.00 | 1.71 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.62 | 1.62 | 0.45 | 0.00 | 2.16 | 20.24 | 117.52 | 200 | 0.35 | 0.624 | 18.08 | 89.33% |
| | | MH6521A | MH6522A | | | | | 0.0 | 105.3 | 4.00 | 1.71 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.62 | 0.45 | 0.00 | 2.16 | 20.24 | 11.41 | 200 | 0.35 | 0.624 | 18.08 | 89.33% |
| | | MH6522A | MH6523A | | | | | 0.0 | 105.3 | 4.00 | 1.71 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.62 | 0.45 | 0.00 | 2.16 | 20.24 | 73.71 | 200 | 0.35 | 0.624 | 18.08 | 89.33% |
| | 6524A | MH6524A | MH6523A | | 0.13 | | | 8.5 | 8.5 | 4.00 | 0.14 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.13 | 0.13 | 0.04 | 0.00 | 0.17 | 20.24 | 70.20 | 200 | 0.35 | 0.624 | 20.07 | 99.14% |
| | 6525A | MH6525A | MH6523A | | 0.95 | | | 61.8 | 61.8 | 4.00 | 1.00 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.95 | 0.95 | 0.27 | 0.00 | 1.27 | 20.24 | 117.33 | 200 | 0.35 | 0.624 | 18.98 | 93.74% |
| | 6523A | MH6523A | MH6526A | | 0.37 | | | 24.1 | 199.6 | 4.00 | 3.23 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.37 | 3.07 | 0.86 | 0.00 | 4.09 | 20.24 | 82.28 | 200 | 0.35 | 0.624 | 16.15 | 79.78% |
| | 6527A | MH6527A | MH6526A | | 0.95 | | | 61.8 | 61.8 | 4.00 | 1.00 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.95 | 0.95 | 0.27 | 0.00 | 1.27 | 20.24 | 117.29 | 200 | 0.35 | 0.624 | 18.98 | 93.74% |
| | 6526A | MH6526A | MH6050A | | 0.37 | | | 24.1 | 285.4 | 4.00 | 4.62 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.37 | 4.39 | 1.23 | 0.00 | 5.85 | 20.24 | 84.97 | 200 | 0.35 | 0.624 | 14.39 | 71.09% |
| | 6050A | MH6050A | MH6051A | | 1.03 | | | 67.0 | 7698.1 | 3.07 | 95.63 | | 5.14 | | 0.00 | | 0.00 | 4.46 | 1.03 | 144.03 | 40.33 | 0.00 | 140.42 | 148.80 | 117.54 | 525 | 0.11 | 0.666 | 8.38 | 5.63% |
| | 6051A | MH6051A | MH6053A | | 0.84 | | | 54.6 | 7752.7 | 3.06 | 96.21 | | 5.14 | | 0.00 | | 0.00 | 4.46 | 0.84 | 144.87 | 40.56 | 0.00 | 141.24 | 148.80 | 78.08 | 525 | 0.11 | 0.666 | 7.56 | 5.08% |
| | 6600A | MH6600A | MH6601A | | 1.90 | | | 123.5 | 123.5 | 4.00 | 2.00 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.90 | 1.90 | 0.53 | 0.00 | 2.53 | 20.24 | 78.62 | 200 | 0.35 | 0.624 | 17.71 | 87.49% |
| | | MH6601A | MH6602A | | | | | 0.0 | 123.5 | 4.00 | 2.00 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.90 | 0.53 | 0.00 | 2.53 | 20.24 | 75.79 | 200 | 0.35 | 0.624 | 17.71 | 87.49% |
| | | MH6602A | MH6603A | | | | | 0.0 | 123.5 | 4.00 | 2.00 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.90 | 0.53 | 0.00 | 2.53 | 20.24 | 11.56 | 200 | 0.35 | 0.624 | 17.71 | 87.49% |
| | | MH6603A | MH6604A | | | | | 0.0 | 123.5 | 4.00 | 2.00 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.90 | 0.53 | 0.00 | 2.53 | 20.24 | 73.95 | 200 | 0.35 | 0.624 | 17.71 | 87.49% |
| | 6607A | MH6607A | MH6606A | | 1.38 | | | 89.7 | 89.7 | 4.00 | 1.45 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.38 | 1.38 | 0.39 | 0.00 | 1.84 | 20.24 | 86.81 | 200 | 0.35 | 0.624 | 18.40 | 90.91% |
| | | MH6606A | MH6604A | | | | | 0.0 | 89.7 | 4.00 | 1.45 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.38 | 0.39 | 0.00 | 1.84 | 20.24 | 83.70 | 200 | 0.35 | 0.624 | 18.40 | 90.91% |
| | 6604A | MH6604A | MH6605A | | 0.39 | | | 25.4 | 238.6 | 4.00 | 3.87 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.39 | 3.67 | 1.03 | 0.00 | 4.89 | 20.24 | 81.84 | 200 | 0.35 | 0.624 | 15.35 | 75.83% |
| | 6608A | MH6608A | MH6609A | | 1.38 | | | 89.7 | 89.7 | 4.00 | 1.45 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.38 | 1.38 | 0.39 | 0.00 | 1.84 | 20.24 | 86.33 | 200 | 0.35 | 0.624 | 18.40 | 90.91% |
| | | MH6609A | MH6605A | | | | | 0.0 | 89.7 | 4.00 | 1.45 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.38 | 0.39 | 0.00 | 1.84 | 20.24 | 83.70 | 200 | 0.35 | 0.624 | 18.40 | 90.91% |
| | 6605A | MH6605A | MH6621A | | 0.36 | | | 23.4 | 351.7 | 4.00 | 5.70 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.36 | 5.41 | 1.51 | 0.00 | 7.21 | 20.24 | 85.00 | 200 | 0.35 | 0.624 | 13.03 | 64.37% |
| | 6620A | MH6620A | MH6621A | | 0.62 | | | 40.3 | 40.3 | 4.00 | 0.65 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.62 | 0.62 | 0.17 | 0.00 | 0.83 | 20.24 | 71.07 | 200 | 0.35 | 0.624 | 19.42 | 95.92% |
| | 6621A | MH6621A | MH6053A | | 0.28 | | | 18.2 | 410.2 | 4.00 | 6.65 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.28 | 6.31 | 1.77 | 0.00 | 8.41 | 148.80 | 104.05 | 525 | 0.11 | 0.666 | 140.39 | 94.35% |
| | | MH6053A | P.S. | | | | | 0.0 | 8162.8 | 3.04 | 100.58 | | 5.14 | | 0.00 | | 0.00 | 4.46 | 0.00 | 151.18 | 42.33 | 0.00 | 147.37 | 212.45 | 27.40 | 600 | 0.11 | 0.728 | 65.08 | 30.63% |
| | | | | 9.92 | 125.39 | 7.94 | 2.79 | 8162.8 | TRUE | | | 5.14 | TRUE | 0.00 | TRUE | 0.00 | TRUE | | 151.18 | TRUE | | | | | | | | | | |
| | | | | | | | | 146.0 | | | | | | | | | | | 151.18 | TRUE | | | | | | | | | | |

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# SANITARY SEWER DESIGN SHEET

**MER BLEUE Urban Expansion Area**
MSS Preferred Concept
CITY OF OTTAWA
Owners Group

| LOCATION | | | | RESIDENTIAL | | | | | | | | ICI AREAS | | | | | | | INFILTRATION ALLOWANCE | | | FIXED FLOW | TOTAL FLOW | PROPOSED SEWER DESIGN | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | AREA (Ha) | AREA w/o units (pp/Ha) | | | POPULATION | | PEAK FACTOR | PEAK FLOW (L/s) | AREA (Ha) | | | | | | PEAK FLOW (L/s) | AREA (Ha) | | FLOW (L/s) | | | CAPACITY (L/s) | LENGTH (m) | DIA (mm) | SLOPE (%) | VELOCITY (full) (m/s) | AVAILABLE CAPACITY | |
| STREET | AREA ID | FROM MH | TO MH | | LOW 65 | MED 110 | HIGH 85 | IND | CUM | | | INSTITUTIONAL IND | INSTITUTIONAL CUM | COMMERCIAL IND | COMMERCIAL CUM | INDUSTRIAL IND | INDUSTRIAL CUM | | IND | CUM | | | | | | | | L/s | (%) |
| **Tenth Line Road Forcemain** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tenth Line Rd | | P.S. | BEND | | | | | | | | | | | | | | | | | | | 147.37 | 147.37 | | 8.68 | 200 | 0.01 | | |
| Tenth Line Rd | | BEND | BEND | | | | | | | | | | | | | | | | | | | 147.37 | 147.37 | | 5.23 | 200 | 0.01 | | |
| Tenth Line Rd | | BEND | BEND | | | | | | | | | | | | | | | | | | | 147.37 | 147.37 | | 176.48 | 200 | 0.01 | | |
| Tenth Line Rd | | BEND | MH8000A | | | | | | | | | | | | | | | | | | | 147.37 | 147.37 | | 685.42 | 200 | 0.01 | | |
| **Tenth Line Road Gravity Trunk Sewer** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tenth Line Rd | | MH8000A | MH8001A | | | | | 0.0 | 3558.4 | 3.38 | 48.70 | | 2.54 | 0.00 | 3.83 | | 0.0 | 5.53 | 0.00 | 63.2 | 17.68 | 147.37 | 219.28 | 367.27 | 111.50 | 750 | 0.10 | 0.805 | 147.99 | 40.29% |
| Tenth Line Rd | | MH8001A | MH8002A | | | | | 0.0 | 3558.4 | 3.38 | 48.70 | | 2.54 | 0.00 | 3.83 | | 0.00 | 5.53 | 0.00 | 63.15 | 17.68 | 147.37 | 219.28 | 367.27 | 111.50 | 750 | 0.10 | 0.805 | 147.99 | 40.29% |
| Tenth Line Rd | | MH8002A | MH8003A | | | | | 0.0 | 3558.4 | 3.38 | 48.70 | | 2.54 | 0.00 | 3.83 | | 0.00 | 5.53 | 0.00 | 63.15 | 17.68 | 147.37 | 219.28 | 367.27 | 111.50 | 750 | 0.10 | 0.805 | 147.99 | 40.29% |
| Tenth Line Rd | | MH8003A | MH8004A | | | | | 0.0 | 3558.4 | 3.38 | 48.70 | | 2.54 | 0.00 | 3.83 | | 0.00 | 5.53 | 0.00 | 63.15 | 17.68 | 147.37 | 219.28 | 367.27 | 111.50 | 750 | 0.10 | 0.805 | 147.99 | 40.29% |
| Tenth Line Rd | | MH8004A | MH8005A | | | | | 0.0 | 3558.4 | 3.38 | 48.70 | | 2.54 | 0.00 | 3.83 | | 0.00 | 5.53 | 0.00 | 63.15 | 17.68 | 147.37 | 219.28 | 367.27 | 111.50 | 750 | 0.10 | 0.805 | 147.99 | 40.29% |
| Tenth Line Rd | | MH8005A | MH8006A | | | | | 0.0 | 3558.4 | 3.38 | 48.70 | | 2.54 | 0.00 | 3.83 | | 0.00 | 5.53 | 0.00 | 63.15 | 17.68 | 147.37 | 219.28 | 367.27 | 111.50 | 750 | 0.10 | 0.805 | 147.99 | 40.29% |
| Tenth Line Rd | | MH8006A | MH8007A | | | | | 0.0 | 3558.4 | 3.38 | 48.70 | | 2.54 | 0.00 | 3.83 | | 0.00 | 5.53 | 0.00 | 63.15 | 17.68 | 147.37 | 219.28 | 367.27 | 117.98 | 750 | 0.10 | 0.805 | 147.99 | 40.29% |
| Tenth Line Rd | | MH8007A | MH514A | | | | | 0.0 | 3558.4 | 3.38 | 48.70 | | 2.54 | 0.00 | 3.83 | | 0.00 | 5.53 | 0.00 | 63.15 | 17.68 | 147.37 | 219.28 | 367.27 | 37.07 | 750 | 0.10 | 0.805 | 147.99 | 40.29% |
| | | Mh514A | MH8008A | | | | | 0.0 | 3558.4 | 3.38 | 48.70 | | 2.54 | 0.00 | 3.83 | | 0.00 | 5.53 | 0.00 | 63.15 | 17.68 | 147.37 | 219.28 | 367.27 | 81.06 | 750 | 0.10 | 0.805 | 147.99 | 40.29% |
| | | EX MH | MH8008A | | | | | 0.0 | 0.0 | 4.00 | 0.00 | | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 277.31 | 5.00 | 675 | 0.10 | 0.751 | 277.31 | 100.00% |
| | | MH80008A | MH8009A | | | | | 0.0 | 3558.4 | 3.38 | 48.70 | | 2.54 | 0.00 | 3.83 | | 0.00 | 5.53 | 0.00 | 63.15 | 17.68 | 147.37 | 219.28 | 277.31 | 26.45 | 675 | 0.10 | 0.751 | 58.03 | 20.93% |

**Design Parameters:**

Residential

| | | |
|---|---|---|
| LOW | 65 | p/p/ha |
| MED | 110 | p/p/ha |
| HIGH | 85 | p/p/ha |

ICI Areas

| | | | |
|---|---|---|---|
| | | | Peak Factor |
| INST | 50,000 | L/Ha/day | 1.5 |
| COM | 50,000 | L/Ha/day | 1.5 |
| IND | 35,000 | L/Ha/day | MOE Chart |
| | 17000 | L/Ha/day | |

**Notes:**

1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 350 L/day
3. Infiltration allowance: 0.28 L/s/Ha
4. Residential Peaking Factor:

Harmon Formula = 1+(14/(4+P^0.5))
where P = population in thousands

**Designed:** RM

**Checked:** DY

**Dwg. Reference:** 34739-8.2.1

| No. | Revision | Date |
|---|---|---|
| 1. | MSS - 3rd Submission | 2017-04 |

| File Reference: | Date: | Sheet No: |
|---|---|---|
| 34739.5.7.1 | 3/2/2017 | 1 of 1 |

# APPENDIX F

## EXCERPT FROM THE MER BLEUE MSS, TABLE 7.6 PRE-DEVELOPMENT PEAK FLOW RATES (IBI GROUP, DECEMBER 2017)

## FIGURE 5.3 PRE-DEVELOPMENT DRAINAGE AREA PLAN FROM THE MER BLEUE CDP (IBI GROUP, DECEMBER 2017)

## FIGURE 8.3.10.1 POTENTIAL DEVELOPMENT DRAINAGE AREA PLAN FROM THE MER BLEUE MSS (IBI GROUP, DECEMBER 2017)

- *Avalon West (Neighbourhood 5) Stormwater Management Facility Design* (IBI Group, October 2013); and

The following is the CDP-related supporting documentation:

- The Mer Bleue Expansion Area was evaluated in the *Mer Bleue Expansion Area, Community Design Plan, Master Servicing Study, Existing Conditions Report, Municipal Infrastructure* (IBI Group, May 2015); and,
- *Mer Bleue Expansion Study Area Environmental Management Plan DRAFT* (Morrison Hershfield, April 2017); henceforth referred to as the EMP.

#### *7.2.3.3 Regulatory Requirements*

**Water Quantity Control**

As noted above, McKinnons Creek is the recipient of surface runoff from the subject site. McKinnons Creek also accommodates flows from existing external stormwater management systems within the Avalon South (Neighbourhood 4) and Avalon West (Neighbourhood 5) developments.

It is recommended that the proposed SWM system for the Mer Bleue Expansion Study Area control peak flows in McKinnons Creek to pre-development levels at Point E (upstream of Navan Road), as presented in the EMP and summarized in the below **Table 7.6**. To be consistent with previously approved studies in the McKinnons Creek watershed, the 24 hour, SCS type II design storm has been used to evaluate peak flows. The pre-development drainage area plan and SWMHYMO Schematic are provided within **Figure 5. 3** and **Figure 5.3. 1**, respectively, within **Appendix B**.

**Table 7.6 Pre-Development Peak Flow Rates**

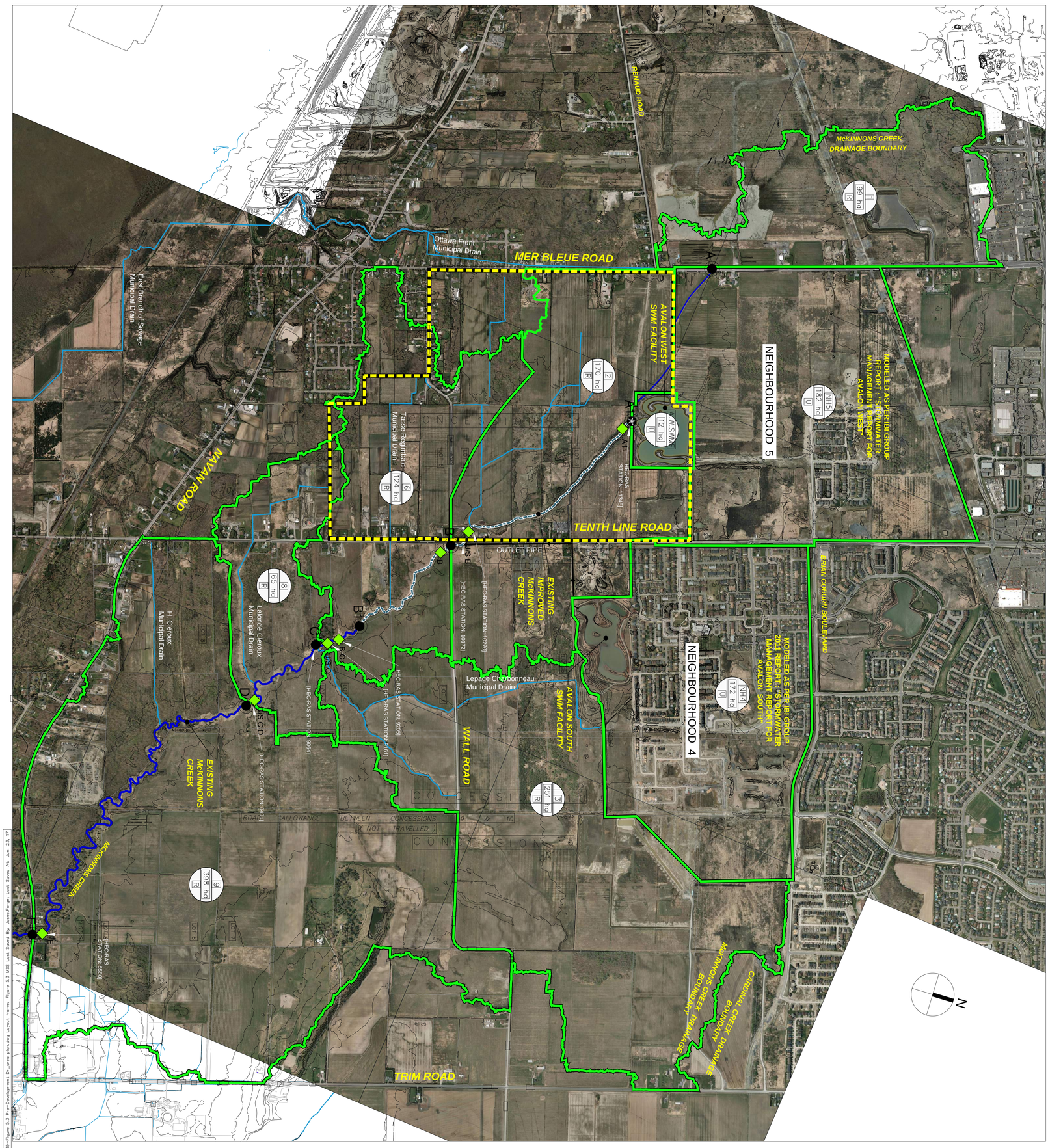
| STORM EVENT | PRE-DEVELOPMENT PEAK FLOW RATES (CMS) | | | | |
|---|---|---|---|---|---|
| | POINT A1 | POINT B | POINT C | POINT D | POINT E |
| 2 year 24 hour SCS Type II | 1.74 | 2.33 | 3.62 | 3.48 | 4.02 |
| 5 year 24 hour SCS Type II | 1.77 | 3.06 | 5.91 | 5.80 | 6.63 |
| 100 year 24 hour SCS Type II | 2.66 | 6.45 | 12.82 | 13.53 | 16.31 |

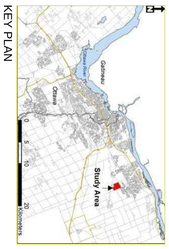
**Water Quality Control**

It is recommended that SWM facilities tributary to McKinnons Creek be designed to provide an Enhanced Level of Protection, or 80% removal of Total Suspended Solids (TSS) in accordance with the MOE Stormwater Management Planning and Design Manual (March, 2003).

**Erosion Potential**

The findings of the geomorphic assessment completed by Parish Geomorphic Ltd. indicate that the lowest critical discharge for the upper reaches of McKinnons Creek (Point A1 to downstream of Point B) are 0.40 cms, while the critical discharge is 1.43 cms for the lower reaches of McKinnons Creek (downstream of Point B to Point E Navan Road). Based on the low critical discharge for the upper reach of McKinnons Creek, it is recommended that the outlet of the proposed MBUEA SWM infrastructure be located downstream of Wall Road (Point B) to minimize the erosion potential of the upper reaches of the creek.




LEGEND:

- A1 — INTERFACE POINT FOR HYDROLOGIC / HYDRAULIC MODEL
- B — PEAK FLOW POINT (SWMHYMO)
- U/S C — EROSION ANALYSIS REFERENCE POINT
- EXISTING IMPROVED McKINNONS CREEK
- EXISTING McKINNONS CREEK
- STUDY AREA
- PRE-DEVELOPMENT DRAINAGE BOUNDARY
- [HECRAS STATION: 5580] PEAK FLOW LOCATION (HEC RAS)

Sheet No.

FIGURE 5.3
JUNE 2017

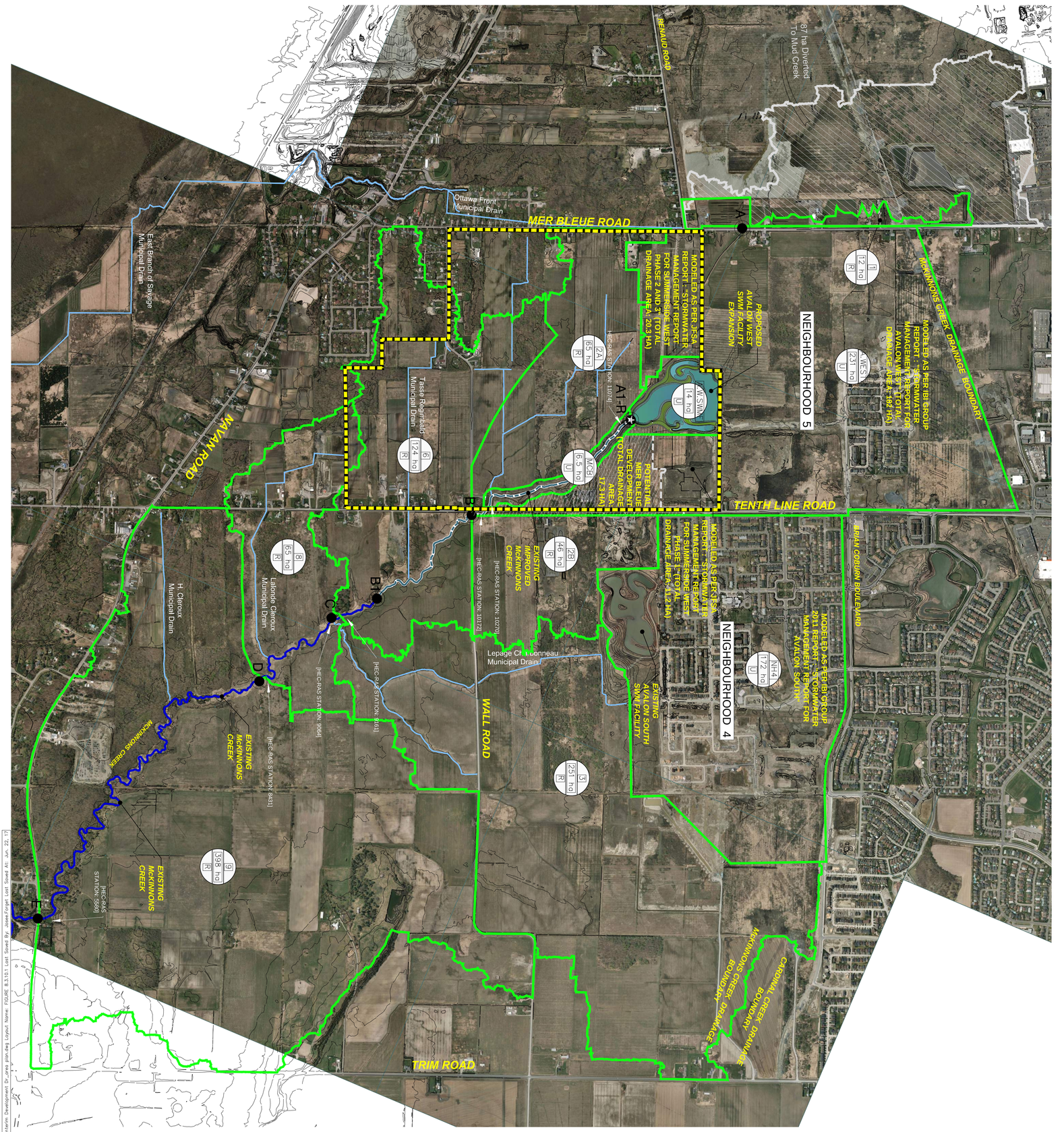
Drawing Title

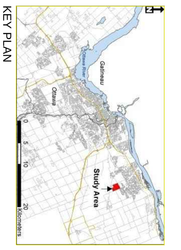
PRE-DEVELOPMENT DRAINAGE AREA PLAN

Project Title

MER BLEUE MASTER SERVICING STUDY

IBI




LEGEND:

- A1 — INTERFACE POINT FOR HYDROLOGIC / HYDRAULOGIC MODEL
- B — PEAK FLOW POINT (SWMHYMO)
- EXISTING IMPROVED McKINNONS CREEK
- EXISTING McKINNONS CREEK
- STUDY AREA
- PRE-DEVELOPMENT DRAINAGE BOUNDARY
- AREA DIVERTED TO MUD CREEK WATERSHED
- POTENTIAL DEVELOPMENT IN ADVANCE OF MCKINNONS CREEK ENHANCEMENT
- [HECRAS STATION: 5580] PEAK FLOW LOCATION (HEC RAS)

| Sheet No. | Drawing Title | Project Title |
|---|---|---|
| FIGURE 8.3.10.1<br>JUNE 2017 | POTENTIAL DEVELOPMENT IN ADVANCE OF MCKINNONS CREEK ENHANCEMENT | MER BLEUE MASTER SERVICING STUDY |

IBI

# APPENDIX G

## MARKUP OF FIGURE 9.1 MACRO GRADING FROM THE MER BLEUE MSS (IBI GROUP, DECEMBER 2017)

## SSW PHASE 4, 5 AND 6 STORM DESIGN SHEET (DSEL, NOVEMBER 2018)

## FIGURE 8.3A RECOMMENDED STORM TRUNK SERVICING FROM THE MER BLEUE MSS (IBI GROUP, DECEMBER 2017)

## STORM SEWER DESIGN SHEET FROM THE MER BLEUE MSS (IBI GROUP, DECEMBER 2017)

Existing Residential

Park

Elementary School

Park

FIRE STATION

EXISTING Pump Station

Existing Stormwater Management Facility

Parkette 0.9ha

CEPEO Secondary School 4.9ha

Stormwater Management Facility Expansion *(may included existing engineered creek)*

Neighbourhood Park 1.7ha

INFO FROM MSS
MH 2040
MH TG = 87.30
PIPE OBV = 84.92m
COVER = 2.38m

MH TG = +/-87.40
PIPE OBV = 85.24m
COVER = 2.16m

87.41m

1800 dia STM

210m @ 0.15%

0.6ha Parkette

PHASE 4 DEVELOPMENT AREA

235m @ 0.150%

OCSB Elementary School 2.5ha

N. Park 2.0ha *(including 0.8ha dry pond)*

87.00m CONTOUR

PIPE OBV = 85.59m

INFO FROM MSS
MH 2003
MH TG = 87.80
PIPE OBV = 85.30m
COVER = 2.50m

MEDIUM DENSITY RESIDENTIAL TO MH 2003

ACCESS CAN BE VIA PH 4 LANDS - i.e CAN BE RAISED TO DRAIN NORTH AGAINST NATURAL GRADES

MINOR SYSTEM ARTERIAL ROAD TO MH 2040

TENTH LINE ROAD

250m @ 0.150%

PIPE OBV = 85.96m

HIGH DENSITY RESIDENTIAL TO MH 2040 VIA TENTH LINE

ACCESS ASSUMED OF TENTH LINE ROAD

88.40 Proposed Grade

Ex. 86.36m

75m @ 0.150%

PIPE OBV = 86.15m

Ex. 86.26m

90m @ 0.150%

Ex. 86.09m

175m @ 0.150%

Ex. 85.62m

60m @ 0.150%

MER BLEUE ROAD

OCDSB Elementary School 2.9ha

N. Park 2.1ha *(including 0.9ha dry pond)*

+1 RISER REQUIRED

Community Park 6.3ha

Stormwater Management Facility 5.6ha

TENTH LINE ROAD

Dry Pond 0.5ha

Existing Residential

CECCE Elem. School 2.2ha

N. Park 2.0ha *(including 0.8ha dry pond)*

NEW Pump Station

Stormwater Management Facility 4.3ha

Vegetation Community/ Woodlot 5.1ha

NAVAN ROAD

LEGEND:

- Area drains to OGS for Treatment
- 87.35 / 86.46 PROPOSED GRADE / EXISTING GRADE
- MAJOR OVERLAND FLOW
- LIMITS OF AREA IDENTIFIED WHERE A GROUNDWATER IMPACT EVALUATION IS REQUIRED AT DETAIL DESIGN

Meters 50 0 50 100

1:2000

C:\34739-CorrDet-Report\5.0 Drawings\Visual\Layouts\MSS - Apr2017\Preferred Option\Figure 9.1 Macro Grading.dwg Layout: Name: Figure 9.1 Macro Grading Last Saved By: ddave Last Saved At: Jun. 26, 17

Sheet No.

FIGURE 9.1
JUNE 2017

Drawing Title

MACRO GRADING

Project Title

MER BLEUE
MASTER SERVICING STUDY

IBI

# 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 | | | | Time of | 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. | Conc. | 2 Year | 5 Year | 10 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 | (min) | (mm/h) | (mm/h) | (mm/h) | Q (l/s) | (actual) | (nominal) | | (%) | (m) | (l/s) | (m/s) | FLOW (min | Q/Q full |
| **TRUNK 4** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 0.30 | 0.70 | 0.58 | 0.58 | | | | 0.00 | | | | 0.00 | | | | | | | | | | | | | | |
| | | | | | | 0.58 | 0.31 | 0.85 | 0.73 | 0.73 | | | | 0.00 | | | | | | | | | | | | | | |
| | | | | | | 0.58 | 0.35 | 0.85 | 0.83 | 1.56 | | | | 0.00 | | | | | | | | | | | | | | |
| | | | 0.13 | 0.70 | 0.25 | 0.84 | | | | 1.56 | | | | 0.00 | | | | | | | | | | | | | | |
| | | | 0.42 | 0.70 | 0.82 | 1.65 | | | | 1.56 | | | | 0.00 | | | | | | | | | | | | | | |
| | 539 | 540 | 0.83 | 0.70 | 1.62 | 3.27 | | | | 1.56 | | | | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 414 | 900 | 900 | CONC | 0.10 | 91.5 | 572 | 0.90 | 1.69 | 0.72 |
| | | | 0.42 | 0.70 | 0.82 | 4.09 | | | | 1.56 | | | | 0.00 | | | | | | | | | | | | | | |
| | | | 1.04 | 0.70 | 2.02 | 6.11 | | | | 1.56 | | | | 0.00 | | | | | | | | | | | | | | |
| | 540 | 541 | | | | 6.11 | 0.13 | 0.85 | 0.31 | 1.87 | | | | 0.00 | 11.69 | 70.86 | 96.02 | 112.52 | 612 | 1050 | 1050 | CONC | 0.10 | 58.5 | 864 | 1.00 | 0.98 | 0.71 |
| | | | | | | 6.11 | 0.18 | 0.85 | 0.43 | 2.29 | | | | 0.00 | | | | | | | | | | | | | | |
| | 541 | 542 | 1.04 | 0.70 | 2.02 | 8.13 | | | | 2.29 | | | | 0.00 | 15.13 | 61.46 | 83.14 | 97.36 | 691 | 1200 | 1200 | CONC | 0.10 | 74.5 | 1233 | 1.09 | 1.14 | 0.56 |
| | | | 0.66 | 0.70 | 1.28 | 9.42 | | | | 2.29 | | | | 0.00 | | | | | | | | | | | | | | |
| | | | 1.42 | 0.70 | 2.76 | 12.18 | | | | 2.29 | | | | 0.00 | | | | | | | | | | | | | | |
| | 542 | 555 | | | | 12.18 | 0.10 | 0.85 | 0.24 | 2.53 | | | | 0.00 | 16.27 | 58.93 | 79.67 | 93.28 | 919 | 1200 | 1200 | CONC | 0.10 | 44.5 | 1233 | 1.09 | 0.68 | 0.75 |
| | | | | | | 12.18 | 0.20 | 0.85 | 0.47 | 3.00 | | | | 0.00 | | | | | | | | | | | | | | |
| | 555 | 559 | 1.56 | 0.70 | 3.04 | 15.22 | | | | 3.00 | | | | 0.00 | 16.95 | 57.52 | 77.75 | 91.02 | 1109 | 1500 | 1500 | CONC | 0.10 | 85.0 | 2235 | 1.26 | 1.12 | 0.50 |
| | | | | | | 15.22 | 0.26 | 0.70 | 0.51 | 3.51 | | | | 0.00 | | | | | | | | | | | | | | |
| | | | | | | 15.22 | 0.29 | 0.85 | 0.69 | 4.19 | | | | 0.00 | | | | | | | | | | | | | | |
| | 559 | 560 | 2.60 | 0.80 | 5.78 | 21.00 | 1.36 | 0.70 | 2.65 | 6.84 | | | | 0.00 | 18.07 | 55.36 | 74.79 | 87.55 | 1674 | 1650 | 1650 | CONC | 0.10 | 117.5 | 2882 | 1.35 | 1.45 | 0.58 |
| | | | | | | 21.00 | 0.28 | 0.85 | 0.66 | 7.50 | | | | 0.00 | | | | | | | | | | | | | | |
| | | | | | | 21.00 | 0.37 | 0.70 | 0.72 | 8.22 | | | | 0.00 | | | | | | | | | | | | | | |
| | 560 | 561 | 1.87 | 0.40 | 2.08 | 23.08 | | | | 8.22 | | | | 0.00 | 19.52 | 52.81 | 71.32 | 83.46 | 1805 | 1650 | 1650 | CONC | 0.10 | 115.5 | 2882 | 1.35 | 1.43 | 0.63 |
| | | | | | | 23.08 | 0.27 | 0.85 | 0.64 | 8.86 | | | | 0.00 | | | | | | | | | | | | | | |
| | | | | | | 23.08 | 0.52 | 0.70 | 1.01 | 9.87 | | | | 0.00 | | | | | | | | | | | | | | |
| | 561 | 576 | | | | 23.08 | | | | 9.87 | | | | 0.00 | 20.95 | 50.55 | 68.23 | 79.84 | 1840 | 1650 | 1650 | CONC | 0.10 | 111.5 | 2882 | 1.35 | 1.38 | 0.64 |
| | | | | | | 23.08 | 0.13 | 0.85 | 0.31 | 10.18 | | | | 0.00 | | | | | | | | | | | | | | |
| | 576 | 577 | 7.03 | 0.70 | 13.68 | 36.76 | | | | 10.18 | | | | 0.00 | 22.33 | 48.56 | 65.52 | 76.66 | 2452 | 1650 | 1650 | CONC | 0.10 | 58.5 | 2882 | 1.35 | 0.72 | 0.85 |
| | | | | | | 36.76 | 0.11 | 0.85 | 0.26 | 10.44 | | | | 0.00 | | | | | | | | | | | | | | |
| | | | | | | 36.76 | 0.47 | 0.70 | 0.91 | 11.35 | | | | 0.00 | | | | | | | | | | | | | | |
| **TRUNK 4 (BY OTHERS)** | | | | | | 36.76 | 0.52 | 0.70 | 1.01 | 12.36 | | | | 0.00 | | | | | | | | | | | | | | |
| | 577 | 578 (B.O.) | 1.12 | 0.70 | 2.18 | 38.94 | | | | 12.36 | | | | 0.00 | 23.05 | 47.59 | 64.19 | 75.10 | 2647 | 1800 | 1800 | CONC | 0.10 | 46.0 | 3635 | 1.43 | 0.54 | 0.73 |
| | 578 (B.O.) | 579 (B.O.) | | | | 38.94 | 0.19 | 0.85 | 0.45 | 12.81 | | | | 0.00 | 23.59 | 46.89 | 63.25 | 73.98 | 2636 | 1800 | 1800 | CONC | 0.10 | 78.0 | 3635 | 1.43 | 0.91 | 0.73 |
| | 579 (B.O.) | 580 (B.O.) | | | | 38.94 | 0.12 | 0.85 | 0.28 | 13.10 | | | | 0.00 | 24.50 | 45.76 | 61.71 | 72.18 | 2590 | 1800 | 1800 | CONC | 0.10 | 50.5 | 3635 | 1.43 | 0.59 | 0.71 |
| | | | 0.31 | 0.70 | 0.60 | 39.54 | | | | 13.10 | | | | 0.00 | | | | | | | | | | | | | | |
| | | | | | | 39.54 | 0.72 | 0.85 | 1.70 | 14.80 | | | | 0.00 | | | | | | | | | | | | | | |
| | | | | | | 39.54 | 0.93 | 0.70 | 1.81 | 16.61 | | | | 0.00 | | | | | | | | | | | | | | |
| | 580 (B.O.) | 581 (B.O.) | 10.72 | 0.70 | 20.86 | 60.40 | | | | 16.61 | | | | 0.00 | 25.09 | 45.06 | 60.76 | 71.06 | 3731 | 2100 | 2100 | CONC | 0.10 | 81.0 | 5483 | 1.58 | 0.85 | 0.68 |
| | | | 0.81 | 0.70 | 1.58 | 61.98 | | | | 16.61 | | | | 0.00 | | | | | | | | | | | | | | |
| | 581 (B.O.) | 582 (B.O.) | 2.08 | 0.70 | 4.05 | 66.03 | | | | 16.61 | | | | 0.00 | 25.94 | 44.09 | 59.43 | 69.51 | 3898 | 2100 | 2100 | CONC | 0.10 | 33.5 | 5483 | 1.58 | 0.35 | 0.71 |
| | 582 (B.O.) | 590 (B.O.) | 0.11 | 0.70 | 0.21 | 66.24 | | | | 16.61 | | | | 0.00 | 26.29 | 43.70 | 58.91 | 68.89 | 3873 | 2100 | 2100 | CONC | 0.10 | 68.5 | 5483 | 1.58 | 0.72 | 0.71 |
| | | | 0.71 | 0.70 | 1.38 | 67.62 | | | | 16.61 | | | | 0.00 | | | | | | | | | | | | | | |
| | | | 0.71 | 0.70 | 1.38 | 69.01 | | | | 16.61 | | | | 0.00 | | | | | | | | | | | | | | |
| | | | 0.59 | 0.40 | 0.66 | 69.66 | | | | 16.61 | | | | 0.00 | | | | | | | | | | | | | | |
| | | | 1.24 | 0.70 | 2.41 | 72.07 | | | | 16.61 | | | | 0.00 | | | | | | | | | | | | | | |
| | | | 1.42 | 0.70 | 2.76 | 74.84 | | | | 16.61 | | | | 0.00 | | | | | | | | | | | | | | |
| | 590 (B.O.) | 591 (B.O.) | 2.73 | 0.70 | 5.31 | 80.15 | | | | 16.61 | | | | 0.00 | 27.01 | 42.93 | 57.86 | 67.66 | 4402 | 2400 | 2400 | CONC | 0.10 | 106.0 | 7828 | 1.73 | 1.02 | 0.56 |
| | 591 (B.O.) | 592 (B.O.) | 0.26 | 0.70 | 0.51 | 80.66 | | | | 16.61 | | | | 0.00 | 28.04 | 41.89 | 56.44 | 66.00 | 4316 | 2400 | 2400 | CONC | 0.10 | 35.5 | 7828 | 1.73 | 0.34 | 0.55 |
| | 592 (B.O.) | 598 (B.O.) | 0.48 | 0.70 | 0.93 | 81.59 | | | | 16.61 | | | | 0.00 | 28.38 | 41.56 | 55.99 | 65.46 | 4321 | 2400 | 2400 | CONC | 0.10 | 75.0 | 7828 | 1.73 | 0.72 | 0.55 |
| | | | 0.89 | 0.70 | 1.73 | 83.32 | | | | 16.61 | | | | 0.00 | | | | | | | | | | | | | | |
| | | | 6.31 | 0.40 | 7.02 | 90.34 | | | | 16.61 | | | | 0.00 | | | | | | | | | | | | | | |
| | 598 (B.O.) | HW (B.O.) | 2.05 | 0.70 | 3.99 | 94.33 | | | | 16.61 | | | | 0.00 | 29.10 | 40.87 | 55.05 | 64.36 | 4769 | 2400 | 2400 | CONC | 0.10 | 67.0 | 7828 | 1.73 | 0.65 | 0.61 |
| **TRUNK 2** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 1.37 | 0.70 | 2.67 | 2.67 | | | | 0.00 | | | | 0.00 | | | | | | | | | | | | | | |
| | 418 | 425 | 3.17 | 0.80 | 7.05 | 9.72 | | | | 0.00 | | | | 0.00 | 12.83 | 67.41 | 91.29 | 106.95 | 655 | 1200 | 1200 | CONC | 0.10 | 112.0 | 1233 | 1.09 | 1.71 | 0.53 |
| | 425 | 426 | 2.28 | 0.70 | 4.44 | 14.15 | | | | 0.00 | | | | 0.00 | 14.79 | 62.27 | 84.24 | 98.66 | 881 | 1350 | 1350 | CONC | 0.10 | 65.0 | 1688 | 1.18 | 0.92 | 0.52 |
| | 426 | 427 | 1.50 | 0.70 | 2.92 | 17.07 | | | | 0.00 | | | | 0.00 | 15.71 | 60.14 | 81.33 | 95.23 | 1027 | 1500 | 1500 | CONC | 0.10 | 81.0 | 2235 | 1.26 | 1.07 | 0.46 |
| | | | 1.68 | 0.70 | 3.27 | 20.34 | | | | 0.00 | | | | 0.00 | | | | | | | | | | | | | | |
| | 427 | 428 | 0.46 | 0.40 | 0.51 | 20.85 | | | | 0.00 | 3.04 | 0.76 | 6.42 | 6.42 | 16.78 | 57.86 | 78.22 | 91.57 | 1795 | 1800 | 1800 | CONC | 0.10 | 72.0 | 3635 | 1.43 | 0.84 | 0.49 |
| | 428 | 429 | 1.20 | 0.70 | 2.34 | 23.19 | | | | 0.00 | | | 0.00 | 6.42 | 17.62 | 56.20 | 75.95 | 88.91 | 1874 | 1800 | 1800 | CONC | 0.10 | 55.5 | 3635 | 1.43 | 0.65 | 0.52 |
| | 429 | 430 | | | | 23.19 | | | | 0.00 | | | 0.00 | 6.42 | 18.27 | 54.99 | 74.29 | 86.96 | 1834 | 1800 | 1800 | CONC | 0.10 | 18.5 | 3635 | 1.43 | 0.22 | 0.50 |
| | 430 | HW | 1.63 | 0.70 | 3.17 | 26.36 | | | | 0.00 | | | 0.00 | 6.42 | 18.48 | 54.61 | 73.77 | 86.35 | 1994 | 1800 | 1800 | CONC | 0.10 | 60.0 | 3635 | 1.43 | 0.70 | 0.55 |

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

| | | | |
|---|---|---|---|
| Designed: P.P. | PROJECT: **Summerside West Phases 4, 5 & 6** | | |
| Checked: C.M.K. | LOCATION: **City of Ottawa** | | |
| Dwg. Reference: Storm Servicing Plan, Figure No. 5 | File Ref: 15-766 | Date: November, 2018 | Sheet No. 1 of 1 |

Multiples
Secondary School
Park
Multiples
Commercial
School
Park
Elementary School
Park
FIRE STATION
Park
EXISTING Pump Station
TRUNK 1A
TRUNK 1B
TRUNK 1C
TRUNK 2
TRUNK 3
TRUNK 4
TRUNK 5
TRUNK 6
OUTLET 1
OUTLET 1-2
Parkette 0.9ha
Approved Stormwater Management Facility 11.1ha
Neighbourhood Park 1.7ha
CEPEO Elementary School /Secondary School 5.9ha
Existing Residential
0.57ha Parkette
Stormwater Management Facility Expansion 4.0ha
OCSB Elementary School 2.4ha
N. Park 1.2ha
Dry Pond 0.8ha
McKinnon's Creek
OCDSB Elementary School 3.1ha
N. Park 1.5ha
Dry Pond 0.9ha
Community Park 6.5ha
Stormwater Management Facility 5.5ha
Dry Pond 0.5ha
Existing Residential
CECCE Elem. School 2.1ha
Dry Pond 0.8ha
N. Park 1.4ha
NEW Pump Station
Stormwater Management Facility 4.3ha
Vegetation Community/ Woodlot 5.1ha
MER BLEUE ROAD
TENTH LINE ROAD
WALL ROAD
NAVAN ROAD
Regional Road 174
N
Meters
50 0 50 100
1:4000

LEGEND:

- PROPOSED TRUNK STORM SEWER
- PROPOSED LOCAL STORM SEWER
- PROPOSED STORM OUTLET
- DRAINAGE SPLIT
- MH4000 — MANHOLE NODE
- MH3220 (12) — MANHOLE NODE (DSL MH ID)
- 450Ø — APPROXIMATE SEWER DIAMETER

J:\34739-CumbServReport\5.9 Drawings\59civil\layouts\MSS-Apr2017\Preferred Option\Figure 8.3A Recommended Storm Trunk Servicing.dwg Layout Name: Figure 8-3A STM Trunk Servicing Last Saved By: ddore Last Saved At: Jun. 27, 17

Sheet No.

FIGURE 8.3A
JUNE 2017

Drawing Title

RECOMMENDED STORM TRUNK SERVICING FOR UPDATED DEMONSTRATION PLAN

Project Title

MER BLEUE
MASTER SERVICING STUDY

IBI

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

**STORM SEWER DESIGN SHEET**
**MER BLEUE Urban Expansion Area**
MSS Preferred Concept
CITY OF OTTAWA
Owners Group

| LOCATION | | | | AREA (Ha) | | | | | | | | | | | | RATIONAL DESIGN FLOW | | | | | | | | | | | | SEWER DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STREET | AREA ID | FROM | TO | C= 0.20 | C= 0.30 | C= 0.40 | C= 0.54 | C= 0.57 | C= 0.70 | C= 0.71 | C= 0.73 | C= 0.74 | C= 0.70 | C= 0.76 | C= 0.80 | IND 2.78AC | CUM 2.78AC | INLET (min) | TIME IN PIPE | TOTAL (min) | i (2) (mm/hr) | i (5) (mm/hr) | i (100) (mm/hr) | 2yr PEAK FLOW (L/s) | 5yr PEAK FLOW (L/s) | 100yr PEAK FLOW (L/s) | FIXED FLOW (L/s) | DESIGN FLOW (L/s) | CAPACITY (L/s) | LENGTH (m) | PIPE SIZE (mm) DIA | W | H | SLOPE (%) | VELOCITY (m/s) | AVAIL CAP (2yr) (L/s) | (%) |
| **OUTLET #1: AVALON POND 5 (West)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1002AB | 1002 | 1003 | | | | | | | | 0.28 | 0.10 | | | | 0.77 | 0.77 | 10.00 | 1.28 | 11.28 | 76.81 | 104.19 | 178.56 | 59.44 | | | | 59.44 | 148.72 | 69.52 | 450 | | | 0.25 | 0.906 | 89.27 | 60.03% |
| | 1003ABC | 1003 | 1004 | | | | | 0.16 | | | 0.24 | 0.13 | | | | 1.01 | 1.78 | 11.28 | 1.01 | 12.29 | 72.22 | 97.89 | 167.65 | 128.69 | | | | 128.69 | 286.47 | 59.51 | 600 | | | 0.20 | 0.982 | 157.77 | 55.08% |
| | | 1004 | 1005 | | | | | | | | | | | | | 0.00 | 1.78 | 12.29 | 0.20 | 12.49 | 69.01 | 93.48 | 160.03 | 122.97 | | | | 122.97 | 286.47 | 11.69 | 600 | | | 0.20 | 0.982 | 163.50 | 57.07% |
| | 1005AB | 1005 | 1006 | | | | | | | | 0.12 | 0.16 | | | | 0.57 | 2.35 | 12.49 | 0.76 | 13.25 | 68.41 | 92.66 | 158.62 | 161.08 | | | | 161.08 | 286.47 | 44.98 | 600 | | | 0.20 | 0.982 | 125.38 | 43.77% |
| | 1007AB | 1007 | 1008 | | | | | | | | | 0.42 | | | | 0.86 | 0.86 | 10.00 | 1.40 | 11.40 | 76.81 | 104.19 | 178.56 | 66.36 | | | | 66.36 | 148.72 | 75.90 | 450 | | | 0.25 | 0.906 | 82.36 | 55.38% |
| | 1008 | 1008 | 1009 | | | | | 0.15 | | | | | | | | 0.24 | 1.10 | 11.40 | 0.20 | 11.60 | 71.83 | 97.35 | 166.73 | 79.14 | | | | 79.14 | 148.72 | 11.07 | 450 | | | 0.25 | 0.906 | 69.58 | 46.79% |
| | 1009AB | 1009 | 1006 | | | | | 0.27 | | | | 0.15 | | | | 0.74 | 1.84 | 11.60 | 0.84 | 12.44 | 71.16 | 96.44 | 165.14 | 130.81 | | | | 130.81 | 265.43 | 60.18 | 525 | | | 0.35 | 1.188 | 134.62 | 50.72% |
| | 1006A-C | 1006 | 1202 | | | | | 0.22 | | | 0.15 | 0.06 | | | | 0.78 | 4.97 | 13.25 | 1.08 | 14.33 | 66.23 | 89.67 | 153.44 | 329.10 | | | | 329.10 | 579.98 | 68.00 | 825 | | | 0.15 | 1.051 | 250.88 | 43.26% |
| | 1200A-F | 1200 | 1201 | | | | | 0.20 | | | 0.57 | 0.06 | | | | 1.60 | 1.60 | 10.00 | 0.95 | 10.95 | 76.81 | 104.19 | 178.56 | 122.67 | | | | 122.67 | 224.33 | 56.94 | 525 | | | 0.25 | 1.004 | 101.66 | 45.32% |
| | 1201A-C | 1201 | 1202 | | | | | | | | 0.32 | 0.18 | | | | 1.02 | 2.62 | 10.95 | 1.55 | 12.49 | 73.36 | 99.45 | 170.36 | 191.96 | | | | 191.96 | 339.63 | 85.26 | 675 | | | 0.15 | 0.919 | 147.67 | 43.48% |
| | 1202A-H | 1202 | 1203 | | | | | 0.23 | | | | 0.64 | | | | 1.68 | 9.27 | 14.33 | 1.26 | 15.59 | 63.39 | 85.79 | 146.74 | 587.49 | | | | 587.49 | 4,154.07 | 120.00 | 1800 | | | 0.12 | 1.581 | 3566.58 | 85.86% |
| | 1203 | 1203 | 1070 | | | | | | | | | 0.24 | | | | 0.49 | 9.76 | 15.59 | 0.95 | 16.55 | 60.40 | 81.68 | 139.66 | 589.54 | | | | 589.54 | 4,154.07 | 90.56 | 1800 | | | 0.12 | 1.581 | 3564.53 | 85.81% |
| | 1207A-C | 1207 | 1070 | | | | 0.15 | 0.09 | | 0.11 | | | | | | 0.58 | 0.58 | 10.00 | 0.32 | 10.32 | 76.81 | 104.19 | 178.56 | 44.92 | | | | 44.92 | 112.79 | 29.61 | 300 | | | 1.25 | 1.546 | 67.87 | 60.17% |
| | 1100AB | 1100 | 1101 | | | | 0.15 | | | 0.08 | | | | | | 0.38 | 0.38 | 10.00 | 0.31 | 10.31 | 76.81 | 104.19 | 178.56 | 29.42 | | | | 29.42 | 131.53 | 33.61 | 300 | | | 1.70 | 1.803 | 102.11 | 77.63% |
| | 1901A | 1901 | 1101 | | | | | | | 0.50 | | | | | | 0.99 | 0.99 | 10.00 | 1.93 | 11.93 | 76.81 | 104.19 | 178.56 | 75.80 | | | | 75.80 | 148.72 | 105.07 | 450 | | | 0.25 | 0.906 | 72.92 | 49.03% |
| | 1101AB | 1101 | 1060 | | | | 0.19 | | | 0.19 | | | | | | 0.66 | 2.03 | 11.93 | 1.32 | 13.25 | 70.10 | 94.98 | 162.63 | 142.32 | | | | 142.32 | 245.74 | 87.14 | 525 | | | 0.30 | 1.100 | 103.42 | 42.08% |
| | 1921A | 1921 | 1060 | | | | | | | 0.14 | | | | | | 0.28 | 0.28 | 10.00 | 0.72 | 10.72 | 76.81 | 104.19 | 178.56 | 21.22 | | | | 21.22 | 320.28 | 47.25 | 600 | | | 0.25 | 1.097 | 299.06 | 93.37% |
| **Future School** | 1060A | 1208 | 1060 | | | | | | 5.24 | | | | | | | 10.20 | 10.20 | 10.00 | 0.21 | 10.21 | 76.81 | 104.19 | 178.56 | 783.18 | | | | 783.18 | 1,575.26 | 16.60 | 1200 | | | 0.15 | 1.349 | 792.08 | 50.28% |
| | 1060AB | 1060 | 1020 | | | | | | | 0.42 | | | | | | 0.83 | 13.33 | 13.25 | 1.54 | 14.79 | 66.22 | 89.66 | 153.43 | 882.91 | | | | 882.91 | 1,928.87 | 120.61 | 1350 | | | 0.12 | 1.305 | 1045.97 | 54.23% |
| **Park** | 1020A | | 1020 | | | 0.86 | | | | | | | | | | 0.96 | 0.96 | 10.00 | 0.16 | 10.16 | 76.81 | 104.19 | 178.56 | 73.45 | | | | 73.45 | 129.34 | 11.00 | 375 | | | 0.50 | 1.134 | 55.89 | 43.21% |
| | 1020BC | 1020 | 1070 | | | | | 0.07 | | 0.24 | | | | | | 0.58 | 14.87 | 14.79 | 0.50 | 15.29 | 62.26 | 84.23 | 144.06 | 926.01 | | | | 926.01 | 2,156.55 | 43.75 | 1350 | | | 0.15 | 1.460 | 1230.54 | 57.06% |
| | 1070 | 1070 | 1080 | | | | | | | 0.25 | | | | | | 0.49 | 25.71 | 16.55 | 0.79 | 17.34 | 58.34 | 78.86 | 134.80 | 1,500.02 | | | | 1,500.02 | 4,154.07 | 74.58 | 1800 | | | 0.12 | 1.581 | 2654.05 | 63.89% |
| | | 1800 | 1801 | | | | | | | | | | | | | 0.00 | 0.00 | 10.00 | 0.26 | 10.26 | 76.81 | 104.19 | 178.56 | 0.00 | | | | 0.00 | 63.80 | 13.65 | 300 | | | 0.40 | 0.874 | 63.80 | 100.00% |
| | 1801AB | 1801 | 1080 | | | | 0.45 | | | 0.43 | | | | | | 1.52 | 1.52 | 10.26 | 1.76 | 12.02 | 75.82 | 102.84 | 176.21 | 115.57 | | | | 115.57 | 200.65 | 94.93 | 525 | | | 0.20 | 0.898 | 85.07 | 42.40% |
| | 1080 | 1080 | 1090 | | | | | | | 0.25 | | | | | | 0.49 | 27.73 | 17.34 | 0.79 | 18.12 | 56.75 | 76.70 | 131.07 | 1,573.82 | | | | 1,573.82 | 4,154.07 | 74.81 | 1800 | | | 0.12 | 1.581 | 2580.25 | 62.11% |
| | 1901B | 1901 | 1910 | | | | | | | 0.22 | | | | | | 0.43 | 0.43 | 10.00 | 1.54 | 11.54 | 76.81 | 104.19 | 178.56 | 33.35 | | | | 33.35 | 100.18 | 81.06 | 375 | | | 0.30 | 0.879 | 66.83 | 66.71% |
| | 1911A-C | 1911 | 1910 | | | | 0.18 | | | 0.07 | | | | | | 0.41 | 0.41 | 10.00 | 0.56 | 10.56 | 76.81 | 104.19 | 178.56 | 31.37 | | | | 31.37 | 71.33 | 33.00 | 300 | | | 0.50 | 0.978 | 39.97 | 56.03% |
| | 1903AB | 1903 | 1904 | | | | 0.15 | | | 0.19 | | | | | | 0.60 | 0.60 | 10.00 | 1.04 | 11.04 | 76.81 | 104.19 | 178.56 | 46.10 | | | | 46.10 | 148.72 | 56.43 | 450 | | | 0.25 | 0.906 | 102.62 | 69.00% |
| | 1904 | 1904 | 1910 | | | | | | | 0.50 | | | | | | 0.99 | 1.59 | 11.04 | 2.21 | 13.25 | 73.04 | 99.01 | 169.59 | 115.92 | | | | 115.92 | 200.65 | 119.13 | 525 | | | 0.20 | 0.898 | 84.73 | 42.23% |
| | 1910A-C | 1910 | 1920 | | | | 0.69 | | | 0.13 | | | | | | 1.29 | 3.72 | 13.25 | 1.27 | 14.52 | 66.23 | 89.68 | 153.46 | 246.53 | | | | 246.53 | 654.22 | 76.00 | 900 | | | 0.12 | 0.996 | 407.69 | 62.32% |
| | 1921B | 1921 | 1922 | | | | | | | 0.35 | | | | | | 0.69 | 0.69 | 10.00 | 1.09 | 11.09 | 76.81 | 104.19 | 178.56 | 53.06 | | | | 53.06 | 100.18 | 57.56 | 375 | | | 0.30 | 0.879 | 47.13 | 47.04% |
| | 1922 | 1922 | 1920 | | | | | | | 0.22 | | | | | | 0.43 | 1.13 | 11.09 | 1.43 | 12.52 | 72.85 | 98.76 | 169.16 | 81.96 | | | | 81.96 | 148.72 | 77.78 | 450 | | | 0.25 | 0.906 | 66.75 | 44.89% |
| | 1903B-D | 1930 | 1924 | | | | 0.04 | | | 0.11 | | | | | | 0.28 | 0.28 | 10.00 | 1.38 | 11.38 | 76.81 | 104.19 | 178.56 | 21.29 | | | | 21.29 | 59.68 | 67.81 | 300 | | | 0.35 | 0.818 | 38.39 | 64.33% |
| | 1924AB | 1924 | 1925 | | | | | | | 0.21 | | | | | | 0.41 | 0.69 | 11.38 | 0.22 | 11.60 | 71.88 | 97.42 | 166.84 | 49.72 | | | | 49.72 | 100.18 | 11.61 | 375 | | | 0.30 | 0.879 | 50.47 | 50.38% |
| | 1925 | 1925 | 1926 | | | | | | | 0.27 | | | | | | 0.53 | 1.22 | 11.60 | 1.68 | 13.28 | 71.16 | 96.43 | 165.13 | 87.14 | | | | 87.14 | 148.72 | 91.40 | 450 | | | 0.25 | 0.906 | 61.58 | 41.41% |
| | 1926 | 1926 | 1920 | | | | | | | 0.23 | | | | | | 0.45 | 1.68 | 13.28 | 1.48 | 14.77 | 66.14 | 89.55 | 153.24 | 111.02 | | | | 111.02 | 248.09 | 75.59 | 600 | | | 0.15 | 0.850 | 137.07 | 55.25% |
| | 1920A-C | 1920 | 1930 | | | | 0.59 | | | 0.13 | | | | | | 1.14 | 7.67 | 14.77 | 1.02 | 15.79 | 62.33 | 84.32 | 144.21 | 477.92 | | | | 477.92 | 986.85 | 67.75 | 1050 | | | 0.12 | 1.104 | 508.93 | 51.57% |
| | 1800 | 1800 | 1930 | | | | | | | 0.28 | | | | | | 0.55 | 0.55 | 10.00 | 1.49 | 11.49 | 76.81 | 104.19 | 178.56 | 42.45 | | | | 42.45 | 148.72 | 81.19 | 450 | | | 0.25 | 0.906 | 106.27 | 71.46% |
| | | | | | | | | | | | | | | | | | 4.11 | =50% of flow to MH1090/DSELMH36 and MH1932/DSELMH31 | | | | | | | | | | | | | | | | | | |
| | 1930AB | 1930 | 1090 | | | | 0.21 | | | 0.36 | | | | | | 1.03 | 5.14 | 15.79 | 1.46 | 17.24 | 59.97 | 81.09 | 138.64 | 308.00 | | | | 308.00 | 1,408.95 | 105.44 | 1200 | | | 0.12 | 1.207 | 1100.95 | 78.14% |
| | 1090AB | 1090 | 1092 | | | | 0.24 | | | 0.18 | | | | | | 0.72 | 33.58 | 18.12 | 0.57 | 18.70 | 55.26 | 74.66 | 127.54 | 1,855.73 | | | | 1,855.73 | 4,154.07 | 54.28 | 1800 | | | 0.12 | 1.581 | 2298.34 | 55.33% |
| | | 1092 | 1091 | | | | | | | | | | | | | 0.00 | 33.58 | 18.70 | 0.12 | 18.82 | 54.23 | 73.25 | 125.12 | 1,821.12 | | | | 1,821.12 | 4,154.07 | 11.66 | 1800 | | | 0.12 | 1.581 | 2332.95 | 56.16% |
| | 1930C | 1930 | 1932 | | | | | | | 0.27 | | | | | | 0.53 | 4.64 | 14.77 | 0.95 | 15.71 | 62.33 | 84.32 | 144.21 | 289.40 | | | | 289.40 | 1,408.95 | 68.46 | 1200 | | | 0.12 | 1.207 | 1119.56 | 79.46% |
| | | 1932 | 1940 | | | | | | | | | | | | | 0.00 | 4.64 | 15.71 | 0.17 | 15.88 | 60.14 | 81.33 | 139.05 | 279.24 | | | | 279.24 | 1,408.95 | 12.39 | 1200 | | | 0.12 | 1.207 | 1129.71 | 80.18% |
| | 1940 | 1940 | 1941 | | | | | | | 0.45 | | | | | | 0.89 | 5.53 | 15.88 | 1.23 | 17.11 | 59.76 | 80.81 | 138.16 | 330.57 | | | | 330.57 | 1,408.95 | 88.88 | 1200 | | | 0.12 | 1.207 | 1078.39 | 76.54% |
| | | 1941 | 1091 | | | | | | | | | | | | | 0.00 | 5.53 | 17.11 | 0.31 | 17.42 | 57.20 | 77.31 | 132.11 | 316.39 | | | | 316.39 | 1,408.95 | 22.56 | 1200 | | | 0.12 | 1.207 | 1092.56 | 77.54% |

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**STORM SEWER DESIGN SHEET**
**MER BLEUE Urban Expansion Area**
MSS Preferred Concept
CITY OF OTTAWA
Owners Group

| LOCATION | | | | AREA (Ha) | | | | | | | | | | | | RATIONAL DESIGN FLOW | | | | | | | | | | | | SEWER DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STREET | AREA ID | FROM | TO | C= 0.20 | C= 0.30 | C= 0.40 | C= 0.54 | C= 0.57 | C= 0.70 | C= 0.71 | C= 0.73 | C= 0.74 | C= 0.70 | C= 0.76 | C= 0.80 | IND 2.78AC | CUM 2.78AC | INLET (min) | TIME IN PIPE | TOTAL (min) | i (2) (mm/hr) | i (5) (mm/hr) | i (100) (mm/hr) | 2yr PEAK FLOW (L/s) | 5yr PEAK FLOW (L/s) | 100yr PEAK FLOW (L/s) | FIXED FLOW (L/s) | DESIGN FLOW (L/s) | CAPACITY (L/s) | LENGTH (m) | PIPE SIZE (mm) DIA | W | H | SLOPE (%) | VELOCITY (m/s) | AVAIL CAP (2yr) (L/s) | (%) |
| | 1091AB | 1091 | RAD | | | | 0.16 | | | | | | | | | 0.24 | 39.35 | 18.82 | 0.10 | 18.92 | 54.01 | 72.96 | 124.61 | 2,125.61 | | | | 2,125.61 | 5,142.48 | 10.31 | 1950 | | | 0.12 | 1.668 | 3016.87 | 58.67% |
| | | RAD | RAD | | | | | | | | | | | | | 0.00 | 39.35 | 18.92 | 0.20 | 19.13 | 53.83 | 72.71 | 124.19 | 2,118.55 | | | | 2,118.55 | 5,142.48 | 20.39 | 1950 | | | 0.12 | 1.668 | 3023.93 | 58.80% |
| | | RAD | 10001 | | | | | | | | | | | | | 0.00 | 39.35 | 19.13 | 0.06 | 19.19 | 53.48 | 72.23 | 123.36 | 2,104.74 | | | | 2,104.74 | 5,142.48 | 6.17 | 1950 | | | 0.12 | 1.668 | 3037.75 | 59.07% |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | EXT | MH10001 | | | | | | | | | | | | | 0.00 | 0.00 | 25.00 | 0.13 | 25.13 | 45.17 | 60.90 | 103.85 | 0.00 | | | | 0.00 | 10,068.39 | 15.00 | 2550 | | | 0.11 | 1.910 | 10068.39 | 100.00% |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | MH10001 | MH10008 | | | | | | | | | | | | | 0.00 | 39.35 | 25.13 | 0.25 | 25.38 | 45.01 | 60.69 | 103.49 | 1,771.48 | | | | 1,771.48 | 15,688.99 | 28.57 | | 3000 | 2700 | 0.10 | 1.937 | 13917.51 | 88.71% |
| | | MH10008 | MH10002 | | | | | | | | | | | | | 0.00 | 39.35 | 25.38 | 0.39 | 25.77 | 44.73 | 60.30 | 102.82 | 1,760.30 | | | | 1,760.30 | 15,688.99 | 45.79 | | 3000 | 2700 | 0.10 | 1.937 | 13928.69 | 88.78% |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | EXT | MH10004 | | | | | | | | | | | | | 0.00 | 0.00 | 25.00 | 0.17 | 25.17 | 45.17 | 60.90 | 103.85 | 0.00 | | | | 0.00 | 3,792.13 | 15.00 | 1800 | | | 0.10 | 1.444 | 3792.13 | 100.00% |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | MH10002 | MH10003 | | | | | | | | | | | | | 0.00 | 39.35 | 25.38 | 0.24 | 25.62 | 44.73 | 60.30 | 102.82 | 1,760.30 | | | | 1,760.30 | 6,745.44 | 22.78 | | 2400 | 1800 | 0.10 | 1.561 | 4985.13 | 73.90% |
| | | | | 0.00 | 0.00 | 0.86 | 3.20 | 1.39 | 5.24 | 6.78 | 1.68 | 2.14 | 0.00 | 0.00 | 0.00 | 39.35 | TRUE | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | 21.29 | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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**STORM SEWER DESIGN SHEET**
**MER BLEUE Urban Expansion Area**
MSS Preferred Concept
CITY OF OTTAWA
Owners Group

| LOCATION | | | | AREA (Ha) | | | | | | | | | | | | RATIONAL DESIGN FLOW | | | | | | | | | | | | SEWER DATA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STREET | AREA ID | FROM | TO | C= 0.20 | C= 0.30 | C= 0.40 | C= 0.54 | C= 0.57 | C= 0.70 | C= 0.71 | C= 0.73 | C= 0.74 | C= 0.70 | C= 0.76 | C= 0.80 | IND 2.78AC | CUM 2.78AC | INLET (min) | TIME IN PIPE | TOTAL (min) | i (2) (mm/hr) | i (5) (mm/hr) | i (100) (mm/hr) | 2yr PEAK FLOW (L/s) | 5yr PEAK FLOW (L/s) | 100yr PEAK FLOW (L/s) | FIXED FLOW (L/s) | DESIGN FLOW (L/s) | CAPACITY (L/s) | LENGTH (m) | PIPE SIZE (mm) DIA | W | H | SLOPE (%) | VELOCITY (m/s) | AVAIL CAP (2yr) (L/s) | (%) |
| **OUTLET #2: AVALON POND 5 (South-East)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 2000 | MH2000 | MH2001 | | | | | | | | | | | | 2.41 | 5.36 | 5.36 | 10.00 | 0.49 | 10.49 | 76.81 | 104.19 | 178.56 | 411.66 | | | | 411.66 | 775.41 | 29.82 | 975 | | | 0.11 | 1.006 | 363.75 | 46.91% |
| | 2001 | MH2001 | MH2002 | | | | | | | | | | 0.87 | | | 1.69 | 7.05 | 10.49 | 1.25 | 11.74 | 74.96 | 101.65 | 174.17 | 528.67 | | | | 528.67 | 944.84 | 79.07 | 1050 | | | 0.11 | 1.057 | 416.17 | 44.05% |
| | | MH2002 | MH2003 | | | | | | | | | | | | | 0.00 | 7.05 | 11.74 | 1.25 | 12.99 | 70.71 | 95.82 | 164.07 | 498.71 | | | | 498.71 | 944.84 | 79.07 | 1050 | | | 0.11 | 1.057 | 446.13 | 47.22% |
| | | MH2003 | MH2004 | | | | | | | | | | | | | 0.00 | 7.05 | 12.99 | 0.35 | 13.33 | 66.97 | 90.68 | 155.19 | 472.30 | | | | 472.30 | 944.84 | 21.98 | 1050 | | | 0.11 | 1.057 | 472.54 | 50.01% |
| | | MH2004 | MH2010 | | | | | | | | | | | | | 0.00 | 7.05 | 13.33 | 0.97 | 14.30 | | | 152.91 | 0.00 | | | | 0.00 | 944.84 | 61.35 | 1050 | | | 0.11 | 1.057 | 944.84 | 100.00% |
| | 2111 | MH2111 | MH2112 | | | | | | | | | | 0.47 | | | 0.91 | 0.91 | 10.00 | 0.32 | 10.32 | 76.81 | 104.19 | 178.56 | 70.25 | | | | 70.25 | 136.30 | 15.97 | 450 | | | 0.21 | 0.830 | 66.05 | 48.46% |
| | | MH2112 | MH2010 | | | | | | | | | | | | | 0.00 | 0.91 | 10.32 | 0.56 | 10.88 | 75.60 | 102.53 | 175.68 | 69.14 | | | | 69.14 | 136.30 | 27.65 | 450 | | | 0.21 | 0.830 | 67.16 | 49.27% |
| | 2100 | MH2100 | MH2101 | | | | | | | | | | 1.34 | | | 2.61 | 2.61 | 10.00 | 1.13 | 11.13 | 76.81 | 104.19 | 178.56 | 200.28 | | | | 200.28 | 303.78 | 55.64 | 675 | | | 0.12 | 0.822 | 103.50 | 34.07% |
| | | MH2101 | MH2102 | | | | | | | | | | | | | 0.00 | 2.61 | 11.13 | 0.20 | 11.33 | 72.73 | 98.59 | 168.87 | 189.65 | | | | 189.65 | 303.78 | 10.05 | 675 | | | 0.12 | 0.822 | 114.12 | 37.57% |
| | | MH2102 | MH2103 | | | | | | | | | | | | | 0.00 | 2.61 | 11.33 | 2.43 | 13.76 | 72.05 | 97.65 | 167.24 | 187.87 | | | | 187.87 | 303.78 | 120.00 | 675 | | | 0.12 | 0.822 | 115.91 | 38.16% |
| | | MH2103 | MH2010 | | | | | | | | | | | | | 0.00 | 2.61 | 13.76 | 1.15 | 14.91 | 64.85 | 87.78 | 150.18 | 169.10 | | | | 169.10 | 303.78 | 56.57 | 675 | | | 0.12 | 0.822 | 134.68 | 44.33% |
| | 2010 | MH2010 | MH2020 | | | | | | | | | | 0.12 | | | 0.23 | 10.81 | 14.30 | 1.04 | 15.34 | 63.47 | 85.89 | 146.91 | 686.00 | | | | 686.00 | 1,348.97 | 71.80 | 1200 | | | 0.11 | 1.155 | 662.97 | 49.15% |
| | 2211 | MH2211 | MH2212 | | | | | | | | | | 1.14 | | | 2.22 | 2.22 | 10.00 | 0.34 | 10.34 | 76.81 | 104.19 | 178.56 | 170.39 | | | | 170.39 | 303.78 | 16.97 | 675 | | | 0.12 | 0.822 | 133.39 | 43.91% |
| | | MH2212 | MH2020 | | | | | | | | | | | | | 0.00 | 2.22 | 10.34 | 2.14 | 12.48 | 75.51 | 102.41 | 175.48 | 167.51 | | | | 167.51 | 303.78 | 105.41 | 675 | | | 0.12 | 0.822 | 136.27 | 44.86% |
| | 2200 | MH2200 | MH2201 | | | | | | | | | | 1.39 | | | 2.70 | 2.70 | 10.00 | 1.72 | 11.72 | 76.81 | 104.19 | 178.56 | 207.75 | | | | 207.75 | 385.20 | 87.03 | 750 | | | 0.11 | 0.845 | 177.44 | 46.07% |
| | | MH2201 | MH2020 | | | | | | | | | | | | | 0.00 | 2.70 | 11.72 | 1.99 | 13.70 | 70.79 | 95.92 | 164.25 | 191.47 | | | | 191.47 | 385.20 | 100.71 | 750 | | | 0.11 | 0.845 | 193.73 | 50.29% |
| | 2020 | MH2020 | MH2030 | | | | | | | | | | 0.12 | | | 0.23 | 15.97 | 13.70 | 0.95 | 14.65 | 65.00 | 87.99 | 150.55 | 1,037.83 | | | | 1,037.83 | 1,846.76 | 70.98 | 1350 | | | 0.11 | 1.250 | 808.92 | 43.80% |
| | 2300 | MH2300 | MH2301 | | | | | | | | | | 1.21 | | | 2.35 | 2.35 | 10.00 | 1.70 | 11.70 | 76.81 | 104.19 | 178.56 | 180.85 | | | | 180.85 | 303.78 | 83.91 | 675 | | | 0.12 | 0.822 | 122.93 | 40.47% |
| | | MH2301 | MH2030 | | | | | | | | | | | | | 0.00 | 2.35 | 11.70 | 1.80 | 13.50 | 70.84 | 95.99 | 164.38 | 166.80 | | | | 166.80 | 303.78 | 88.90 | 675 | | | 0.12 | 0.822 | 136.98 | 45.09% |
| | 2030 | MH2030 | MH2040 | | | | | | | | | | 0.11 | | | 0.21 | 18.53 | 14.65 | 1.01 | 15.66 | 62.60 | 84.70 | 144.87 | 1,160.32 | | | | 1,160.32 | 1,846.76 | 76.03 | 1350 | | | 0.11 | 1.250 | 686.44 | 37.17% |
| | | | | | | | | | | | | | | | | | | | | | 167.22 | 230.48 | | | | | | | | | | | | | | |
| | 2400 | MH2400 | MH2401 | | | | | | | | | | 1.62 | | | 3.15 | 3.15 | 10.00 | 1.22 | 11.22 | 76.81 | 104.19 | 178.56 | 242.13 | | | | 242.13 | 385.20 | 61.83 | 750 | | | 0.11 | 0.845 | 143.07 | 37.14% |
| | | MH2401 | MH2402 | | | | | | | | | | | | | 0.00 | 3.15 | 11.22 | 0.20 | 11.42 | 72.42 | 98.16 | 168.13 | 228.30 | | | | 228.30 | 385.20 | 10.04 | 750 | | | 0.11 | 0.845 | 156.90 | 40.73% |
| TENTH LINE ROAD | | MH2402 | MH2403 | | | | | | | | | | | 4.50 | | 9.51 | 12.66 | 11.42 | 1.18 | 12.60 | 71.76 | 97.25 | 166.56 | 908.45 | | | | 908.45 | 1,846.76 | 88.84 | 1350 | | | 0.11 | 1.250 | 938.30 | 50.81% |
| | | MH2403 | MH2040 | | | | | | | | | | | | | 0.00 | 12.66 | 12.60 | 1.12 | 13.72 | 68.07 | 92.20 | 157.81 | 861.81 | | | | 861.81 | 1,846.76 | 83.68 | 1350 | | | 0.11 | 1.250 | 984.95 | 53.33% |
| | 2040 | MH2040 | MH2041 | | | | | | | | | | 0.71 | | | 1.38 | 32.58 | 15.66 | 0.75 | 16.42 | 60.24 | 81.47 | 139.29 | 1,962.44 | | | | 1,962.44 | 3,977.22 | 68.16 | 1800 | | | 0.11 | 1.514 | 2014.78 | 50.66% |
| | | MH2041 | MH2042 | | | | | | | | | | | | | 0.00 | 32.58 | 16.42 | 0.76 | 17.17 | 58.62 | 79.25 | 135.46 | 1,909.53 | | | | 1,909.53 | 3,977.22 | 68.79 | 1800 | | | 0.11 | 1.514 | 2067.69 | 51.99% |
| | | MH2042 | MH2050 | | | | | | | | | | | | | 0.00 | 32.58 | 17.17 | 0.11 | 17.28 | 57.07 | 77.14 | 131.82 | 1,859.26 | | | | 1,859.26 | 3,977.22 | 10.07 | 1800 | | | 0.11 | 1.514 | 2117.96 | 53.25% |
| | 2500 | MH2500 | MH2501 | | | | | | | | | | 1.45 | | | 2.82 | 2.82 | 10.00 | 1.18 | 11.18 | 76.81 | 104.19 | 178.56 | 216.72 | | | | 216.72 | 303.78 | 58.26 | 675 | | | 0.12 | 0.822 | 87.06 | 28.66% |
| | | MH2501 | MH2502 | | | | | | | | | | | | | 0.00 | 2.82 | 11.18 | 1.39 | 12.57 | 72.55 | 98.34 | 168.44 | 204.72 | | | | 204.72 | 303.78 | 68.41 | 675 | | | 0.12 | 0.822 | 99.06 | 32.61% |
| | | MH2502 | MH2503 | | | | | | | | | | | | | 0.00 | 2.82 | 12.57 | 0.21 | 12.77 | 68.18 | 92.34 | 158.06 | 192.38 | | | | 192.38 | 303.78 | 10.19 | 675 | | | 0.12 | 0.822 | 111.40 | 36.67% |
| | | MH2503 | MH2504 | | | | | | | | | | | | | 0.00 | 2.82 | 12.77 | 1.26 | 14.03 | 67.58 | 91.52 | 156.64 | 190.68 | | | | 190.68 | 303.78 | 62.02 | 675 | | | 0.12 | 0.822 | 113.10 | 37.23% |
| | | MH2504 | MH2050 | | | | | | | | | | | | | 0.00 | 2.82 | 14.03 | 0.24 | 14.27 | 64.15 | 86.83 | 148.54 | 181.03 | | | | 181.03 | 303.78 | 11.61 | 675 | | | 0.12 | 0.822 | 122.75 | 40.41% |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | MH2050 | MH2051 | | | | | | | | | | | | | 0.00 | 35.40 | 17.28 | 0.45 | 17.74 | 56.86 | 76.84 | 131.31 | 2,012.58 | | | | 2,012.58 | 3,977.22 | 41.23 | 1800 | | | 0.11 | 1.514 | 1964.64 | 49.40% |
| | | MH2051 | HW2 | | | | | | | | | | | | | 0.00 | 35.40 | 17.74 | 1.06 | 18.79 | 55.98 | 75.64 | 129.24 | 1,981.62 | | | | 1,981.62 | 3,977.22 | 95.90 | 1800 | | | 0.11 | 1.514 | 1995.60 | 50.18% |
| | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | 10.55 | 4.50 | 2.41 | 35.40 | TRUE | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | 17.46 | | | | | | | | | | | | | | | | | | | | | |

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**STORM SEWER DESIGN SHEET**
**MER BLEUE Urban Expansion Area**
MSS Preferred Concept
CITY OF OTTAWA
Owners Group

| LOCATION | | | | AREA (Ha) | | | | | | | | | | | | RATIONAL DESIGN FLOW | | | | | | | | | | | | SEWER DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STREET | AREA ID | FROM | TO | C= 0.20 | C= 0.30 | C= 0.40 | C= 0.54 | C= 0.57 | C= 0.70 | C= 0.71 | C= 0.73 | C= 0.74 | C= 0.70 | C= 0.76 | C= 0.80 | IND 2.78AC | CUM 2.78AC | INLET (min) | TIME IN PIPE | TOTAL (min) | i (2) (mm/hr) | i (5) (mm/hr) | i (100) (mm/hr) | 2yr PEAK FLOW (L/s) | 5yr PEAK FLOW (L/s) | 100yr PEAK FLOW (L/s) | FIXED FLOW (L/s) | DESIGN FLOW (L/s) | CAPACITY (L/s) | LENGTH (m) | PIPE SIZE (mm) DIA | W | H | SLOPE (%) | VELOCITY (m/s) | AVAIL CAP (2yr) (L/s) | (%) |
| **OUTLET #3: AVALON POND 5 (North)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MANDALEY | 3001 | MH3001 | MH3002 | | | | | | | | | | 0.32 | | | 0.62 | 0.62 | 10.00 | 0.22 | 10.22 | 76.81 | 104.19 | 178.56 | 47.83 | | | | 47.83 | 100.18 | 11.73 | 375 | | | 0.30 | 0.879 | 52.36 | 52.26% |
| MANDALEY | | MH3002 | MH3003 | | | | | | | | | | | | | 0.00 | 0.62 | 10.22 | 0.73 | 10.96 | 75.96 | 103.03 | 176.55 | 47.30 | | | | 47.30 | 148.72 | 39.93 | 450 | | | 0.25 | 0.906 | 101.41 | 68.19% |
| SWEETFERN | 3210B | MH3210 | MH3003 | | | | | | | | | | 0.32 | | | 0.62 | 0.62 | 0.00 | 1.34 | 1.34 | 167.22 | 230.48 | 398.62 | 104.13 | | | | 104.13 | 100.18 | 70.50 | 375 | | | 0.30 | 0.879 | -3.95 | -3.94% |
| MANDALEY | 3003 | MH3003 | MH3004 | | | | | | | | | | 0.62 | | | 1.21 | 2.45 | 10.96 | 1.21 | 12.17 | 73.32 | 99.39 | 170.26 | 179.77 | | | | 179.77 | 339.63 | 66.87 | 675 | | | 0.15 | 0.919 | 159.87 | 47.07% |
| MANDALEY | | MH3004 | MH3010 | | | | | | | | | | | | | 0.00 | 2.45 | 10.96 | 1.14 | 12.09 | 73.32 | 99.39 | 170.26 | 179.77 | | | | 179.77 | 449.81 | 67.25 | 750 | | | 0.15 | 0.986 | 270.05 | 60.04% |
| SWEETVALLEY | 3010 | MH3010 | MH3011 | | | | | | | | | | 0.11 | | | 0.21 | 2.67 | 12.09 | 0.41 | 12.51 | 69.60 | 94.30 | 161.45 | 185.57 | | | | 185.57 | 579.98 | 25.97 | 825 | | | 0.15 | 1.051 | 394.41 | 68.00% |
| PARK | 3101 | MH3101 | MH3011 | | 1.66 | | | | | | | | | | | 1.38 | 1.38 | 13.00 | 0.18 | 13.18 | 66.93 | 90.63 | 155.11 | 92.66 | | | | 92.66 | 184.99 | 8.80 | 525 | | | 0.17 | 0.828 | 92.33 | 49.91% |
| SWEETVALLEY | | MH3011 | MH3020 | | | | | | | | | | | | | 0.00 | 4.05 | 12.51 | 0.70 | 13.20 | 68.36 | 92.59 | 158.50 | 276.89 | | | | 276.89 | 579.98 | 44.03 | 825 | | | 0.15 | 1.051 | 303.09 | 52.26% |
| SWEETFERN | 3202 | MH3202 | MH3203 | | | | | | | | | | 0.86 | | | 1.67 | 1.67 | 10.00 | 0.57 | 10.57 | 76.81 | 104.19 | 178.56 | 128.54 | | | | 128.54 | 162.91 | 34.18 | 450 | | | 0.30 | 0.992 | 34.37 | 21.10% |
| SWEETFERN | | MH3203 | MH3204 | | | | | | | | | | | | | 0.00 | 1.67 | 10.57 | 0.21 | 10.78 | 74.67 | 101.26 | 173.48 | 124.96 | | | | 124.96 | 200.65 | 11.30 | 525 | | | 0.20 | 0.898 | 75.68 | 37.72% |
| SWEETFERN | | MH3204 | MH3210 | | | | | | | | | | | | | 0.00 | 1.67 | 10.78 | 0.99 | 11.78 | 73.92 | 100.23 | 171.70 | 123.71 | | | | 123.71 | 320.28 | 65.29 | 600 | | | 0.25 | 1.097 | 196.57 | 61.37% |
| ASTERVALE | 3210B | MH3210 | MH3220 | | | | | | | | | | 0.20 | | | 0.39 | 2.06 | 11.78 | 1.03 | 12.81 | 70.60 | 95.67 | 163.81 | 145.63 | | | | 145.63 | 579.98 | 65.00 | 825 | | | 0.15 | 1.051 | 434.35 | 74.89% |
| BROADLEAF | 3221B | MH3221 | MH3220 | | | | | | | | | | 0.51 | | | 0.99 | 0.99 | 10.00 | 1.73 | 11.73 | 76.81 | 104.19 | 178.56 | 76.23 | | | | 76.23 | 184.99 | 85.82 | 525 | | | 0.17 | 0.828 | 108.76 | 58.79% |
| ASTERVALE | 3220A | MH3220 | MH3020 | | | | | | | | | | 0.31 | | | 0.60 | 3.66 | 12.81 | 0.89 | 13.69 | 67.48 | 91.39 | 156.42 | 246.88 | | | | 246.88 | 844.60 | 68.46 | 900 | | | 0.20 | 1.286 | 597.72 | 70.77% |
| CASA GRANDE | 3020 | MH3020 | MH3021 | | | | | | | | | | 0.67 | | | 1.30 | 9.01 | 12.51 | 0.83 | 13.34 | 68.36 | 92.59 | 158.50 | 616.11 | | | | 616.11 | 1,575.26 | 67.59 | 1200 | | | 0.15 | 1.349 | 959.15 | 60.89% |
| CASA GRANDE | | MH3021 | MH3022 | | | | | | | | | | | | | 0.00 | 9.01 | 13.34 | 0.71 | 14.05 | 65.98 | 89.33 | 152.87 | 594.70 | | | | 594.70 | 2,856.14 | 67.01 | 1500 | | | 0.15 | 1.566 | 2261.44 | 79.18% |
| CASA GRANDE | 3022 | MH3022 | MH3023 | | | | | | | | | | 1.08 | | | 2.10 | 11.11 | 14.05 | 0.14 | 14.20 | 64.10 | 86.74 | 148.40 | 712.38 | | | | 712.38 | 2,856.14 | 13.50 | 1500 | | | 0.15 | 1.566 | 2143.75 | 75.06% |
| CASA GRANDE | | MH3023 | MH3024 | | | | | | | | | | | | | 0.00 | 11.11 | 14.20 | 0.75 | 14.95 | 63.73 | 86.24 | 147.53 | 708.32 | | | | 708.32 | 3,682.64 | 75.25 | 1650 | | | 0.15 | 1.668 | 2974.32 | 80.77% |
| CASA GRANDE | | MH3024 | MH3025 | | | | | | | | | | | | | 0.00 | 11.11 | 14.95 | 0.53 | 15.48 | 61.89 | 83.72 | 143.18 | 687.85 | | | | 687.85 | 3,682.64 | 52.93 | 1650 | | | 0.15 | 1.668 | 2994.79 | 81.32% |
| CASA GRANDE | | MH3025 | MH3030 | | | | | | | | | | | | | 0.00 | 11.11 | 15.48 | 0.12 | 15.60 | 60.66 | 82.04 | 140.28 | 674.23 | | | | 674.23 | 3,682.64 | 12.32 | 1650 | | | 0.15 | 1.668 | 3008.41 | 81.69% |
| SWEETVALLEY | 3300 | MH3300 | MH3301 | | | | | | | | | | 1.67 | | | 3.25 | 3.25 | 10.00 | 0.68 | 10.68 | 76.81 | 104.19 | 178.56 | 249.60 | | | | 249.60 | 100.18 | 35.91 | 375 | | | 0.30 | 0.879 | -149.42 | -149.14% |
| SWEETVALLEY | | MH3301 | MH3302 | | | | | | | | | | | | | 0.00 | 3.25 | 10.68 | 0.98 | 11.66 | 74.29 | 100.73 | 172.56 | 241.41 | | | | 241.41 | 148.72 | 53.06 | 450 | | | 0.25 | 0.906 | -92.70 | -62.33% |
| SWEETVALLEY | | MH3302 | MH3303 | | | | | | | | | | | | | 0.00 | 3.25 | 11.66 | 0.93 | 12.59 | 70.98 | 96.18 | 164.71 | 230.67 | | | | 230.67 | 317.25 | 79.51 | 525 | | | 0.50 | 1.420 | 86.58 | 27.29% |
| SWEETVALLEY | | MH3303 | MH3310 | | | | | | | | | | | | | 0.00 | 3.25 | 12.59 | 0.31 | 12.90 | 68.11 | 92.25 | 157.90 | 221.34 | | | | 221.34 | 317.25 | 26.70 | 525 | | | 0.50 | 1.420 | 95.91 | 30.23% |
| SWEETVALLEY | 3312 | MH3312 | MH3313 | | | | | | | | | | 0.47 | | | 0.91 | 0.91 | 10.00 | 1.00 | 11.00 | 76.81 | 104.19 | 178.56 | 70.25 | | | | 70.25 | 63.80 | 52.58 | 300 | | | 0.40 | 0.874 | -6.44 | -10.10% |
| BROADLEAF | | MH3221 | MH3314 | | | | | | | | | | | | | 0.00 | 0.91 | 10.00 | 0.23 | 10.23 | 76.81 | 104.19 | 178.56 | 70.25 | | | | 70.25 | 136.30 | 11.58 | 450 | | | 0.21 | 0.830 | 66.05 | 48.46% |
| BROADLEAF | 3314 | MH3314 | MH3313 | | | | | | | | | | 0.35 | | | 0.68 | 0.68 | 10.23 | 1.19 | 11.42 | 75.92 | 102.98 | 176.46 | 51.71 | | | | 51.71 | 136.30 | 59.20 | 450 | | | 0.21 | 0.830 | 84.59 | 62.06% |
| SWEETVALLEY | 3313 | MH3313 | MH3315 | | | | | | | | | | 0.26 | | | 0.51 | 2.10 | 11.00 | 0.77 | 11.77 | 73.16 | 99.18 | 169.89 | 153.76 | | | | 153.76 | 224.33 | 46.42 | 525 | | | 0.25 | 1.004 | 70.57 | 31.46% |
| SWEETVALLEY | | MH3315 | MH3310 | | | | | | | | | | | | | 0.00 | 2.10 | 11.77 | 0.20 | 11.98 | 70.61 | 95.68 | 163.83 | 148.39 | | | | 148.39 | 224.33 | 12.24 | 525 | | | 0.25 | 1.004 | 75.93 | 33.85% |
| PATHWAY | | MH3310 | MH3311 | | | | | | | | | | | | | 0.00 | 5.35 | 12.90 | 0.51 | 13.42 | 67.20 | 91.00 | 155.75 | 359.63 | | | | 359.63 | 734.54 | 49.70 | 750 | | | 0.40 | 1.611 | 374.91 | 51.04% |
| PATHWAY | | MH3311 | MH3322 | | | | | | | | | | | | | 0.00 | 5.35 | 13.42 | 0.10 | 13.52 | 65.77 | 89.04 | 152.36 | 351.97 | | | | 351.97 | 899.63 | 12.16 | 750 | | | 0.60 | 1.973 | 547.65 | 60.88% |
| CASA GRANDE | 3320 | MH3320 | MH3322 | | | | | | | | | | 1.03 | | | 2.00 | 2.00 | 10.00 | 1.93 | 11.93 | 76.81 | 104.19 | 178.56 | 153.95 | | | | 153.95 | 224.33 | 116.20 | 525 | | | 0.25 | 1.004 | 70.38 | 31.37% |
| CASA GRANDE | | MH3322 | MH3323 | | | | | | | | | | 0.73 | | | 1.42 | 8.78 | 13.52 | 0.16 | 13.69 | 65.49 | 88.66 | 151.71 | 574.80 | | | | 574.80 | 1,045.56 | 13.43 | 975 | | | 0.20 | 1.357 | 470.76 | 45.02% |
| CASA GRANDE | 3323 | MH3323 | MH3324 | | | | | | | | | | | | | 0.00 | 8.78 | 13.69 | 0.55 | 14.24 | 65.05 | 88.06 | 150.66 | 570.94 | | | | 570.94 | 2,033.65 | 57.95 | 1200 | | | 0.25 | 1.742 | 1462.71 | 71.93% |
| CASA GRANDE | | MH3324 | MH3030 | | | | | | | | | | | | | 0.00 | 8.78 | 14.24 | 0.23 | 14.48 | 63.62 | 86.09 | 147.27 | 558.36 | | | | 558.36 | 2,227.75 | 26.86 | 1200 | | | 0.30 | 1.908 | 1669.40 | 74.94% |
| | | MH3030 | MH3031 | | | | | | | | | | | | | 0.00 | 19.89 | 15.60 | 0.18 | 15.78 | 60.39 | 81.67 | 139.63 | 1,201.11 | | | | 1,201.11 | 6,638.91 | 23.44 | 1950 | | | 0.20 | 2.154 | 5437.80 | 81.91% |
| | | MH3031 | MH3032 | | | | | | | | | | | | | 0.00 | 19.89 | 15.78 | 0.05 | 15.83 | 59.98 | 81.11 | 138.68 | 1,193.08 | | | | 1,193.08 | 6,638.91 | 6.57 | 1950 | | | 0.20 | 2.154 | 5445.84 | 82.03% |
| | | MH3032 | MH3033 | | | | | | | | | | | | | 0.00 | 19.89 | 15.83 | 0.43 | 16.27 | 59.87 | 80.96 | 138.41 | 1,190.85 | | | | 1,190.85 | 5,749.47 | 48.48 | 1950 | | | 0.15 | 1.865 | 4558.62 | 79.29% |
| | | MH3033 | EXMH1 | | | | | | | | | | | | | 0.00 | 19.89 | 16.27 | 0.14 | 16.41 | 58.93 | 79.68 | 136.20 | 1,172.21 | | | | 1,172.21 | 5,749.47 | 15.70 | 1950 | | | 0.15 | 1.865 | 4577.26 | 79.61% |
| | | EXMH1 | EXMH2 | | | | | | | | | | | | | 0.00 | 19.89 | 16.41 | 0.25 | 16.65 | 58.64 | 79.27 | 135.50 | 1,166.31 | | | | 1,166.31 | 8,261.44 | 28.32 | | 2400 | 1800 | 0.15 | 1.912 | 7095.13 | 85.88% |
| | | EXMH2 | HW3 | | | | | | | | | | | | | 0.00 | 19.89 | 16.41 | 0.34 | 16.75 | 58.64 | 79.27 | 135.50 | 1,166.31 | | | | 1,166.31 | 6,745.44 | 31.94 | | 2400 | 1800 | 0.10 | 1.561 | 5579.12 | 82.71% |
| | | | | 0.00 | 1.66 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | 9.51 | 0.00 | 0.00 | 19.89 | TRUE | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | 11.17 | | | | | | | | | | | | | | | | | | | | | |

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**STORM SEWER DESIGN SHEET**
**MER BLEUE Urban Expansion Area**
MSS Preferred Concept
CITY OF OTTAWA
Owners Group

| LOCATION | | | | AREA (Ha) | | | | | | | | | | | | RATIONAL DESIGN FLOW | | | | | | | | | | | | SEWER DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STREET | AREA ID | FROM | TO | C= 0.20 | C= 0.30 | C= 0.40 | C= 0.54 | C= 0.57 | C= 0.70 | C= 0.71 | C= 0.73 | C= 0.74 | C= 0.70 | C= 0.76 | C= 0.80 | IND 2.78AC | CUM 2.78AC | INLET (min) | TIME IN PIPE | TOTAL (min) | i (2) (mm/hr) | i (5) (mm/hr) | i (100) (mm/hr) | 2yr PEAK FLOW (L/s) | 5yr PEAK FLOW (L/s) | 100yr PEAK FLOW (L/s) | FIXED FLOW (L/s) | DESIGN FLOW (L/s) | CAPACITY (L/s) | LENGTH (m) | PIPE SIZE (mm) DIA | W | H | SLOPE (%) | VELOCITY (m/s) | AVAIL CAP (2yr) (L/s) | (%) |
| **OUTLET #4: New Central SWM Pond (North)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MER BLEUE ROAD | 4000A/B | MH4000 | MH4001 | | | | | | | | | | 0.40 | 1.46 | | 3.86 | 3.86 | 13.67 | 0.78 | 14.45 | 65.10 | 88.12 | 150.76 | 251.47 | | | | 251.47 | 626.37 | 44.75 | 900 | | | 0.11 | 0.954 | 374.90 | 59.85% |
| | | MH4001 | MH4002 | | | | | | | | | | | | | 0.00 | 3.86 | 14.45 | 0.77 | 15.22 | 63.09 | 85.37 | 146.02 | 243.73 | | | | 243.73 | 626.37 | 43.86 | 900 | | | 0.11 | 0.954 | 382.64 | 61.09% |
| | | MH4002 | MH4010 | | | | | | | | | | | | | 0.00 | 3.86 | 15.22 | 0.79 | 16.01 | 61.26 | 82.86 | 141.69 | 236.64 | | | | 236.64 | 626.37 | 45.49 | 900 | | | 0.11 | 0.954 | 389.73 | 62.22% |
| | 4010 | MH4010 | MH4011 | | | | | | | | | | 0.52 | | | 1.01 | 4.88 | 16.01 | 0.70 | 16.71 | 59.47 | 80.42 | 137.48 | 289.94 | | | | 289.94 | 775.41 | 42.33 | 975 | | | 0.11 | 1.006 | 485.47 | 62.61% |
| | | MH4011 | MH4012 | | | | | | | | | | | | | 0.00 | 4.88 | 16.71 | 1.51 | 18.22 | 58.00 | 78.40 | 133.99 | 282.73 | | | | 282.73 | 775.41 | 91.15 | 975 | | | 0.11 | 1.006 | 492.68 | 63.54% |
| | 4110 | MH4110 | MH4111 | | | | | | | | | | 0.92 | | | 1.79 | 1.79 | 10.00 | 1.79 | 11.79 | 76.81 | 104.19 | 178.56 | 137.51 | | | | 137.51 | 239.68 | 88.06 | 600 | | | 0.14 | 0.821 | 102.17 | 42.63% |
| | | MH4111 | MH4112 | | | | | | | | | | | | | 0.00 | 1.79 | 11.79 | 0.14 | 11.93 | 70.56 | 95.61 | 163.72 | 126.33 | | | | 126.33 | 239.68 | 6.82 | 600 | | | 0.14 | 0.821 | 113.35 | 47.29% |
| | | MH4112 | MH4113 | | | | | | | | | | | | | 0.00 | 1.79 | 11.93 | 0.77 | 12.69 | 70.13 | 95.01 | 162.68 | 125.55 | | | | 125.55 | 239.68 | 37.74 | 600 | | | 0.14 | 0.821 | 114.13 | 47.62% |
| | | MH4113 | MH4121 | | | | | | | | | | | | | 0.00 | 1.79 | 12.69 | 0.84 | 13.53 | 67.81 | 91.84 | 157.20 | 121.41 | | | | 121.41 | 239.68 | 41.15 | 600 | | | 0.14 | 0.821 | 118.27 | 49.34% |
| | 4120 | MH4120 | MH4121 | | | | | | | | | | 0.79 | | | 1.54 | 1.54 | 10.00 | 2.39 | 12.39 | 76.81 | 104.19 | 178.56 | 118.08 | | | | 118.08 | 93.27 | 117.46 | 375 | | | 0.26 | 0.818 | -24.81 | -26.60% |
| | 4121 | MH4121 | MH4131 | | | | | | | | | | 0.31 | | | 0.60 | 3.93 | 13.53 | 1.44 | 14.97 | 65.48 | 88.64 | 151.67 | 257.39 | | | | 257.39 | 496.66 | 77.96 | 825 | | | 0.11 | 0.900 | 239.27 | 48.18% |
| | 4130 | MH4130 | MH4131 | | | | | | | | | | 0.78 | | | 1.52 | 1.52 | 10.00 | 2.40 | 12.40 | 76.81 | 104.19 | 178.56 | 116.58 | | | | 116.58 | 93.27 | 117.68 | 375 | | | 0.26 | 0.818 | -23.31 | -25.00% |
| | 4132 | MH4132 | MH4131 | | | | | | | | | | 0.12 | | | 0.23 | 0.23 | 10.00 | 1.45 | 11.45 | 76.81 | 104.19 | 178.56 | 17.94 | | | | 17.94 | 93.27 | 71.02 | 375 | | | 0.26 | 0.818 | 75.33 | 80.77% |
| | 4131 | MH4131 | MH4140 | | | | | | | | | | 0.33 | | | 0.64 | 6.32 | 14.97 | 1.19 | 16.16 | 61.84 | 83.65 | 143.06 | 391.09 | | | | 391.09 | 775.41 | 72.00 | 975 | | | 0.11 | 1.006 | 384.32 | 49.56% |
| | 4100 | MH4100 | MH4101 | | | | | | | | | | 0.10 | | | 0.19 | 0.19 | 10.00 | 1.19 | 11.19 | 76.81 | 104.19 | 178.56 | 14.95 | | | | 14.95 | 496.66 | 64.10 | 825 | | | 0.11 | 0.900 | 481.72 | 96.99% |
| | 4107 | MH4107 | MH4101 | | | | | | | | | | 0.40 | | | 0.78 | 0.78 | 10.00 | 1.67 | 11.67 | 76.81 | 104.19 | 178.56 | 59.79 | | | | 59.79 | 93.27 | 82.00 | 375 | | | 0.26 | 0.818 | 33.48 | 35.90% |
| | 4101 | MH4101 | MH4102 | | | | | | | | | | 1.16 | | | 2.26 | 3.23 | 11.67 | 0.80 | 12.47 | 70.94 | 96.13 | 164.61 | 229.15 | | | | 229.15 | 496.66 | 43.26 | 825 | | | 0.11 | 0.900 | 267.52 | 53.86% |
| | | MH4102 | MH4103 | | | | | | | | | | | | | 0.00 | 3.23 | 12.47 | 0.90 | 13.37 | 68.46 | 92.73 | 158.73 | 221.15 | | | | 221.15 | 496.66 | 48.72 | 825 | | | 0.11 | 0.900 | 275.51 | 55.47% |
| | | MH4103 | MH4104 | | | | | | | | | | | | | 0.00 | 3.23 | 13.37 | 0.99 | 14.37 | 65.89 | 89.21 | 152.65 | 212.86 | | | | 212.86 | 496.66 | 53.73 | 825 | | | 0.11 | 0.900 | 283.81 | 57.14% |
| | | MH4104 | MH4105 | | | | | | | | | | | | | 0.00 | 3.23 | 14.37 | 0.63 | 15.00 | 63.30 | 85.65 | 146.51 | 204.48 | | | | 204.48 | 496.66 | 33.89 | 825 | | | 0.11 | 0.900 | 292.19 | 58.83% |
| | | MH4105 | MH4106 | | | | | | | | | | | | | 0.00 | 3.23 | 15.00 | 0.86 | 15.85 | 61.78 | 83.57 | 142.91 | 199.56 | | | | 199.56 | 496.66 | 46.18 | 825 | | | 0.11 | 0.900 | 297.11 | 59.82% |
| | | MH4106 | MH4140 | | | | | | | | | | | | | 0.00 | 3.23 | 15.85 | 1.69 | 17.54 | 59.83 | 80.90 | 138.32 | 193.27 | | | | 193.27 | 496.66 | 91.06 | 825 | | | 0.11 | 0.900 | 303.40 | 61.09% |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | MH4140 | MH4012 | | | | | | | | | | | | | 0.00 | 9.55 | 17.54 | 0.19 | 17.73 | 56.36 | 76.16 | 130.14 | 538.53 | | | | 538.53 | 944.84 | 12.08 | 1050 | | | 0.11 | 1.057 | 406.31 | 43.00% |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | MH4012 | MH4020 | | | | | | | | | | | | | 0.00 | 14.43 | 17.73 | 1.08 | 18.81 | 56.00 | 75.67 | 129.28 | 808.05 | | | | 808.05 | 1,846.76 | 80.96 | 1350 | | | 0.11 | 1.250 | 1038.71 | 56.24% |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 4200 | MH4200 | MH4201 | | | | | | | | | | 0.80 | | | 1.56 | 1.56 | 10.00 | 2.08 | 12.08 | 76.81 | 104.19 | 178.56 | 119.57 | | | | 119.57 | 385.20 | 105.31 | 750 | | | 0.11 | 0.845 | 265.63 | 68.96% |
| | 4201 | MH4201 | MH4202 | | | | | | | | | | 1.06 | | | 2.06 | 3.62 | 12.08 | 2.13 | 14.21 | 69.65 | 94.36 | 161.56 | 252.11 | | | | 252.11 | 385.20 | 107.95 | 750 | | | 0.11 | 0.845 | 133.09 | 34.55% |
| | | MH4202 | MH4204 | | | | | | | | | | | | | 0.00 | 3.62 | 14.21 | 1.44 | 15.64 | 63.70 | 86.21 | 147.47 | 230.57 | | | | 230.57 | 496.66 | 77.56 | 825 | | | 0.11 | 0.900 | 266.09 | 53.58% |
| | | MH4204 | MH4220 | | | | | | | | | | | | | 0.00 | 3.62 | 15.64 | 0.38 | 16.02 | 60.29 | 81.53 | 139.40 | 218.21 | | | | 218.21 | 496.66 | 20.27 | 825 | | | 0.11 | 0.900 | 278.45 | 56.06% |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 4212 | MH4212 | MH4213 | | | | | | | | | | 0.99 | | | 1.93 | 1.93 | 10.00 | 0.73 | 10.73 | 76.81 | 104.19 | 178.56 | 147.97 | | | | 147.97 | 303.78 | 35.90 | 675 | | | 0.12 | 0.822 | 155.81 | 51.29% |
| | | MH4213 | MH4220 | | | | | | | | | | | | | 0.00 | 1.93 | 10.73 | 0.53 | 11.26 | 74.12 | 100.50 | 172.17 | 142.79 | | | | 142.79 | 303.78 | 26.26 | 675 | | | 0.12 | 0.822 | 160.98 | 52.99% |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SCHOOL | 4221 | MH4221 | MH4220 | | | | | | | | | | | | 2.54 | 5.65 | 5.65 | 13.00 | 0.35 | 13.35 | 66.93 | 90.63 | 155.11 | 378.08 | | | | 378.08 | 626.37 | 20.00 | 900 | | | 0.11 | 0.954 | 248.29 | 39.64% |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 4220 | MH4220 | MH4222 | | | | | | | | | | 1.01 | | | 1.97 | 13.16 | 16.02 | 0.83 | 16.85 | 59.46 | 80.40 | 137.45 | 782.54 | | | | 782.54 | 1,348.97 | 57.40 | 1200 | | | 0.11 | 1.155 | 566.43 | 41.99% |
| | | MH4222 | MH4223 | | | | | | | | | | | | | 0.00 | 13.16 | 16.85 | 0.48 | 17.32 | 57.73 | 78.03 | 133.35 | 759.69 | | | | 759.69 | 1,348.97 | 32.99 | 1200 | | | 0.11 | 1.155 | 589.28 | 43.68% |
| | | MH4223 | MH4224 | | | | | | | | | | | | | 0.00 | 13.16 | 17.32 | 0.54 | 17.87 | 56.78 | 76.73 | 131.12 | 747.22 | | | | 747.22 | 1,348.97 | 37.75 | 1200 | | | 0.11 | 1.155 | 601.75 | 44.61% |
| | | MH4224 | MH4020 | | | | | | | | | | | | | 0.00 | 13.16 | 17.87 | 1.22 | 19.09 | 55.73 | 75.31 | 128.66 | 733.50 | | | | 733.50 | 1,348.97 | 84.51 | 1200 | | | 0.11 | 1.155 | 615.48 | 45.63% |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 4020 | MH4020 | MH4021 | | | | | | | | | | 0.92 | | | 1.79 | 29.38 | 19.09 | 1.11 | 20.20 | 53.55 | 72.32 | 123.52 | 1,573.28 | | | | 1,573.28 | 3,153.62 | 95.11 | 1650 | | | 0.11 | 1.429 | 1580.34 | 50.11% |
| | | MH4021 | MH4022 | | | | | | | | | | | | | 0.00 | 29.38 | 20.20 | 1.11 | 21.31 | 51.72 | 69.82 | 119.21 | 1,519.50 | | | | 1,519.50 | 3,153.62 | 95.12 | 1650 | | | 0.11 | 1.429 | 1634.12 | 51.82% |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PARK | 4332 | MH4023 | MH4022 | | 2.04 | | | | | | | | | | | 1.70 | 1.70 | 13.33 | 0.38 | 13.71 | 66.01 | 89.37 | 152.93 | 112.31 | | | | 112.31 | 184.99 | 19.00 | 525 | | | 0.17 | 0.828 | 72.68 | 39.29% |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 4022 | MH4022 | MH4024 | | | | | | | | | | 0.89 | | | 1.73 | 32.81 | 21.31 | 0.83 | 22.14 | 50.02 | 67.51 | 115.23 | 1,641.40 | | | | 1,641.40 | 3,153.62 | 71.11 | 1650 | | | 0.11 | 1.429 | 1512.23 | 47.95% |
| | | MH4024 | MH4025 | | | | | | | | | | | | | 0.00 | 32.81 | 22.14 | 0.85 | 22.99 | 48.83 | 65.89 | 112.44 | 1,602.37 | | | | 1,602.37 | 3,153.62 | 72.87 | 1650 | | | 0.11 | 1.429 | 1551.26 | 49.19% |
| | 4025 | MH4025 | MH4026 | | | | | | | | | | 1.07 | | | 2.08 | 34.90 | 22.99 | 0.52 | 23.50 | 47.68 | 64.31 | 109.73 | 1,663.73 | | | | 1,663.73 | 3,153.62 | 44.40 | 1650 | | | 0.11 | 1.429 | 1489.89 | 47.24% |
| | | MH4026 | MH4030 | | | | | | | | | | | | | 0.00 | 34.90 | 23.50 | 0.66 | 24.16 | 47.00 | 63.39 | 108.15 | 1,640.19 | | | | 1,640.19 | 3,153.62 | 56.54 | 1650 | | | 0.11 | 1.429 | 1513.43 | 47.99% |
| | 4030 | MH4030 | MH4031 | | | | | | | | | | 1.13 | | | 2.20 | 37.10 | 24.16 | 0.51 | 24.68 | 46.17 | 62.27 | 106.20 | 1,712.81 | | | | 1,712.81 | 3,153.62 | 44.06 | 1650 | | | 0.11 | 1.429 | 1440.82 | 45.69% |
| | | MH4031 | MH4032 | | | | | | | | | | | | | 0.00 | 37.10 | 24.68 | 0.57 | 25.25 | 45.55 | 61.42 | 104.74 | 1,689.67 | | | | 1,689.67 | 3,153.62 | 49.23 | 1650 | | | 0.11 | 1.429 | 1463.95 | 46.42% |
| | | MH4032 | MH4040 | | | | | | | | | | | | | 0.00 | 37.10 | 25.25 | 0.67 | 25.92 | 44.87 | 60.50 | 103.16 | 1,664.64 | | | | 1,664.64 | 3,977.22 | 60.53 | 1800 | | | 0.11 | 1.514 | 2312.58 | 58.15% |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 4400 | MH4400 | MH4401 | | | | | | | | | | 1.93 | | | 3.76 | 3.76 | 10.00 | 1.24 | 11.24 | 76.81 | 104.19 | 178.56 | 288.46 | | | | 288.46 | 496.66 | 67.15 | 825 | | | 0.11 | 0.900 | 208.20 | 41.92% |
| | | MH4401 | MH4402 | | | | | | | | | | | | | 0.00 | 3.76 | 11.24 | 0.23 | 11.47 | 72.34 | 98.05 | 167.94 | 271.69 | | | | 271.69 | 496.66 | 12.40 | 825 | | | 0.11 | 0.900 | 224.98 | 45.30% |
| | | MH4402 | MH4403 | | | | | | | | | | | | | 0.00 | 3.76 | 11.47 | 1.58 | 13.05 | 71.58 | 97.01 | 166.13 | 268.83 | | | | 268.83 | 496.66 | 85.28 | 825 | | | 0.11 | 0.900 | 227.84 | 45.87% |
| | | MH4403 | MH4404 | | | | | | | | | | | | | 0.00 | 3.76 | 13.05 | 1.58 | 14.63 | 66.78 | 90.43 | 154.76 | 250.82 | | | | 250.82 | 496.66 | 85.28 | 825 | | | 0.11 | 0.900 | 245.84 | 49.50% |
| | 4404 | MH4404 | MH4405 | | | | | | | | | | 2.20 | | | 4.28 | 8.04 | 14.63 | 1.54 | 16.17 | 62.65 | 84.77 | 144.98 | 503.53 | | | | 503.53 | 775.41 | 92.82 | 975 | | | 0.11 | 1.006 | 271.88 | 35.06% |
| | | MH4405 | MH4406 | | | | | | | | | | | | | 0.00 | 8.04 | 16.17 | 0.69 | 16.86 | 59.14 | 79.96 | 136.69 | 475.30 | | | | 475.30 | 775.41 | 41.72 | 975 | | | 0.11 | 1.006 | 300.11 | 38.70% |
| | | MH4406 | MH4407 | | | | | | | | | | | | | 0.00 | 8.04 | 16.86 | 0.50 | 17.36 | 57.70 | 77.99 | 133.29 | 463.73 | | | | 463.73 | 775.41 | 29.92 | 975 | | | 0.11 | 1.006 | 311.68 | 40.20% |
| | | MH4407 | MH4408 | | | | | | | | | | | | | 0.00 | 8.04 | 17.36 | 0.72 | 18.08 | 56.71 | 76.65 | 130.97 | 455.81 | | | | 455.81 | 775.41 | 43.43 | 975 | | | 0.11 | 1.006 | 319.60 | 41.22% |
| | | MH4408 | MH4440 | | | | | | | | | | | | | 0.00 | 8.04 | 18.08 | 0.60 | 18.68 | 55.35 | 74.78 | 127.76 | 444.84 | | | | 444.84 | 775.41 | 36.52 | 975 | | | 0.11 | 1.006 | 330.57 | 42.63% |

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**STORM SEWER DESIGN SHEET**
**MER BLEUE Urban Expansion Area**
MSS Preferred Concept
CITY OF OTTAWA
Owners Group

| LOCATION | | | | AREA (Ha) | | | | | | | | | | | | RATIONAL DESIGN FLOW | | | | | | | | | | | | SEWER DATA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STREET | AREA ID | FROM | TO | C= 0.20 | C= 0.30 | C= 0.40 | C= 0.54 | C= 0.57 | C= 0.70 | C= 0.71 | C= 0.73 | C= 0.74 | C= 0.70 | C= 0.76 | C= 0.80 | IND 2.78AC | CUM 2.78AC | INLET (min) | TIME IN PIPE | TOTAL (min) | i (2) (mm/hr) | i (5) (mm/hr) | i (100) (mm/hr) | 2yr PEAK FLOW (L/s) | 5yr PEAK FLOW (L/s) | 100yr PEAK FLOW (L/s) | FIXED FLOW (L/s) | DESIGN FLOW (L/s) | CAPACITY (L/s) | LENGTH (m) | PIPE SIZE (mm) DIA | W | H | SLOPE (%) | VELOCITY (m/s) | AVAIL CAP (2yr) (L/s) | (%) |
| | 4410 | MH4410 | MH4411 | | | | | | | | | | 2.15 | | | 4.18 | 4.18 | 10.00 | 1.82 | 11.82 | 76.81 | 104.19 | 178.56 | 321.34 | | | | 321.34 | 496.66 | 98.27 | 825 | | | 0.11 | 0.900 | 175.32 | 35.30% |
| | | MH4411 | MH4412 | | | | | | | | | | | | | 0.00 | 4.18 | 11.82 | 1.82 | 13.64 | 70.46 | 95.47 | 163.48 | 294.79 | | | | 294.79 | 496.66 | 98.27 | 825 | | | 0.11 | 0.900 | 201.87 | 40.65% |
| | 4412 | MH4412 | MH4413 | | | | | | | | | | 1.28 | | | 2.49 | 6.67 | 13.64 | 1.42 | 15.06 | 65.18 | 88.23 | 150.96 | 435.04 | | | | 435.04 | 1,348.97 | 98.27 | 1200 | | | 0.11 | 1.155 | 913.93 | 67.75% |
| | | MH4413 | MH4414 | | | | | | | | | | | | | 0.00 | 6.67 | 15.06 | 0.51 | 15.57 | 61.63 | 83.37 | 142.58 | 411.39 | | | | 411.39 | 1,348.97 | 35.55 | 1200 | | | 0.11 | 1.155 | 937.58 | 69.50% |
| | | MH4414 | MH4415 | | | | | | | | | | | | | 0.00 | 6.67 | 15.57 | 0.35 | 15.92 | 60.45 | 81.76 | 139.79 | 403.52 | | | | 403.52 | 1,348.97 | 24.20 | 1200 | | | 0.11 | 1.155 | 945.45 | 70.09% |
| | | MH4415 | MH4424 | | | | | | | | | | | | | 0.00 | 6.67 | 15.92 | 0.34 | 16.26 | 59.68 | 80.70 | 137.97 | 398.36 | | | | 398.36 | 1,348.97 | 23.36 | 1200 | | | 0.11 | 1.155 | 950.61 | 70.47% |
| | 4420 | MH4420 | MH4421 | | | | | | | | | | 0.91 | | | 1.77 | 1.77 | 10.00 | 0.84 | 10.84 | 76.81 | 104.19 | 178.56 | 136.01 | | | | 136.01 | 239.68 | 41.35 | 600 | | | 0.14 | 0.821 | 103.66 | 43.25% |
| | | MH4421 | MH4422 | | | | | | | | | | | | | 0.00 | 1.77 | 10.84 | 1.54 | 12.38 | 73.73 | 99.96 | 171.23 | 130.56 | | | | 130.56 | 239.68 | 76.12 | 600 | | | 0.14 | 0.821 | 109.12 | 45.53% |
| | | MH4422 | MH4423 | | | | | | | | | | | | | 0.00 | 1.77 | 12.38 | 0.24 | 12.62 | 68.72 | 93.09 | 159.35 | 121.69 | | | | 121.69 | 239.68 | 11.68 | 600 | | | 0.14 | 0.821 | 117.98 | 49.23% |
| | | MH4423 | MH4424 | | | | | | | | | | | | | 0.00 | 1.77 | 12.62 | 0.67 | 13.29 | 68.02 | 92.12 | 157.69 | 120.45 | | | | 120.45 | 239.68 | 32.89 | 600 | | | 0.14 | 0.821 | 119.22 | 49.74% |
| | | MH4424 | MH4440 | | | | | | | | | | | | | 0.00 | 8.45 | 16.26 | 1.25 | 17.50 | 58.95 | 79.71 | 136.25 | 497.91 | | | | 497.91 | 1,348.97 | 86.61 | 1200 | | | 0.11 | 1.155 | 851.06 | 63.09% |
| | 4430 | MH4430 | MH4431 | | | | | | | | | | 0.83 | | | 1.62 | 1.62 | 10.00 | 1.51 | 11.51 | 76.81 | 104.19 | 178.56 | 124.05 | | | | 124.05 | 239.68 | 74.43 | 600 | | | 0.14 | 0.821 | 115.62 | 48.24% |
| | | MH4431 | MH4432 | | | | | | | | | | | | | 0.00 | 1.62 | 11.51 | 0.23 | 11.74 | 71.45 | 96.84 | 165.84 | 115.41 | | | | 115.41 | 239.68 | 11.53 | 600 | | | 0.14 | 0.821 | 124.26 | 51.85% |
| | | MH4432 | MH4433 | | | | | | | | | | | | | 0.00 | 1.62 | 11.74 | 1.57 | 13.31 | 70.70 | 95.80 | 164.04 | 114.19 | | | | 114.19 | 239.68 | 77.32 | 600 | | | 0.14 | 0.821 | 125.49 | 52.36% |
| | 4433 | MH4433 | MH4434 | | | | | | | | | | 1.38 | | | 2.69 | 4.30 | 13.31 | 1.47 | 14.78 | 66.06 | 89.43 | 153.04 | 284.09 | | | | 284.09 | 496.66 | 79.15 | 825 | | | 0.11 | 0.900 | 212.58 | 42.80% |
| | | MH4434 | MH4435 | | | | | | | | | | | | | 0.00 | 4.30 | 14.78 | 1.01 | 15.79 | 62.29 | 84.28 | 144.14 | 267.90 | | | | 267.90 | 496.66 | 54.79 | 825 | | | 0.11 | 0.900 | 228.76 | 46.06% |
| | | MH4435 | MH4440 | | | | | | | | | | | | | 0.00 | 4.30 | 15.79 | 0.61 | 16.41 | 59.95 | 81.08 | 138.61 | 257.85 | | | | 257.85 | 496.66 | 33.15 | 825 | | | 0.11 | 0.900 | 238.82 | 48.08% |
| | | MH4440 | MH4040 | | | | | | | | | | | | | 0.00 | 20.78 | 17.50 | 1.16 | 18.66 | 56.43 | 76.25 | 130.29 | 1,172.70 | | | | 1,172.70 | 1,846.76 | 86.70 | 1350 | | | 0.11 | 1.250 | 674.06 | 36.50% |
| | | | | | | | | | | | | | | | | | | | | | 167.22 | 230.48 | | | | | | | | | | | | | | | |
| | 4450 | MH4450 | MH4451 | | | | | | | | | | 1.50 | | | 2.92 | 2.92 | 10.00 | 1.66 | 11.66 | 76.81 | 104.19 | 178.56 | 224.19 | | | | 224.19 | 385.20 | 84.22 | 750 | | | 0.11 | 0.845 | 161.00 | 41.80% |
| | | MH4451 | MH4452 | | | | | | | | | | | | | 0.00 | 2.92 | 11.66 | 1.55 | 13.21 | 70.96 | 96.16 | 164.67 | 207.14 | | | | 207.14 | 385.20 | 78.50 | 750 | | | 0.11 | 0.845 | 178.05 | 46.22% |
| | | MH4452 | MH4453 | | | | | | | | | | | | | 0.00 | 2.92 | 13.21 | 1.28 | 14.49 | 66.34 | 89.82 | 153.71 | 193.65 | | | | 193.65 | 385.20 | 64.76 | 750 | | | 0.11 | 0.845 | 191.55 | 49.73% |
| | | MH4453 | MH4040 | | | | | | | | | | | | | 0.00 | 2.92 | 14.49 | 0.98 | 15.47 | 63.00 | 85.25 | 145.81 | 183.90 | | | | 183.90 | 385.20 | 49.59 | 750 | | | 0.11 | 0.845 | 201.30 | 52.26% |
| | 4040 | MH4040 | MH4050 | | | | | | | | | | 0.29 | | | 0.56 | 61.36 | 25.92 | 0.70 | 26.62 | 44.12 | 59.47 | 101.39 | 2,707.24 | | | | 2,707.24 | 5,999.35 | 70.78 | 2100 | | | 0.11 | 1.678 | 3292.11 | 54.87% |
| | 4500 | MH4500 | MH4501 | | | | | | | | | | 1.68 | | | 3.27 | 3.27 | 10.00 | 2.12 | 12.12 | 76.81 | 104.19 | 178.56 | 251.10 | | | | 251.10 | 385.20 | 107.48 | 750 | | | 0.11 | 0.845 | 134.10 | 34.81% |
| | | MH4501 | MH4502 | | | | | | | | | | | | | 0.00 | 3.27 | 12.12 | 0.82 | 12.94 | 69.52 | 94.18 | 161.25 | 227.28 | | | | 227.28 | 385.20 | 41.59 | 750 | | | 0.11 | 0.845 | 157.92 | 41.00% |
| | | MH4502 | MH4503 | | | | | | | | | | | | | 0.00 | 3.27 | 12.94 | 0.82 | 13.76 | 67.10 | 90.86 | 155.50 | 219.35 | | | | 219.35 | 385.20 | 41.59 | 750 | | | 0.11 | 0.845 | 165.84 | 43.05% |
| | | MH4503 | MH4050 | | | | | | | | | | | | | 0.00 | 3.27 | 13.76 | 0.82 | 14.58 | 64.85 | 87.78 | 150.19 | 212.02 | | | | 212.02 | 385.20 | 41.59 | 750 | | | 0.11 | 0.845 | 173.18 | 44.96% |
| | 4050 | MH4050 | MH4051 | | | | | | | | | | 0.41 | | | 0.80 | 65.43 | 26.62 | 0.35 | 26.97 | 43.35 | 58.43 | 99.60 | 2,836.48 | | | | 2,836.48 | 5,999.35 | 35.44 | 2100 | | | 0.11 | 1.678 | 3162.87 | 52.72% |
| | | MH4051 | MH4060 | | | | | | | | | | | | | 0.00 | 65.43 | 26.97 | 0.73 | 27.70 | 42.98 | 57.92 | 98.73 | 2,812.08 | | | | 2,812.08 | 5,999.35 | 73.50 | 2100 | | | 0.11 | 1.678 | 3187.27 | 53.13% |
| | 4600 | MH4600 | MH4601 | | | | | | | | | | 1.29 | | | 2.51 | 2.51 | 10.00 | 2.34 | 12.34 | 76.81 | 104.19 | 178.56 | 192.81 | | | | 192.81 | 303.78 | 115.57 | 675 | | | 0.12 | 0.822 | 110.97 | 36.53% |
| | | MH4601 | MH4602 | | | | | | | | | | | | | 0.00 | 2.51 | 12.34 | 2.34 | 14.68 | 68.85 | 93.26 | 159.65 | 172.83 | | | | 172.83 | 303.78 | 115.57 | 675 | | | 0.12 | 0.822 | 130.95 | 43.11% |
| | 4602 | MH4602 | MH4603 | | | | | | | | | | 1.45 | | | 2.82 | 5.33 | 14.68 | 1.88 | 16.57 | 62.52 | 84.59 | 144.68 | 333.37 | | | | 333.37 | 626.37 | 107.75 | 900 | | | 0.11 | 0.954 | 293.00 | 46.78% |
| | | MH4603 | MH4604 | | | | | | | | | | | | | 0.00 | 5.33 | 16.57 | 1.88 | 18.45 | 58.30 | 78.81 | 134.71 | 310.86 | | | | 310.86 | 626.37 | 107.75 | 900 | | | 0.11 | 0.954 | 315.51 | 50.37% |
| | 4605 | MH4605 | MH4606 | | | | | | | | | | 0.46 | | | 0.90 | 0.90 | 10.00 | 1.69 | 11.69 | 76.81 | 104.19 | 178.56 | 68.75 | | | | 68.75 | 91.46 | 81.57 | 375 | | | 0.25 | 0.802 | 22.70 | 24.82% |
| | | MH4606 | MH4607 | | | | | | | | | | | | | 0.00 | 0.90 | 11.69 | 0.24 | 11.94 | 70.86 | 96.02 | 164.42 | 63.43 | | | | 63.43 | 91.46 | 11.63 | 375 | | | 0.25 | 0.802 | 28.03 | 30.65% |
| | 4607 | MH4607 | MH4604 | 0.60 | | | | | | | | | | | | 0.50 | 1.40 | 11.94 | 1.28 | 13.22 | 70.09 | 94.97 | 162.60 | 97.82 | | | | 97.82 | 184.99 | 63.78 | 525 | | | 0.17 | 0.828 | 87.17 | 47.12% |
| | 4604 | MH4604 | MH4610 | | | | | | | | | | 0.26 | | | 0.51 | 7.23 | 18.45 | 1.07 | 19.52 | 54.67 | 73.85 | 126.15 | 395.43 | | | | 395.43 | 626.37 | 61.03 | 900 | | | 0.11 | 0.954 | 230.94 | 36.87% |
| | 4611 | MH4611 | MH4612 | | | | | | | | | | 0.93 | | | 1.81 | 1.81 | 10.00 | 1.50 | 11.50 | 76.81 | 104.19 | 178.56 | 139.00 | | | | 139.00 | 290.85 | 71.05 | 675 | | | 0.11 | 0.787 | 151.85 | 52.21% |
| | | MH4612 | MH4610 | | | | | | | | | | | | | 0.00 | 1.81 | 11.50 | 1.40 | 12.91 | 71.48 | 96.87 | 165.89 | 129.35 | | | | 129.35 | 385.20 | 71.05 | 750 | | | 0.11 | 0.845 | 255.84 | 66.42% |
| | 4610 | MH4610 | MH4620 | | | | | | | | | | 0.32 | | | 0.62 | 9.67 | 19.52 | 1.14 | 20.65 | 52.82 | 71.33 | 121.81 | 510.59 | | | | 510.59 | 944.84 | 72.00 | 1050 | | | 0.11 | 1.057 | 434.25 | 45.96% |
| | 4630 | MH4630 | MH4631 | | | | | | | | | | 1.82 | | | 3.54 | 3.54 | 10.00 | 1.85 | 11.85 | 76.81 | 104.19 | 178.56 | 272.02 | | | | 272.02 | 385.20 | 93.78 | 750 | | | 0.11 | 0.845 | 113.18 | 29.38% |
| | | MH4631 | MH4632 | | | | | | | | | | | | | 0.00 | 3.54 | 11.85 | 1.85 | 13.70 | 70.36 | 95.34 | 163.25 | 249.20 | | | | 249.20 | 385.20 | 93.78 | 750 | | | 0.11 | 0.845 | 135.99 | 35.31% |
| | | MH4632 | MH4633 | | | | | | | | | | | | | 0.00 | 3.54 | 13.70 | 0.23 | 13.93 | 65.01 | 88.00 | 150.57 | 230.26 | | | | 230.26 | 385.20 | 11.83 | 750 | | | 0.11 | 0.845 | 154.94 | 40.22% |
| | | MH4633 | MH4640 | | | | | | | | | | | | | 0.00 | 3.54 | 13.93 | 1.26 | 15.19 | 64.40 | 87.17 | 149.12 | 228.10 | | | | 228.10 | 385.20 | 63.65 | 750 | | | 0.11 | 0.845 | 157.10 | 40.78% |
| | 4641 | MH4641 | MH4642 | | | | | | | | | | 0.93 | | | 1.81 | 1.81 | 10.00 | 1.42 | 11.42 | 76.81 | 104.19 | 178.56 | 139.00 | | | | 139.00 | 212.45 | 61.91 | 600 | | | 0.11 | 0.728 | 73.45 | 34.57% |
| | | MH4642 | MH4640 | | | | | | | | | | | | | 0.00 | 1.81 | 11.42 | 1.42 | 12.84 | 71.76 | 97.26 | 166.56 | 129.87 | | | | 129.87 | 212.45 | 61.91 | 600 | | | 0.11 | 0.728 | 82.58 | 38.87% |
| | 4640 | MH4640 | MH4650 | | | | | | | | | | 0.32 | | | 0.62 | 5.97 | 15.19 | 1.31 | 16.50 | 61.32 | 82.95 | 141.84 | 366.35 | | | | 366.35 | 626.37 | 74.98 | 900 | | | 0.11 | 0.954 | 260.02 | 41.51% |
| | 4651A | MH4651 | MH4652 | | | | | | | | | | 1.37 | | | 2.67 | 2.67 | 10.00 | 1.20 | 11.20 | 76.81 | 104.19 | 178.56 | 204.76 | | | | 204.76 | 303.78 | 59.31 | 675 | | | 0.12 | 0.822 | 99.01 | 32.59% |
| | | MH4652 | MH4653 | | | | | | | | | | | | | 0.00 | 2.67 | 11.20 | 0.15 | 11.35 | 72.48 | 98.25 | 168.27 | 193.23 | | | | 193.23 | 303.78 | 7.34 | 675 | | | 0.12 | 0.822 | 110.55 | 36.39% |
| | | MH4653 | MH4654 | | | | | | | | | | | | | 0.00 | 2.67 | 11.35 | 1.31 | 12.66 | 71.98 | 97.56 | 167.09 | 191.90 | | | | 191.90 | 303.78 | 64.51 | 675 | | | 0.12 | 0.822 | 111.88 | 36.83% |
| | | MH4654 | MH4650 | | | | | | | | | | | | | 0.00 | 2.67 | 12.66 | 1.31 | 13.97 | 67.91 | 91.98 | 157.43 | 181.05 | | | | 181.05 | 303.78 | 64.51 | 675 | | | 0.12 | 0.822 | 122.73 | 40.40% |
| | 4651B | MH4650 | MH4660 | | | | | | | | | | 0.33 | | | 0.64 | 9.28 | 16.50 | 1.08 | 17.58 | 58.44 | 79.00 | 135.04 | 542.45 | | | | 542.45 | 944.84 | 68.50 | 1050 | | | 0.11 | 1.057 | 402.38 | 42.59% |
| | | | | | | | | | | | | | | | | | | | | | 167.22 | 230.48 | | | | | | | | | | | | | | | |
| | 4661 | MH4661 | MH4662 | | | | | | | | | | 0.36 | | | 0.70 | 0.70 | 0.00 | 0.55 | 0.55 | 167.22 | 230.48 | 398.62 | 117.15 | | | | 117.15 | 184.99 | 27.35 | 525 | | | 0.17 | 0.828 | 67.84 | 36.67% |
| | | MH4662 | MH4663 | | | | | | | | | | | | | 0.00 | 0.70 | 0.55 | 0.36 | 0.91 | 156.09 | 214.71 | 370.99 | 109.35 | | | | 109.35 | 184.99 | 17.64 | 525 | | | 0.17 | 0.828 | 75.64 | 40.89% |
| | | MH4663 | MH4660 | | | | | | | | | | | | | 0.00 | 0.70 | 0.91 | 0.77 | 1.67 | 149.73 | 205.75 | 355.30 | 104.90 | | | | 104.90 | 184.99 | 38.15 | 525 | | | 0.17 | 0.828 | 80.09 | 43.29% |
| | 4660 | MH4660 | MH4620 | | | | | | | | | | 0.42 | | | 0.82 | 10.80 | 17.58 | 1.10 | 18.68 | 56.28 | 76.05 | 129.95 | 607.83 | | | | 607.83 | 944.84 | 69.50 | 1050 | | | 0.11 | 1.057 | 337.00 | 35.67% |

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**STORM SEWER DESIGN SHEET**
**MER BLEUE Urban Expansion Area**
MSS Preferred Concept
CITY OF OTTAWA
Owners Group

| LOCATION | | | | AREA (Ha) | | | | | | | | | | | RATIONAL DESIGN FLOW | | | | | | | | | | | SEWER DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STREET | AREA ID | FROM | TO | C= 0.20 | C= 0.30 | C= 0.40 | C= 0.54 | C= 0.57 | C= 0.70 | C= 0.71 | C= 0.73 | C= 0.74 | C= 0.70 | C= 0.76 | C= 0.80 | IND 2.78AC | CUM 2.78AC | INLET (min) | TIME IN PIPE | TOTAL (min) | i (2) (mm/hr) | i (5) (mm/hr) | i (100) (mm/hr) | 2yr PEAK FLOW (L/s) | 5yr PEAK FLOW (L/s) | 100yr PEAK FLOW (L/s) | FIXED FLOW (L/s) | DESIGN FLOW (L/s) | CAPACITY (L/s) | LENGTH (m) | PIPE SIZE (mm) DIA | W | H | SLOPE (%) | VELOCITY (m/s) | AVAIL CAP (2yr) (L/s) | (%) |
| | 4622 | MH4620 | MH4621 | | | | | | | | | | 0.29 | | | 0.56 | 21.03 | 20.65 | 1.22 | 21.87 | 51.01 | 68.85 | 117.54 | 1,072.69 | | | | 1,072.69 | 1,846.76 | 91.45 | 1350 | | | 0.11 | 1.250 | 774.06 | 41.91% |
| | 4621 | MH4621 | MH4622 | | | | | | | | | | 0.51 | | | 0.99 | 22.02 | 21.87 | 0.77 | 22.65 | 49.20 | 66.39 | 113.31 | 1,083.62 | | | | 1,083.62 | 1,846.76 | 58.10 | 1350 | | | 0.11 | 1.250 | 763.13 | 41.32% |
| | 4624 | MH4624 | MH4622 | | | | | | | | | | 0.25 | | | 0.49 | 0.49 | 0.00 | 1.32 | 1.32 | 167.22 | 230.48 | 398.62 | 81.35 | | | | 81.35 | 93.27 | 64.60 | 375 | | | 0.26 | 0.818 | 11.91 | 12.77% |
| | 4623 | MH4623 | MH4622 | | | | | | | | | | 0.18 | | | 0.35 | 0.35 | 0.00 | 0.59 | 0.59 | 167.22 | 230.48 | 398.62 | 58.57 | | | | 58.57 | 136.30 | 29.35 | 450 | | | 0.21 | 0.830 | 77.73 | 57.03% |
| | | MH4622 | MH4625 | | | | | | | | | | | | | 0.00 | 22.86 | 22.65 | 0.95 | 23.60 | 48.13 | 64.93 | 110.79 | 1,100.26 | | | | 1,100.26 | 1,846.76 | 71.19 | 1350 | | | 0.11 | 1.250 | 746.50 | 40.42% |
| | 4625 | MH4625 | MH4626 | | | | | | | | | | 1.22 | | | 2.37 | 25.23 | 23.60 | 0.44 | 24.04 | 46.88 | 63.23 | 107.87 | 1,183.08 | | | | 1,183.08 | 1,846.76 | 33.18 | 1350 | | | 0.11 | 1.250 | 663.67 | 35.94% |
| | | MH4626 | MH4060 | | | | | | | | | | | | | 0.00 | 25.23 | 24.04 | 1.10 | 25.14 | 46.33 | 62.48 | 106.57 | 1,169.04 | | | | 1,169.04 | 1,846.76 | 82.57 | 1350 | | | 0.11 | 1.250 | 677.72 | 36.70% |
| | 4060 | MH4060 | MH4061 | | | | | | | | | | 1.49 | | | 2.90 | 93.56 | 27.70 | 0.82 | 28.52 | 42.23 | 56.90 | 96.97 | 3,950.94 | | | | 3,950.94 | 8,565.43 | 89.77 | 2400 | | | 0.11 | 1.834 | 4614.49 | 53.87% |
| | | MH4061 | MH4062 | | | | | | | | | | | | | 0.00 | 93.56 | 28.52 | 0.32 | 28.84 | 41.42 | 55.80 | 95.09 | 3,875.58 | | | | 3,875.58 | 8,565.43 | 35.42 | 2400 | | | 0.11 | 1.834 | 4689.85 | 54.75% |
| | | MH4062 | MH4063 | | | | | | | | | | | | | 0.00 | 93.56 | 28.84 | 0.32 | 29.16 | 41.11 | 55.38 | 94.37 | 3,846.72 | | | | 3,846.72 | 8,565.43 | 35.42 | 2400 | | | 0.11 | 1.834 | 4718.72 | 55.09% |
| | | MH4063 | MH4070 | | | | | | | | | | | | | 0.00 | 93.56 | 29.16 | 0.52 | 29.68 | 40.81 | 54.97 | 93.66 | 3,818.33 | | | | 3,818.33 | 8,565.43 | 57.52 | 2400 | | | 0.11 | 1.834 | 4747.10 | 55.42% |
| | 4720 | MH4720 | MH4721 | | | | | | | | | | 0.82 | | | 1.60 | 1.60 | 10.00 | 1.75 | 11.75 | 76.81 | 104.19 | 178.56 | 122.56 | | | | 122.56 | 184.99 | 87.00 | 525 | | | 0.17 | 0.828 | 62.43 | 33.75% |
| | | MH4721 | MH4722 | | | | | | | | | | | | | 0.00 | 1.60 | 11.75 | 0.42 | 12.17 | 70.68 | 95.77 | 163.99 | 112.78 | | | | 112.78 | 184.99 | 20.83 | 525 | | | 0.17 | 0.828 | 72.21 | 39.03% |
| | | MH4722 | MH4723 | | | | | | | | | | | | | 0.00 | 1.60 | 12.17 | 0.96 | 13.13 | 69.37 | 93.97 | 160.88 | 110.69 | | | | 110.69 | 184.99 | 47.67 | 525 | | | 0.17 | 0.828 | 74.30 | 40.16% |
| | | MH4723 | MH4724 | | | | | | | | | | | | | 0.00 | 1.60 | 13.13 | 0.28 | 13.41 | 66.56 | 90.13 | 154.24 | 106.22 | | | | 106.22 | 184.99 | 13.70 | 525 | | | 0.17 | 0.828 | 78.77 | 42.58% |
| PARK | 4725 | MH4725 | MH4724 | | 6.31 | | | | | | | | | | | 5.26 | 5.26 | 15.00 | 0.28 | 15.28 | 61.77 | 83.56 | 142.89 | 325.05 | | | | 325.05 | 496.66 | 15.00 | 825 | | | 0.11 | 0.900 | 171.61 | 34.55% |
| | | MH4724 | MH4070 | | | | | | | | | | | | | 0.00 | 6.86 | 13.41 | 1.06 | 14.46 | 65.80 | 89.09 | 152.44 | 451.30 | | | | 451.30 | 775.41 | 63.81 | 975 | | | 0.11 | 1.006 | 324.11 | 41.80% |
| | 4710 | MH4710 | MH4711 | | | | | | | | | | 1.01 | | | 1.97 | 1.97 | 10.00 | 0.20 | 10.20 | 76.81 | 104.19 | 178.56 | 150.96 | | | | 150.96 | 239.68 | 9.81 | 600 | | | 0.14 | 0.821 | 88.72 | 37.02% |
| | | MH4711 | MH4712 | | | | | | | | | | | | | 0.00 | 1.97 | 10.20 | 2.25 | 12.44 | 76.05 | 103.15 | 176.76 | 149.47 | | | | 149.47 | 239.68 | 110.65 | 600 | | | 0.14 | 0.821 | 90.20 | 37.64% |
| | 4712 | MH4712 | MH4713 | | | | | | | | | | 1.13 | | | 2.20 | 4.16 | 12.44 | 2.13 | 14.58 | 68.54 | 92.84 | 158.92 | 285.43 | | | | 285.43 | 496.66 | 115.08 | 825 | | | 0.11 | 0.900 | 211.24 | 42.53% |
| | | MH4713 | MH4714 | | | | | | | | | | | | | 0.00 | 4.16 | 14.58 | 0.89 | 15.47 | 62.79 | 84.95 | 145.30 | 261.47 | | | | 261.47 | 496.66 | 48.16 | 825 | | | 0.11 | 0.900 | 235.19 | 47.35% |
| | 4714 | MH4714 | MH4715 | | | | | | | | | | 0.95 | | | 1.85 | 6.01 | 15.47 | 0.77 | 16.24 | 60.69 | 82.08 | 140.34 | 364.91 | | | | 364.91 | 626.37 | 43.97 | 900 | | | 0.11 | 0.954 | 261.46 | 41.74% |
| | | MH4715 | MH4716 | | | | | | | | | | | | | 0.00 | 6.01 | 16.24 | 1.05 | 17.29 | 59.00 | 79.77 | 136.35 | 354.76 | | | | 354.76 | 626.37 | 60.36 | 900 | | | 0.11 | 0.954 | 271.62 | 43.36% |
| | | MH4716 | MH4717 | | | | | | | | | | | | | 0.00 | 6.01 | 17.29 | 0.24 | 17.53 | 56.84 | 76.82 | 131.27 | 341.80 | | | | 341.80 | 626.37 | 13.70 | 900 | | | 0.11 | 0.954 | 284.58 | 45.43% |
| | | MH4717 | MH4070 | | | | | | | | | | | | | 0.00 | 6.01 | 17.53 | 1.17 | 18.70 | 56.38 | 76.18 | 130.18 | 339.00 | | | | 339.00 | 626.37 | 66.81 | 900 | | | 0.11 | 0.954 | 287.37 | 45.88% |
| | | MH4070 | HW4 | | | | | | | | | | | | | 0.00 | 106.43 | 29.68 | 0.43 | 30.12 | 40.33 | 54.31 | 92.53 | 4,292.31 | | | | 4,292.31 | 8,565.43 | 47.51 | 2400 | | | 0.11 | 1.834 | 4273.13 | 49.89% |
| | | | | 0.00 | 8.95 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | 46.37 | 1.46 | 2.54 | 106.43 | TRUE | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | 59.32 | | | | | | | | | | | | | | | | | | | | | |

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**STORM SEWER DESIGN SHEET**
**MER BLEUE Urban Expansion Area**
MSS Preferred Concept
CITY OF OTTAWA
Owners Group

| LOCATION | | | | AREA (Ha) | | | | | | | | | | | | RATIONAL DESIGN FLOW | | | | | | | | | | | | SEWER DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STREET | AREA ID | FROM | TO | C= 0.20 | C= 0.30 | C= 0.40 | C= 0.54 | C= 0.57 | C= 0.70 | C= 0.71 | C= 0.73 | C= 0.74 | C= 0.70 | C= 0.76 | C= 0.80 | IND 2.78AC | CUM 2.78AC | INLET (min) | TIME IN PIPE | TOTAL (min) | i (2) (mm/hr) | i (5) (mm/hr) | i (100) (mm/hr) | 2yr PEAK FLOW (L/s) | 5yr PEAK FLOW (L/s) | 100yr PEAK FLOW (L/s) | FIXED FLOW (L/s) | DESIGN FLOW (L/s) | CAPACITY (L/s) | LENGTH (m) | PIPE SIZE (mm) DIA | W | H | SLOPE (%) | VELOCITY (m/s) | AVAIL CAP (2yr) (L/s) | (%) |
| **OUTLET #5: New Central SWM Pond (South)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MER BLEUE ROAD | 5000A/B | MH5000 | MH5001 | | | | | | | | | | 0.89 | 1.99 | | 5.94 | 5.94 | 16.67 | 1.36 | 18.03 | 58.09 | 78.52 | 134.21 | 344.83 | | | | 344.83 | 626.37 | 77.55 | 900 | | | 0.11 | 0.954 | 281.54 | 44.95% |
| | | MH5001 | MH5002 | | | | | | | | | | | | | 0.00 | 5.94 | 18.03 | 1.36 | 19.38 | 55.44 | 74.91 | 127.97 | 329.12 | | | | 329.12 | 626.37 | 77.55 | 900 | | | 0.11 | 0.954 | 297.25 | 47.46% |
| | | MH5002 | MH5010 | | | | | | | | | | | | | 0.00 | 5.94 | 19.38 | 1.28 | 20.66 | 53.05 | 71.64 | 122.35 | 314.93 | | | | 314.93 | 626.37 | 73.01 | 900 | | | 0.11 | 0.954 | 311.44 | 49.72% |
| | 5110 | MH5110 | MH5111 | | | | | | | | | | 1.36 | | | 2.65 | 2.65 | 10.00 | 1.43 | 11.43 | 76.81 | 104.19 | 178.56 | 203.27 | | | | 203.27 | 303.78 | 70.81 | 675 | | | 0.12 | 0.822 | 100.51 | 33.09% |
| | | MH5111 | MH5112 | | | | | | | | | | | | | 0.00 | 2.65 | 11.43 | 1.43 | 12.87 | 71.70 | 97.18 | 166.43 | 189.76 | | | | 189.76 | 303.78 | 70.81 | 675 | | | 0.12 | 0.822 | 114.01 | 37.53% |
| | | MH5112 | MH5121 | | | | | | | | | | | | | 0.00 | 2.65 | 12.87 | 1.18 | 14.05 | 67.30 | 91.14 | 155.98 | 178.11 | | | | 178.11 | 303.78 | 58.19 | 675 | | | 0.12 | 0.822 | 125.67 | 41.37% |
| | 5120 | MH5120 | MH5121 | | | | | | | | | | 0.32 | | | 0.62 | 0.62 | 10.00 | 1.14 | 11.14 | 76.81 | 104.19 | 178.56 | 47.83 | | | | 47.83 | 93.27 | 55.81 | 375 | | | 0.26 | 0.818 | 45.44 | 48.72% |
| | S5122 | MH5121 | MH5122 | | | | | | | | | | 0.21 | | | 0.41 | 3.68 | 14.05 | 0.20 | 14.25 | 64.11 | 86.76 | 148.42 | 235.78 | | | | 235.78 | 385.20 | 10.26 | 750 | | | 0.11 | 0.845 | 149.42 | 38.79% |
| | | MH5122 | MH5010 | | | | | | | | | | | | | 0.00 | 3.68 | 14.25 | 0.92 | 15.18 | 63.59 | 86.06 | 147.21 | 233.89 | | | | 233.89 | 385.20 | 46.87 | 750 | | | 0.11 | 0.845 | 151.31 | 39.28% |
| HIGH RES | 5012 | MH5012 | MH5010 | | | | | | | | | | | | 6.20 | 13.79 | 13.79 | 15.83 | 0.22 | 16.05 | 59.88 | 80.97 | 138.43 | 825.61 | | | | 825.61 | 1,348.97 | 15.00 | 1200 | | | 0.11 | 1.155 | 523.36 | 38.80% |
| | 5010 | MH5010 | MH5020 | | | | | | | | | | 0.18 | | | 0.35 | 23.75 | 16.05 | 0.99 | 17.04 | 59.40 | 80.32 | 137.31 | 1,411.03 | | | | 1,411.03 | 2,445.85 | 79.77 | 1500 | | | 0.11 | 1.341 | 1034.81 | 42.31% |
| COMMERCIAL | 5262 | MH5262 | MH5263 | | | | | | | | | | | | 3.83 | 8.52 | 8.52 | 14.50 | 0.24 | 14.74 | 62.97 | 85.21 | 145.74 | 536.40 | | | | 536.40 | 809.89 | 15.00 | 975 | | | 0.12 | 1.051 | 273.49 | 33.77% |
| | 5261 | MH5261 | MH5263 | | | | | | | | | | 0.85 | | | 1.65 | 1.65 | 10.00 | 1.51 | 11.51 | 76.81 | 104.19 | 178.56 | 127.04 | | | | 127.04 | 239.68 | 74.23 | 600 | | | 0.14 | 0.821 | 112.63 | 46.99% |
| | | | | | | | | | | | | | | | | | | | | | 167.22 | 230.48 | | | | | | | | | | | | | | |
| | | MH5263 | MH5200 | | | | | | | | | | | | | 0.00 | 10.17 | 14.74 | 1.48 | 16.22 | 62.39 | 84.41 | 144.37 | 634.66 | | | | 634.66 | 1,348.97 | 102.73 | 1200 | | | 0.11 | 1.155 | 714.31 | 52.95% |
| HIGH RES | 5260 | MH5260 | MH5200 | | | | | | | | | | | | 2.79 | 6.20 | 6.20 | 13.00 | 0.25 | 13.25 | 66.93 | 90.63 | 155.11 | 415.30 | | | | 415.30 | 775.41 | 15.00 | 975 | | | 0.11 | 1.006 | 360.11 | 46.44% |
| | 5200 | MH5200 | MH5201 | | | | | | | | | | 0.58 | | | 1.13 | 17.51 | 16.22 | 0.62 | 16.83 | 59.03 | 79.81 | 136.43 | 1,033.38 | | | | 1,033.38 | 1,846.76 | 46.14 | 1350 | | | 0.11 | 1.250 | 813.38 | 44.04% |
| | | MH5201 | MH5202 | | | | | | | | | | | | | 0.00 | 17.51 | 16.83 | 1.25 | 18.09 | 57.75 | 78.06 | 133.41 | 1,010.96 | | | | 1,010.96 | 1,846.76 | 94.11 | 1350 | | | 0.11 | 1.250 | 835.79 | 45.26% |
| | | MH5202 | MH5020 | | | | | | | | | | | | | 0.00 | 17.51 | 18.09 | 0.88 | 18.97 | 55.32 | 74.74 | 127.69 | 968.44 | | | | 968.44 | 1,846.76 | 66.17 | 1350 | | | 0.11 | 1.250 | 878.31 | 47.56% |
| | 5210 | MH5210 | MH5211 | | | | | | | | | | 0.84 | | | 1.63 | 1.63 | 10.00 | 1.19 | 11.19 | 76.81 | 104.19 | 178.56 | 125.55 | | | | 125.55 | 239.68 | 58.40 | 600 | | | 0.14 | 0.821 | 114.13 | 47.62% |
| | | MH5211 | MH5212 | | | | | | | | | | | | | 0.00 | 1.63 | 11.19 | 0.24 | 11.42 | 72.54 | 98.32 | 168.40 | 118.57 | | | | 118.57 | 239.68 | 11.62 | 600 | | | 0.14 | 0.821 | 121.11 | 50.53% |
| | | MH5212 | MH5220 | | | | | | | | | | | | | 0.00 | 1.63 | 11.42 | 2.01 | 13.43 | 71.75 | 97.24 | 166.53 | 117.28 | | | | 117.28 | 239.68 | 98.89 | 600 | | | 0.14 | 0.821 | 122.39 | 51.07% |
| PARK | 5220A/B | MH5220 | MH5221 | | 0.53 | | | | | | | | 1.24 | | | 2.86 | 4.49 | 13.43 | 1.71 | 15.14 | 65.74 | 89.01 | 152.30 | 295.17 | | | | 295.17 | 775.41 | 103.16 | 975 | | | 0.11 | 1.006 | 480.24 | 61.93% |
| | | MH5221 | MH5222 | | | | | | | | | | | | | 0.00 | 4.49 | 15.14 | 1.34 | 16.48 | 61.45 | 83.12 | 142.13 | 275.87 | | | | 275.87 | 775.41 | 81.04 | 975 | | | 0.11 | 1.006 | 499.54 | 64.42% |
| | | MH5222 | MH5223 | | | | | | | | | | | | | 0.00 | 4.49 | 16.48 | 0.19 | 16.67 | 58.48 | 79.06 | 135.14 | 262.57 | | | | 262.57 | 775.41 | 11.66 | 975 | | | 0.11 | 1.006 | 512.84 | 66.14% |
| | | MH5223 | MH5230 | | | | | | | | | | | | | 0.00 | 4.49 | 16.67 | 0.34 | 17.01 | 58.08 | 78.52 | 134.20 | 260.77 | | | | 260.77 | 775.41 | 20.26 | 975 | | | 0.11 | 1.006 | 514.64 | 66.37% |
| | 5231 | MH5231 | MH5230 | | | | | | | | | | 1.16 | | | 2.26 | 2.26 | 10.00 | 2.19 | 12.19 | 76.81 | 104.19 | 178.56 | 173.38 | | | | 173.38 | 239.68 | 108.08 | 600 | | | 0.14 | 0.821 | 66.30 | 27.66% |
| | S5230 | MH5230 | MH5020 | | | | | | | | | | 0.40 | | | 0.78 | 7.53 | 17.01 | 1.44 | 18.45 | 57.40 | 77.58 | 132.59 | 431.97 | | | | 431.97 | 944.84 | 91.14 | 1050 | | | 0.11 | 1.057 | 512.87 | 54.28% |
| | 5020 | MH5020 | MH5021 | | | | | | | | | | 1.40 | | | 2.72 | 51.51 | 18.45 | 0.86 | 19.30 | 54.67 | 73.86 | 126.17 | 2,816.22 | | | | 2,816.22 | 5,999.35 | 86.18 | 2100 | | | 0.11 | 1.678 | 3183.13 | 53.06% |
| | | MH5021 | MH5030 | | | | | | | | | | | | | 0.00 | 51.51 | 19.30 | 0.90 | 20.20 | 53.18 | 71.82 | 122.66 | 2,739.40 | | | | 2,739.40 | 5,999.35 | 90.18 | 2100 | | | 0.11 | 1.678 | 3259.95 | 54.34% |
| | 5300 | MH5300 | MH5301 | | | | | | | | | | 1.61 | | | 3.13 | 3.13 | 10.00 | 1.11 | 11.11 | 76.81 | 104.19 | 178.56 | 240.63 | | | | 240.63 | 303.78 | 54.71 | 675 | | | 0.12 | 0.822 | 63.14 | 20.79% |
| | | MH5301 | MH5302 | | | | | | | | | | | | | 0.00 | 3.13 | 11.11 | 0.22 | 11.33 | 72.79 | 98.68 | 169.02 | 228.07 | | | | 228.07 | 303.78 | 10.92 | 675 | | | 0.12 | 0.822 | 75.71 | 24.92% |
| | | MH5302 | MH5030 | | | | | | | | | | | | | 0.00 | 3.13 | 11.33 | 1.71 | 13.04 | 72.05 | 97.66 | 167.25 | 225.74 | | | | 225.74 | 303.78 | 84.57 | 675 | | | 0.12 | 0.822 | 78.04 | 25.69% |
| | 5310 | MH5310 | MH5311 | | | | | | | | | | 0.99 | | | 1.93 | 1.93 | 10.00 | 1.27 | 11.27 | 76.81 | 104.19 | 178.56 | 147.97 | | | | 147.97 | 239.68 | 62.41 | 600 | | | 0.14 | 0.821 | 91.71 | 38.26% |
| | | MH5311 | MH5312 | | | | | | | | | | | | | 0.00 | 1.93 | 11.27 | 1.27 | 12.53 | 72.26 | 97.95 | 167.75 | 139.21 | | | | 139.21 | 239.68 | 62.41 | 600 | | | 0.14 | 0.821 | 100.46 | 41.92% |
| | | MH5312 | MH5313 | | | | | | | | | | | | | 0.00 | 1.93 | 12.53 | 0.24 | 12.78 | 68.28 | 92.48 | 158.30 | 131.54 | | | | 131.54 | 239.68 | 12.02 | 600 | | | 0.14 | 0.821 | 108.14 | 45.12% |
| | | MH5313 | MH5314 | | | | | | | | | | | | | 0.00 | 1.93 | 12.78 | 1.58 | 14.36 | 67.57 | 91.50 | 156.61 | 130.17 | | | | 130.17 | 239.68 | 78.09 | 600 | | | 0.14 | 0.821 | 109.51 | 45.69% |
| | 5315 | MH5315 | MH5316 | | | | | | | | | | 1.13 | | | 2.20 | 2.20 | 10.00 | 0.28 | 10.28 | 76.81 | 104.19 | 178.56 | 168.89 | | | | 168.89 | 303.78 | 13.90 | 675 | | | 0.12 | 0.822 | 134.89 | 44.40% |
| | | MH5316 | MH5317 | | | | | | | | | | | | | 0.00 | 2.20 | 10.28 | 1.47 | 11.75 | 75.74 | 102.73 | 176.02 | 166.55 | | | | 166.55 | 303.78 | 72.38 | 675 | | | 0.12 | 0.822 | 137.23 | 45.17% |
| | | MH5317 | MH5314 | | | | | | | | | | | | | 0.00 | 2.20 | 11.75 | 1.48 | 13.23 | 70.69 | 95.78 | 164.01 | 155.44 | | | | 155.44 | 303.78 | 72.88 | 675 | | | 0.12 | 0.822 | 148.34 | 48.83% |
| | 5314 | MH5314 | MH5030 | | | | | | | | | | 0.14 | | | 0.27 | 4.40 | 14.36 | 1.53 | 15.90 | 63.31 | 85.68 | 146.55 | 278.46 | | | | 278.46 | 496.66 | 82.88 | 825 | | | 0.11 | 0.900 | 218.21 | 43.93% |
| | 5030 | MH5030 | MH5031 | | | | | | | | | | 2.20 | | | 4.28 | 63.32 | 20.20 | 1.15 | 21.35 | 51.72 | 69.82 | 119.21 | 3,274.74 | | | | 3,274.74 | 5,999.35 | 116.00 | 2100 | | | 0.11 | 1.678 | 2724.61 | 45.42% |
| SCHOOL | 5034 | MH5034 | MH5031 | | | | | | | | | | | | 2.92 | 6.49 | 6.49 | 13.33 | 0.25 | 13.58 | 66.01 | 89.37 | 152.93 | 428.69 | | | | 428.69 | 775.41 | 15.00 | 975 | | | 0.11 | 1.006 | 346.72 | 44.71% |
| | | MH5031 | MH5032 | | | | | | | | | | | | | 0.00 | 69.82 | 21.35 | 0.48 | 21.83 | 49.96 | 67.42 | 115.08 | 3,487.78 | | | | 3,487.78 | 5,999.35 | 47.96 | 2100 | | | 0.11 | 1.678 | 2511.57 | 41.86% |
| | | MH5032 | MH5033 | | | | | | | | | | | | | 0.00 | 69.82 | 21.83 | 0.43 | 22.25 | 49.27 | 66.48 | 113.46 | 3,439.68 | | | | 3,439.68 | 5,999.35 | 43.21 | 2100 | | | 0.11 | 1.678 | 2559.67 | 42.67% |
| PARK | 5035 | MH5035 | MH5033 | | 2.18 | | | | | | | | | | | 1.82 | 1.82 | 13.50 | 0.36 | 13.86 | 65.55 | 88.74 | 151.84 | 119.18 | | | | 119.18 | 239.68 | 17.81 | 600 | | | 0.14 | 0.821 | 120.50 | 50.28% |
| | | MH5033 | MH5040 | | | | | | | | | | | | | 0.00 | 71.63 | 22.25 | 0.43 | 22.68 | 48.67 | 65.66 | 112.05 | 3,486.07 | | | | 3,486.07 | 5,999.35 | 43.11 | 2100 | | | 0.11 | 1.678 | 2513.28 | 41.89% |
| | | MH5440 | MH5441 | | | | | | | | | | | | | 0.00 | 0.00 | 10.00 | 0.38 | 10.38 | 76.81 | 104.19 | 178.56 | 0.00 | | | | 0.00 | 93.27 | 18.69 | 375 | | | 0.26 | 0.818 | 93.27 | 100.00% |
| | | MH5441 | MH5040 | | | | | | | | | | | | | 0.00 | 0.00 | 10.38 | 0.40 | 10.78 | 75.37 | 102.22 | 175.15 | 0.00 | | | | 0.00 | 93.27 | 19.82 | 375 | | | 0.26 | 0.818 | 93.27 | 100.00% |
| | 5040 | MH5040 | MH5041 | | | | | | | | | | 3.26 | | | 6.34 | 77.98 | 22.68 | 0.61 | 23.30 | 48.08 | 64.86 | 110.67 | 3,749.17 | | | | 3,749.17 | 5,999.35 | 61.73 | 2100 | | | 0.11 | 1.678 | 2250.18 | 37.51% |
| | | MH5041 | MH5042 | | | | | | | | | | | | | 0.00 | 77.98 | 23.30 | 0.61 | 23.91 | 47.27 | 63.76 | 108.77 | 3,685.91 | | | | 3,685.91 | 5,999.35 | 61.73 | 2100 | | | 0.11 | 1.678 | 2313.44 | 38.56% |
| | | MH5042 | MH5043 | | | | | | | | | | | | | 0.00 | 77.98 | 23.91 | 0.34 | 24.25 | 46.49 | 62.69 | 106.94 | 3,624.99 | | | | 3,624.99 | 5,999.35 | 34.46 | 2100 | | | 0.11 | 1.678 | 2374.36 | 39.58% |
| | | MH5043 | MH5050 | | | | | | | | | | | | | 0.00 | 77.98 | 24.25 | 0.55 | 24.80 | 46.06 | 62.12 | 105.95 | 3,591.96 | | | | 3,591.96 | 5,999.35 | 55.60 | 2100 | | | 0.11 | 1.678 | 2407.39 | 40.13% |

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**STORM SEWER DESIGN SHEET**
**MER BLEUE Urban Expansion Area**
MSS Preferred Concept
CITY OF OTTAWA
Owners Group

| LOCATION | | | | AREA (Ha) | | | | | | | | | | | RATIONAL DESIGN FLOW | | | | | | | | | | | | SEWER DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STREET | AREA ID | FROM | TO | C= 0.20 | C= 0.30 | C= 0.40 | C= 0.54 | C= 0.57 | C= 0.70 | C= 0.71 | C= 0.73 | C= 0.74 | C= 0.70 | C= 0.76 | C= 0.80 | IND 2.78AC | CUM 2.78AC | INLET (min) | TIME IN PIPE | TOTAL (min) | i (2) (mm/hr) | i (5) (mm/hr) | i (100) (mm/hr) | 2yr PEAK FLOW (L/s) | 5yr PEAK FLOW (L/s) | 100yr PEAK FLOW (L/s) | FIXED FLOW (L/s) | DESIGN FLOW (L/s) | CAPACITY (L/s) | LENGTH (m) | PIPE SIZE (mm) DIA | W | H | SLOPE (%) | VELOCITY (m/s) | AVAIL CAP (2yr) (L/s) | (%) |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5500 | MH5500 | MH5050 | | | | | | | | | | 0.75 | | | 1.46 | 1.46 | 10.00 | 2.40 | 12.40 | 76.81 | 104.19 | 178.56 | 112.10 | | | | 112.10 | 184.99 | 119.28 | 525 | | | 0.17 | 0.828 | 72.89 | 39.40% |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5050 | MH5050 | MH5051 | | | | | | | | | | 1.65 | | | 3.21 | 82.65 | 24.80 | 1.00 | 25.80 | 45.40 | 61.21 | 104.39 | 3,752.07 | | | | 3,752.07 | 7,211.18 | 104.95 | 2250 | | | 0.11 | 1.757 | 3459.11 | 47.97% |
| | | MH5051 | MH5052 | | | | | | | | | | | | | 0.00 | 82.65 | 25.80 | 1.04 | 26.84 | 44.25 | 59.65 | 101.70 | 3,657.24 | | | | 3,657.24 | 7,211.18 | 109.95 | 2250 | | | 0.11 | 1.757 | 3553.94 | 49.28% |
| | | MH5052 | MH5060 | | | | | | | | | | | | | 0.00 | 82.65 | 26.84 | 0.16 | 27.00 | 43.12 | 58.11 | 99.05 | 3,563.44 | | | | 3,563.44 | 7,211.18 | 16.98 | 2250 | | | 0.11 | 1.757 | 3647.73 | 50.58% |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5600 | MH5600 | MH5601 | | | | | | | | | | 2.10 | | | 4.09 | 4.09 | 10.00 | 2.14 | 12.14 | 76.81 | 104.19 | 178.56 | 313.87 | | | | 313.87 | 496.66 | 115.31 | 825 | | | 0.11 | 0.900 | 182.79 | 36.80% |
| | | MH5601 | MH5602 | | | | | | | | | | | | | 0.00 | 4.09 | 12.14 | 1.76 | 13.89 | 69.48 | 94.12 | 161.14 | 283.92 | | | | 283.92 | 496.66 | 94.83 | 825 | | | 0.11 | 0.900 | 212.75 | 42.83% |
| | | MH5602 | MH5060 | | | | | | | | | | | | | 0.00 | 4.09 | 13.89 | 0.31 | 14.21 | 64.51 | 87.32 | 149.39 | 263.64 | | | | 263.64 | 496.66 | 16.95 | 825 | | | 0.11 | 0.900 | 233.02 | 46.92% |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | MH5060 | HW5 | | | | | | | | | | | | | 0.00 | 86.73 | 27.00 | 0.48 | 27.48 | 42.95 | 57.87 | 98.65 | 3,724.94 | | | | 3,724.94 | 7,211.18 | 50.69 | 2250 | | | 0.11 | 1.757 | 3486.24 | 48.34% |
| | | | | 0.00 | 2.71 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | 23.26 | 1.99 | 15.74 | 86.73 | TRUE | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | 43.70 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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**STORM SEWER DESIGN SHEET**
**MER BLEUE Urban Expansion Area**
MSS Preferred Concept
CITY OF OTTAWA
Owners Group

| LOCATION | | | | AREA (Ha) | | | | | | | | | | | | RATIONAL DESIGN FLOW | | | | | | | | | | | | SEWER DATA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STREET | AREA ID | FROM | TO | C= 0.20 | C= 0.30 | C= 0.40 | C= 0.54 | C= 0.57 | C= 0.70 | C= 0.71 | C= 0.73 | C= 0.74 | C= 0.70 | C= 0.76 | C= 0.80 | IND 2.78AC | CUM 2.78AC | INLET (min) | TIME IN PIPE | TOTAL (min) | i (2) (mm/hr) | i (5) (mm/hr) | i (100) (mm/hr) | 2yr PEAK FLOW (L/s) | 5yr PEAK FLOW (L/s) | 100yr PEAK FLOW (L/s) | FIXED FLOW (L/s) | DESIGN FLOW (L/s) | CAPACITY (L/s) | LENGTH (m) | PIPE SIZE (mm) DIA | W | H | SLOPE (%) | VELOCITY (m/s) | AVAIL CAP (2yr) (L/s) | (%) |
| **OUTLET #6: New Southern SWM Pond** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 6000 | MH6000 | MH6010 | | | | | | | | | | 0.26 | | | 0.51 | 0.51 | 10.00 | 1.17 | 11.17 | 76.81 | 104.19 | 178.56 | 38.86 | | | | 38.86 | 93.27 | 57.40 | 375 | | | 0.26 | 0.818 | 54.41 | 58.33% |
| | 6100 | MH6100 | MH6101 | | | | | | | | | | 1.05 | | | 2.04 | 2.04 | 10.00 | 1.73 | 11.73 | 76.81 | 104.19 | 178.56 | 156.94 | | | | 156.94 | 303.78 | 85.16 | 675 | | | 0.12 | 0.822 | 146.84 | 48.34% |
| | | MH6101 | MH6010 | | | | | | | | | | | | | 0.00 | 2.04 | 11.73 | 1.73 | 13.45 | 70.76 | 95.88 | 164.18 | 144.58 | | | | 144.58 | 303.78 | 85.16 | 675 | | | 0.12 | 0.822 | 159.20 | 52.41% |
| | 6010 | MH6010 | MH6020 | | | | | | | | | | 0.41 | | | 0.80 | 3.35 | 13.45 | 1.63 | 15.08 | 65.68 | 88.92 | 152.15 | 219.84 | | | | 219.84 | 385.20 | 82.51 | 750 | | | 0.11 | 0.845 | 165.36 | 42.93% |
| | | MH6200 | MH6201 | | | | | | | | | | | | | 0.00 | 0.00 | 10.00 | 0.80 | 10.80 | 76.81 | 104.19 | 178.56 | 0.00 | | | | 0.00 | 93.27 | 39.46 | 375 | | | 0.26 | 0.818 | 93.27 | 100.00% |
| | | MH6202 | MH6201 | | | | | | | | | | | | | 0.00 | 0.00 | 10.00 | 0.62 | 10.62 | 76.81 | 104.19 | 178.56 | 0.00 | | | | 0.00 | 93.27 | 30.47 | 375 | | | 0.26 | 0.818 | 93.27 | 100.00% |
| | 6201 | MH6201 | MH6203 | | | | | | | | | | 2.62 | | | 5.10 | 5.10 | 10.80 | 1.71 | 12.52 | 73.85 | 100.13 | 171.53 | 376.53 | | | | 376.53 | 626.37 | 98.09 | 900 | | | 0.11 | 0.954 | 249.85 | 39.89% |
| | | MH6203 | MH6204 | | | | | | | | | | | | | 0.00 | 5.10 | 12.52 | 1.71 | 14.23 | 68.32 | 92.54 | 158.41 | 348.35 | | | | 348.35 | 626.37 | 98.07 | 900 | | | 0.11 | 0.954 | 278.03 | 44.39% |
| | | MH6204 | MH6205 | | | | | | | | | | | | | 0.00 | 5.10 | 14.23 | 0.18 | 14.41 | 63.64 | 86.13 | 147.33 | 324.48 | | | | 324.48 | 626.37 | 10.22 | 900 | | | 0.11 | 0.954 | 301.89 | 48.20% |
| | | MH6205 | MH6210 | | | | | | | | | | | | | 0.00 | 5.10 | 14.41 | 1.36 | 15.77 | 63.20 | 85.51 | 146.27 | 322.21 | | | | 322.21 | 626.37 | 77.78 | 900 | | | 0.11 | 0.954 | 304.17 | 48.56% |
| | 6211 | MH6211 | MH6212 | | | | | | | | | | 1.90 | | | 3.70 | 3.70 | 10.00 | 1.23 | 11.23 | 76.81 | 104.19 | 178.56 | 283.98 | | | | 283.98 | 496.66 | 66.55 | 825 | | | 0.11 | 0.900 | 212.69 | 42.82% |
| | | MH6212 | MH6213 | | | | | | | | | | | | | 0.00 | 3.70 | 11.23 | 0.22 | 11.45 | 72.38 | 98.10 | 168.03 | 267.60 | | | | 267.60 | 496.66 | 11.70 | 825 | | | 0.11 | 0.900 | 229.06 | 46.12% |
| | | MH6213 | MH6214 | | | | | | | | | | | | | 0.00 | 3.70 | 11.45 | 1.43 | 12.88 | 71.66 | 97.11 | 166.32 | 264.94 | | | | 264.94 | 496.66 | 77.05 | 825 | | | 0.11 | 0.900 | 231.73 | 46.66% |
| WOODLOT | 6219 | MH6219 | MH6214 | 1.20 | | | | | | | | | | | | 0.67 | 0.67 | 12.50 | 0.31 | 12.81 | 68.38 | 92.61 | 158.53 | 45.62 | | | | 45.62 | 93.27 | 15.00 | 375 | | | 0.26 | 0.818 | 47.65 | 51.09% |
| | | MH6214 | MH6215 | | | | | | | | | | | | | 0.00 | 4.36 | 12.88 | 1.06 | 13.93 | 67.28 | 91.11 | 155.94 | 293.66 | | | | 293.66 | 496.66 | 57.01 | 825 | | | 0.11 | 0.900 | 203.00 | 40.87% |
| | | MH6215 | MH6210 | | | | | | | | | | | | | 0.00 | 4.36 | 13.93 | 1.83 | 15.76 | 64.41 | 87.18 | 149.14 | 281.12 | | | | 281.12 | 496.66 | 98.72 | 825 | | | 0.11 | 0.900 | 215.54 | 43.40% |
| | 6210 | MH6210 | MH6220 | | | | | | | | | | 0.29 | | | 0.56 | 10.03 | 15.77 | 1.24 | 17.01 | 60.01 | 81.15 | 138.74 | 601.75 | | | | 601.75 | 944.84 | 78.96 | 1050 | | | 0.11 | 1.057 | 343.09 | 36.31% |
| | 6222 | MH6222 | MH6220 | | | | | | | | | | 0.59 | | | 1.15 | 1.15 | 10.00 | 1.51 | 11.51 | 76.81 | 104.19 | 178.56 | 88.18 | | | | 88.18 | 184.99 | 74.78 | 525 | | | 0.17 | 0.828 | 96.80 | 52.33% |
| | 6223 | MH6223 | MH6224 | | | | | | | | | | 1.24 | | | 2.41 | 2.41 | 10.00 | 1.25 | 11.25 | 76.81 | 104.19 | 178.56 | 185.33 | | | | 185.33 | 303.78 | 61.78 | 675 | | | 0.12 | 0.822 | 118.45 | 38.99% |
| | | MH6224 | MH6225 | | | | | | | | | | | | | 0.00 | 2.41 | 11.25 | 0.28 | 11.53 | 72.31 | 98.01 | 167.87 | 174.49 | | | | 174.49 | 303.78 | 13.65 | 675 | | | 0.12 | 0.822 | 129.29 | 42.56% |
| | | MH6225 | MH6220 | | | | | | | | | | | | | 0.00 | 2.41 | 11.53 | 1.81 | 13.34 | 71.40 | 96.76 | 165.70 | 172.28 | | | | 172.28 | 303.78 | 89.45 | 675 | | | 0.12 | 0.822 | 131.50 | 43.29% |
| | 6620 | MH6220 | MH6221 | | | | | | | | | | 0.81 | | | 1.58 | 15.16 | 17.01 | 1.09 | 18.10 | 57.39 | 77.57 | 132.56 | 870.31 | | | | 870.31 | 1,846.76 | 81.41 | 1350 | | | 0.11 | 1.250 | 976.45 | 52.87% |
| | | MH6221 | MH6020 | | | | | | | | | | | | | 0.00 | 15.16 | 18.10 | 1.30 | 19.40 | 55.30 | 74.72 | 127.65 | 838.68 | | | | 838.68 | 1,846.76 | 97.38 | 1350 | | | 0.11 | 1.250 | 1008.08 | 54.59% |
| | S6020 | MH6020 | MH6030 | | | | | | | | | | 0.85 | | | 1.65 | 20.17 | 19.40 | 1.09 | 20.48 | 53.02 | 71.60 | 122.28 | 1,069.21 | | | | 1,069.21 | 1,846.76 | 81.50 | 1350 | | | 0.11 | 1.250 | 777.54 | 42.10% |
| SCHOOL | 6300 | MH6300 | MH6030 | | | | | | | | | | | | 2.22 | 4.94 | 4.94 | 13.00 | 0.26 | 13.26 | 66.93 | 90.63 | 155.11 | 330.45 | | | | 330.45 | 626.37 | 15.00 | 900 | | | 0.11 | 0.954 | 295.92 | 47.24% |
| | | MH6030 | MH6040 | | | | | | | | | | | | | 0.00 | 25.10 | 20.48 | 1.12 | 21.61 | 51.26 | 69.20 | 118.15 | 1,286.91 | | | | 1,286.91 | 2,445.85 | 90.38 | 1500 | | | 0.11 | 1.341 | 1158.94 | 47.38% |
| | 6400 | MH6400 | MH6401 | | | | | | | | | | 1.43 | | | 2.78 | 2.78 | 10.00 | 0.54 | 10.54 | 76.81 | 104.19 | 178.56 | 213.73 | | | | 213.73 | 385.20 | 27.40 | 750 | | | 0.11 | 0.845 | 171.47 | 44.51% |
| WOODLOT | 6408 | MH6408 | MH6401 | 3.98 | | | | | | | | | | | | 2.21 | 2.21 | 14.67 | 0.30 | 14.97 | 62.56 | 84.64 | 144.76 | 138.43 | | | | 138.43 | 239.68 | 15.00 | 600 | | | 0.14 | 0.821 | 101.24 | 42.24% |
| | | MH6401 | MH6402 | | | | | | | | | | | | | 0.00 | 5.00 | 14.97 | 0.25 | 15.22 | 61.83 | 83.64 | 143.04 | 308.87 | | | | 308.87 | 496.66 | 13.37 | 825 | | | 0.11 | 0.900 | 187.79 | 37.81% |
| | | MH6402 | MH6403 | | | | | | | | | | | | | 0.00 | 5.00 | 15.22 | 0.43 | 15.65 | 61.25 | 82.85 | 141.67 | 305.98 | | | | 305.98 | 496.66 | 22.99 | 825 | | | 0.11 | 0.900 | 190.69 | 38.39% |
| | | MH6403 | MH6404 | | | | | | | | | | | | | 0.00 | 5.00 | 15.65 | 1.10 | 16.75 | 60.28 | 81.52 | 139.38 | 301.14 | | | | 301.14 | 496.66 | 59.66 | 825 | | | 0.11 | 0.900 | 195.53 | 39.37% |
| | | MH6404 | MH6405 | | | | | | | | | | | | | 0.00 | 5.00 | 16.75 | 0.51 | 17.26 | 57.92 | 78.29 | 133.81 | 289.34 | | | | 289.34 | 496.66 | 27.58 | 825 | | | 0.11 | 0.900 | 207.32 | 41.74% |
| | | MH6405 | MH6406 | | | | | | | | | | | | | 0.00 | 5.00 | 17.26 | 0.51 | 17.77 | 56.90 | 76.89 | 131.40 | 284.23 | | | | 284.23 | 496.66 | 27.53 | 825 | | | 0.11 | 0.900 | 212.43 | 42.77% |
| PARK | 6407 | MH6407 | MH6406 | | 2.03 | | | | | | | | | | | 1.69 | 1.69 | 13.00 | 0.30 | 13.30 | 66.93 | 90.63 | 155.11 | 113.31 | | | | 113.31 | 184.99 | 15.00 | 525 | | | 0.17 | 0.828 | 71.67 | 38.74% |
| | | MH6406 | MH6040 | | | | | | | | | | | | | 0.00 | 6.69 | 17.77 | 1.98 | 19.75 | 55.91 | 75.55 | 129.08 | 373.99 | | | | 373.99 | 626.37 | 113.03 | 900 | | | 0.11 | 0.954 | 252.38 | 40.29% |
| | 6040 | MH6040 | MH6050 | | | | | | | | | | 0.18 | | | 0.35 | 32.14 | 21.61 | 1.01 | 22.62 | 49.58 | 66.91 | 114.19 | 1,593.62 | | | | 1,593.62 | 3,153.62 | 86.50 | 1650 | | | 0.11 | 1.429 | 1560.00 | 49.47% |
| | 6500 | MH6500 | MH6501 | | | | | | | | | | 1.92 | | | 3.74 | 3.74 | 10.00 | 1.55 | 11.55 | 76.81 | 104.19 | 178.56 | 286.97 | | | | 286.97 | 496.66 | 83.83 | 825 | | | 0.11 | 0.900 | 209.70 | 42.22% |
| | | MH6501 | MH6502 | | | | | | | | | | | | | 0.00 | 3.74 | 11.55 | 1.55 | 13.10 | 71.32 | 96.65 | 165.51 | 266.47 | | | | 266.47 | 496.66 | 83.83 | 825 | | | 0.11 | 0.900 | 230.20 | 46.35% |
| | | MH6502 | MH6503 | | | | | | | | | | | | | 0.00 | 3.74 | 13.10 | 0.18 | 13.29 | 66.64 | 90.23 | 154.41 | 248.97 | | | | 248.97 | 496.66 | 9.98 | 825 | | | 0.11 | 0.900 | 247.69 | 49.87% |
| | | MH6503 | MH6504 | | | | | | | | | | | | | 0.00 | 3.74 | 13.29 | 1.19 | 14.48 | 66.12 | 89.52 | 153.20 | 247.06 | | | | 247.06 | 496.66 | 64.53 | 825 | | | 0.11 | 0.900 | 249.60 | 50.26% |
| | | MH6504 | MH6505 | | | | | | | | | | | | | 0.00 | 3.74 | 14.48 | 0.27 | 14.76 | 63.01 | 85.26 | 145.84 | 235.43 | | | | 235.43 | 496.66 | 14.76 | 825 | | | 0.11 | 0.900 | 261.23 | 52.60% |
| | 6505 | MH6505 | MH6506 | | | | | | | | | | 1.52 | | | 2.96 | 6.69 | 14.76 | 0.87 | 15.62 | 62.35 | 84.35 | 144.26 | 417.36 | | | | 417.36 | 775.41 | 52.33 | 975 | | | 0.11 | 1.006 | 358.05 | 46.18% |
| | | MH6506 | MH6507 | | | | | | | | | | | | | 0.00 | 6.69 | 15.62 | 1.04 | 16.66 | 60.33 | 81.59 | 139.50 | 403.88 | | | | 403.88 | 775.41 | 62.68 | 975 | | | 0.11 | 1.006 | 371.53 | 47.91% |
| | | MH6507 | MH6508 | | | | | | | | | | | | | 0.00 | 6.69 | 16.66 | 0.12 | 16.79 | 58.10 | 78.54 | 134.24 | 388.95 | | | | 388.95 | 775.41 | 7.44 | 975 | | | 0.11 | 1.006 | 386.46 | 49.84% |
| | | MH6508 | MH6509 | | | | | | | | | | | | | 0.00 | 6.69 | 16.79 | 0.52 | 17.30 | 57.85 | 78.20 | 133.65 | 387.26 | | | | 387.26 | 775.41 | 31.21 | 975 | | | 0.11 | 1.006 | 388.15 | 50.06% |
| | | MH6509 | MH6510 | | | | | | | | | | | | | 0.00 | 6.69 | 17.30 | 0.83 | 18.14 | 56.82 | 76.79 | 131.21 | 380.35 | | | | 380.35 | 775.41 | 50.27 | 975 | | | 0.11 | 1.006 | 395.06 | 50.95% |

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# STORM SEWER DESIGN SHEET

**MER BLEUE Urban Expansion Area**
MSS Preferred Concept
CITY OF OTTAWA
Owners Group

| LOCATION | | | | AREA (Ha) | | | | | | | | | | | RATIONAL DESIGN FLOW | | | | | | | | | | | SEWER DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STREET | AREA ID | FROM | TO | C= 0.20 | C= 0.30 | C= 0.40 | C= 0.54 | C= 0.57 | C= 0.70 | C= 0.71 | C= 0.73 | C= 0.74 | C= 0.70 | C= 0.76 | C= 0.80 | IND 2.78AC | CUM 2.78AC | INLET (min) | TIME IN PIPE | TOTAL (min) | i (2) (mm/hr) | i (5) (mm/hr) | i (100) (mm/hr) | 2yr PEAK FLOW (L/s) | 5yr PEAK FLOW (L/s) | 100yr PEAK FLOW (L/s) | FIXED FLOW (L/s) | DESIGN FLOW (L/s) | CAPACITY (L/s) | LENGTH (m) | PIPE SIZE (mm) DIA | W | H | SLOPE (%) | VELOCITY (m/s) | AVAIL CAP (2yr) (L/s) | (%) |
| | S6431 | MH6511 | MH6512 | | | | | | | | | | 1.60 | | | 3.11 | 3.11 | 10.00 | 1.33 | 11.33 | 76.81 | 104.19 | 178.56 | 239.14 | | | | 239.14 | 385.20 | 67.37 | 750 | | | 0.11 | 0.845 | 146.06 | 37.92% |
| | | MH6512 | MH6513 | | | | | | | | | | | | | 0.00 | 3.11 | 11.33 | 0.20 | 11.53 | 72.05 | 97.66 | 167.26 | 224.34 | | | | 224.34 | 385.20 | 10.15 | 750 | | | 0.11 | 0.845 | 160.86 | 41.76% |
| | | MH6513 | MH6514 | | | | | | | | | | | | | 0.00 | 3.11 | 11.53 | 1.32 | 12.85 | 71.39 | 96.75 | 165.69 | 222.29 | | | | 222.29 | 385.20 | 66.94 | 750 | | | 0.11 | 0.845 | 162.91 | 42.29% |
| | | MH6514 | MH6510 | | | | | | | | | | | | | 0.00 | 3.11 | 12.85 | 1.32 | 14.17 | 67.36 | 91.21 | 156.11 | 209.72 | | | | 209.72 | 385.20 | 66.94 | 750 | | | 0.11 | 0.845 | 175.48 | 45.56% |
| | 6510 | MH6510 | MH6050 | | | | | | | | | | 0.37 | | | 0.72 | 10.53 | 18.14 | 1.27 | 19.40 | 55.24 | 74.63 | 127.49 | 581.53 | | | | 581.53 | 944.84 | 80.41 | 1050 | | | 0.11 | 1.057 | 363.31 | 38.45% |
| | 6520 | MH6520 | MH6521 | | | | | | | | | | 1.24 | | | 2.41 | 2.41 | 10.00 | 2.43 | 12.43 | 76.81 | 104.19 | 178.56 | 185.33 | | | | 185.33 | 303.78 | 120.00 | 675 | | | 0.12 | 0.822 | 118.45 | 38.99% |
| | | MH6521 | MH6522 | | | | | | | | | | | | | 0.00 | 2.41 | 12.43 | 0.24 | 12.67 | 68.58 | 92.89 | 159.01 | 165.48 | | | | 165.48 | 303.78 | 11.64 | 675 | | | 0.12 | 0.822 | 138.30 | 45.53% |
| | | MH6522 | MH6523 | | | | | | | | | | | | | 0.00 | 2.41 | 12.67 | 1.49 | 14.16 | 67.88 | 91.94 | 157.37 | 163.80 | | | | 163.80 | 303.78 | 73.55 | 675 | | | 0.12 | 0.822 | 139.97 | 46.08% |
| | 6524 | MH6524 | MH6523 | | | | | | | | | | 0.13 | | | 0.25 | 0.25 | 10.00 | 1.46 | 11.46 | 76.81 | 104.19 | 178.56 | 19.43 | | | | 19.43 | 93.27 | 71.44 | 375 | | | 0.26 | 0.818 | 73.84 | 79.17% |
| | 6525 | MH6525 | MH6523 | | | | | | | | | | 0.95 | | | 1.85 | 1.85 | 10.00 | 2.44 | 12.44 | 76.81 | 104.19 | 178.56 | 141.99 | | | | 141.99 | 239.68 | 120.00 | 600 | | | 0.14 | 0.821 | 97.69 | 40.76% |
| | 6523 | MH6523 | MH6526 | | | | | | | | | | 0.37 | | | 0.72 | 5.23 | 14.16 | 1.44 | 15.60 | 63.83 | 86.38 | 147.76 | 334.12 | | | | 334.12 | 626.37 | 82.25 | 900 | | | 0.11 | 0.954 | 292.25 | 46.66% |
| | 6527 | MH6527 | MH6526 | | | | | | | | | | 0.95 | | | 1.85 | 1.85 | 10.00 | 2.44 | 12.44 | 76.81 | 104.19 | 178.56 | 141.99 | | | | 141.99 | 239.68 | 120.00 | 600 | | | 0.14 | 0.821 | 97.69 | 40.76% |
| | 6526 | MH6526 | MH6050 | | | | | | | | | | 0.37 | | | 0.72 | 7.80 | 15.60 | 1.41 | 17.01 | 60.40 | 81.68 | 139.66 | 471.30 | | | | 471.30 | 944.84 | 89.50 | 1050 | | | 0.11 | 1.057 | 473.54 | 50.12% |
| | 6050 | MH6050 | MH6051 | | | | | | | | | | 1.03 | | | 2.00 | 52.48 | 19.40 | 1.23 | 20.63 | 53.01 | 71.59 | 122.25 | 2,781.90 | | | | 2,781.90 | 4,923.55 | 117.54 | 1950 | | | 0.11 | 1.597 | 2141.65 | 43.50% |
| | | MH6051 | MH6052 | | | | | | | | | | | | | 0.00 | 52.48 | 20.63 | 0.92 | 21.55 | 51.04 | 68.90 | 117.62 | 2,678.43 | | | | 2,678.43 | 4,923.55 | 88.31 | 1950 | | | 0.11 | 1.597 | 2245.12 | 45.60% |
| | 6052 | MH6052 | MH6060 | | | | | | | | | | 0.84 | | | 1.63 | 54.11 | 21.55 | 0.15 | 21.70 | 49.66 | 67.02 | 114.38 | 2,687.33 | | | | 2,687.33 | 4,923.55 | 13.92 | 1950 | | | 0.11 | 1.597 | 2236.22 | 45.42% |
| | 6600 | MH6600 | MH6601 | | | | | | | | | | 1.48 | | | 2.88 | 2.88 | 10.00 | 1.59 | 11.59 | 76.81 | 104.19 | 178.56 | 221.20 | | | | 221.20 | 303.78 | 78.58 | 675 | | | 0.12 | 0.822 | 82.57 | 27.18% |
| | | MH6601 | MH6602 | | | | | | | | | | | | | 0.00 | 2.88 | 11.59 | 1.59 | 13.18 | 71.19 | 96.47 | 165.20 | 205.03 | | | | 205.03 | 303.78 | 78.58 | 675 | | | 0.12 | 0.822 | 98.75 | 32.51% |
| | | MH6602 | MH6603 | | | | | | | | | | | | | 0.00 | 2.88 | 13.18 | 0.24 | 13.42 | 66.41 | 89.92 | 153.88 | 191.27 | | | | 191.27 | 303.78 | 11.71 | 675 | | | 0.12 | 0.822 | 112.51 | 37.04% |
| | | MH6603 | MH6604 | | | | | | | | | | | | | 0.00 | 2.88 | 13.42 | 1.50 | 14.92 | 65.76 | 89.03 | 152.34 | 189.40 | | | | 189.40 | 303.78 | 73.85 | 675 | | | 0.12 | 0.822 | 114.38 | 37.65% |
| | 6605 | MH6605 | MH6606 | | | | | | | | | | 1.38 | | | 2.69 | 2.69 | 10.00 | 1.74 | 11.74 | 76.81 | 104.19 | 178.56 | 206.26 | | | | 206.26 | 303.78 | 85.86 | 675 | | | 0.12 | 0.822 | 97.52 | 32.10% |
| | | MH6606 | MH6604 | | | | | | | | | | | | | 0.00 | 2.69 | 11.74 | 1.77 | 13.51 | 70.71 | 95.82 | 164.08 | 189.90 | | | | 189.90 | 303.78 | 87.57 | 675 | | | 0.12 | 0.822 | 113.88 | 37.49% |
| | 6604 | MH6604 | MH6607 | | | | | | | | | | 0.39 | | | 0.76 | 6.32 | 14.92 | 1.43 | 16.35 | 61.96 | 83.82 | 143.35 | 391.86 | | | | 391.86 | 626.37 | 81.85 | 900 | | | 0.11 | 0.954 | 234.51 | 37.44% |
| | 6608 | MH6608 | MH6609 | | | | | | | | | | 1.38 | | | 2.69 | 2.69 | 10.00 | 1.75 | 11.75 | 76.81 | 104.19 | 178.56 | 206.26 | | | | 206.26 | 303.78 | 86.17 | 675 | | | 0.12 | 0.822 | 97.52 | 32.10% |
| | | MH6609 | MH6607 | | | | | | | | | | | | | 0.00 | 2.69 | 11.75 | 1.76 | 13.51 | 70.69 | 95.79 | 164.03 | 189.84 | | | | 189.84 | 303.78 | 86.98 | 675 | | | 0.12 | 0.822 | 113.93 | 37.51% |
| | 6607 | MH6607 | MH6621 | | | | | | | | | | 0.36 | | | 0.70 | 9.71 | 16.35 | 1.41 | 17.76 | 58.76 | 79.44 | 135.79 | 570.56 | | | | 570.56 | 944.84 | 89.49 | 1050 | | | 0.11 | 1.057 | 374.28 | 39.61% |
| TENTH LINE ROAD | 6620A/B | MH6620 | MH6621 | | | | | | | | | | 0.62 | 3.22 | | 8.01 | 8.01 | 15.67 | 1.11 | 16.78 | 60.23 | 81.45 | 139.26 | 482.43 | | | | 482.43 | 944.84 | 70.59 | 1050 | | | 0.11 | 1.057 | 462.41 | 48.94% |
| | 6621 | MH6621 | MH6622 | | | | | | | | | | 0.28 | | | 0.54 | 18.27 | 17.76 | 1.04 | 18.80 | 55.94 | 75.58 | 129.14 | 1,021.71 | | | | 1,021.71 | 1,846.76 | 77.62 | 1350 | | | 0.11 | 1.250 | 825.04 | 44.68% |
| | | MH6622 | MH6060 | | | | | | | | | | | | | 0.00 | 18.27 | 18.80 | 0.19 | 18.98 | 54.05 | 73.01 | 124.71 | 987.30 | | | | 987.30 | 1,846.76 | 13.91 | 1350 | | | 0.11 | 1.250 | 859.45 | 46.54% |
| | | MH6060 | HW6 | | | | | | | | | | | | | 0.00 | 72.38 | 21.70 | 0.53 | 22.22 | 49.45 | 66.73 | 113.89 | 3,579.24 | | | | 3,579.24 | 5,999.35 | 52.97 | 2100 | | | 0.11 | 1.678 | 2420.11 | 40.34% |
| | | | | 5.18 | 2.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | 28.81 | 3.22 | 2.22 | 72.38 | TRUE | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | 41.46 | | | | | | | | | | | | | | | | | | | | |

**OVERALL SITE AREA**

| | A |
|---|---|
| Outlet #1 : EX Pond North - West | 21.29 |
| Outlet #2: EX Pond South - East | 17.46 |
| Outlet #3: EX Pond North - East | 11.17 |
| Outlet #4: New Central Pond North | 59.32 |
| Outlet #5: New Central Pond South | 43.70 |
| Outlet #6: New South Pond | 41.46 |
| | 194.40 |
| Measured Area (excl Ponds and McKinnon's Creek) | XXX |

**Definitions:**
Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (Ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR
[i = 1735.688 / (TC+6.014)^0.820] 100 YEAR

**Notes:**
1. Mannings coefficient (n) = 0.013

**Designed:** RM
**Checked:** DY
**Dwg. Reference:** 34739-8.3.1

| No. | Revision | Date |
|---|---|---|
| 1. | MSS - 1st Submission | 2016-03 |
| 2. | MSS - 3rd Submission | 2017-03 |

**File Reference:** 34739-5.7.1
**Date:** 3/15/2016
**Sheet No:** 1 of 1

**IBI GROUP**
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**ibigroup.com**

# STORM SEWER DESIGN SHEET

**MER BLEUE Urban Expansion Area**
MSS Preferred Outlet
CITY OF OTTAWA
Owners Group

| LOCATION | | | | AREA (Ha) | | | | | | | | | | RATIONAL DESIGN FLOW | | | | | | | | | | | SEWER DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STREET | AREA ID | FROM | TO | C= 0.20 | C= 0.25 | C= 0.40 | C= 0.50 | C= 0.57 | C= 0.65 | C= 0.69 | C= 0.70 | C= 0.76 | C= 0.80 | IND 2.78AC | CUM 2.78AC | INLET (min) | TIME IN PIPE | TOTAL (min) | i (5) (mm/hr) | i (10) (mm/hr) | i (100) (mm/hr) | 5yr PEAK FLOW (L/s) | 10yr PEAK FLOW (L/s) | 100yr PEAK FLOW (L/s) | FIXED FLOW (L/s) | DESIGN FLOW (L/s) | CAPACITY (L/s) | LENGTH (m) | PIPE SIZE (mm) DIA | W | H | SLOPE (%) | VELOCITY (m/s) | AVAIL CAP (5yr) (L/s) | (%) |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Wall Road | | MH7000 | MH7001 | | | | | | | | | | | | | | | | | | | | | | 2,400.00 | 2,400.00 | 3,006.86 | 56.37 | 1650 | | | 0.10 | 1.362 | 606.86 | 20.18% |
| Wall Road | | MH7001 | MH7002 | | | | | | | | | | | | | | | | | | | | | | 2,400.00 | 2,400.00 | 3,006.86 | 76.46 | 1650 | | | 0.10 | 1.362 | 606.86 | 20.18% |
| Tenth Line Road | | MH7002 | MH7003 | | | | | | | | | | | | | | | | | | | | | | 2,400.00 | 2,400.00 | 3,006.86 | 105.55 | 1650 | | | 0.10 | 1.362 | 606.86 | 20.18% |
| Tenth Line Road | | MH7003 | MH7004 | | | | | | | | | | | | | | | | | | | | | | 2,400.00 | 2,400.00 | 3,006.86 | 101.00 | 1650 | | | 0.10 | 1.362 | 606.86 | 20.18% |
| Tenth Line Road | | MH7004 | MH7005 | | | | | | | | | | | | | | | | | | | | | | 2,400.00 | 2,400.00 | 3,006.86 | 100.01 | 1650 | | | 0.10 | 1.362 | 606.86 | 20.18% |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tenth Line Road | | MH7100 | MH7101 | | | | | | | | | | | | | | | | | | | | | | 780.00 | 780.00 | 900.87 | 39.71 | 1050 | | | 0.10 | 1.008 | 120.87 | 13.42% |
| Tenth Line Road | | MH7101 | MH7102 | | | | | | | | | | | | | | | | | | | | | | 780.00 | 780.00 | 900.87 | 63.03 | 1050 | | | 0.10 | 1.008 | 120.87 | 13.42% |
| Tenth Line Road | | MH7102 | MH7005 | | | | | | | | | | | | | | | | | | | | | | 780.00 | 780.00 | 900.87 | 40.06 | 1050 | | | 0.10 | 1.008 | 120.87 | 13.42% |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | MH7005 | MH7006 | | | | | | | | | | | | | | | | | | | | | | 3,180.00 | 3,180.00 | 3,682.64 | 12.60 | 1650 | | | 0.15 | 1.668 | 502.64 | 13.65% |
| | | MH7006 | MH7007 | | | | | | | | | | | | | | | | | | | | | | 3,180.00 | 3,180.00 | 3,682.64 | 114.00 | 1650 | | | 0.15 | 1.668 | 502.64 | 13.65% |
| | | MH7007 | MH7008 | | | | | | | | | | | | | | | | | | | | | | 3,180.00 | 3,180.00 | 3,682.64 | 110.00 | 1650 | | | 0.15 | 1.668 | 502.64 | 13.65% |
| | | MH7008 | | | | | | | | | | | | | | | | | | | | | | | 3,180.00 | 3,180.00 | 3,682.64 | 107.85 | 1650 | | | 0.15 | 1.668 | 502.64 | 13.65% |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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Q = 2.78CiA, where:
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[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR
[i = 1735.688 / (TC+6.014)^0.820] 100 YEAR

**Notes:**
1. Mannings coefficient (n) = 0.013

**Designed:** RM
**Checked:** DY
**Dwg. Reference:** 34739-8.3.1

| No. | Revision | Date |
|---|---|---|
| 1. | MSS - 1st Submission | 2016-03 |
| 2. | MSS - 3rd Submission | 2017-04 |

**File Reference:** 34739.5.7.1
**Date:** 3/15/2016
**Sheet No:** 1 of 1

# APPENDIX H

## FIGURE 8.3.12 DRAINAGE AREA PLAN FROM THE MER BLEUE MSS (IBI GROUP, DECEMBER 2017)

## SUMMERSIDE WEST PHASE 4 / AVALON WEST SWM POND EXPANSION (JFSA, SEPTEMBER 26, 2018)

KEY PLAN




N

MODELED AS PER JFSA REPORT : "STORMWATER MANAGEMENT REPORT FOR SUMMERSIDE WEST PHASE 2 AND PHASE 3"

AVALON WEST SWM FACILITY EXPANSION

MODELED AS PER JFSA REPORT : "STORMWATER MANAGEMENT REPORT FOR SUMMERSIDE WEST PHASE 1"

CEPEO Secondary School 5.6 ha

Neighbourhood Park 1.7 ha

Existing Residential

OCSB Elem. School 2.5 ha

DRY POND

Parkette 0.6 ha

[HEC RAS STATION : 11074]

OCDSB Elem. School

DRY POND

Community park 6.3 ha

NORTH SWM FACILITY

[HEC RAS STATION : 10270]

[HEC RAS STATION : 10172]

WALL ROAD

MCKINNONS CREEK

[HEC RAS STATION : 9576

TO MCKINNONS CREEK

CECCE Elem. School

DRY POND

SOUTH SWM FACILITY

Vegetation Community / Woodlot

Existing Residential

DRY POND

MER BLEUE ROAD

NAVAN ROAD

TENTH LINE ROAD

Tenth Line Rd

LEGEND:

- STUDY AREA
- DRAINAGE AREA BOUNDARY
- STORM SEWER
- MANHOLE AND ID (MH6219)
- TRIBUTARY AREA ID (6219), AREA (Hectares²), IMPERVIOUSNESS, CN / Tp (hrs)
- MAJOR FLOW (4)
- DRY POND
- AREA TRIBUTARY TO AVALON WEST EXPANSION SWM FACILITY (INTERIM DEVELOPMENT)
- AREA TRIBUTARY TO NORTH SWM FACILITY
- AREA TRIBUTARY TO SOUTH SWM FACILITY
- * INTERFACE POINT FOR HYDROLOGIC / HYDRAULIC MODEL
- [HEC RAS STATION : 5580] PEAK FLOW LOCATION (HEC RAS)

Sheet No.

FIGURE 8.3.12
JUNE 2017

Drawing Title

ON - SITE SWMHYMO
DRAINAGE AREA PLAN

Project Title

MER BLEUE
MASTER SERVICING STUDY

IBI

J:\34739-Cumdev\Report\8.0 Drawings\Stawm\MIDS\Figures\4th Submission\34739-Figure 8.3.12 Post Swmymo Drainage area plan.dwg Layout Name: Figure 8.3.12 Post SWMYMO Dr Area Plan Last Saved By: JosseForget Last Saved At: Jun. 22, 17

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

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

September 26, 2018

**David Schaeffer Engineering Ltd.**
120 Iber Road, Unit 103
Ottawa, Ontario K2S 1E9

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

**Subject:** **Summerside West Phase 4 / Avalon West Stormwater Management Pond Expansion** *our file: 1102-13*

As requested by your office, and based on the information summarized below, we have estimated the Stormwater Management (SWM) requirements and 100-year water level in the Avalon West SWM Pond upon its expansion to accommodate the development of Phase 4 of Summerside West. The Avalon West SWM Facility is located within the City of Ottawa, and discharges to McKinnon's Creek.

The Avalon West SWM Facility was initially designed to service a 194.28 ha area at 57% imperviousness (including the pond block) for quality and quantity control, in accordance with the October 2013 *Avalon West (Neighbourhood 5) Stormwater Management Facility Design* report by IBI Group. The pond was later revised to accommodate Summerside West Phases 1, 2 and 3, in accordance 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. The revised drainage area to the pond was 238.30 ha at 53% imperviousness.

Quality control requirements for the pond were set in the October 2013 and November 2014 reports to provide an enhanced level of protection (80% TSS removal) in accordance with Ministry of the Environment and Climate Change guidelines. Quantity control requirements were set in these background reports to match post- to pre-development flows at Point C (cross-section 9064) on McKinnon's Creek under the 2-, 5- and 100-year 24-hour SCS Type II design storms based on old City of Ottawa IDF curves. Note that flows in McKinnon's Creek were modelled in a separate SWMHYMO model from the Avalon West SWM Facility (modelled in SWMHYMO and XPSWMM), and water levels in McKinnon's Creek were modelled in HEC-RAS. Boundary conditions at the outlet of the pond to McKinnon's Creek were modelled in XPSWMM as a stage-time curve derived iteratively by IBI Group using the McKinnon's Creek SWMHYMO / HEC-RAS models and the pond outflow hydrographs.

Based on the most recent submissions, the maximum 100-year water level in the Avalon West Pond is 84.64 m, as per the December 2016 *Stormwater Management Report for Summerside West Phases 2 and 3* by JFSA and the December 2016 *Addendum to the Sanitary Overflow Analysis (DSEL/JFSA, August 31, 2015) Summerside West - Phase 2* memo by DSEL. Note that the sanitary overflow analysis is relevant as sanitary flows to the 10th Line pumping station will overflow to the Avalon West system under pump station failure, and would be affected by water levels in the pond under these emergency conditions.

An expansion of the existing Avalon West SWM Facility is proposed to accommodate future development in the December 2017 *Mer Bleue Urban Expansion Area 10, Master Servicing Study* by IBI Group. The December 2017 Master Servicing Study establishes new "pre-development" targets based on the flows in McKinnon's Creek at Points C (cross-section 9064) and E (cross-section 5580) during the 2-, 5- and 100-year 24-hour SCS Type II design storms based on current City of Ottawa IDF curves. These new "pre-development" conditions are based on the original October 2013 pond design, prior to the inclusion of Summerside West Phases 1-3. The pre-development

peak flow at key points along the creek are summarized in Table 1 below, as per the December 2017 *Master Servicing Study*.

**Table 1: Pre-Development Peak Flow Rates on McKinnon's Creek [(1)]**

| Storm Event | "Pre-Development" Peak Flow Rates ($m^3/s$) | | | | |
|---|---|---|---|---|---|
| | Point A1 11346 | Point B 10172 | Point C 9064 | Point D 8431 | Point E 5580 |
| 2-Year 24-Hour SCS Type II | 1.74 | 2.33 | 3.62 | 3.48 | 4.02 |
| 5-Year 24-Hour SCS Type II | 1.77 | 3.06 | 5.91 | 5.80 | 6.63 |
| 100-Year 24-Hour SCS Type II | 2.66 | 6.45 | 12.82 | 13.53 | 16.31 |

[(1)] Per Table 7.6 of the December 2017 *Mer Bleue Urban Expansion Area 10, Master Servicing Study* by IBI Group.

For the purpose of the current study, we have imported the December 2017 pre-development McKinnon's Creek HEC-RAS model into the December 2017 "pre-development" XPSWMM model, in order to model the interaction between the pond and the downstream creek dynamically rather than iteratively. Under these conditions, the pre-development peak flows at key points along the creek are summarized in Table 2. Note that road crossings were excluded from the XPSWMM model and represented as natural channel sections instead for the purposes of simulating pre-development peak flows along the creek.

**Table 2: Pre-Development Peak Flow Rates on McKinnon's Creek [(1)]**

| Storm Event | "Pre-Development" Peak Flow Rates ($m^3/s$) | | | | |
|---|---|---|---|---|---|
| | Point A1 11346 | Point B 10172 | Point C 9064 | Point D 8431 | Point E 5580 |
| 2-Year 24-Hour SCS Type II | 0.767 | 1.954 | 3.705 | 3.946 | 4.982 |
| 5-Year 24-Hour SCS Type II | 1.197 | 3.144 | 5.950 | 6.184 | 7.991 |
| 100-Year 24-Hour SCS Type II | 2.696 | 7.048 | 13.853 | 14.738 | 18.560 |

[(1)] Modelled dynamically in XPSWMM based on SWMHYMO-generated inflow hydrographs.

We understand from DSEL that it is proposed that the Avalon West SWM Facility be expanded to accommodate the development of Summerside West Phase 4 prior to any further improvements to downstream McKinnon's Creek. Summerside West Phase 4 has a drainage area to the pond of approximately 17.88 ha at 60% imperviousness (including the pond expansion block), resulting in a revised total drainage area of 256.19 ha at 54% imperviousness to the expanded Avalon West SWM Facility.

Based on the revised drainage area of 256.19 ha at 54% imperviousness, a permanent pool volume of 37,787 $m^3$ is required for enhanced protection. The expanded pond stage-storage relationship by DSEL (refer to Attachment A) provides a permanent pool volume of 99,692 $m^3$ at 83.15 m, which exceeds the required volume. The active storage volume required for quality control is 10,247 $m^3$ (40 $m^3$/ha), and is provided in the expanded pond at an elevation of 83.300 m. A 500 mm diameter circular vertical orifice at an invert of 83.15 m will provide a drawdown time of 26.7 hours for the quality control volume; between 24 and 48 hours in accordance with Ministry of the Environment and Climate Change standards. Refer to Attachment A for drawdown time calculations and proposed pond outlet controls.

A detailed XPSWMM model of the Avalon West subdivision, with .xpx inflow hydrograph files for a range of design storms, was provided by IBI Group on September 6, 2018. Detailed modelling for Summerside West Phases 1 to 4 was incorporated in the XPSWMM model along with the pond expansion and revised outlet controls proposed in support of the Summerside West Phase 4 development. Similar to the "pre-development" XPSWMM model, the HEC-RAS model of McKinnon's Creek submitted with the May 18, 2018 *Avalon West SWM Facility Model Update and Confirmation of Tailwater Boundary Condition* memo by IBI Group into the Summerside West / Avalon West XPSWMM model, in order to model the interaction between the pond and the downstream creek dynamically rather than iteratively. This version of the McKinnon's Creek HEC-RAS modelling includes a proposed temporary culvert

and access road that we understand is proposed to be implemented in the near future. The post-development flows in McKinnon's Creek were simulated in XPSWMM as summarized in Table 3. As previously noted, road crossings were excluded from the XPSWMM model and represented as natural channel sections instead for the purposes of simulating post-development peak flows along the creek.

**Table 3: Post-Development Peak Flow Rates on McKinnon's Creek [(1)]**

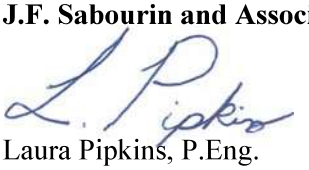
| Storm | Post-Development Peak Flow Rates ($m^3/s$) | | | | |
|---|---|---|---|---|---|
| Event | Point A1 | Point B | Point C | Point D | Point E |
| | 11346.1 | 10172 | 9064 | 8431 | 5580 |
| 2-Year 24-Hour SCS Type II | 0.612 | 1.714 | 3.374 | 3.616 | 4.588 |
| 5-Year 24-Hour SCS Type II | 1.049 | 2.753 | 5.515 | 5.890 | 7.411 |
| 100-Year 24-Hour SCS Type II | 2.987 | 6.321 | 12.842 | 13.970 | 17.417 |

[(1)] Modelled dynamically in XPSWMM based on SWMHYMO- and DDSWMM-generated inflow hydrographs.

As may be seen in Tables 2 and 3, the post-development peak flows on McKinnon's Creek at Points C and E are less than pre-development peak flows. Note that the 100-year post-development peak flow of 2.987 $m^3/s$ at Point A1 does exceed the pre-development peak flow of 2.696 $m^3/s$ by 0.291 $m^3/s$; the difference between this result and all other points of comparison may be partly explained by the fact that Point A1 is at the pond outlet and does not account for the differences in time to peak and overlap between the pond outflows and other contributing flows to the creek. Based on the December 2017 *Mer Bleue Urban Expansion Area 10, Master Servicing Study* and previous studies by IBI Group, we understand that matching pre-development peak flows at Point A1 is not required to satisfy quantity control requirements.

The maximum 100-year water level in the pond, simulated with road crossings in place in downstream McKinnon's Creek, is 84.47 m (based on the Summerside West Phase 4 pond expansion scenario; less than the 84.64 m maximum identified in the most recent reports for Summerside West Phases 1-3 and the 10th Line Pumping Station. Note that the proposed 100-year pond level of 84.47 m is 4 cm higher than the 84.43 m pond level proposed in the December 2017 *Mer Bleue Urban Expansion Area 10, Master Servicing Study*.

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



Laura Pipkins, P.Eng.

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

Attachment A: Extended Detention and Stage-Storage-Outflow Curve for Expanded Avalon West SWM Pond



# ATTACHMENT

# A

## Extended Detention and Stage- Storage- Outflow Curve For Expanded Avalon West SWM Pond

JFSA Water Resources and Environmental Consultants

**Table A-1: Extended Detention Parameters for SWM Facility (Summerside West Phase 4)**

| Permanent Pool Parameters | | | Quality Orifice Parameters | | |
|---|---|---|---|---|---|
| Area (C3) | 63574.00 | $m^2$ | Diameter | 0.500 | m |
| Volume | 99691.97 | $m^3$ | | | |
| PP Elev | 83.150 | m | Area | 0.196 | $m^2$ |
| QC Elev | 83.300 | m | Invert | 83.150 | m |
| h (m) | 0.150 | m | $C_o$ | 0.62 | |

Notes:
- C3 is the intercept from the area-depth linear regression.
- PP Elev indicates the elevation of the permanent pool.
- QC Elev indicates the elevation of the storage volume required by MOE for quality control.
- h is the maximum water elevation above the orifice (m).

**Table A-2: Extended Detention Drawdown Time for SWM Facility (Summerside West Phase 4)**

| Elev. | Active Storage | | | C2 | Drawdown Time | Drawdown Time | Flow | Demarkation |
|---|---|---|---|---|---|---|---|---|
| (m) | V ($m^3$) | A ($m^2$) | depth (m) | ($m^2/m$) | (h) | (days) | ($m^3/s$) | Point |
| **83.15** | **0.00** | **63574.00** | **0.00** | | | | **0.000** | **PP Elev** |
| 83.20 | 3249.17 | 66448.70 | 0.05 | 57494 | 14.84 | 0.62 | 0.027 | |
| 83.25 | 6655.76 | 69959.90 | 0.10 | 63859 | 21.37 | 0.89 | 0.054 | |
| **83.300** | **10247.00** | **74319.51** | **0.15** | **71725** | **26.73** | **1.11** | **0.081** | **QC Elev** |
| 83.30 | 10260.26 | 74335.60 | 0.15 | 71744 | 26.75 | 1.11 | 0.081 | |
| **83.35** | **14093.46** | **79174.90** | **0.20** | **78005** | **31.62** | **1.32** | **0.108** | **Ext. Det.** |
| 83.40 | 18076.71 | 79936.80 | 0.25 | 65451 | 35.48 | 1.48 | 0.135 | |
| 83.45 | 22087.15 | 80480.20 | 0.30 | 56354 | 38.97 | 1.62 | 0.162 | |
| 83.50 | 26124.68 | 81020.75 | 0.35 | 49848 | 42.20 | 1.76 | 0.189 | |
| 83.55 | 30189.20 | 81560.35 | 0.40 | 44966 | 45.23 | 1.88 | 0.216 | |
| 83.60 | 34280.68 | 82098.05 | 0.45 | 41165 | 48.10 | 2.00 | 0.243 | |
| 83.65 | 38399.04 | 82635.75 | 0.50 | 38124 | 50.83 | 2.12 | 0.270 | |
| 83.70 | 42544.20 | 83171.55 | 0.55 | 35632 | 53.44 | 2.23 | 0.295 | |
| 83.75 | 46716.14 | 83705.45 | 0.60 | 33552 | 55.96 | 2.33 | 0.319 | |
| 83.80 | 50915.68 | 84276.40 | 0.65 | 31850 | 58.40 | 2.43 | 0.341 | |
| 83.85 | 55143.75 | 84846.40 | 0.70 | 30389 | 60.77 | 2.53 | 0.362 | |
| 83.90 | 59400.33 | 85420.20 | 0.75 | 29128 | 63.07 | 2.63 | 0.381 | |
| 83.95 | 63696.57 | 86290.40 | 0.80 | 28396 | 65.40 | 2.73 | 0.400 | |
| 84.00 | 68029.64 | 87046.60 | 0.85 | 27615 | 67.65 | 2.82 | 0.418 | |
| 84.05 | 72584.97 | 91485.00 | 0.90 | 31012 | 71.04 | 2.96 | 0.435 | |
| 84.10 | 77175.47 | 92128.15 | 0.95 | 30057 | 73.20 | 3.05 | 0.451 | |
| 84.15 | 81800.07 | 92827.35 | 1.00 | 29253 | 75.34 | 3.14 | 0.467 | |

Notes:
- C2 is the slope coefficient from the area-depth linear regression.
- PP Elev indicates the elevation of the permanent pool.
- QC Elev indicates the elevation of the storage volume required by MOE for quality control.
- Ext Det indicates the elevation of extended detention provided based on 40 $m^3$/ha and a 24 to 48 hour drawdown time.

**Table A-3: Stage-Storage-Outflow Curve for SWM Facility (Summerside West Phase 4)**

| | | | Quality Control 1 | | Quantity Control 1 | | Emergency Overflow | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Vertical Orifice | | Vertical Rect. Orifice | | Broad Crested Weir | | | |
| | | | Dia (m) | 0.500 | Width (m) | 5.000 | L (m) | 10.000 | | |
| | | | | | Height (m) | 1.000 | | | | |
| | | | Area ($m^2$) | 0.19635 | Area ($m^2$) | 5.000 | | | | |
| | | | Invert (m) | 83.15 | Invert (m) | 83.35 | $C_w$ | 1.580 | | |
| | | | $C_o$ | 0.62 | $C_o$ | 0.62 | Invert (m) | 84.70 | | |
| | | | Q @ D | 0.270 | $C_w$ | 1.800 | n contr. | 0 | | |
| Elevation | Active Sto. | Demarkation | Head | Outflow | Head | Outflow | Head | Outflow | Outflow | Storage |
| (m) | ($m^3$) | Points | (m) | ($m^3/s$) | (m) | ($m^3/s$) | (m) | ($m^3/s$) | ($m^3/s$) | (ha·m) |
| **83.15** | **0** | **PP Elev** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** |
| 83.20 | 3249 | | 0.050 | 0.027 | 0.000 | 0.000 | 0.000 | 0.000 | 0.027 | 0.325 |
| 83.25 | 6656 | | 0.100 | 0.054 | 0.000 | 0.000 | 0.000 | 0.000 | 0.054 | 0.666 |
| **83.300** | **10247** | **QC Elev** | **0.150** | **0.081** | **0.000** | **0.000** | **0.000** | **0.000** | **0.081** | **1.025** |
| 83.30 | 10260 | | 0.150 | 0.081 | 0.000 | 0.000 | 0.000 | 0.000 | 0.081 | 1.026 |
| **83.35** | **14093** | **Ext. Det.** | **0.200** | **0.108** | **0.000** | **0.000** | **0.000** | **0.000** | **0.108** | **1.409** |
| 83.40 | 18077 | | 0.250 | 0.135 | 0.050 | 0.100 | 0.000 | 0.000 | 0.235 | 1.808 |
| 83.45 | 22087 | | 0.300 | 0.162 | 0.100 | 0.283 | 0.000 | 0.000 | 0.445 | 2.209 |
| 83.50 | 26125 | | 0.350 | 0.189 | 0.150 | 0.520 | 0.000 | 0.000 | 0.708 | 2.612 |
| 83.55 | 30189 | | 0.400 | 0.216 | 0.200 | 0.799 | 0.000 | 0.000 | 1.014 | 3.019 |
| 83.60 | 34281 | | 0.450 | 0.243 | 0.250 | 1.114 | 0.000 | 0.000 | 1.356 | 3.428 |
| 83.65 | 38399 | | 0.500 | 0.270 | 0.300 | 1.461 | 0.000 | 0.000 | 1.731 | 3.840 |
| 83.70 | 42544 | | 0.550 | 0.295 | 0.350 | 1.837 | 0.000 | 0.000 | 2.133 | 4.254 |
| 83.75 | 46716 | | 0.600 | 0.319 | 0.400 | 2.240 | 0.000 | 0.000 | 2.559 | 4.672 |
| 83.80 | 50916 | | 0.650 | 0.341 | 0.450 | 2.668 | 0.000 | 0.000 | 3.009 | 5.092 |
| 83.85 | 55144 | | 0.700 | 0.362 | 0.500 | 3.118 | 0.000 | 0.000 | 3.480 | 5.514 |
| 83.90 | 59400 | | 0.750 | 0.381 | 0.550 | 3.590 | 0.000 | 0.000 | 3.972 | 5.940 |
| 83.95 | 63697 | | 0.800 | 0.400 | 0.600 | 4.082 | 0.000 | 0.000 | 4.482 | 6.370 |
| 84.00 | 68030 | | 0.850 | 0.418 | 0.650 | 4.594 | 0.000 | 0.000 | 5.011 | 6.803 |
| 84.05 | 72585 | | 0.900 | 0.435 | 0.700 | 5.123 | 0.000 | 0.000 | 5.558 | 7.258 |
| 84.10 | 77175 | | 0.950 | 0.451 | 0.750 | 5.670 | 0.000 | 0.000 | 6.121 | 7.718 |
| 84.15 | 81800 | | 1.000 | 0.467 | 0.800 | 6.234 | 0.000 | 0.000 | 6.701 | 8.180 |
| 84.20 | 86455 | | 1.050 | 0.482 | 0.850 | 6.813 | 0.000 | 0.000 | 7.295 | 8.645 |
| 84.25 | 91134 | | 1.100 | 0.497 | 0.900 | 7.408 | 0.000 | 0.000 | 7.905 | 9.113 |
| 84.30 | 95837 | | 1.150 | 0.512 | 0.950 | 8.017 | 0.000 | 0.000 | 8.528 | 9.584 |
| 84.35 | 100564 | | 1.200 | 0.526 | 1.000 | 9.709 | 0.000 | 0.000 | 10.235 | 10.056 |
| 84.40 | 105313 | | 1.250 | 0.539 | 1.050 | 10.183 | 0.000 | 0.000 | 10.723 | 10.531 |
| 84.45 | 110085 | | 1.300 | 0.553 | 1.100 | 10.636 | 0.000 | 0.000 | 11.189 | 11.008 |
| 84.50 | 114879 | | 1.350 | 0.566 | 1.150 | 11.071 | 0.000 | 0.000 | 11.636 | 11.488 |
| 84.55 | 119811 | | 1.400 | 0.578 | 1.200 | 11.488 | 0.000 | 0.000 | 12.067 | 11.981 |
| 84.60 | 124760 | | 1.450 | 0.591 | 1.250 | 11.892 | 0.000 | 0.000 | 12.482 | 12.476 |
| 84.65 | 129727 | | 1.500 | 0.603 | 1.300 | 12.282 | 0.000 | 0.000 | 12.885 | 12.973 |
| **84.70** | **134712** | **Ovf Elev** | **1.550** | **0.615** | **1.350** | **12.660** | **0.000** | **0.000** | **13.274** | **13.471** |

**Table A-3: Stage-Storage-Outflow Curve for SWM Facility (Summerside West Phase 4)**

| | | | Quality Control 1 | | Quantity Control 1 | | Emergency Overflow | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Vertical Orifice | | Vertical Rect. Orifice | | Broad Crested Weir | | | |
| | | | Dia (m) | 0.500 | Width (m) | 5.000 | L (m) | 10.000 | | |
| | | | | | Height (m) | 1.000 | | | | |
| | | | Area ($m^2$) | 0.19635 | Area ($m^2$) | 5.000 | | | | |
| | | | Invert (m) | 83.15 | Invert (m) | 83.35 | $C_w$ | 1.580 | | |
| | | | $C_o$ | 0.62 | $C_o$ | 0.62 | Invert (m) | 84.70 | | |
| | | | Q @ D | 0.270 | $C_w$ | 1.800 | n contr. | 0 | | |
| Elevation | Active Sto. | Demarkation Points | Head | Outflow | Head | Outflow | Head | Outflow | Outflow | Storage |
| (m) | ($m^3$) | | (m) | ($m^3$/s) | (m) | ($m^3$/s) | (m) | ($m^3$/s) | ($m^3$/s) | (ha·m) |
| 84.75 | 139717 | | 1.600 | 0.627 | 1.400 | 13.027 | 0.050 | 0.177 | 13.830 | 13.972 |
| 84.80 | 144743 | | 1.650 | 0.638 | 1.450 | 13.384 | 0.100 | 0.500 | 14.521 | 14.474 |
| 84.85 | 149792 | | 1.700 | 0.649 | 1.500 | 13.731 | 0.150 | 0.918 | 15.298 | 14.979 |
| 84.90 | 154864 | | 1.750 | 0.660 | 1.550 | 14.070 | 0.200 | 1.413 | 16.144 | 15.486 |
| 84.95 | 159955 | | 1.800 | 0.671 | 1.600 | 14.401 | 0.250 | 1.975 | 17.048 | 15.996 |
| **85.00** | **165065** | **Top of Berm** | **1.850** | **0.682** | **1.650** | **14.725** | **0.300** | **2.596** | **18.003** | **16.507** |

Notes : - PP Elev indicates the elevation of the permanent pool.

- QC Elev indicates the elevation of the storage volume required by MOE for quality control.
- Ext Det indicates the elevation of extended detention provided.
- Ovf Elev indicates the elevation of the overflow provided above the 100-year water level.
- Top of Berm indicates the elevation at the top of the berm.