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FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

FOR

MATTAMY HOMES
WATERIDGE VILLAGE – BLOCK 22

CITY OF OTTAWA

PROJECT NO.: 17-948

AUGUST 2017 – REV 1

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
FOR
WATERIDGE VILLAGE – BLOCK 22

MATTAMY HOMES

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1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has been retained to prepare a Functional Servicing and Stormwater Management report in support of the Site Plan Application for Block 22 of the former CFB Rockcliffe lands, which are currently under re-development by the Canada Lands Company.

The subject property is located within the City of Ottawa urban boundary, in the Rideau-Rockcliffe area. As illustrated in ***Figure 1***, the subject property is encompassed by Hemlock Road, Michael Stoqua Street and Moses Tennisco Street, all of which are currently under construction. Comprised of a single parcel, it measures approximately ***0.46 ha*** and is zoned Residential Fifth Density Zone (R5Y[2312]).

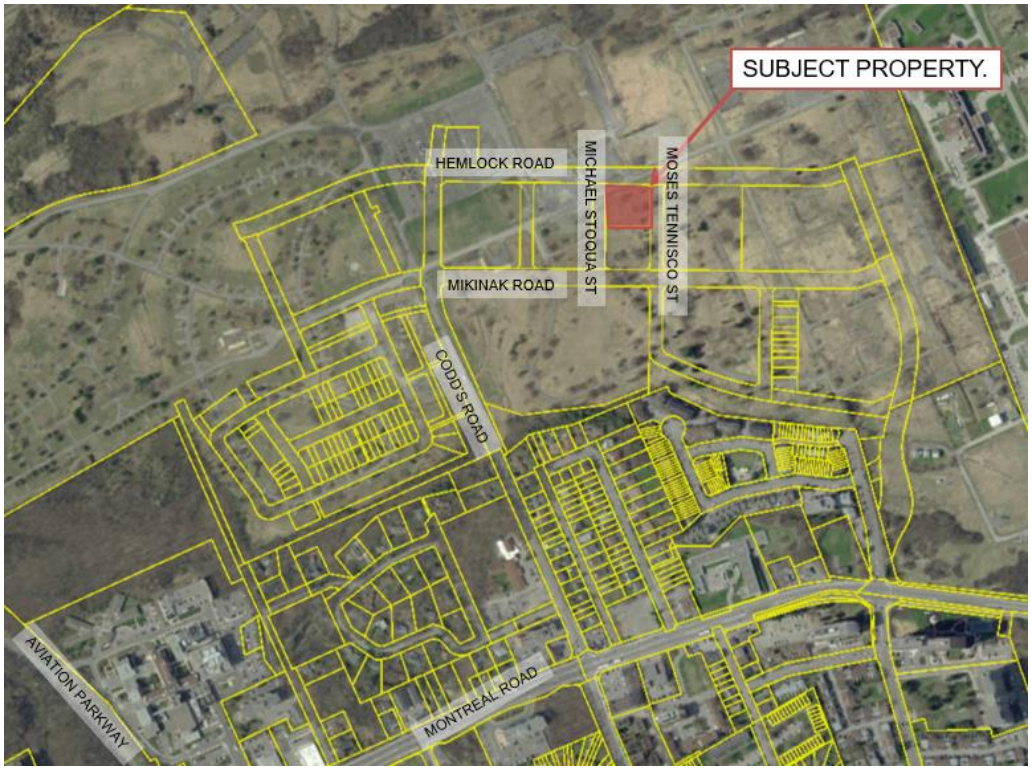

Figure 1: Site Location

The proposed development by Mattamy Homes involves the construction of 11 Rear Lane Townhomes and 48 Stacked Townhomes. The development also includes surface parking for the Stacked Townhomes within the site. A copy of the site plan and site statistics is included in ***Drawings/Figures***.

The objective of this report is to provide sufficient detail with respect to the availability of site services, to support the application for site plan control.

1.1 Existing Conditions

The existing lands are vacant, while the construction of the surrounding road network and underground services are currently underway at the time of this publication. Historically, the lands were part of the Canadian Forces Base Rockcliffe (CFB Rockcliffe).

A preliminary geotechnical investigation was completed by Paterson Group Inc. in August 2017. Per the geotechnical report, the subject site consists of a layer of existing fill from the previous land use underlain by stiff to very stiff brown silty clay. Practical refusal was encountered between 3.3 to 3.9m below existing grade.

The Canada Lands Company will be delivering the site to a pre-grade condition in accordance with Mattamy Homes requirements.

Hemlock Road

- 300mm diameter PVC watermain
- 750mm diameter storm sewer
- 250mm diameter sanitary sewer

Michael Stoqua Street

- 200 mm diameter watermain
- 375mm diameter storm sewer
- 250mm diameter sanitary sewer

Moses Tennisco Street

- 200 mm diameter watermain
- 525 mm diameter storm sewer
- 250mm diameter sanitary sewer

The infrastructure described above is based on design drawings, not as-built drawings. The design drawings are as per the Wateridge Village at Rockcliffe Phase 1B drawing set prepared by IBI Group dated February 16, 2017.

1.2 Required Permits / Approvals

The proposed development is subject to the site plan control approval process. The City of Ottawa must approve the engineering design drawings and reports prior to the issuance of site plan control.

1.3 Pre-consultation

Pre-consultation correspondence, along with the servicing guidelines checklist, is located in ***Appendix A***.

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, *SDG002,* October 2012
  (City Standards)

- **Ottawa Design Guidelines – Water Distribution**
  City of Ottawa, July 2010.
  (Water Supply Guidelines)

  - **Technical Bulletin ISD-2010-2**
    City of Ottawa, December 15, 2010.
    (*ISD-2010-2*)

  - **Technical Bulletin ISDTB-2014-02**
    City of Ottawa, May 27, 2014.
    (*ISDTB-2014-02*)

- **Design Guidelines for Sewage Works,**
  Ministry of the Environment, 2008.
  (MOE* Design Guidelines*)

- **Stormwater Planning and Design Manual,**
  Ministry of the Environment, March 2003.
  (SWMP Design Manual)

- **Ontario Building Code Compendium**
  Ministry of Municipal Affairs and Housing Building Development Branch,
  January 1, 2010 Update
  (OBC)

- **Water Supply for Public Fire Protection**
  Fire Underwriters Survey, 1999.
  (FUS)

- **Low Impact Development Stormwater Management Planning and Design Guide**
  Credit Valley Conservation & Toronto and Region Conservation, 2010.
  (LID Guide)

- **Former CFB Rockcliffe Master Servicing Study**
  IBI Group, August 2015
  (MSS)

- **Low Impact Development (LID) Demonstration Project**
  Aquafor Beech Ltd., August 2015
  (LID Demonstration Project)

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The subject property lies within the City of Ottawa MONT pressure zone, as shown by the Pressure Zone map in ***Appendix B***. Based on the design drawings for the Wateridge Phase 1B subdivision, a local 200 mm diameter watermain is currently being constructed within the Michael Stoqua Street and Moses Tennisco Street right-of-ways to service the subject site.

The water servicing for the subject site was accounted for in the design of the water distribution system outlined in the ***MSS***. Block 22 described in the MSS is part of a larger parcel known as ***Block 40***. The total units allocated in these blocks per the ***MSS*** is ***83 units***. Block 22 has since been split into 2 equal blocks, therefore, there are approximately ***42 units*** allocated with a population of ***2.3 person/unit*** in each block. The water demand per the ***MSS*** was determined assuming a consumption rate of ***198 L/person/day***, the total water demand per the ***MSS*** is summarized in ***Table 1*** below.

Table 1
Summary of Water Demand per *MSS*

Design Parameter	Total Demand (L/min)
Average Day	13.3
Max Day	65.4
Max Day + Fire Flow	13,000 + 65.4

Fire flow for the site has been assumed at ***13,000 L/min*** and all nodes surrounding the site have the ability to provide the required fire flow at greater than 140 kPa (20 PSI).

3.2 Water Supply Servicing Design

It is proposed to provide a connection to the 200mm watermain within Michael Stoqua Street and a connection to the 200mm watermain within Moses Tennisco Street. The site is adequately serviced by surrounding fire hydrants on Hemlock Road, Michael Stoqua Street and Moses Tennisco Street.

Due to the width of the right-of-way and the proximity of the Rear Lane Townhomes, it is proposed to provide a watermain 1.5m away from the proposed sanitary sewer. The water and sanitary sewers are designed in accordance with *Procedures to Govern Seperation of Sewers and Watermains (Procedure F-6-1)* prepared by the Ministry of the Environment.

Table 2 summarizes the ***Water Supply Guidelines*** employed in the preparation of the water demand estimate for the proposed development.

Table 2
Water Supply Design Criteria

Design Parameter	Value
Townhouse	2.7 P/unit
Residential Average Daily Demand	350 L/d/P
Residential Maximum Daily Demand	3.6 x avg. day *
Residential Maximum Hourly	5.4 x max. day *
Minimum Watermain Size	150mm diameter
Minimum Depth of Cover	2.4m from top of watermain to finished grade
During normal operating conditions desired operating pressure is within	350kPa and 480kPa
During normal operating conditions pressure must not drop below	275kPa
During normal operating conditions pressure must not exceed	552kPa
During fire flow operating pressure must not drop below	140kPa
Daily average based on Appendix 4-A from **Water Supply Guidelines* *** Residential Max. Daily and Max. Hourly peaking factors per MOE Guidelines for Drinking-Water Systems Table 3-3 for 0 to 500 persons.* *-Table updated to reflect ISD-2010-2*	

Table 3 summarizes the anticipated water supply demand and proposed boundary conditions. Boundary conditions for the subject site were extracted from the ***MSS*** for the nodes closest to the proposed connection points on Michael Stoqua Street and Moses Tennisco Street.

Table 3
Water Demand and Boundary Conditions
Proposed Conditions

Design Parameter	Anticipated Demand[1] (L/min)	Boundary Condition[2] Connection 1 (m H_2O / kPa)		Boundary Condition[2] Connection 2 (m H_2O / kPa)	
Average Daily Demand	38.9	52.6	516.0	54.0	529.4
Max Day	140.0	53.2	521.6	54.5	534.4
Max Day + Fire Flow	11,000 + 140.0	37.4	366.9	43.0	421.4
1) Water demand calculation per ***Water Supply Guidelines***. See ***Appendix B*** for detailed calculations. 2) Boundary conditions per the ***MSS*** Connection 1 is to Michael Stoqua (Node 27 from MSS), Connection 2 is to Moses Tennisco (Node 24 from MSS)					

The ***MSS*** only described the Average Daily Demand, Max Day Demand and Max Day + Fire Flow scenarios. There is a proposed water demand increased as the ***MSS*** estimated water demand assuming the 2013 Water Master Plan, whereas the water demand shown in ***Table 3*** is calculated in accordance with the ***Water Supply Guideline***.

The increase in water demand is to be reviewed by IBI to ensure that no negative impacts arise from the additional demand.

Fire flow requirements are to be determined in accordance with Local Guidelines (***FUS***), City of Ottawa ***Water Supply Guidelines***, and the Ontario Building Code.

Using the ***FUS*** method, a conservative estimation of fire flow has been established. Based on information received from ***Mattamy Homes,*** the following assumptions were assumed for both Stacked Townhomes and standard Townhomes:

Type of construction – Non-Combustible Construction

Occupancy type – Non-Combustible

Sprinkler Protection – Non-Sprinklered

The above assumptions result in an estimated fire flow of approximately ***11,000 L/min****;* actual building materials selected will affect the estimated flow; see ***Appendix B*** for detailed FUS calculations.

3.3 Watermain Modeling

EPANet was utilized to determine pipe sizing and the availability of pressures throughout the system during Average Day demand, Max Day, and Max Day plus Fire Flow scenarios. The static model determines pressures based on the available head obtained from the boundary conditions from the ***MSS***, as indicated in ***Table 3.***

The model utilizes the Hazen-Williams equation to determine pressure drops, while the pipe properties, including friction factors, have been selected in accordance with Table 4.4 of the ***Water Supply Guidelines***.

A summary of the resulting pressures at all nodes are summarized in ***Table 4*** below.

Table 4
Resulting Pressures Proposed Conditions

Node ID	Average Day (kPa)	Max Day (kPa)	Max Day + Fire Flow (kPa)
1	542.4	543.4	393.6
2	538.8	520.7	375.6
3	544.3	541.5	396.4
4	548.7	549.0	418.8

The minimum and maximum pressures shown in ***Table 4*** fall within the allowable pressures described in ***Table 2***. Pressures during Average Day and Max Day are at the high end of the allowable pressure. A pressure test should be conducted at the time of construction to determine if pressure reducing valves are required.

The model predicted that water will flow in all areas of the system and no ‘dead’ zones were found.

3.4 Water Supply Conclusion

The boundary conditions at the site were determined from the ***MSS***. As demonstrated by ***Table 4***, the municipal system is capable of delivering water within the ***Water Supply Guidelines*** pressure range. Sufficient flow is available within Michael Stoqua Street and Moses Tennisco Street to provide fire protection for the site.

The proposed water supply design conforms to all relevant City Guidelines and Policies.

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The sanitary flow from the subject property has been considered in the wastewater design for the Wateridge Subdivision, as outlined in the ***MSS***. Block 22 was contemplated to drain a portion of the flow to the 250mm sanitary sewer within Michael Stoqua Street with the other portion of flow directed to the sanitary sewer within Moses Tennisco Street.

The total wastewater flow from the ***MSS*** is summarized in ***Table 5*** below.

Table 5
Wastewater Flow per MSS – Total Site Area

Design Parameter	Total Flow (L/s)
Estimated Average Dry Weather Flow	0.39
Estimated Peak Dry Weather Flow	1.57
Estimated Peak Wet Weather Flow	1.70

As discussed above, only a portion of the site was allocated to drain to the Michael Stoqua Street sanitary sewer, summarized below.

Table 6
Wastewater Flow per MSS – To Michael Stoqua Street Sewer

Design Parameter	Total Flow (L/s)
Estimated Average Dry Weather Flow	0.21
Estimated Peak Dry Weather Flow	0.84
Estimated Peak Wet Weather Flow	0.91

Based on the sanitary design sheet prepared by IBI Group (dated January 25, 2017) there is ***48.11 L/s*** of available capacity within the Michael Stoqua Street sanitary sewer. Please refer to ***Appendix C*** for reduced copies of the IBI sanitary design sheet and drainage area map.

4.2 Wastewater Design

It is proposed that the development will connect to the 250mm diameter sewer within the Michael Stoqua Street right-of-way.

Table 7 summarizes the ***City Standards*** employed in the design of the proposed wastewater sewer system.

Table 7
Wastewater Design Criteria

Design Parameter	Value
Townhouse	2.7 P/unit
Average Daily Demand - Residential	350 L/d/per
Peaking Factor	Harmon's Peaking Factor. 4.0
Infiltration and Inflow Allowance	0.28L/s/ha
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{2/3} S^{1/2}$
Minimum Sewer Size	200mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6m/s
Maximum Full Flowing Velocity	3.0m/s
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012.	

Table 8 demonstrates the anticipated peak flow from the proposed development. See ***Appendix C*** for associated calculations.

Table 8
Summary of Estimated Peak Wastewater Flow

Design Parameter	Total Flow (L/s)
Estimated Average Dry Weather Flow	0.65
Estimated Peak Dry Weather Flow	2.59
Estimated Peak Wet Weather Flow	2.72

The estimated sanitary flow, based on the site plan provide in ***Drawings/Figures,*** anticipates a peak wet weather flow of ***2.72 L/s***.

The anticipated peak wastewater flow generated from the proposed development to the Michael Stoqua Street sewer has been estimated to be ***2.72 L/s***; this results in a ***1.80 L/s*** increase from the ***MSS***. Based on the capacity analysis completed for the downstream section of sanitary sewer the sewer has the ability to convey the increase in wastewater flow.

A sanitary calculation sheet was prepared that shows the on-site and off-site capacity of the local sanitary sewers, see ***Appendix C*** for the calculation sheet.

The total increase in flow is to be reviewed by IBI to ensure that there are no negative impacts from the additional wastewater flow.

4.3 Wastewater Servicing Conclusions

The sanitary flow from the subject property has been considered in the wastewater design for the Wateridge Subdivision, outlined in the ***MSS***.

The proposed development results in an estimated increase in wastewater flow contribution of ***1.80 L/s*** to the sanitary sewer within the Michael Stoqua Street right-of-way. Based on a capacity analysis of the sanitary sewer there is capacity to convey the increase in sanitary flow.

The proposed wastewater design conforms to all relevant ***City Standards***.

5.0 STORMWATER MANAGEMENT

5.1 Existing Stormwater Services

Minor and major flow from the subject site was accounted for in the Wateridge Subdivision, outlined in the ***MSS***. It is proposed that minor system flow from the Block will be conveyed directly to the Eastern SWM Facility. Major flow is proposed to be directed to a dry pond to the south of Mikinak Road for quantity control and will eventually discharge through the minor system to the Easter SWM Facility.

The ***MSS*** contemplated minor and major system drainage from Block 22 to be split to Michael Stoqua Street and Moses Tennisco Street. According to storm design sheets and drainage area maps prepared by IBI, there is ***53.62 L/s*** of available capacity within the Michael Stoqua Street storm sewer. Refer to ***Appendix D*** for reduced copy of the storm design sheet and drainage area figures prepared by IBI for the Wateridge Subdivision.

Flows that influence the watershed in which the subject property is located are further reviewed by the principal authority. The subject property is located within the Ottawa River watershed, and is therefore subject to review by the Rideau Valley Conservation Authority (RVCA).

5.2 Post-development Stormwater Management Target

Stormwater management requirements for the proposed development were reviewed with the City of Ottawa, where the proposed development is required to:

- Follow quantity and quality controls outlined in the ***MSS***
- Incorporate Low Impact Development measures in accordance with the ***MSS*** and ***LID Demonstration Project***

5.3 Proposed Stormwater Management System

It is proposed that the stormwater from the development will be directed to the 375mm storm sewer within Michael Stoqua Street.

As discussed in ***Section 5.1***, the quantity controls for Block 22 will be provided by the dry pond south of the subject site and through the Eastern SWM Facility outlined in the ***MSS***.

The subject site was also accounted for in the design of the permanent pool of the Eastern SWM Facility which provides 80% TSS removal for the subdivision.

A storm design sheet was prepared to support the capacity of the internal and external storm sewers, refer to ***Appendix D*** for the calculation sheet and ***SWM-1*** for the drainage area figure. The overall Runoff Coefficient from the site is equal to what was allocated in the ***MSS*** and therefore, no additional quantity or quality controls are required.

As shown in the design sheet, the storm sewer within Michael Stoqua Street has sufficient capacity to convey the 5-year flow from the subject site.

5.4 Low Impact Development (LID) Practices

LID measures are proposed in accordance with the ***MSS*** and ***LID Demonstration Project***. It is proposed to direct all roof flow to side yard and bioswales, eventually draining to area drains. Area drains will collect and discharge clean roof flow to infiltration tanks and oversized perforated pipe systems. Refer to ***Appendix D*** for a summary of the underground storage tanks and refer to drawing ***SSP-1*** for the location of proposed LID practices.

All LID measures are designed to infiltrate an equivalent of the 4mm event over the site area and each LID measure must treat the minimum of the 15mm event. A total infiltration requirement of 4mm or ***18.4m^3*** and a total treatment volume of the 15mm event, or ***32.4m^3*** is required per the ***LID Demonstration Project***. The current underground storage and perforated pipe system provides ***46.5m^3*** of volume to be infiltrated, exceeding the above noted requirements.

Details of the LID practices are shown on ***DS-1***.

5.5 Stormwater Servicing Conclusions

Minor and major system flow from Block 22 was accounted for in the subdivision design. Quantity and quality controls are provided through a dry stormwater pond to the south and the Eastern SWM Facility to the north.

Sufficient capacity is available in the adjacent storm sewers to convey the 5-year storm event from the subject site.

LID practices in the form of underground storage tanks and oversized perforated pipes are proposed to infiltrate roof runoff from the site, in accordance with the ***LID Demonstration Project***

The proposed stormwater design conforms to all relevant ***City Standards*** and Policies.

6.0 CONCLUSION AND RECOMMENDATIONS

David Schaeffer Engineering Ltd. (DSEL) has been retained to prepare a Functional Servicing and Stormwater Management for the proposed development for Block 22 of the former CFB Rockcliffe lands, which are currently under re-development. The preceding report outlines the following:

- Based on boundary conditions from the ***MSS*** and a water distribution model completed for the site, sufficient pressure exists to support the development
- Based on estimated fire flow per the ***FUS***, there is sufficient pressure within the local system to provide the required fire flow
- The proposed development is anticipated to have a peak wet weather flow of ***2.72 L/s***; the adjacent sanitary sewer has capacity to convey the increase in flow
- The quantity and quality controls are provided for the site through a dry pond to the south of the site and the Eastern SWM Facility outlined in the ***MSS***
- LID practices include underground storage tanks and oversized perforated pipes to infiltrate roof runoff and meet criteria outlined in the ***LID Demonstration Project.***

Prepared by,
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Per: Steven L. Merrick, P.Eng

Reviewed by,
David Schaeffer Engineering Ltd.

Per: Adam D. Fobert, P. Eng.

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APPENDIX A

Pre-Consultation

DEVELOPMENT SERVICING STUDY CHECKLIST

17-948 08/08/2017

4.1 General Content		
☐	Executive Summary (for larger reports only).	N/A
☒	Date and revision number of the report.	Report Cover Sheet
☒	Location map and plan showing municipal address, boundary, and layout of proposed development.	Drawings/Figures
☒	Plan showing the site and location of all existing services.	Figure 1
☒	Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Section 1.0
☒	Summary of Pre-consultation Meetings with City and other approval agencies.	Section 1.3
☒	Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	Section 2.1
☒	Statement of objectives and servicing criteria.	Section 1.0
☒	Identification of existing and proposed infrastructure available in the immediate area.	Sections 3.1, 4.1, 5.1
☐	Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	N/A
☒	Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	N/A
☐	Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
☐	Proposed phasing of the development, if applicable.	N/A
☒	Reference to geotechnical studies and recommendations concerning servicing.	Section 1.4
☒	All preliminary and formal site plan submissions should have the following information: -Metric scale -North arrow (including construction North) -Key plan -Name and contact information of applicant and property owner -Property limits including bearings and dimensions -Existing and proposed structures and parking areas -Easements, road widening and rights-of-way -Adjacent street names	N/A

4.2 Development Servicing Report: Water		
☐	Confirm consistency with Master Servicing Study, if available	N/A
☒	Availability of public infrastructure to service proposed development	Section 1.1
☒	Identification of system constraints	Section 3.1
☒	Identify boundary conditions	Section 3.1, 3.2
☒	Confirmation of adequate domestic supply and pressure	Section 3.3

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☒	Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Section 3.2
☐	Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	N/A
☐	Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	N/A
☐	Address reliability requirements such as appropriate location of shut-off valves	N/A
☐	Check on the necessity of a pressure zone boundary modification	N/A
☒	Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range	Section 3.2, 3.3
☐	Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	N/A
☐	Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	N/A
☒	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Section 3.2
☐	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	N/A

4.3 Development Servicing Report: Wastewater

☒	Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	Section 4.2
☐	Confirm consistency with Master Servicing Study and/or justifications for deviations.	N/A
☐	Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	N/A
☒	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 4.1
☒	Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Section 4.2
☒	Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Section 4.2, Appendix C
☒	Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 4.2
☐	Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	N/A

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☐	Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
☐	Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
☐	Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A
☐	Special considerations such as contamination, corrosive environment etc.	N/A

4.4 Development Servicing Report: Stormwater Checklist

☒	Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 5.1
☒	Analysis of available capacity in existing public infrastructure.	Section 5.1, Appendix D
☒	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Drawings/Figures
☒	Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Section 5.2
☒	Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Section 5.2
☒	Description of the stormwater management concept with facility locations and descriptions with references and supporting information	Section 5.3
☐	Set-back from private sewage disposal systems.	N/A
☐	Watercourse and hazard lands setbacks.	N/A
☒	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	Appendix A
☐	Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A
☒	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).	Section 5.3
☐	Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	N/A
☒	Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Section 5.1, 5.3
☐	Any proposed diversion of drainage catchment areas from one outlet to another.	N/A
☐	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	N/A
☐	If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	N/A
☐	Identification of potential impacts to receiving watercourses	N/A
☐	Identification of municipal drains and related approval requirements.	N/A

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☒	Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 5.3
☐	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	N/A
☐	Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A
☒	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	N/A
☐	Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
☐	Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

4.5 Approval and Permit Requirements: Checklist

☒	Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement ct. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.	Section 1.2
☐	Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N/A
☐	Changes to Municipal Drains.	N/A
☐	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	N/A

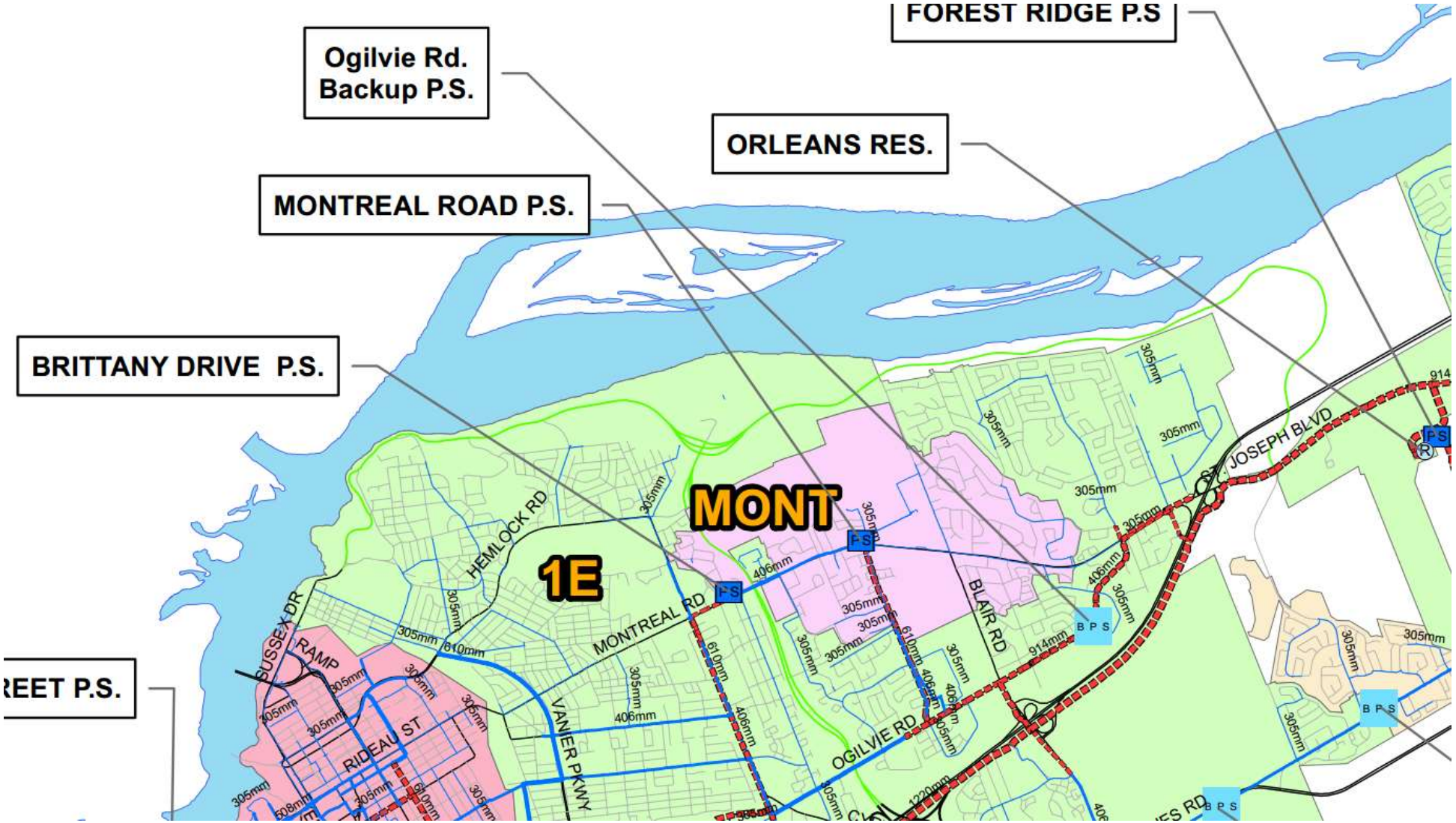
4.6 Conclusion Checklist

☒	Clearly stated conclusions and recommendations	Section 7.0
☐	Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	
☐	All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

APPENDIX B

Water Supply


FOREST RIDGE P.S
Ogilvie Rd.
Backup P.S.
ORLEANS RES.
MONTREAL ROAD P.S.
BRITTANY DRIVE P.S.
REET P.S.
MONT
1E
HEMLOCK RD
MONTREAL RD
SUSSEX DR
RAMP
RIDEAU ST
VANIER PKWY
OGILVIE RD
BLAIR RD
ST. JOSEPH BLVD
305mm
406mm
610mm
914mm
1220mm
508mm
P S
B P S

Mattamy Homes
Wateridge Block 22
Water Demand Per MSS

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

Domestic Demand

Type of Housing	Per / Unit	Units	Pop	
Single Family	3.4		0	
Semi-detached	2.7		0	
Townhouse (per MSS)	2.3	42	97	<-- Unit Count and Population from MSS
Apartment			0	
Bachelor	1.4		0	
1 Bedroom	1.4		0	
2 Bedroom	2.1		0	
3 Bedroom	3.1		0	
Average	1.8		0	

	Pop	Avg. Daily		Max Day		Peak Hour	
		m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Total Domestic Demand	97	19.2	13.3	94.1	65.4	142.1	98.7

Institutional / Commercial / Industrial Demand

			Avg. Daily		Max Day		Peak Hour	
Property Type	**Unit Rate**	**Units**	m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Commercial floor space	2.5 $L/m^2/d$		0.00	0.0	0.0	0.0	0.0	0.0
Office	75 $L/9.3m^2/d$		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Light	35,000 L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Heavy	55,000 L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
		Total I/CI Demand	0.0	0.0	0.0	0.0	0.0	0.0
		Total Demand	**19.2**	**13.3**	**94.1**	**65.4**	**142.1**	**98.7**

Mattamy Homes
Wateridge Block 22
Proposed Water Demand

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

Domestic Demand

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4		0
Semi-detached	2.7		0
Townhouse	2.7	59	160
Apartment			0
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8		0

	Pop	Avg. Daily		Max Day		Peak Hour	
		m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Total Domestic Demand	160	56.0	38.9	201.6	140.0	302.4	210.0

Institutional / Commercial / Industrial Demand

Property Type	Unit Rate	Units	Avg. Daily m^3/d	Avg. Daily L/min	Max Day m^3/d	Max Day L/min	Peak Hour m^3/d	Peak Hour L/min
Commercial floor space	2.5 $L/m^2/d$		0.00	0.0	0.0	0.0	0.0	0.0
Office	75 $L/9.3m^2/d$		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Light	35,000 L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Heavy	55,000 L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Total I/CI Demand			0.0	0.0	0.0	0.0	0.0	0.0
Total Demand			**56.0**	**38.9**	**201.6**	**140.0**	**302.4**	**210.0**

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999

Fire Flow Required

1. Base Requirement

$F = 220C\sqrt{A}$ L/min *Where **F** is the fire flow, **C** is the Type of construction and **A** is the Total floor area*

Type of Construction: Ordinary Construction

C	1		*Type of Construction Coefficient per FUS Part II, Section 1*
A	1250.4	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	7779.4	L/min	
	8000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible	-15%
Fire Flow	**6800.0 L/min**

3. Reduction for Sprinkler Protection

Non-Sprinklered	0%
Reduction	**0 L/min**

4. Increase for Separation Distance

N	30.1m-45m	5%	
S	10.1m-20m	15%	
E	20.1m-30m	10%	
W	0m-3m	25%	
	% Increase	**55%**	*value not to exceed 75% per FUS Part II, Section 4*

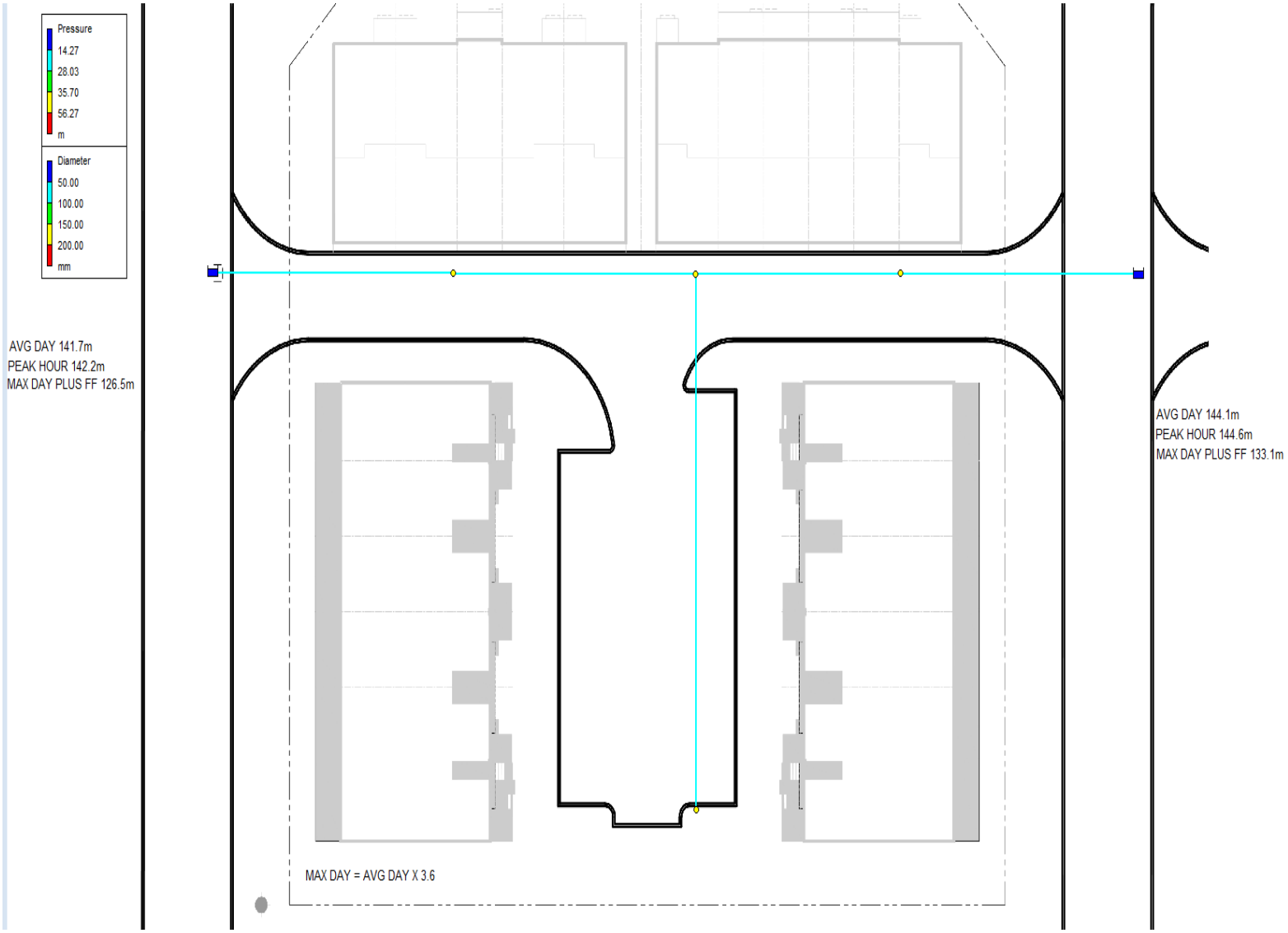
Increase	**3740.0 L/min**

Total Fire Flow

Fire Flow	10540.0	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	11000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided by Mattamy Homes.
-Calculations based on Fire Underwriters Survey - Part II

AVERAGE DAY – BLOCK 22



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

AVERAGE DAY-BLOCK 22

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
3	3	2	39.1	50
4	MichaelStoquaStreet1		23.2	50
5	1	3	23.2	50
6	3	4	21.6	50
7	4	MosesTeniscoStreet	21.6	50

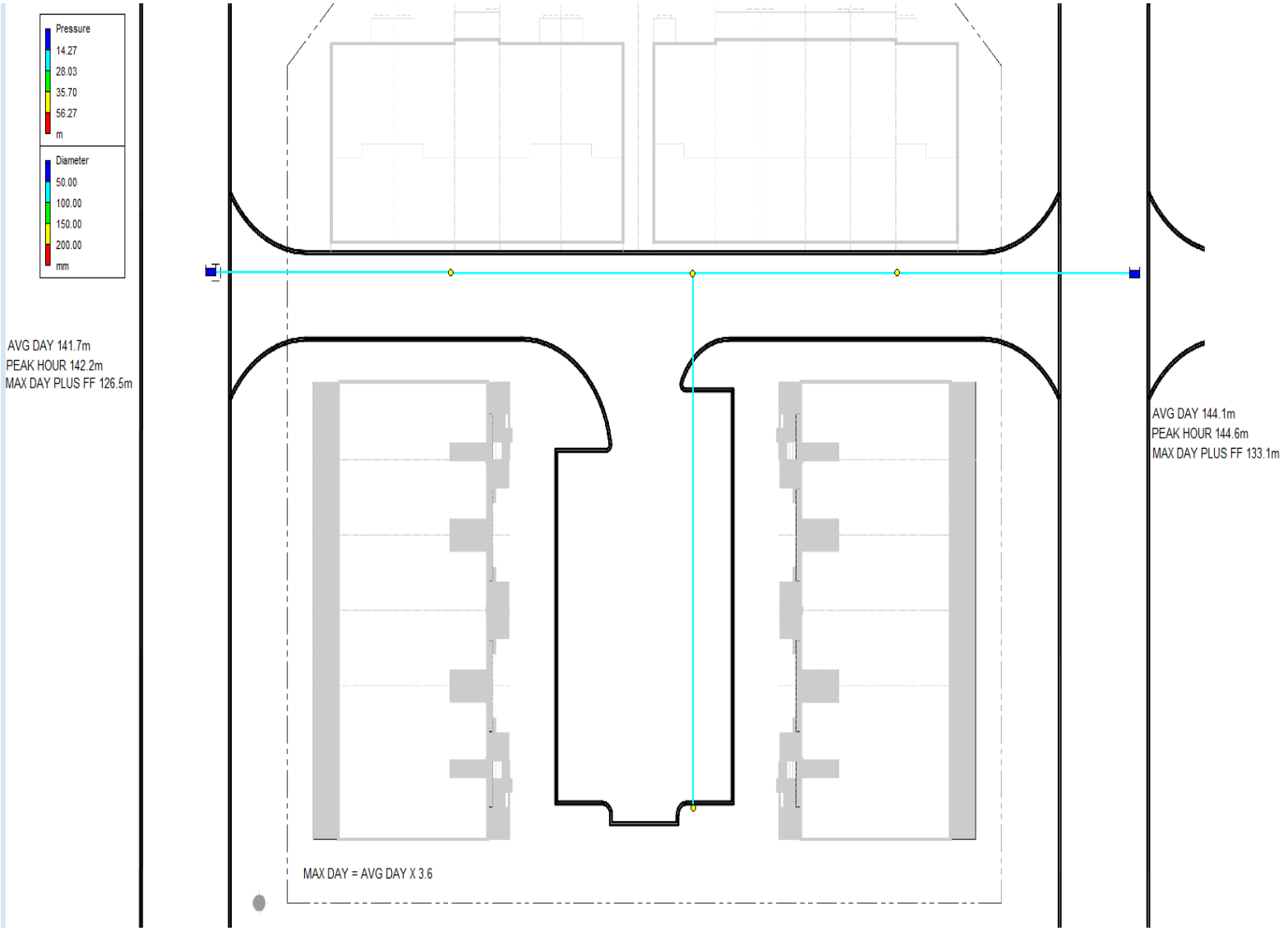
Node Results:

Node ID	Demand LPM	Head m	Pressure m	Quality	
3	2.43	142.48	55.48	0.00	
2	31.60	142.32	54.92	0.00	
1	2.43	142.09	55.29	0.00	
4	2.43	143.23	55.93	0.00	
MichaelStoquaStreet	66.82	141.70	0.00	0.00	Reservoir
MosesTeniscoStreet	-105.71	144.10	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPM	VelocityUnit m/s	Headloss m/km	Status
3	31.60	0.27	4.06	Open
4	-66.82	0.57	16.97	Open
5	-69.25	0.59	16.62	Open
6	-103.28	0.88	34.85	Open
7	-105.71	0.90	40.18	Open

MAX DAY – BLOCK 22



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

MAX DAY-BLOCK 22

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
3	3	2	39.1	50
4	MichaelStoquaStreet1		23.2	50
5	1	3	23.2	50
6	3	4	21.6	50
7	4	MosesTeniscoStreet	21.6	50

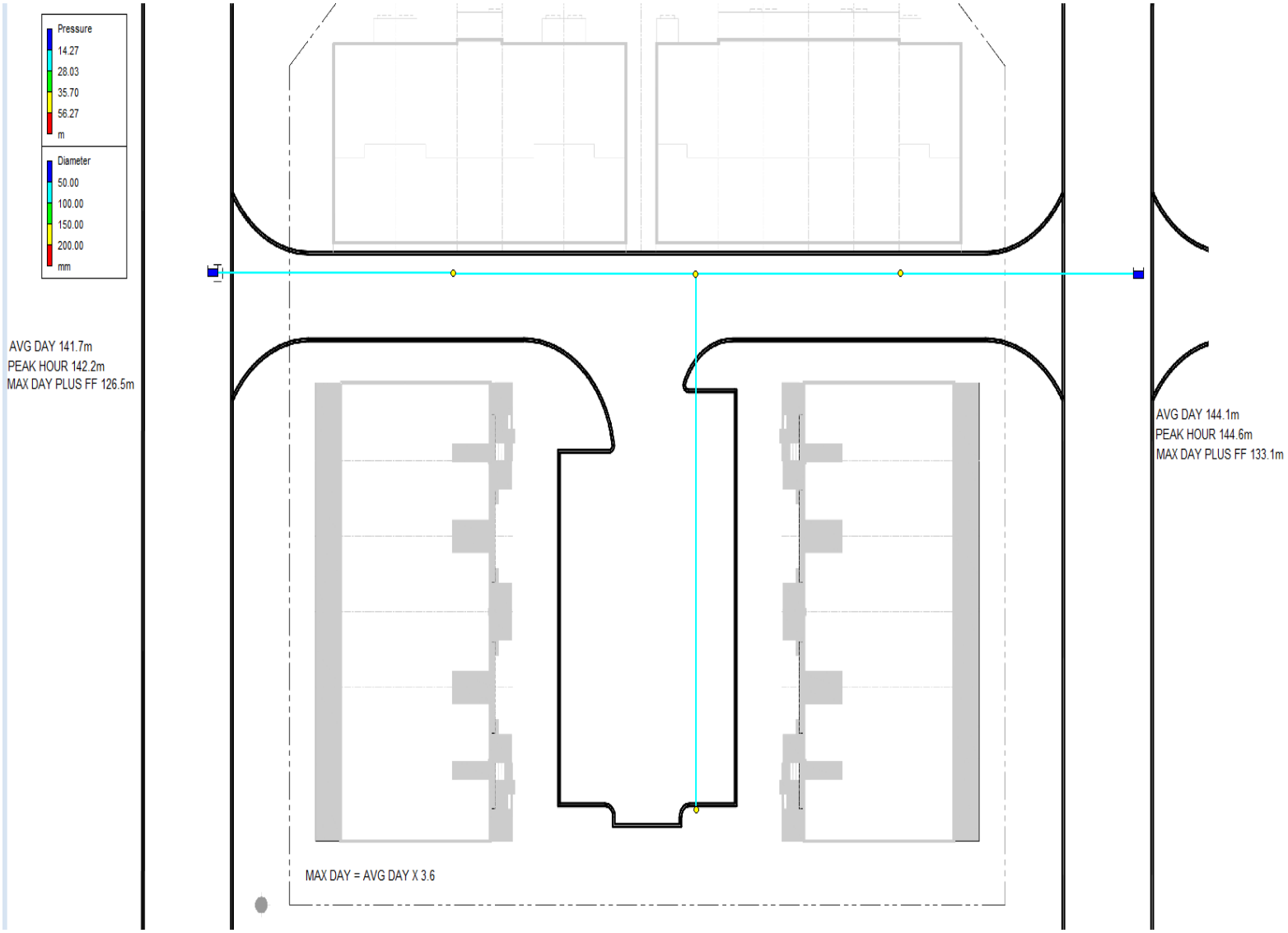
Node Results:

Node ID	Demand LPM	Head m	Pressure m	Quality	
3	8.75	142.20	55.20	0.00	
2	113.76	140.48	53.08	0.00	
1	8.75	142.19	55.39	0.00	
4	8.75	143.26	55.96	0.00	
MichaelStoquaStreet	-6.64	142.20	0.00	0.00	Reservoir
MosesTeniscoStreet	-133.36	144.60	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPM	VelocityUnit m/s	Headloss m/km	Status
3	113.76	0.97	43.87	Open
4	6.64	0.06	0.23	Open
5	-2.10	0.02	0.03	Open
6	-124.61	1.06	49.34	Open
7	-133.36	1.13	61.99	Open

MAX DAY + FIRE FLOW – BLOCK 22



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

MAX DAY PLUS FF-BLOCK 22

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
3	3	2	39.1	50
4	MichaelStoquaStreet1		23.2	50
5	1	3	23.2	50
6	3	4	21.6	50
7	4	MosesTeniscoStreet	21.6	50

Node Results:

Node ID	Demand LPM	Head m	Pressure m	Quality	
3	8.75	127.41	40.41	0.00	
2	113.76	125.69	38.29	0.00	
1	8.75	126.92	40.12	0.00	
4	8.75	129.99	42.69	0.00	
MichaelStoquaStreet	69.55	126.50	0.00	0.00	Reservoir
MosesTeniscoStreet	-209.55	133.10	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
3	113.76	0.97	43.87	Open
4	-69.55	0.59	18.28	Open
5	-78.30	0.66	20.87	Open
6	-200.80	1.70	119.39	Open
7	-209.55	1.78	144.12	Open

APPENDIX C

Wastewater Collection

REVIEWED BY
DEVELOPMENT REVIEW SERVICES BRANCH

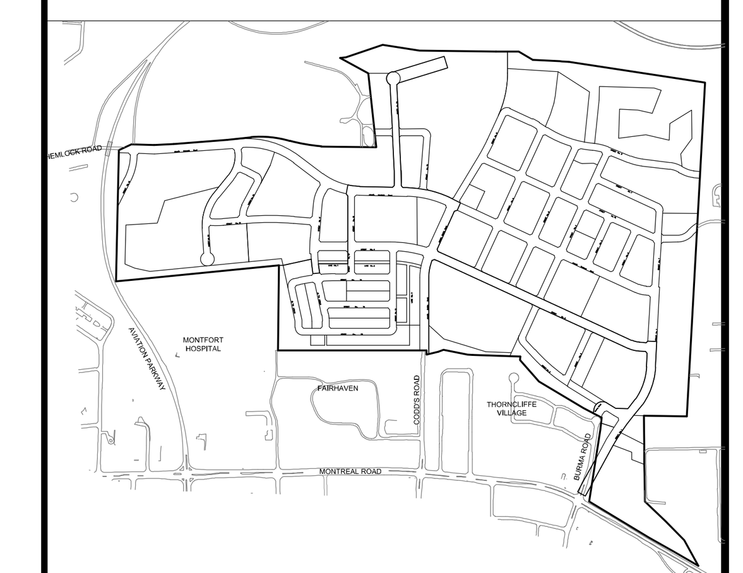
Signed ______________________

Date ______________________ 2017

Plan Number ______________________

LEGEND :

210A — AREA NUMBER
52.5 — POPULATION
0.50 — AREA IN HECTARES
POTENTIAL DRAINAGE DIRECTION



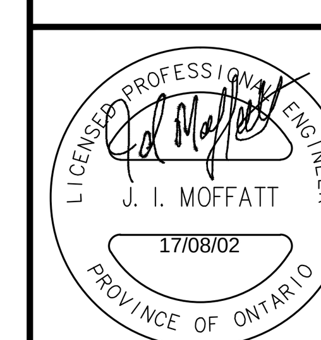
No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8	ISSUED FOR CONSTRUCTION	J.I.M.	2017:08:02
7	REVISED PER CITY COMMENTS	J.I.M.	2017:06:16
6	REVISED PER MOECC COMMENTS	J.I.M.	2017:06:07
5	ISSUED FOR TENDER	J.I.M.	2017:03:23
4	SUBMISSION FOR MOECC APPROVAL	J.I.M.	2017:02:16
3	SUBMISSION No.3 FOR CITY REVIEW	J.I.M.	2017:01:25
2	SUBMISSION No.2 FOR CITY REVIEW	J.I.M.	2016:11:04
1	SUBMISSION No.1 FOR CITY REVIEW	J.I.M.	2016:07:08

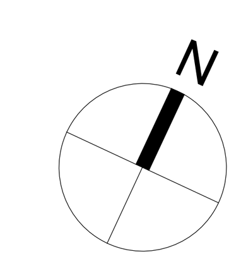
CANADA LANDS COMPANY
SOCIÉTÉ IMMOBILIÈRE DU CANADA
30 Metcalfe Street Suite 601
Ottawa, On K1P 5L4
613 998 7777

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

Project Title

WATERIDGE VILLAGE AT ROCKCLIFFE
PHASE 1B





Drawing Title

SANITARY DRAINAGE AREA PLAN

Scale: 1 : 2000

Design: J.I.M.	Date: MAY 2016
Drawn: M.M.	Checked: J.I.M.
Project No.: 38298	Drawing No.: 501A

D07-16-15-0003

#17063

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

Former CFB Rockcliffe
City of Ottawa
Canada Lands Company

LOCATION				RESIDENTIAL										ICI AREAS							INFILTRATION ALLOWANCE			FIXED FLOW	TOTAL FLOW	PROPOSED SEWER DESIGN						
				AREA	UNIT TYPES				AREA	POPULATION		PEAK	PEAK	AREA (Ha)						PEAK	AREA (Ha)		FLOW			CAPACITY	LENGTH	DIA	SLOPE	VELOCITY	AVAILABLE CAPACITY	
														INSTITUTIONAL		COMMERCIAL		INDUSTRIAL													
STREET	AREA ID	FROM MH	TO MH	Phase 1B (Ha)	SF	SD	TH	APT	EXTERNAL (Ha)	IND	CUM	FACTOR	FLOW (L/s)	IND	CUM	IND	CUM	IND	CUM	FLOW (L/s)	IND	CUM	(L/s)	(L/s)	(L/s)	(L/s)	(m)	(mm)	(%)	(full) (m/s)	L/s	(%)
Phase 1B																																
Hemlock Road	201A	MH201A	MH202A	0.31						0.0	0.0	4.00	0.00		0.00		0.00		0.00	0.00	0.31	0.31	0.09	0.00	0.09	50.02	87.06	250	0.65	0.987	49.93	99.83%
Future Street No. 6	EX202A	BULK202AN	MH202A						2.08	358.5	358.5	4.00	5.81		0.00		0.00		0.00	0.00	2.08	2.08	0.58	0.00	6.39	31.02	21.00	250	0.25	0.612	24.63	79.40%
Hemlock Road	202A	MH202A	MH203A	0.21						0.0	358.5	4.00	5.81		0.00		0.00		0.00	0.00	0.21	2.60	0.73	0.00	6.54	75.98	86.00	250	1.50	1.500	69.44	91.40%
Future Street No. 5	EX203A	BULK203AN	MH203A						1.40	160.5	160.5	4.00	2.60		0.00		0.00		0.00	0.00	1.40	1.40	0.39	0.00	2.99	83.23	21.00	250	1.80	1.643	80.24	96.40%
Hemlock Road	203A, EXPARK2	MH203A	MH204A	0.20					0.44	0.0	0.0	4.00	0.00		0.00		0.00		0.00	0.00	0.64	0.64	0.18	0.00	0.18	82.07	86.00	250	1.75	1.620	81.89	99.78%
rue Moses Tennisco Street	EX204A	BULK204AN	MH204A						1.39	153.5	153.5	4.00	2.49		0.00		0.00		0.00	0.00	1.39	1.39	0.39	0.00	2.88	83.23	21.00	250	1.80	1.643	80.36	96.54%
Hemlock Road	204A	MH204A	MH205A	0.21						0.0	153.5	4.00	2.49		0.00		0.00		0.00	0.00	0.21	1.60	0.45	0.00	2.94	67.96	90.00	250	1.20	1.341	65.02	95.68%
rue Michael Stoqua Street	EX205A	BULK205AN	MH205A						1.38	241.5	241.5	4.00	3.91		0.00		0.00		0.00	0.00	1.38	1.38	0.39	0.00	4.30	67.96	21.00	250	1.20	1.341	63.66	93.67%
Hemlock Road	205A	MH205A	MH206A	0.25						0.0	395.0	4.00	6.40		0.00		0.00		0.00	0.00	0.25	3.23	0.90	0.00	7.30	31.02	112.00	250	0.25	0.612	23.71	76.45%
rue Bareille-Snow Street	EX206A-B	BULK206AN	MH206A						9.61	1755.0	1755.0	3.63	25.80		0.00		0.00		0.00	0.00	9.61	9.61	2.69	0.00	28.49	87.74	21.00	250	2.00	1.731	59.24	67.52%
Hemlock Road	206A	MH206A	MH207A	0.20						0.0	2150.0	3.56	31.02		0.00		0.00		0.00	0.00	0.20	13.04	3.65	0.00	34.67	55.26	89.33	300	0.30	0.757	20.59	37.26%
Block 20	PARK1	MH207AN	MH207A	0.32						0.0	0.0	4.00	0.00		0.00		0.00		0.00	0.00	0.32	0.32	0.09	0.00	0.09	39.24	14.00	250	0.40	0.774	39.15	99.77%
Hemlock Road	PARK1, 207A	MH207A	*BULK176AE*	0.12						0.0	2150.0	3.56	31.02		0.00		0.00		0.00	0.00	0.12	13.48	3.77	0.00	34.79	65.38	33.16	300	0.42	0.896	30.59	46.79%
Phase 1A																																
Hemlock Road		*BULK176AE*	*MH176A*							0.0	2150.0	3.56	31.02		0.00		0.00		0.00	0.00	0.00	13.48	3.77	0.00	34.79	65.38	*21.97*	*300*	*0.42*	0.896	30.59	46.79%
Phase 1B																																
chemin Wanaki Road	200A, COM1	MH200A	MH214A	0.25						0.0	0.0	4.00	0.00		0.00	0.90	0.90		0.00	0.78	1.15	1.15	0.32	0.00	1.10	73.41	98.28	250	1.40	1.449	72.30	98.50%
chemin Wanaki Road	214A, COM2	MH214A	*BULK153AN*	0.16						0.0	0.0	4.00	0.00		0.00	0.65	1.55		0.00	1.35	0.81	1.96	0.55	0.00	1.89	51.91	44.22	250	0.70	1.024	50.01	96.35%
Phase 1B																																
chemin Wanaki Road	143B	BULK143AE	MH143A	0.31						104.0	104.0	4.00	1.69		0.00		0.00		0.00	0.00	0.31	0.31	0.09	0.00	1.77	43.87	21.50	250	0.50	0.866	42.10	95.96%
chemin Wanaki Road	143A	MH143A	MH144A	0.27						0.0	104.0	4.00	1.69		0.00		0.00		0.00	0.00	0.27	0.58	0.16	0.00	1.85	87.74	47.73	250	2.00	1.731	85.89	97.89%
chemin Wanaki Road	144A, 144B	MH144A	MH145A	0.72						0.0	104.0	4.00	1.69		0.00		0.00		0.00	0.00	0.72	1.30	0.36	0.00	2.05	87.74	40.57	250	2.00	1.731	85.69	97.66%
chemin Wanaki Road	145A, 145B, 145C	MH145A	MH146A	2.77						835.6	939.6	3.82	14.53		0.00		0.00		0.00	0.00	2.77	4.07	1.14	0.00	15.67	107.45	53.01	250	3.00	2.121	91.79	85.42%
chemin Wanaki Road	146A	MH146A	MH147A	0.14						0.0	939.6	3.82	14.53		0.00		0.00		0.00	0.00	0.14	4.21	1.18	0.00	15.71	43.54	37.48	250	1.00	1.224	27.83	63.92%
chemin Wanaki Road	PARK2	BLK147AE	MH147A	0.55						0.0	0.0	4.00	0.00		0.00		0.00		0.00	0.00	0.55	0.55	0.15	0.00	0.15	39.24	17.66	250	0.40	0.774	39.08	99.61%
chemin Wanaki Road	147C	BLK147AW	MH147A	0.10						33.6	33.6	4.00	0.54		0.00		0.00		0.00	0.00	0.10	0.10	0.03	0.00	0.57	43.87	17.33	250	0.50	0.866	43.30	98.70%
chemin Wanaki Road	147A	MH147A	MH170A	0.03						0.0	973.2	3.81	15.01		0.00		0.00		0.00	0.00	0.03	4.89	1.37	0.00	16.38	31.02	10.23	250	0.25	0.612	14.64	47.19%
chemin Wanaki Road	147B	MH107A	MH147C	0.16						0.0	973.2	3.81	15.01		0.00		0.00		0.00	0.00	0.16	5.05	1.41	0.00	16.42	31.02	39.00	250	0.25	0.612	14.59	47.05%
chemin Wanaki Road		MH147C	*BLK148AW*							0.0	973.2	3.81	15.01		0.00		0.00		0.00	0.00	0.00	5.05	1.41	0.00	16.42	31.02	11.77	250	0.25	0.612	14.59	47.05%
Phase 1B																																
Block 9	154A	*MH158A*	MH217A	0.19						0.0	973.2	3.81	15.01		2.62		3.83		0.00	5.60	0.19	12.94	3.62	0.00	24.23	53.37	171.95	250	0.74	1.053	29.13	54.59%
croissant Squadron Crescent	215Aa-b	MH215A	MH216A	0.79	3	4				117.8	117.8	4.00	1.91		0.00		0.00		0.00	0.00	0.79	0.79	0.22	0.00	2.13	50.02	80.00	250	0.65	0.987	47.89	95.74%
croissant Squadron Crescent	216Aa-b	MH216A	MH217A	0.67	2	6				94.5	212.3	4.00	3.44		0.00		0.00		0.00	0.00	0.67	1.46	0.41	0.00	3.85	50.02	71.19	250	0.65	0.987	46.17	92.30%
croissant Squadron Crescent	217A	MH217A	MH218A	0.02						0.0	1185.5	3.75	18.01		2.62		3.83		0.00	5.60	0.02	14.42	4.04	0.00	27.65	36.70	10.52	250	0.35	0.724	9.05	24.66%
croissant Squadron Crescent	218A	MH218A	MH218B	0.02						0.0	1185.5	3.75	18.01		2.62		3.83		0.00	5.60	0.02	14.44	4.04	0.00	27.66	36.70	12.49	250	0.35	0.724	9.05	24.65%
	THORN1	*EX SANMH*	MH218B						5.55	1574.0	1574.0	3.66	23.36		0.00		0.00		0.00	0.00	5.55	5.55	1.55	0.00	24.92	74.13	46.02	300	0.54	1.016	49.21	66.39%
croissant Squadron Crescent	218B	MH218B	MH219A	0.07						0.0	2759.5	3.47	38.82		2.62		3.83		0.00	5.60	0.07	20.06	5.62	0.00	50.04	59.68	37.08	300	0.35	0.818	9.64	16.16%
croissant Squadron Crescent	219A	MH219A	MH220A	0.15						0.0	2759.5	3.47	38.82		2.62		3.83		0.00	5.60	0.15	20.21	5.66	0.00	50.08	59.68	72.49	300	0.35	0.818	9.60	16.09%
croissant Squadron Crescent	220A, 220B	MH220A	MH221A	1.46						319.0	3078.5	3.43	42.81		2.62		3.83		0.00	5.60	1.46	21.67	6.07	0.00	54.48	59.68	43.77	300	0.35	0.818	5.21	8.72%
croissant Squadron Crescent	221A	MH221A	MH222A	0.02						0.0	3078.5	3.43	42.81		2.62		3.83		0.00	5.60	0.02	21.69	6.07	0.00	54.48	59.68	8.66	300	0.35	0.818	5.20	8.71%
croissant Squadron Crescent	222A	MH222A	*MH169A*	0.22						0.0	3078.5	3.43	42.81		2.62		3.83		0.00	5.60	0.22	21.91	6.13	0.00	54.54	59.68	89.42	300	0.35	0.818	5.14	8.61%

Design Parameters:

Residential			ICI Areas			
						Peak Factor
SF	3.4	p/p/u	INST	50,000	L/Ha/day	1.5
TH/SD	2.7	p/p/u	COM	50,000	L/Ha/day	1.5
APT	1.8	p/p/u	IND	35,000	L/Ha/day	MOE Chart
Other	60	p/p/Ha		17000	L/Ha/day	

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 350 L/day 300 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: WY

Checked: JIM

Dwg. Reference: 38298-501

No.	Revision	Date
1.	City submission No. 1	7/8/2016
2.	City submission No. 2	11/4/2016
3.	City submission No. 3	1/25/2017

File Reference:	Date:	Sheet No:
38298.5.7.1	7/8/2016	1 of 2

IBI GROUP
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ibigroup.com

SANITARY SEWER DESIGN SHEET

Former CFB Rockcliffe
City of Ottawa
Canada Lands Company

LOCATION				RESIDENTIAL										ICI AREAS							INFILTRATION ALLOWANCE			FIXED FLOW	TOTAL FLOW	PROPOSED SEWER DESIGN						
				AREA	UNIT TYPES				AREA	POPULATION		PEAK	PEAK	AREA (Ha)						PEAK	AREA (Ha)		FLOW			CAPACITY	LENGTH	DIA	SLOPE	VELOCITY	AVAILABLE CAPACITY	
STREET	AREA ID	FROM MH	TO MH	Phase 1B (Ha)	SF	SD	TH	APT	EXTERNAL (Ha)	IND	CUM	FACTOR	FLOW (L/s)	INSTITUTIONAL IND	INSTITUTIONAL CUM	COMMERCIAL IND	COMMERCIAL CUM	INDUSTRIAL IND	INDUSTRIAL CUM	FLOW (L/s)	IND	CUM	(L/s)	(L/s)	(L/s)	(L/s)	(m)	(mm)	(%)	(full) (m/s)	L/s	(%)
Phase 1A																																
croissant Squadron Crescent		*MH169A*	*MH165A*							0.0	3078.5	3.43	42.81		2.62		3.83		0.00	5.60	0.00	21.91	6.13	0.00	54.54	63.80	*27.00*	*300*	*0.40*	0.874	9.26	14.51%
Phase 1B																																
rue Moses Tennisco Street	212A	MH212A	MH213A	1.20						252.0	252.0	4.00	4.08		0.00		0.00		0.00	0.00	1.20	1.20	0.34	0.00	4.42	50.02	63.80	250	0.65	0.987	45.60	91.16%
rue Moses Tennisco Street	213A	MH213A	*BULK165AN*	0.35						52.5	304.5	4.00	4.93		0.00		0.00		0.00	0.00	0.35	1.55	0.43	0.00	5.37	39.24	50.79	250	0.40	0.774	33.87	86.32%
Phase 1A																																
rue Moses Tennisco Street		*BULK165AN*	*MH165A*							0.0	304.5	4.00	4.93		0.00		0.00		0.00	0.00	0.00	1.55	0.43	0.00	5.37	39.24	*22.50*	*250*	*0.40*	0.774	33.87	86.32%
Phase 1B																																
rue Michael Stoqua Street	210A	MH210A	MH211A	0.40						52.5	52.5	4.00	0.85		0.00		0.00		0.00	0.00	0.40	0.40	0.11	0.00	0.96	50.02	64.80	250	0.65	0.987	49.05	98.08%
rue Michael Stoqua Street	211A	MH211A	MH166B	0.35						52.5	105.0	4.00	1.70		0.00		0.00		0.00	0.00	0.35	0.75	0.21	0.00	1.91	50.02	52.19	250	0.65	0.987	48.11	96.18%
Phase 1A																																
rue Michael Stoqua Street		MH166B	*MH166A*							0.0	105.0	4.00	1.70		0.00		0.00		0.00	0.00	0.00	0.75	0.21	0.00	1.91	39.24	*21.10*	*250*	*0.40*	0.774	37.33	95.13%
Phase 1B																																
rue Bareille-Snow Street	208A	MH208A	MH209A	1.01						207.4	207.4	4.00	3.36		0.00		0.00		0.00	0.00	1.01	1.01	0.28	0.00	3.64	50.02	64.85	250	0.65	0.987	46.37	92.72%
rue Bareille-Snow Street	209A	MH209A	MH167B	0.35						52.6	260.0	4.00	4.21		0.00		0.00		0.00	0.00	0.35	1.36	0.38	0.00	4.59	50.02	52.87	250	0.65	0.987	45.42	90.82%
Phase 1A																																
rue Bareille-Snow Street		MH167B	*MH167A*							0.0	260.0	4.00	4.21		0.00		0.00		0.00	0.00	0.00	1.36	0.38	0.00	4.59	63.80	*20.43*	*300*	*0.40*	0.874	59.21	92.80%
Phase 1B																																
Codd's Road	230A	BLK231AN	MH231A						0.87	85.7	85.7	4.00	1.39		0.00		0.00		0.00	0.00	0.87	0.87	0.24	0.00	1.63	75.98	3.00	250	1.50	1.500	74.35	97.85%
Codd's Road	231A, EXPARK1	MH231A	*BULK176AN*						0.76	43.3	129.0	4.00	2.09		0.00		0.00		0.00	0.00	0.76	1.63	0.46	0.00	2.55	87.74	50.22	250	2.00	1.731	85.19	97.10%
Phase 1A																																
Codd's Road		*BULK176AN*	*MH176A*							0.0	129.0	4.00	2.09		0.00		0.00		0.00	0.00	0.00	1.63	0.46	0.00	2.55	55.49	*23.23*	*250*	*0.80*	1.095	52.94	95.41%

Design Parameters:

Residential			ICI Areas			
						Peak Factor
SF	3.4	p/p/u				
TH/SD	2.7	p/p/u	INST	50,000	L/Ha/day	1.5
APT	1.8	p/p/u	COM	50,000	L/Ha/day	1.5
Other	60	p/p/Ha	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 300 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: WY

Checked: JIM

Dwg. Reference: 38298-501

No.	Revision	Date
1.	City submission No. 1	7/8/2016
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3.	City submission No. 3	1/25/2017

File Reference: 38298.5.7.1 **Date:** 7/8/2016 **Sheet No:** 2 of 2

Mattamy Homes
Wateridge Block 22
Wastewater Flow per MSS

Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2012

Site Area		0.460	**ha**
Extraneous Flow Allowances			
	Infiltration / Inflow	**0.13**	**L/s**

Domestic Contributions

Unit Type	**Unit Rate**	**Units**	**Pop**
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.3	42	97
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8		0

Total Pop	**97**	
Average Domestic Flow	**0.39**	**L/s**
Peaking Factor	**4.00**	
Peak Domestic Flow	**1.57**	**L/s**

Total Estimated Average Dry Weather Flow Rate	**0.39**	**L/s**
Total Estimated Peak Dry Weather Flow Rate	**1.57**	**L/s**
Total Estimated Peak Wet Weather Flow Rate	**1.70**	**L/s**

Mattamy Homes
Wateridge Block 22
Wastewater Flow per MSS
Drainage to Michael Stoqua Only

Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2012

Site Area 0.230 **ha**

Extraneous Flow Allowances

Infiltration / Inflow **0.06 L/s**

Domestic Contributions

Unit Type	**Unit Rate**	**Units**	**Pop**
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.7	19	52
Stacked Townhouse	2.3		0
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8		0

Total Pop **52**

Average Domestic Flow **0.21 L/s**

Peaking Factor **4.00**

Peak Domestic Flow **0.84 L/s**

Total Estimated Average Dry Weather Flow Rate	**0.21 L/s**
Total Estimated Peak Dry Weather Flow Rate	**0.84 L/s**
Total Estimated Peak Wet Weather Flow Rate	**0.91 L/s**

Richcraft
146 Mountshannon Drive
Proposed Site Conditions

Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2012

Site Area 0.460 **ha**

Extraneous Flow Allowances

Infiltration / Inflow	**0.13**	**L/s**

Domestic Contributions

Unit Type	**Unit Rate**	**Units**	**Pop**
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.7	59	160
Stacked Townhouse	2.3		0
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8		0

Total Pop	**160**	
Average Domestic Flow	**0.65**	**L/s**
Peaking Factor	**4.00**	
Peak Domestic Flow	**2.59**	**L/s**

Total Estimated Average Dry Weather Flow Rate	**0.65**	**L/s**
Total Estimated Peak Dry Weather Flow Rate	**2.59**	**L/s**
Total Estimated Peak Wet Weather Flow Rate	**2.72**	**L/s**

SANITARY SEWER CALCULATION SHEET

PROJECT: **Mattamy - Wateridge**
LOCATION: **Block 22**
FILE REF: **17-948**
DATE: **8-Aug-17**

DESIGN PARAMETERS

Avg. Daily Flow Res.	350	L/p/d	Peak Fact Res. Per Harmons: Min = 2.0, Max =4.0		Infiltration / Inflow	0.28	L/s/ha
Avg. Daily Flow Comm.	50,000	L/ha/d	Peak Fact. Comm.	1.5	Min. Pipe Velocity	0.60	m/s full flowing
Avg. Daily Flow Instit.	50,000	L/ha/d	Peak Fact. Instit.	1.5	Max. Pipe Velocity	3.00	m/s full flowing
Avg. Daily Flow Indust.	35,000	L/ha/d	Peak Fact. Indust. per MOE graph		Mannings N	0.013	

Location			Residential Area and Population							Commercial		Institutional		Industrial			Infiltration				Pipe Data							
Area ID	Up	Down	Area	Proposed Units	Pop.	Cumulative Area	Cumulative Pop.	Peak. Fact.	Q_{res}	Area	Accu. Area	Area	Accu. Area	Area	Accu. Area	Q_{C+I+I}	Total Area	Accu. Area	Infiltration Flow	Total Flow	DIA	Slope	Length	$A_{hydraulic}$	R	Velocity	Q_{cap}	Q / Q full
			(ha)			(ha)		(-)	(L/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)	(mm)	(%)	(m)	(m^2)	(m)	(m/s)	(L/s)	(-)
On site																											
SAN-5	5	3	0.276	48	130.0	0.276	130.0	4.00	2.11		0.00		0.00		0.00	0.0	0.276	0.276	0.077	2.18	250	1.00	37.6	0.049	0.063	1.21	59.5	0.04
SAN-4	4	3	0.089	6	17.0	0.089	17.0	4.00	0.28		0.00		0.00		0.00	0.0	0.089	0.089	0.025	0.30	250	1.20	28.7	0.049	0.063	1.33	65.1	0.00
SAN-3	3	2	0.095	5	14.0	0.460	161.0	4.00	2.61		0.00		0.00		0.00	0.0	0.460	0.460	0.129	2.74	250	1.20	36.2	0.049	0.063	1.33	65.1	0.04
	2	1				0.46	161	4.00	2.61		0.00		0.00		0.00	0.0	0.000	0.460	0.129	2.74	250	1.00	10.8	0.049	0.063	1.21	59.5	0.05
Off site - per IBI sanitary sewer design for Former CFB Rockcliffe (January 25, 2017)																											
	SAN210A	*SAN211A*	0.17			0.63	161	4.00	2.61		0.00		0.00		0.00	0.0	0.630	0.630	0.176	2.79	250	0.65	48.7	0.049	0.063	0.98	47.9	0.06
	Ex. 211A	*Ex. 166B*	*0.35*		*52.5*	*0.98*	*214*	*4.00*	*3.46*		*0.00*		*0.00*		*0.00*	*0.0*	*0.350*	*0.980*	*0.274*	*3.73*	*250*	*0.65*	*52.2*	*0.049*	*0.063*	*0.98*	*47.9*	*0.08*

APPENDIX D

Stormwater Management

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Ottawa, Ontario K1S 5N4 Canada
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STORM SEWER DESIGN SHEET

Former CFB Rockcliffe
City of Ottawa
Name of Client/Developer

LOCATION				AREA (Ha)										RATIONAL DESIGN FLOW												SEWER DATA								
STREET	AREA ID	FROM	TO	C= 0.20	C= 0.30	C= 0.45	C= 0.50	C= 0.56	C= 0.60	C= 0.65	C= 0.70	C= 0.73	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)	(%)
Phase 1B																																		
Hemlock Road	S201A-B, EX201	MH201	MH202								0.31		0.56	1.85	1.85	10.00	1.17	11.17	104.19	122.14	178.56	192.62				192.62	210.32	90.18	450			0.50	1.281	17.70	8.41%
Future Street No. 6	EX202A	BULK202N	MH202										0.90	2.00	2.00	12.23	0.27	12.50	93.72	109.82	160.45	187.60				187.60	286.47	16.00	600			0.20	0.982	98.87	34.51%
Hemlock Road	S202A, EX202B-C	MH202	MH203								0.10		0.55	1.42	5.27	12.50	0.53	13.03	92.61	108.50	158.52	487.86				487.86	784.52	86.00	600			1.50	2.688	296.66	37.81%
Future Street No. 5	S203B, EX203	BULK203N	203								0.09		0.73	1.80	1.80	10.88	0.12	11.00	99.76	116.92	170.90	179.44				179.44	351.93	16.00	450			1.40	2.144	172.49	49.01%
Hemlock Road	S203A, EXP203	MH203	MH204		0.44						0.16			0.68	7.75	13.03	0.49	13.53	90.49	106.01	154.87	700.89				700.89	847.38	86.00	600			1.75	2.903	146.49	17.29%
rue Moses Tennisco Street	S204B, EX204A	BULK204N	MH204								0.08		0.72	1.76	1.76	10.89	0.11	11.00	99.72	116.87	170.81	175.20				175.20	399.05	16.00	450			1.80	2.431	223.85	56.10%
Hemlock Road	S204A, EX204B	MH204	MH205								0.14		0.47	1.32	10.82	13.53	0.54	14.07	88.63	103.82	151.66	958.99				958.99	1,272.26	90.00	750			1.20	2.790	313.27	24.62%
rue Michael Stoqua Street	S205A, EX205A	BULK205N	MH205								0.08		0.81	1.96	1.96	11.15	0.15	11.30	98.49	115.42	168.69	192.75				192.75	297.43	16.01	450			1.00	1.812	104.68	35.20%
Hemlock Road	S205B-C, EX205B	MH205	MH206								0.17		0.63	1.73	14.51	14.07	1.20	15.26	86.70	101.55	148.32	1,257.92				1,257.92	1,818.95	112.01	1200			0.20	1.558	561.03	30.84%
Temp Ditch	FUTURE PHASE	DI 10	BULK206N		7.68									6.41	6.41	59.66	0.16	59.82	33.08	38.61	56.13	211.89				211.89	297.43	17.03	450			1.00	1.812	85.54	28.76%
rue Bareille-Snow Street	S206A, EX206A	BULK206N	MH206								0.06		1.02	2.39	2.39	10.85	0.15	11.00	99.91	117.09	171.14	238.30				238.30	448.66	17.50	525			1.00	2.008	210.35	46.89%
Hemlock Road	S206B, EX206B	MH206	MH207								0.03		0.46	1.08	17.98	15.26	0.78	16.04	82.71	96.86	141.44	1,486.80				1,486.80	2,227.75	89.33	1200			0.30	1.908	740.96	33.26%
Block 20	P207	CBMH207N	MH207		0.32									0.27	0.27	10.00	0.27	10.27	104.19	122.14	178.56	27.81				27.81	63.80	14.00	300			0.40	0.874	36.00	56.42%
Hemlock Road	S207	MH207	*BULK176E*								0.22			0.43	18.67	16.04	0.37	16.42	80.33	94.05	137.32	1,499.75				1,499.75	2,156.55	32.62	1350			0.15	1.460	656.80	30.46%
Phase 1A																																		
Ex. Hemlock Road	S176C	*BULK176E*	*MH176*								0.02			0.04	18.71	16.42	0.27	16.69	79.24	92.78	135.45	1,482.57				1,482.57	2,156.55	*24.06*	*1350*			*0.15*	1.460	673.98	31.25%
Phase 1B																																		
Codd's Road	S230, LOT230A-B	230	231								0.16		0.70	1.87	1.87	10.00	0.63	10.63	104.19	122.14	178.56	194.65				194.65	364.28	84.30	450			1.50	2.219	169.63	46.57%
Codd's Road	S231, LOT231	231	*BULK176N*								0.12		0.30	0.90	2.77	10.63	0.36	11.00	100.96	118.34	172.97	279.55				279.55	549.49	53.76	525			1.50	2.459	269.94	49.12%
Phase 1A																																		
Ex. Codd's Road	---	*BULK176N*	*MH176*											0.00	2.95	11.77	0.29	12.06	95.69	112.12	163.84	281.96				281.96	339.63	*18.21*	*525*			*1.50*	0.919	57.67	16.98%
Phase 1B																																		
chemin Wanaki Road	S200, LOT200	MH200	MH214								0.20		0.91	2.41	2.41	10.00	0.78	10.78	104.19	122.14	178.56	251.42				251.42	351.93	99.75	450			1.40	2.144	100.51	28.56%
chemin Wanaki Road	S214, LOT214	MH214	*BULK152N*								0.19		0.84	2.24	4.65	10.78	0.42	11.20	100.27	117.52	171.77	466.34				466.34	535.93	46.51	600			0.70	1.836	69.59	12.99%
Phase 1B																																		
chemin Wanaki Road	EX143	BULK143E	MH143										0.33	0.73	0.73	10.00	0.29	10.29	104.19	122.14	178.56	76.47				76.47	129.34	20.00	375			0.50	1.134	52.87	40.88%
chemin Wanaki Road		MH143	MH144											0.00	0.73	10.29	0.37	10.66	102.67	120.34	175.92	75.35				75.35	258.68	50.50	375			2.00	2.269	183.33	70.87%
chemin Wanaki Road	S144, EX144	MH144	MH145		0.55						0.18			0.81	1.54	10.66	0.30	10.97	100.81	118.15	172.70	155.54				155.54	258.68	41.15	375			2.00	2.269	103.14	39.87%
chemin Wanaki Road	S145, EX145	MH145	MH146								0.15		2.74	6.39	7.93	10.97	0.28	11.24	99.35	116.44	170.18	787.69				787.69	1,324.21	48.01	750			1.30	2.904	536.53	40.52%
chemin Wanaki Road		MH146	MH147											0.00	7.93	11.24	0.25	11.49	98.06	114.92	167.95	777.46				777.46	2,296.77	38.53	1050			0.65	2.570	1519.32	66.15%
chemin Wanaki Road	S147C	BULK147E	MH147		0.40									0.33	0.33	10.00	0.28	10.28	104.19	122.14	178.56	34.76				34.76	71.33	16.51	300			0.50	0.978	36.58	51.27%
chemin Wanaki Road	EX147	BULK 147W	MH147	0.16										0.09	0.09	12.00	0.32	12.32	94.70	110.96	162.13	8.42				8.42	71.33	18.72	300			0.50	0.978	62.91	88.19%
chemin Wanaki Road		MH147	MH170											0.00	8.35	12.32	0.09	12.41	93.35	109.38	159.81	779.62				779.62	2,296.77	13.96	1050			0.65	2.570	1517.16	66.06%
chemin Wanaki Road	S147A	MH170	BOX CULVERT								0.14			0.27	8.62	12.41	0.10	12.51	92.98	108.94	159.17	801.83				801.83	2,296.77	15.00	1050			0.65	2.570	1494.94	65.09%
Phase 1B																																		
rue Moses Tennisco Street	S212, LOT212A-B	MH212	MH213								0.15		1.03	2.58	2.58	10.00	0.66	10.66	104.19	122.14	178.56	269.09				269.09	361.72	63.80	525			0.65	1.619	92.63	25.61%
rue Moses Tennisco Street	S213, LOT213	MH213	*BULK165N*								0.21		0.23	0.92	3.50	10.66	0.82	11.47	100.85	118.20	172.77	353.25				353.25	519.40	55.71	750			0.20	1.139	166.15	31.99%
Temp Ditch	BLOCK 24	DI 1	MH165N		1.60									1.33	1.33	26.41	0.25	26.66	58.73	68.69	100.13	78.37				78.37	129.34	17.03	375			0.50	1.134	50.96	39.40%
Phase 1A																																		
Ex. Street No. 3	---	*BULK165N*	*MH165*											0.00	3.50	11.47	0.24	11.71	97.01	113.68	166.14	339.81				339.81	519.40	*16.10*	*750*			*0.20*	1.139	179.59	34.58%

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: WY
Checked: JIM
Dwg. Reference: 38298-500

No.	Revision	Date
1.	City submission No. 1	7/8/2016
2.	City submission No. 2	11/4/2016
3.	City submission No. 3	1/25/2017

File Reference: 38298.5.7.1
Date: 7/8/2016
Sheet No: 1 of 2

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

Former CFB Rockcliffe
City of Ottawa
Name of Client/Developer

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= 0.56	C= 0.60	C= 0.65	C= 0.70	C= 0.73	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)	(%)
Phase 1B																																		
Block 9	---	*MH157*	MH217											0.00	12.28	13.26	0.93	14.19	89.63	105.00	153.38	1,100.86				1,100.86	2,337.95	168.50	975			1.00	3.034	1237.09	52.91%
croissant Squadron Crescent	S215, R215	MH215	MH216					0.14				0.38		0.99	0.99	10.00	0.94	10.94	104.19	122.14	178.56	103.06				103.06	317.25	79.94	525			0.50	1.420	214.19	67.51%
croissant Squadron Crescent	S216, R216A-B	MH216	MH217					0.20				0.28		0.88	1.87	10.94	0.86	11.80	99.48	116.60	170.41	185.91				185.91	429.70	75.99	600			0.45	1.472	243.79	56.74%
croissant Squadron Crescent	---	MH217	MH218											0.00	14.15	14.19	0.10	14.29	86.28	101.05	147.59	1,220.93				1,220.93	1,911.03	12.94	1050			0.45	2.138	690.10	36.11%
croissant Squadron Crescent	S218	MH218	MH219								0.17			0.33	14.48	14.29	0.51	14.80	85.93	100.64	146.99	1,244.42				1,244.42	1,424.40	49.00	1050			0.25	1.594	179.98	12.64%
croissant Squadron Crescent	---	MH219	MH220											0.00	14.48	14.80	0.90	15.70	84.21	98.62	144.02	1,219.47				1,219.47	1,575.26	73.09	1200			0.15	1.349	355.79	22.59%
croissant Squadron Crescent	S220, LOT220	MH220	MH221								0.18		1.96	4.71	19.19	15.70	0.54	16.24	81.35	95.26	139.09	1,561.24				1,561.24	1,575.26	43.47	1200			0.15	1.349	14.02	0.89%
														FIXED OUTLET FLOW FROM SWM FACILITY = 6660 L/s																				
croissant Squadron Crescent	---	MH221	MH222											0.00	19.19	16.24	0.11	16.35	79.75	93.38	136.33	1,530.55			6,660.00	8,190.55	8,565.43	11.97	2400			0.11	1.834	374.88	4.38%
croissant Squadron Crescent	S222A-B	MH222	*BULK165S*								0.26			0.51	19.70	16.35	0.86	17.21	79.44	93.01	135.79	1,564.69			6,660.00	8,224.69	8,565.43	94.49	2400			0.11	1.834	340.74	3.98%
Phase 1A																																		
croissant Squadron Crescent	---	*BULK165S*	*MH165*											0.00	19.70	17.21	0.23	17.43	77.04	90.19	131.66	1,517.52			6,660.00	8,177.52	8,565.43	*24.90*	*2400*			*0.11*	1.834	387.92	4.53%
Temp Ditch	BLOCK 15	DI 4	MH165S		1.96									1.63	1.63	50.88	0.17	51.05	37.18	43.41	63.14	60.73				60.73	182.91	16.50	375			1.00	1.604	122.18	66.80%
Phase 1B																																		
rue Michael Stoqua Street	S210, LOT210	MH210	MH211								0.20		0.23	0.90	0.90	10.00	0.83	10.83	104.19	122.14	178.56	93.85				93.85	147.47	64.80	375			0.65	1.293	53.62	36.36%
Temp Ditch	BLOCK 22	DI 12	MH211N		0.46									0.38	0.38	19.39	0.33	19.72	71.62	83.82	122.31	27.44				27.44	43.87	17.38	250			0.50	0.866	16.43	37.45%
Temp Ditch	BLOCK 23	DI 13	MH166N		0.46									0.38	0.38	22.34	0.34	22.68	65.50	76.63	111.77	25.06				25.06	43.87	17.50	250			0.50	0.866	18.81	42.88%
rue Michael Stoqua Street	S211, LOT211	MH211	*BULK166N*								0.17		0.23	0.84	1.74	10.83	1.09	11.93	99.98	117.18	171.27	174.27				174.27	248.09	55.70	600			0.15	0.850	73.82	29.75%
Phase 1A																																		
rue Michael Stoqua Street	---	*BULK166N*	*MH166*											0.00	1.74	11.93	0.32	12.24	95.01	111.33	162.67	165.61				165.61	248.09	*16.10*	*600*			*0.15*	0.850	82.48	33.25%
Phase 1B																																		
rue Bareille-Snow Street	S208, LOT208A-B	MH208	MH209								0.19		0.81	2.17	2.17	10.00	0.76	10.76	104.19	122.14	178.56	226.22				226.22	317.25	64.85	525			0.50	1.420	91.03	28.69%
rue Bareille-Snow Street	S209, LOT209	MH209	*BULK167N*								0.20		0.20	0.83	3.01	10.76	1.01	11.77	100.34	117.60	171.89	301.53				301.53	339.63	55.70	675			0.15	0.919	38.10	11.22%
Temp Ditch	BLOCK 21	DI 11	MH167N		1.22									1.02	1.02	35.74	0.21	35.95	47.82	55.88	81.38	48.58				48.58	100.88	17.52	300			1.00	1.383	52.30	51.84%
Phase 1A																																		
rue Bareille-Snow Street	---	*BULK167N*	*MH167*											0.00	3.01	11.77	0.29	12.06	95.69	112.12	163.84	287.55				287.55	339.63	*16.10*	*675*			*0.15*	0.919	52.08	15.34%

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Date: 7/8/2016
Sheet No: 1 of 2

REVIEWED BY
DEVELOPMENT REVIEW SERVICES BRANCH

Signed ____________________

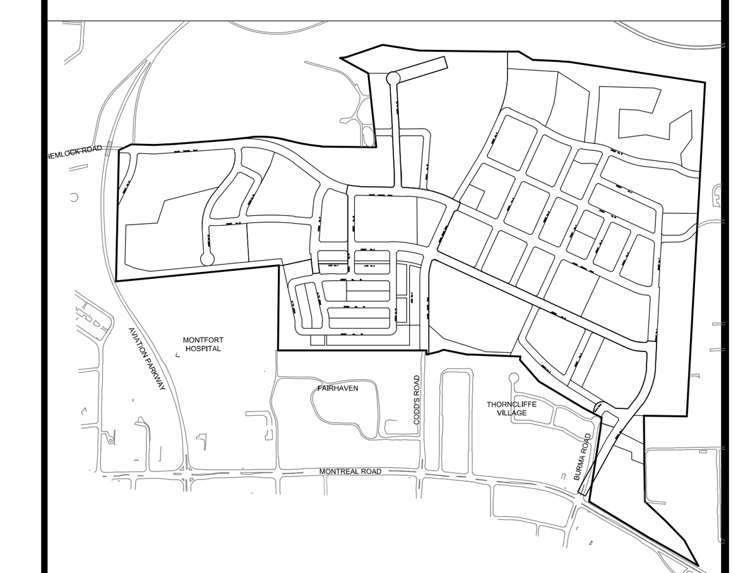
Date ____________________ 2017

Plan Number ____________________

LEGEND :

S168 2.01 0.80 — AREA NUMBER, RUNOFF COEFFICIENT, AREA IN HECTARES

POTENTIAL DRAINAGE DIRECTION



No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7	REVISED PER CITY COMMENTS	J.I.M.	2017:06:16
6	REVISED PER MOECC COMMENTS	J.I.M.	2017:06:07
5	ISSUED FOR TENDER	J.I.M.	2017:03:23
4	SUBMISSION FOR MOECC APPROVAL	J.I.M.	2017:02:16
3	SUBMISSION No.3 FOR CITY REVIEW	J.I.M.	2017:01:25
2	SUBMISSION No.2 FOR CITY REVIEW	J.I.M.	2016:11:04
1	SUBMISSION No.1 FOR CITY REVIEW	J.I.M.	2016:07:08

CANADA LANDS COMPANY
SOCIÉTÉ IMMOBILIÈRE DU CANADA
30 Metcalfe Street Suite 601
Ottawa, On K1P 5L4
613 998 7777

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

Project Title

WATERIDGE VILLAGE AT ROCKCLIFFE
PHASE 1B

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
17/06/16
PROVINCE OF ONTARIO

N

Drawing Title

STORM DRAINAGE AREA PLAN

Scale 1 : 2000

Design	Date
J.I.M.	MAY 2016
Drawn	Checked
M.M.	J.I.M.
Project No.	Drawing No.
38298	500A

D07-16-15-0003

#17063

									Sewer Data								
Up	Down	Area	C	2.78 Indiv AxC	2.78 Acc AxC	T_C	I	Q	DIA	Slope	Length	$A_{hydraulic}$	R	Velocity	Qcap	Time Flow	Q / Q full
		(ha)	(-)			(min)	(mm/hr)	(L/s)	(mm)	(%)	(m)	(m^2)	(m)	(m/s)	(L/s)	(min)	(-)
On site																	
104	103	0.053	0.80	0.12	0.12	10.0	104.2	12.3	250	1.20	28.2	0.049	0.063	1.33	65.1	0.4	0.19
105	103	0.223	0.80	0.50	0.50	10.0	104.2	51.7	250	1.00	34.1	0.049	0.063	1.21	59.5	0.5	0.87
103	102	0.116	0.80	0.26	0.87	10.5	101.8	88.7	300	1.20	36.2	0.071	0.075	1.50	105.9	0.4	0.84
102	101	0.000	0.00	0.00	0.87	10.9	99.8	87.0	300	4.00	11.1	0.071	0.075	2.74	193.4	0.1	0.45
					0.87	10.9											
Off Site - Per IBI storm sewer design sheet for Former CFB Rockcliffe (January 25, 2017)																	
Block 22 Portion of U1		0.026	0.80	0.06	0.06												
MH 210	MH 211	0.200	0.70	0.39	1.32	10.9	99.5	131.2	375	0.65	64.8	0.110	0.094	1.28	141.4	0.8	0.93
		0.230	0.80	0.51	1.83												
MH 211	BULK166N	0.170	0.70	0.33	2.16	11.8	95.6	206.7	600	0.15	55.7	0.283	0.150	0.84	237.8	1.1	0.87

ADVANCED DRAINAGE SYSTEMS, INC.

Wateridge - Block 22

Rockcliffe Village

STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-740, SC-310, OR APPROVED EQUAL.
2. CHAMBERS SHALL BE MANUFACTURED FROM VIRGIN POLYPROPYLENE OR POLYETHYLENE RESINS.
3. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORT PANELS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
4. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
5. CHAMBERS SHALL MEET ASTM F2922 (POLYETHYLENE) OR ASTM F2418 (POLYPROPYLENE), "STANDARD SPECIFICATION FOR THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
6. CHAMBERS SHALL BE DESIGNED AND ALLOWABLE LOADS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
7. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. THE CHAMBER MANUFACTURER SHALL SUBMIT THE FOLLOWING UPON REQUEST TO THE SITE DESIGN ENGINEER FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE:
   a. A STRUCTURAL EVALUATION SEALED BY A REGISTERED PROFESSIONAL ENGINEER THAT DEMONSTRATES THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY AASHTO FOR THERMOPLASTIC PIPE.
   b. A STRUCTURAL EVALUATION SEALED BY A REGISTERED PROFESSIONAL ENGINEER THAT DEMONSTRATES THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET. THE 50 YEAR CREEP MODULUS DATA SPECIFIED IN ASTM F2418 OR ASTM F2922 MUST BE USED AS PART OF THE AASHTO STRUCTURAL EVALUATION TO VERIFY LONG-TERM PERFORMANCE.
   c. STRUCTURAL CROSS SECTION DETAIL ON WHICH THE STRUCTURAL EVALUATION IS BASED.
8. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-310/SC-740 SYSTEM

1. STORMTECH SC-310 & SC-740 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH SC-310 & SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/SC-780 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS.

   STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 6" (150 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 3/4-2" (20-50 mm).
8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
9. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH SC-310 & SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER SC-310 & SC-740 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

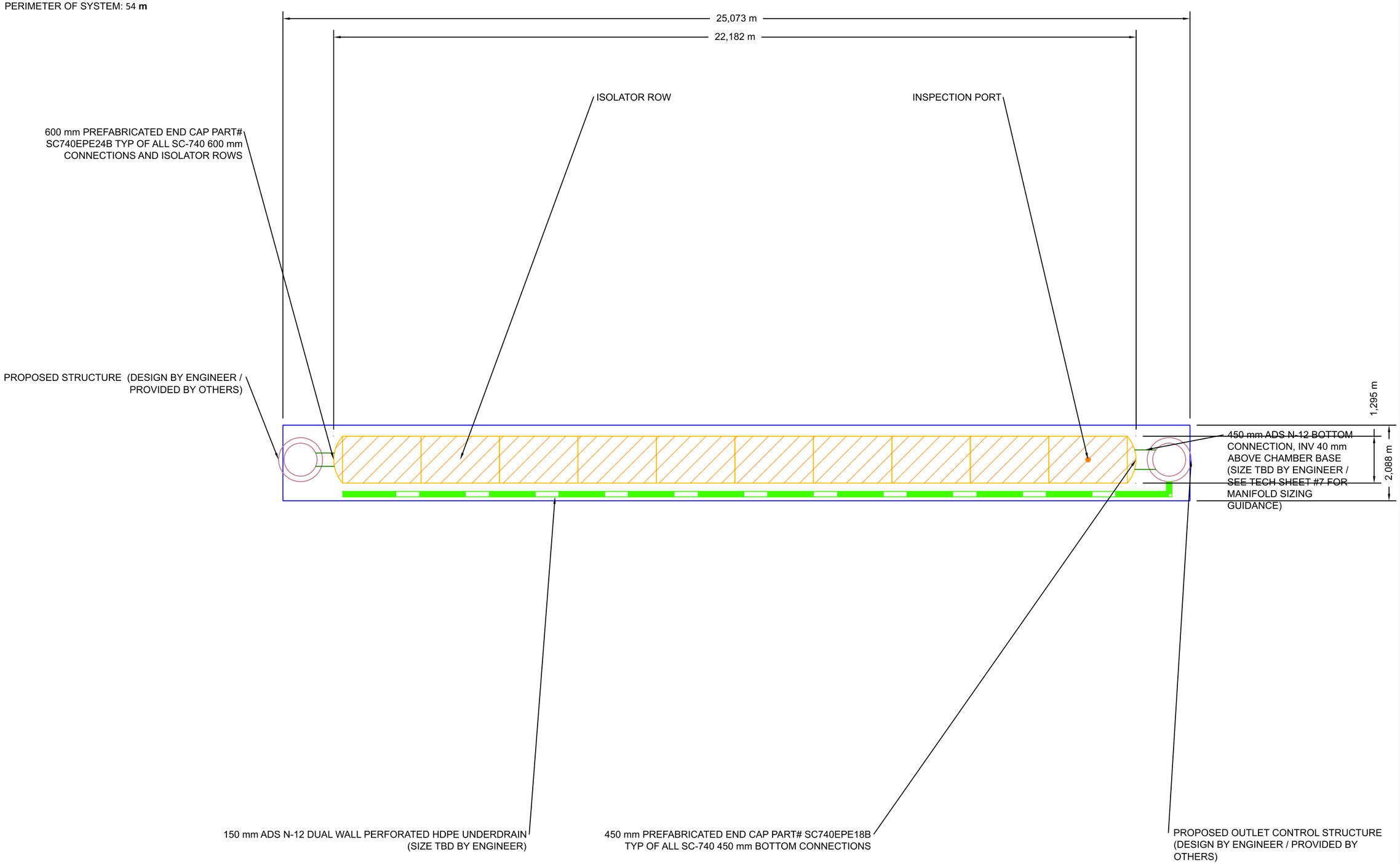
USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

CONCEPTUAL LAYOUT

(10) STORMTECH SC-740 CHAMBERS
(2) STORMTECH SC-740 END CAPS
INSTALLED WITH 152 mm COVER STONE, 152 mm BASE STONE, 40% STONE VOID
INSTALLED SYSTEM VOLUME: 30 m³
AREA OF SYSTEM: 52 **m²**
PERIMETER OF SYSTEM: 54 **m**

COMPUTER GENERATED CONCEPTUAL LAYOUT - NOT FOR CONSTRUCTION



Wateridge - Block 22
Rockcliffe Village

DATE: 08/02/2017 | DRAWN: SM | CHECKED: ---
PROJECT #: Tool

REV	DRW	CHK	DESCRIPTION

StormTech®
Detention- Retention- Water Quality
70 INWOOD ROAD, SUITE 3 | ROCKY HILL | CT | 06067
860-529-8188 |888-892-2694 | WWW.STORMTECH.COM

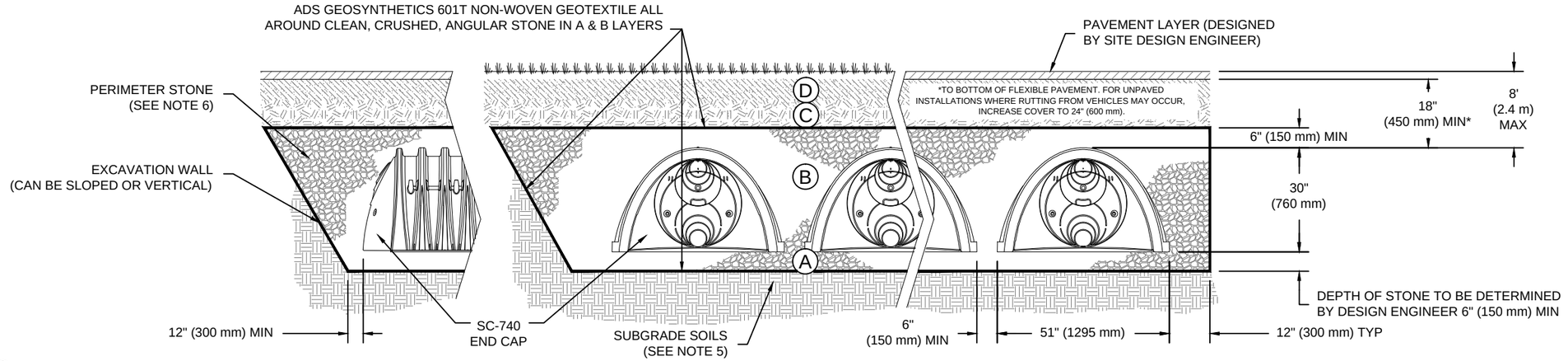
ADS®
ADVANCED DRAINAGE SYSTEMS, INC.
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

NOT TO SCALE

ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4-2 INCH (20-50 mm)	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4-2 INCH (20-50 mm)	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. [2] [3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.



NOTES:

1. SC-740 CHAMBERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F2418 "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS", OR ASTM F2922 "STANDARD SPECIFICATION FOR POLYETHYLENE (PE) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-740 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. "ACCEPTABLE FILL MATERIALS" TABLE ABOVE PROVIDES MATERIAL LOCATIONS, DESCRIPTIONS, GRADATIONS, AND COMPACTION REQUIREMENTS FOR FOUNDATION, EMBEDMENT, AND FILL MATERIALS.
4. THE "SITE DESIGN ENGINEER" REFERS TO THE ENGINEER RESPONSIBLE FOR THE DESIGN AND LAYOUT OF THE STORMTECH CHAMBERS FOR THIS PROJECT.
5. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
6. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
7. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.

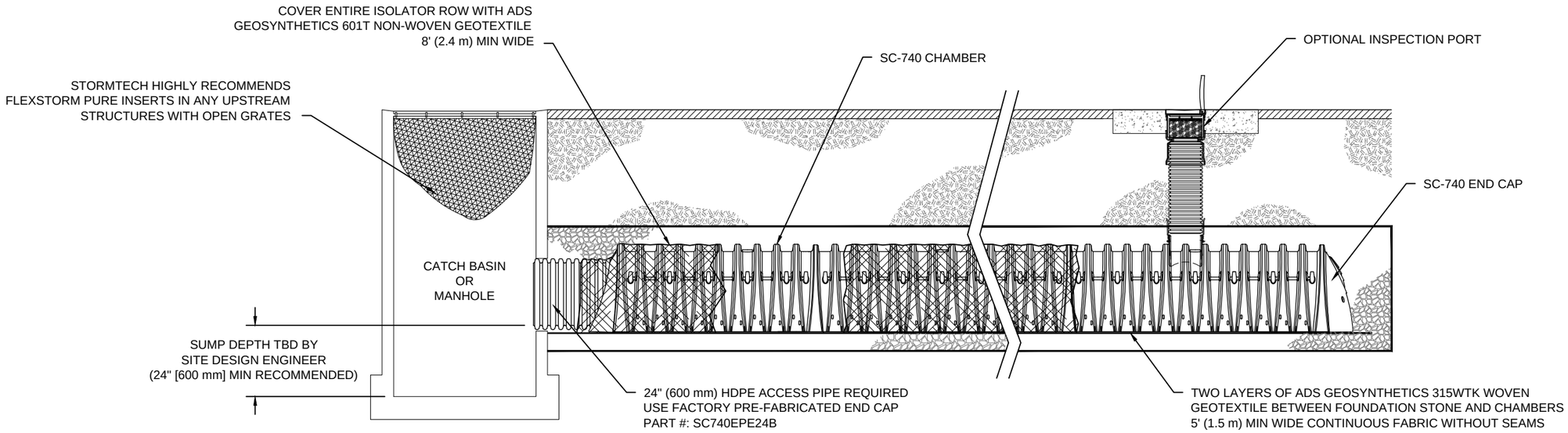
Wateridge - Block 22
Rockcliffe Village

DATE: 08/02/2017
DRAWN: SM
PROJECT #: Tool
CHECKED: ---

REV	DRW	CHK	DESCRIPTION

StormTech
Detention+Retention+Water Quality
70 INWOOD ROAD, SUITE 3 | ROCKY HILL | CT | 06067
860-529-8188 | 888-892-2694 | WWW.STORMTECH.COM

ADS
ADVANCED DRAINAGE SYSTEMS, INC.
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473



SC-740 ISOLATOR ROW DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

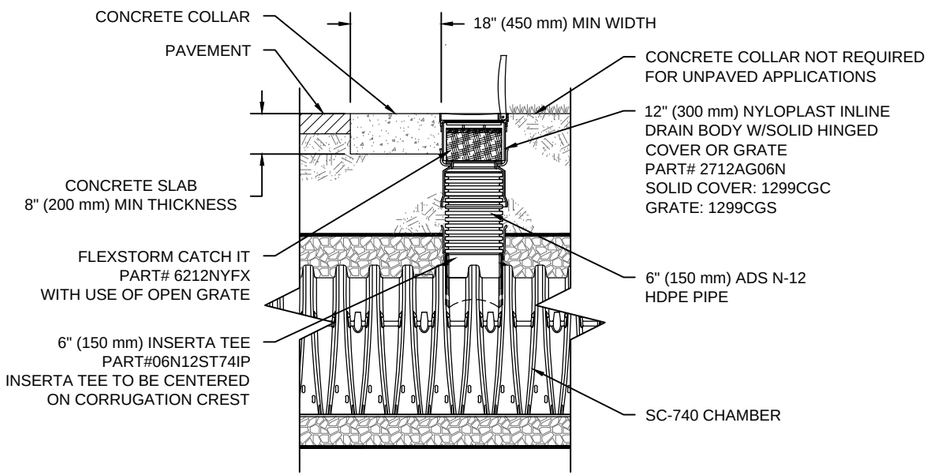
STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.

2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



SC-740 6" INSPECTION PORT DETAIL
NTS

Wateridge - Block 22
Rockcliffe Village

DATE: 08/02/2017 | DRAWN: SM
PROJECT #: Tool | CHECKED: ---

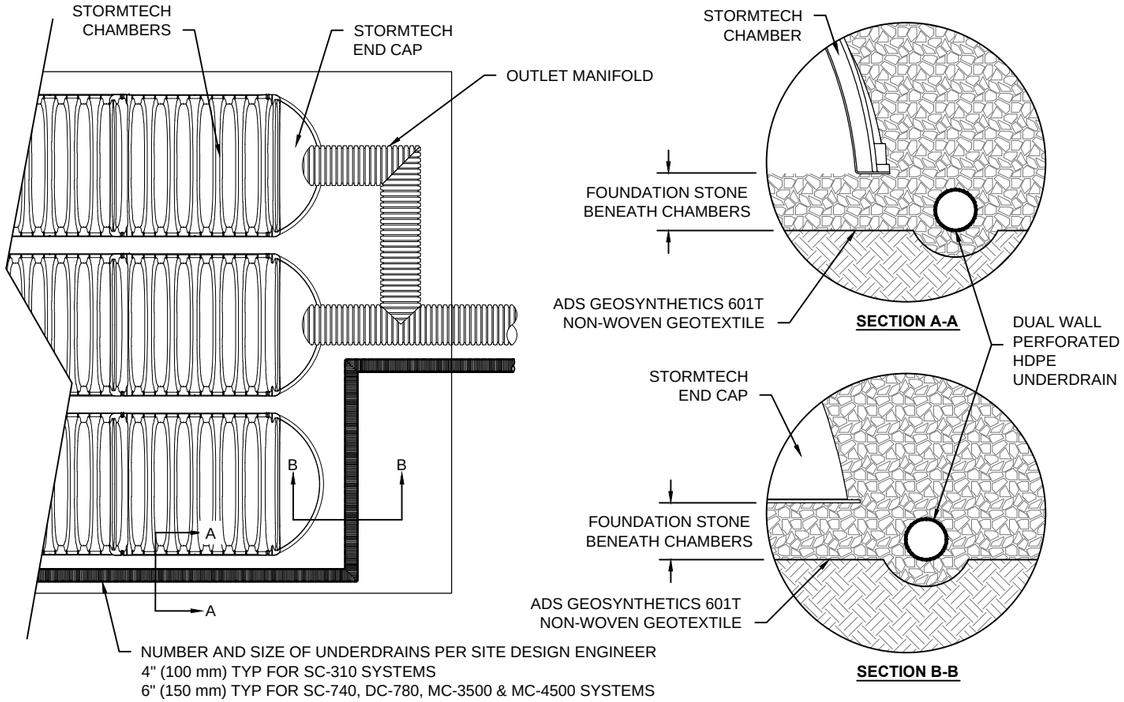
REV	DRW	CHK	DESCRIPTION

StormTech
Detention+Retention+Water Quality
70 INWOOD ROAD, SUITE 3 | ROCKY HILL | CT | 06067
860-529-8188 | 888-892-2694 | WWW.STORMTECH.COM

ADS
ADVANCED DRAINAGE SYSTEMS, INC.
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

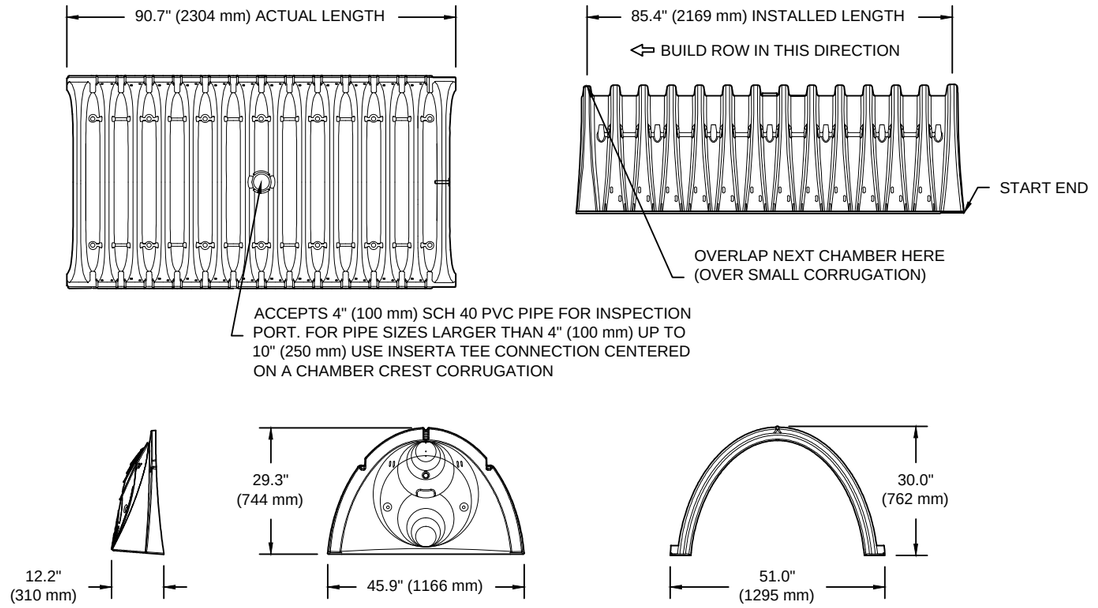
UNDERDRAIN DETAIL

NTS



SC-740 TECHNICAL SPECIFICATION

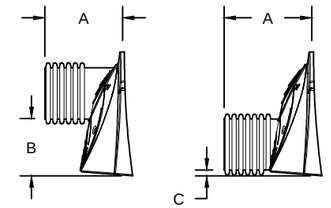
NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	51.0" X 30.0" X 85.4"	(1295 mm X 762 mm X 2169 mm)
CHAMBER STORAGE	45.9 CUBIC FEET	(1.30 m³)
MINIMUM INSTALLED STORAGE*	74.9 CUBIC FEET	(2.12 m³)
WEIGHT	75.0 lbs.	(33.6 kg)

*ASSUMES 6" (152 mm) STONE ABOVE, BELOW, AND BETWEEN CHAMBERS



STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"

PART #	STUB	A	B	C
SC740EPE06T / SC740EPE06TPC	6" (150 mm)	10.9" (277 mm)	18.5" (470 mm)	---
SC740EPE06B / SC740EPE06BPC			---	0.5" (13 mm)
SC740EPE08T /SC740EPE08TPC	8" (200 mm)	12.2" (310 mm)	16.5" (419 mm)	---
SC740EPE08B / SC740EPE08BPC			---	0.6" (15 mm)
SC740EPE10T / SC740EPE10TPC	10" (250 mm)	13.4" (340 mm)	14.5" (368 mm)	---
SC740EPE10B / SC740EPE10BPC			---	0.7" (18 mm)
SC740EPE12T / SC740EPE12TPC	12" (300 mm)	14.7" (373 mm)	12.5" (318 mm)	---
SC740EPE12B / SC740EPE12BPC			---	1.2" (30 mm)
SC740EPE15T / SC740EPE15TPC	15" (375 mm)	18.4" (467 mm)	9.0" (229 mm)	---
SC740EPE15B / SC740EPE15BPC			---	1.3" (33 mm)
SC740EPE18T / SC740EPE18TPC	18" (450 mm)	19.7" (500 mm)	5.0" (127 mm)	---
SC740EPE18B / SC740EPE18BPC			---	1.6" (41 mm)
SC740EPE24B*	24" (600 mm)	18.5" (470 mm)	---	0.1" (3 mm)

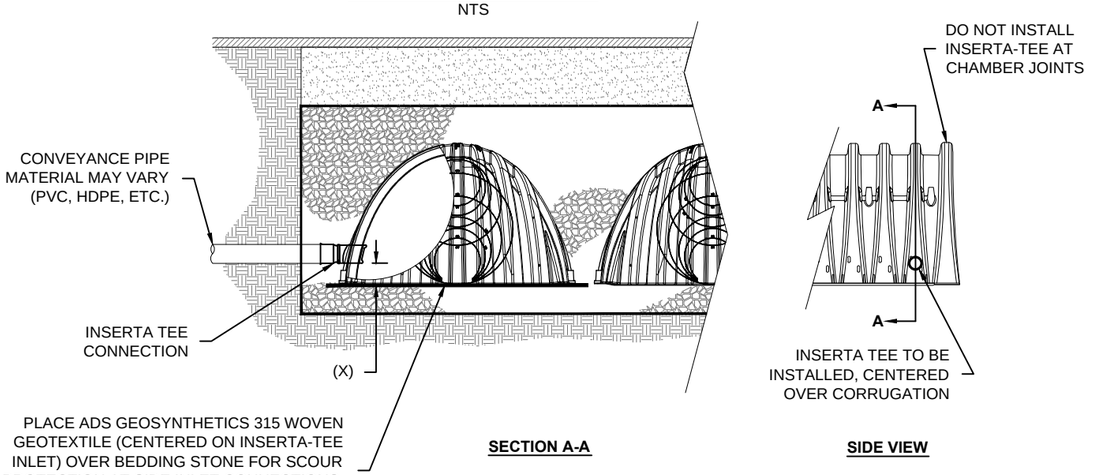
ALL STUBS, EXCEPT FOR THE SC740EPE24B ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

* FOR THE SC740EPE24B THE 24" (600 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 1.75" (44 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL

INSERTA TEE DETAIL

NTS



CHAMBER	MAX DIAMETER OF INSERTA TEE	HEIGHT FROM BASE OF CHAMBER (X)
SC-310	6" (150 mm)	4" (100 mm)
SC-740	10" (250 mm)	4" (100 mm)
DC-780	10" (250 mm)	4" (100 mm)
MC-3500	12" (300 mm)	6" (150 mm)
MC-4500	12" (300 mm)	8" (200 mm)
INSERTA TEE FITTINGS AVAILABLE FOR SDR 26, SDR 35, SCH 40 IPS GASKETED & SOLVENT WELD, N-12, HP STORM, C-900 OR DUCTILE IRON		

NOTE:
PART NUMBERS WILL VARY BASED ON INLET PIPE MATERIALS. CONTACT STORMTECH FOR MORE INFORMATION.

Wateridge - Block 22
Rockcliffe Village

DATE: 08/02/2017 | DRAWN: SM | PROJECT #: Tool | CHECKED: ---

REV	DRW	CHK	DESCRIPTION

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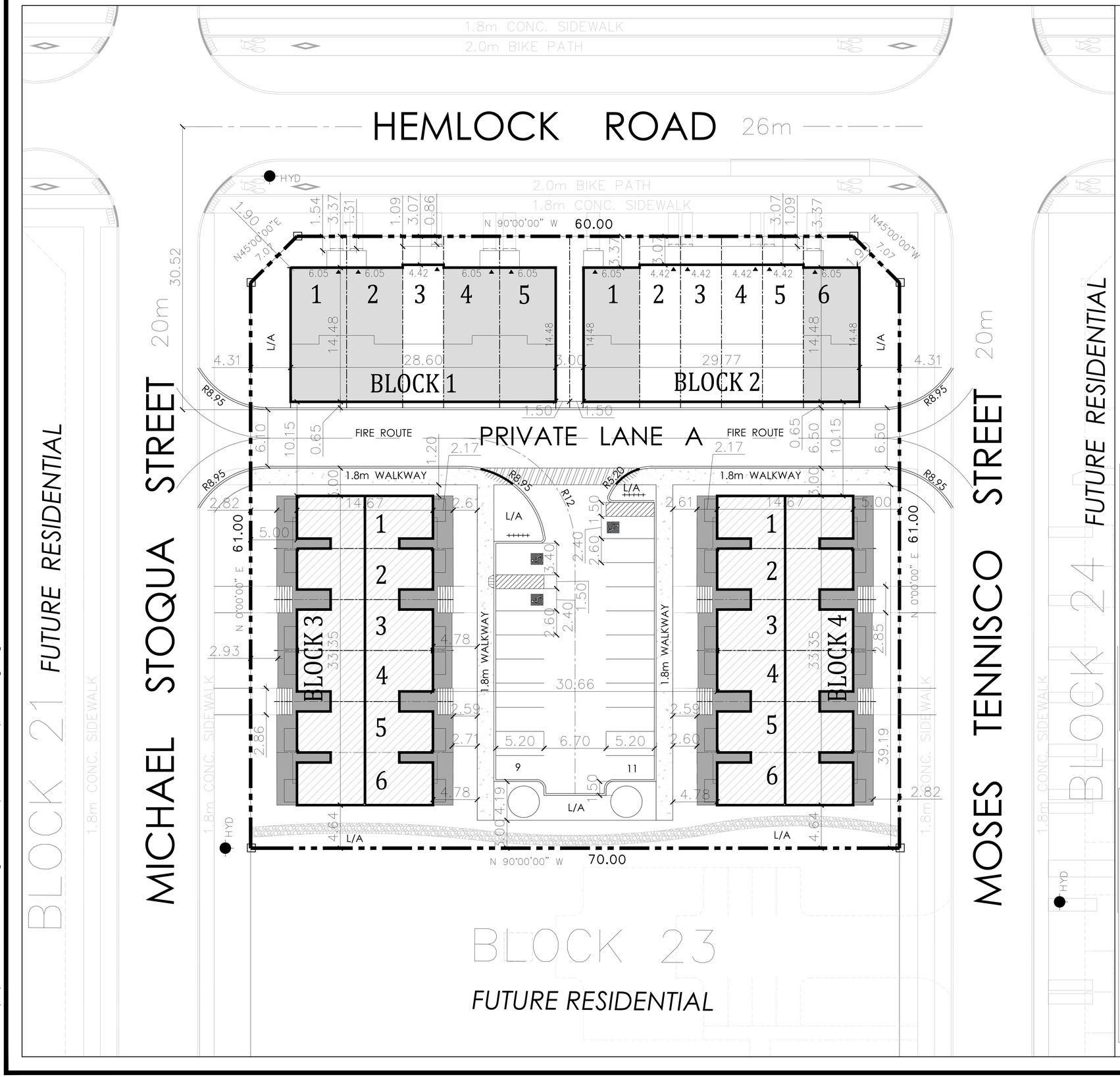
DRAWINGS / FIGURES



SITE STATISTIC AND DEVELOPMENT DATA

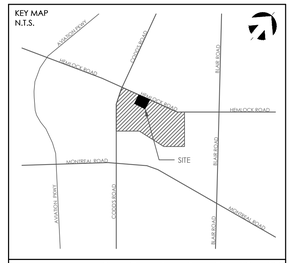
SITE AREA	4,594.19 m^2
PAVED AREA	1,185.74 m^2
LANDSCAPED AREA	1,562.36 m^2
TOTAL GROSS FLOOR AREA	5,841.3 m^2
TYPE A TOWNHOUSE (6 @ 241.8 m^2)	1,450.8 m^2
TYPE B TOWNHOUSE (5 @ 191.7 m^2)	958.5 m^2
STACKED TOWNS (24 @ 69 m^2; 24 @ 74 m^2)	3,432 m^2
DENSITY (UPH)	128.3
ZONE CATEGORY	R5Y[2312]

DWELLING BLOCK	DWELLING TYPE	GROUND FLOOR AREA (m2)	UNITS
BLOCK 1	REAR LANE TOWNS	415.42	5
BLOCK 2	REAR LANE TOWNS	436.41	6
BLOCK 3	STACKED TOWNS	465.64	24
BLOCK 4	STACKED TOWNS	465.64	24
		TOTAL	59

SECTION	ZONE PROVISION - TOWNHOUSE	REQUIRED	PROPOSED
164(1)	MIN. LOT WIDTH (m)	6 m	4.42 m
164(1)	MIN. LOT AREA (m2)	150 m2	81.76 m2
164(1)	MAX. BUILDING HEIGHT (m)	11 m	?
164(1)	MIN. FRONT YARD SETBACK (m)	3 m	3.07 m
164(1)	MIN. CORNER SIDE YARD SETBACK (m)	3 m	4.3 m
164(1)	MIN. REAR YARD SETBACK (m)	6 m	0.65 m
164(1)	MIN. INTERIOR YARD SETBACK (m)	1.2 m	1.5 m
101 (Table)	RESIDENT PARKING - TYPE A TOWNHOUSE	# @ 0.75/unit = #	# @ 2/unit = #
102 (Table)	TYPE B TOWNHOUSE	# @ 0.75/unit = #	# @ 1/unit = #
	REQUIRED VISITOR PARKING		
SECTION	ZONE PROVISION - STACKED TOWNS	REQUIRED	PROPOSED
163(9)	MIN. LANDSCAPING (% of lot)	30%	29%
164(1)	MIN. LOT WIDTH (m)	18 m	39.19 m
164(1)	MIN. LOT AREA (m2)	450 m2	1,000 m2
164(1)	MAX. BUILDING HEIGHT (m)	11 m	?
164(1)	MIN. FRONT YARD SETBACK (m)	5 m	5 m
164(1)	MIN. CORNER SIDE YARD SETBACK (m)	3 m	N/A
164(1)	MIN. REAR YARD SETBACK (m)	7.5 m	4.75 m
164(1)	MIN. INTERIOR YARD SETBACK (m)	3 m	3 m
101 (Table)	REQUIRED PARKING	0.5/unit	0.42/unit
102(Table)	REQUIRED VISITOR PARKING	0.1/unit	0

SECTION	ADDITIONAL PROVISIONS	REQUIRED	PROPOSED
57(2)	Corner sight triangle	TBD	5 x 5m
	Permitted projections into req. yards		
65(2)	Eaves, eave-troughs, gutters	1 m	TBD
65(3)	Sills, belt courses, cornices, parapets, pilasters	0.6 m	TBD
65(4)	Canopies, awnings	1.8 m	TBD
65(5)	Fire escapes, open stairways, stoop	>0.6m to lot line	TBD
65(6)	Covered or uncovered balcony, porch, deck	2 m	2 m
65(7)	Bay window	1 m	TBD
65(8)	Air conditioner condenser, heat pump	1 m	TBD
100(3)(b)	Min. shared driveway width	3 m	N/A
106(1)(a)	Min. perpendicular parking space size	2.6 x 5.2 m	2.6 x 5.2 m
106(1)(b)	Min. parallel parking space size	2.6 x 6.7 m	N/A
107(1)(a)(i)	Min. driveway width to parking lot	6.7 m	6.7 m
107 (Table)	Min. aisle width to spaces	6.7 m	6.7 m
107(2)	Min. driveway width to garage	2.6 m	2.6 m
109(3)(b)	Max. walkway width permitted in yard	1.8 m	1.8 m
110(1)	Min. % of parking lot area landscaped	15%	TBD
110 (Table)	Min. landscape buffer width parking lot to lot line	1.5 m	0 m
110(3)(b)	Min. waste collection setback to lot line	3 m	3 m

KEY MAP N.T.S.



SCALE 1 : 200 0 2 4 6 8 10 12

LEGEND

- CONCRETE SIDEWALK
- CROSSWALK
- RIVERSTONE
- CURB
- DEPRESSED CURB
- PAINTED LINES
- PROJECTION (BALCONY)
- PROJECTION (STAIRS)
- MOLOK WASTE STORAGE
- HYD FIRE HYDRANT
- BICYCLE PARKING
- BARRIER FREE PARKING
- DWELLING ENTRANCE
- # UNIT NUMBER
- TYPE A TOWNHOUSE (6.05m)
- TYPE B TOWNHOUSE (4.42m)
- STACKED DWELLING
- PROPOSED LOT BOUNDARY
- PROPERTY BOUNDARY

JULY 28, 2017	DRAFT FOR REVIEW	SP
DATE (D.M.Y)	REVISION	BY

GENERAL NOTES

1. DO NOT SCALE DRAWINGS.
2. THIS DRAWING IS THE EXCLUSIVE PROPERTY OF KORSIAK URBAN PLANNING. COPYRIGHT RESERVED.
3. SITE PLAN PREPARED IN ACCORDANCE WITH PLAN 4M-1581 AND PLAN 4R-30196, PREPARED BY ANNIS O'SULLIVAN, VOLLEBEKK LTD.
4. TOWNHOUSE DWELLING UNITS ARE DESIGNED TO ACCOMMODATE CURBSIDE GARBAGE PICK-UP.

PROJECT TEAM

SITE PLAN DESIGN: KORSIAK Urban Planning
LANDSCAPE ARCHITECT: NAK design strategies
ARCHITECT: Q4A
PLANNING: Stantec
CIVIL ENGINEER: DSEL david schaeffer engineering ltd
MECHANICAL/ELECTRICAL ENGINEER: LRJ

mattamyHOMES

WATERIDGE VILLAGE: PHASE 113
335 ST. LAURENT BLVD.

PART OF LOTS 21, 22 AND 23
CONCESSION 1 (OTTAWA FRONT)
GEOGRAPHIC TOWNSHIP OF GLOUCESTER
AND BLOCKS 118-124, 126 AND 127
REGISTERED PLAN 4M-1559
CITY OF OTTAWA

TITLE: BLOCK 22 SITE PLAN

DATE:	DRAWN BY:	CHECKED BY:	DRAWING NO.
August 1, 2017	SP	CR	A1
JOB NO.: Mattamy - Wateridge			

S:\Korsiak & Company\MATTAMY\Ottawa\Wateridge\Site Plan Template\Block 22 site plan-2017Aug1.dwg