david schaeffer engineering ltd

120 Iber Road, Suite 103
Ottawa, Ontario K2S 1E9
Tel. (613)836-0856
Fax (613) 836-7183
www.DSEL.ca

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

FOR

MATTAMY HOMES
WATERIDGE VILLAGE – BLOCK 22
1400 HEMLOCK ROAD

CITY OF OTTAWA
FILE #: D07-01-20-0072

PROJECT NO.: 17-948

MAY 2020 – REV 4

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
FOR
WATERIDGE VILLAGE – BLOCK 22
1400 HEMLOCK ROAD

MATTAMY HOMES

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Squadron Crescent Moses Tennisco Street (STA. 0+400 to STA. 0+700), Drawing No. 135, Project No. 38298, prepared by IBI Group, dated June 15, 2018.

Moses Tennisco Street (STA. 0+700 to STA. 0+780), Drawing No. 136, Project No. 38298, prepared by IBI Group, dated August 2, 2017.

Grading Plan, Drawing No. 210, Project No. 38298, prepared by IBI Group, dated February 2, 2018.

Ponding Plan, Drawing No. 751, Project No. 38298, prepared by IBI Group, dated June 16, 2017.

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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.

Site Plan Approval was previously obtained from the City of Ottawa, but a new site plan is being proposed with updated building types and unit counts. It should be noted that the servicing and grading strategy for the proposed development remain consistent with the City of Ottawa's previously approved design. However, the servicing and grading design have been updated to reflect the current site plan, the latest City of Ottawa guidelines and pre-consultation comments received from the City of Ottawa. Pre-consultation comments and responses are included in ***Appendix A***.

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]).

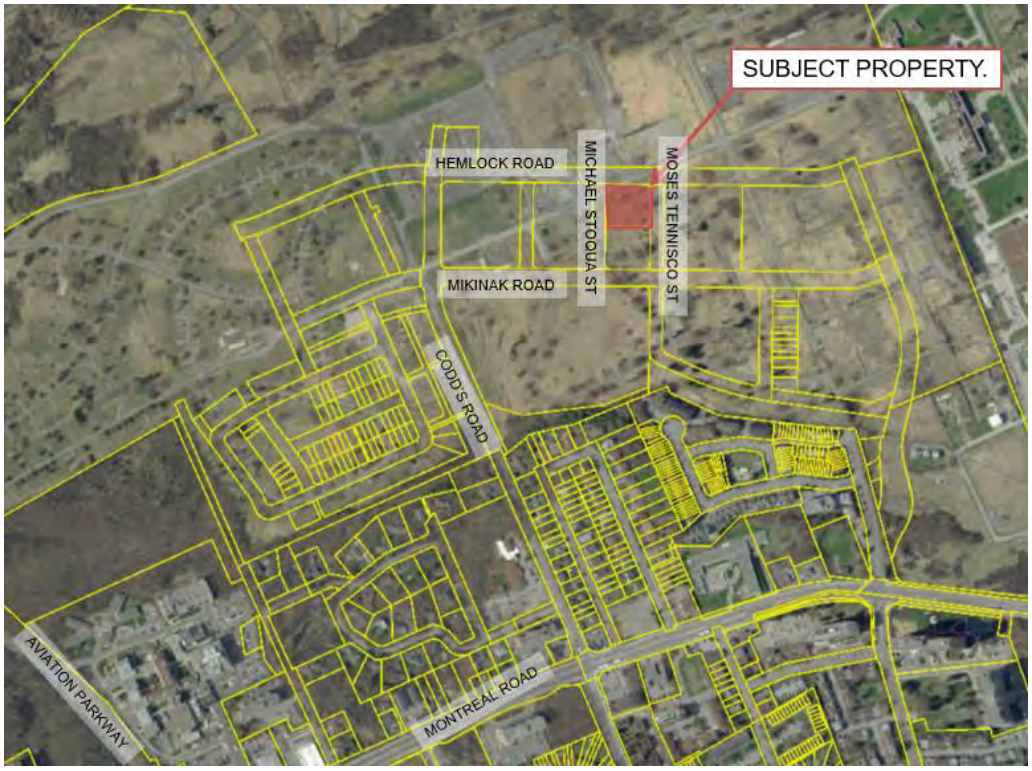

Figure 1: Site Location

The proposed development by Mattamy Homes involves the construction of 18 Rear Lane Townhomes and 20 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 during borehole excavation was encountered at a maximum depth of 3.9 m below existing grade.

Supplemental information from Paterson Group Inc. was also received regarding the anticipated infiltration rates. An infiltration rate of 140 – 200 mm/day was estimated for Block 22.

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

- **Hemlock Road**
  - 300 mm diameter PVC watermain
  - 750 mm diameter storm sewer
  - 250 mm diameter sanitary sewer
- **Michael Stoqua Street**
  - 200 mm diameter watermain
  - 375 mm diameter storm sewer
  - 250 mm diameter sanitary sewer
- **Moses Tennisco Street**
  - 200 mm diameter watermain
  - 525 mm diameter storm sewer
  - 250 mm diameter sanitary sewer

The infrastructure described above is based on as-built drawings. The as-built drawings are as per the Wateridge Village at Rockcliffe Phase 1B drawing set prepared by IBI Group dated June 15, 2018.

The servicing information received from IBI Group dated June 15, 2018 provides stubs to the proposed property and confirms storm and sanitary capacity within the external system at these new connection points.

The as-built drawings prepared by IBI Group detailing the services within Michael Stoqua Street and Moses Tennisco Street are included in the appendix ***Drawings/Figures***.

The existing services per ***Design Brief Phase 1B*** are considered “in service” as per correspondence with IBI Group included in ***Appendix A***. Refer to ***Drawing 2*** for the Existing Conditions Plan.

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. Once site plan approval has been received, the site will go through Part Lot Control.

An ECA Approval will be required through the Ministry of the Environment, Conservation and Parks (MECP) through the Direct Submission process as the development does not fall under the exemptions set out in O.Reg 525/98.

As per consultation with the RVCA, additional stormwater quality control is not required for the subject site as the water quality objectives are being achieved through the Eastern SWM Facility. Supporting correspondence is included in ***Appendix A***.

The City of Ottawa reviews watermains on behalf of the MECP. The MECP "Form 1" is submitted to the City of Ottawa for approval of watermains.

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)

  - **Technical Bulletin ISTB-2018-01**
    City of Ottawa, March 21, 2018.
    (*ISTB-2018-01*)

  - **Technical Bulletin ISTB-2018-04**
    City of Ottawa, June 27, 2018.
    (*ISTB-2018-04*)

  - **Technical Bulletin ISTB-2019-02**
    City of Ottawa, July 8, 2019.
    (*ISTB-2019-02*)

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

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

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

  - **Technical Bulletin ISTB-2018-02**
    City of Ottawa, March 21, 2018.
    (*ISTB-2018-02*)

- **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)

- **Wateridge Phase 1B Developer's Checklist**
  Aquafor Beech Ltd., October 22, 2019
  (LID Checklist)

- **Design Brief Wateridge Village at Rockcliffe Phase 1A**
  IBI Group, April 2016
  (Design Brief Phase 1A)

- **Design Brief Wateridge Village at Rockcliffe Phase 1B**
  IBI Group, June 2017
  (Design Brief Phase 1B)

- **Geotechnical Investigation Proposed Residential Development Block 22**
  Paterson, April 24, 2020
  (Geotechnical Investigation)

- **Landscaping Plan Review – Block 22 – Wateridge Village Residential Development – Phase 1B – Block 22**
  Paterson, May 15, 2020
  (PG5345-MEMO.01)

- **Grading Plan Review – Wateridge Residential Development – Phase 1B – Block 22**
  Paterson, May 15, 2020
  (PG5345-MEMO.02)

- **Geotechnical Review of Site Servicing Drawings – Wateridge Residential Development – Phase 1B – Block 22**
  Paterson, May 15, 2020
  (PG5345-MEMO.03)

- **Geotechnical Recommendations – Review of Servicing – Installation Impact on Adjacent Building Foundations – Wateridge Residential Development – Phase 1B – Block 22**
  Paterson, May 15, 2020
  (PG5345-MEMO.04)

- **Geotechnical Review – Infiltration Rates – Wateridge Village Residential Development – Phase 1B – Block 22**
  Paterson, May 15, 2020
  (PG5345-MEMO.05)

- **Hydraulic Capacity and Modelling Analysis – Wateridge Village Phase 1B – Block 22 Development**
  GeoAdvice, May 25, 2020
  (Water Analysis)

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 was 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 ***Design Brief Phase 1B***, water demand summarized below:

Table 1
Summary of Water Demand per *Design Brief Phase 1*

Design Parameter	Total Demand (L/min)
Average Daily Demand	25.5
Max Day	188.9
Max Day + Fire Flow	13,000 + 125.1

3.2 Water Supply Servicing Design

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

The proposed development will have a perimeter meter in the vicinity of each proposed connection to the existing watermain system. The meters will not be located on City of Ottawa property.

Due to the width of the right-of-way and the proximity of the Rear Lane Townhomes, it is proposed to provide a watermain 1.5 m away from the proposed sanitary sewer. The water and sanitary sewers are designed in accordance with *Procedures to Govern Separation 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	280 L/d/P
Residential Maximum Daily Demand	4.9 x avg. day**
Residential Peak Hour Demand	7.4 x max. day**
Residential Minimum Hour Demand	0.5 x avg. day
Contingency Factor	10%***
Minimum Depth of Cover	2.4 m from top of watermain to finished grade
During normal operating conditions desired operating pressure is within	350 kPa and 480 kPa
During normal operating conditions pressure must not drop below	276 kPa
During normal operating conditions pressure must not exceed	552 kPa
During fire flow operating pressure must not drop below	140 kPa

Daily average based on Appendix 4-1 from **Water Supply Guidelines*
*** Residential Max. Daily and Peak Hourly peaking factors per MOE Guidelines for Drinking-Water Systems Table 3-3 for 0 to 500 persons.*
****10% Contingency Factor added to all demands to account for potential changes in occupancy*
-Table updated to reflect ISD-2010-2, ISDTB-2014-02 and ISTB 2018-02

Table 3 summarizes the anticipated water supply demand and proposed boundary conditions. Boundary conditions for the subject site were provided by the City of Ottawa for the nodes closest to the proposed connection points on Michael Stoqua Street and Moses Tennisco Street. For the Max Day + Fire Flow scenario, boundary conditions were only provided for the highest fire flow demand as this will govern the design.

Table 3
Water Demand and Boundary Conditions
Proposed Conditions

Design Parameter	Anticipated Demand[1] (L/min)	Boundary Condition[2] Connection 1 (m H_2O)	Boundary Condition[2] Connection 2 (m H_2O)
Average Daily Demand	22.0		
Peak Hour Demand	163.0	146.7 m	146.7 m
Minimum Hour Demand	11.0	147.0 m	147.0 m
Max Day + Fire Flow (1)	107.9 + 14,000		
Max Day + Fire Flow (2)	107.9 + 15,000	140.0 m	140.0 m

1) Water demand calculation per ***Water Supply Guidelines*** + 10% contingency. See ***Appendix B*** for detailed calculations.
2) Boundary conditions received from City of Ottawa on May 15, 2020.

The above pressures are assuming the hydraulic grade line (HGL) under current conditions for the Montreal Road Pressure Zone. As per the ***Design Brief Phase 1B***, future development and upgrades to the existing Montreal Road Pressure Zone will reduce the HGL within the development compared to the current condition.

Upgrades to the Montreal and Brittany pump stations are currently being planned by the City of Ottawa to support the overall CFB Rockcliffe development. The City plans to use

a different pumping strategy that will try to maintain a constant HGL of 143.0 m, even during peak hour and / or fire flow conditions. On May 22, 2020, the City provided the future boundary conditions. The future boundary conditions are based on a proposed HGL target of 143.0 m at the Montreal Road pump station. The future HGLs are about 4 m lower compared to the existing HGLs. The pressure results presented in this report are based on the existing boundary conditions and the predicted pressures will thus decrease by about 4 m (6 psi) in the future. No additional modeling was completed using the future boundary conditions as it has no impact on the proposed pipe sizes. Refer to correspondence from the City of Ottawa and the ***Watermain Analysis*** located in ***Appendix B*** for reference.

A hydraulic analysis of the proposed watermain network has been prepared by GeoAdvice Engineering (***Watermain Analysis***, May 25, 2020) and is included in ***Appendix B***.

A pressure check is recommended during installation to determine if pressure reducing valves are required.

Fire flow requirements were determined in accordance with City of Ottawa ***Water Supply Guidelines***. The Water Supply Guidelines specific that fire flows are to be estimated using the FUS in conjunction with the technical bulletin ISDTB-2014-02 and ISTB-2018-02.

The following assumptions were provided by Mattamy Homes for both Stacked Townhomes and Rear Lane Townhomes and were used in estimating the fire supply requirements:

- Type of construction – Wood Frame Construction
- Occupancy type – Limited Combustible
- Sprinkler Protection
  - Rear Lane Townhomes do not have sprinkler protection.
  - Stacked Townhomes have sprinkler protection.

The estimated fire flow ranges from ***14,000 L/min*** to ***15,000 L/min***; see ***Appendix B*** for detailed FUS calculations. ***Table 4***, summarizes the fire flow requirement calculated for each block, per the above assumptions and the available fire flow per ***Table 18.5.4.3*** of the ***ISTB-2018-02***.

Table 4
Estimated Fire Flow Demand

Block, Street and Townhome Type	Estimated Fire Demand (L/min)	Fire Hydrants within 75 m	Fire Hydrants within 150 m	Available Fire Flow per Table 18.5.4.3 of ISTB-2018-02 (L/min)
Block 1 (Rear Lane) – Hemlock Road	15,000	1	3	17,033
Block 2 (Rear lane) – Hemlock Road	15,000	1	3	17,033
Block 3 (Rear Lane) – Moses Tennisco Street	14,000	1	3	17,033
Block 4 (Stacked) – Michael Stoqua Street	14,000	1	3	17,033

The property has four (4) adjacent hydrants used to calculate the available fire flow:

- Two (2) hydrants located along the south side of Hemlock Road, one at the northwest corner of the property and one across from Moses Tennisco Street;
- One (1) hydrant located along the east side of Michael Stoqua Street, at the southwest corner of the property; and
- One (1) hydrant located along the east side of Moses Tennisco Street, near the southeast corner of the property.

As can be seen in ***Table 4,*** the fire flow demand can be met by using existing fire hydrants for all of the proposed blocks within the development.

The ***Design Brief Phase 1B*** had contemplated a higher population than currently proposed. It is anticipated that the decrease in population will not have a significant impact on pressures within the Wateridge Village Development. A water distribution model was completed to ensure that the internal pipe network can adequately service the proposed development.

3.3 Watermain Modeling

As described in the ***Watermain Analysis,*** InfoWater (Innovyze), a GIS water distribution system modeling and management software application was utilized to determine pipe sizing and the availability of pressures throughout the system during Minimum Hour Demand, Peak Hour Demand and Max Day plus Fire Flow scenarios. The static model determines pressures based on the available head obtained from the boundary conditions obtained from the City of Ottawa, as indicated in ***Table 3.***

A summary of the resulting pressures at all nodes are summarized in ***Table 5*** below.

Table 5
Resulting Pressures Proposed Conditions

Node ID	Minimum Hour (kPa)	Peak Hour (kPa)
JCT-1	565.4	565.4
JCT-2	565.4	558.5
JCT-3	558.5	558.5
JCT-4	565.4	558.5
JCT-5	558.5	551.6

The minimum and maximum pressures shown in ***Table 5*** generally exceed the allowable pressures described in ***Table 2*** by less than 3%. As the pressures exceed the maximum allowable distribution pressure of 552 kPa, pressure reducing valves might be required.

It should be noted that the Max Day + Fire Flow scenario was not included in the watermain modelling as fire flows would be drawn from existing fire hydrants and the existing watermain network within the ROW. Therefore, the pressure drops within the development are anticipated to be negligible in a fire flow scenario.

3.4 Water Supply Conclusion

It is proposed to service the development through two separate connections to the existing 200 mm diameter watermains within Michael Stoqua Street and Moses Tennisco Street.

The anticipated water demand was submitted to the City of Ottawa for establishing boundary conditions.

The fire flow for the development ranges from ***14,000 L/min*** to ***15,000 L/min*** and the flow was analyzed through surrounding existing hydrants using values from ***Table 18.5.4.3*** of ***ISTB-2018-02***. The fire flows could be met for all blocks per the ***Water Supply Guidelines***.

Pressures during the Minimum Hour Demand and Peak Hour Demand scenarios are higher than allowable pressure in ***Table 2***; thus, pressure reducing valves might be required.

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 ***Design Brief Phase 1B***.

The total wastewater flow from Block 22 contemplated in the ***Design Brief Phase 1B*** is summarized in ***Table 6*** below.

Table 6
Wastewater Flow per Design Brief Phase 1B – Total Site Area

Design Parameter	Total Flow (L/s)
Estimated Average Dry Weather Flow	0.43
Estimated Peak Dry Weather Flow	1.70
Estimated Peak Wet Weather Flow	1.83

The total flow summarized in ***Table 6*** is for the total drainage area from Block 22, with a total contemplated population of 105 and based on previous ***City Standards*** per the ***Design Brief Phase 1B***, but it should be noted that the ***Design Brief Phase 1B*** contemplated splitting the sanitary flows between sanitary sewers on Michael Stoqua Street and Moses Tennisco Street. Refer to ***Appendix C*** for calculation sheets and 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 250 mm diameter sewer within the Michael Stoqua Street right-of-way, as the City of Ottawa has requested a singular connection to the existing sanitary sewer network.

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	280 L/d/per
Peaking Factor	Harmon's Peaking Factor. Max 3.8, Min 2.0 Harmon's Corrector Factor 0.8
Infiltration and Inflow Allowance	0.05 L/s/ha (Dry Weather) 0.28 L/s/ha (Wet Weather) 0.33 L/s/ha (Total)
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{2/3} S^{1/2}$
Minimum Sewer Size	200 mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5 m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6 m/s
Maximum Full Flowing Velocity	3.0 m/s
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012. and *ISTB-2018-01*	

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	0.36
Estimated Peak Dry Weather Flow	1.23
Estimated Peak Wet Weather Flow	1.36

The estimated sanitary flow, based on the site plan provide in ***Drawings/Figures,*** anticipates a peak wet weather flow of ***1.36 L/s***.

The anticipated peak wastewater flow generated from the proposed development is lower than the total flow contemplated in the ***Design Brief Phase 1B*** for Block 22, but more than the ***0.96 L/s*** contribution to the existing 250 mm sanitary sewer in Michael Stoqua Street contemplated in the ***Design Brief Phase 1B***. However, the existing 250 mm sewer was shown to have an available capacity of 98%, and the ***0.40 L/s*** increase in flow will not have an impact on the existing sewer. The downstream sanitary system can accommodate the flow from the proposed sanitary sewer system for Block 22.

A sanitary calculation sheet was prepared for the on-site sewers. See ***Appendix C*** for the calculation sheet, the IBI design sheet and drainage area map and ***Drawing 10*** for sanitary drainage area drawing.

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 ***Design Brief Phase 1B***.

Although the drainage from the site was revised to be entirely directed to the existing sanitary sewer within Michael Stoqua Street, the total anticipated peak wastewater flow generated from the proposed development is lower than contemplated in the ***Design Brief Phase 1B***. The downstream sanitary system can accommodate the flow from the proposed sanitary sewer system.

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. The subject site was contemplated in the ***Design Brief Phase 1B*** to be conveyed 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 Eastern SWM Facility.

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 ***Design Brief Phase 1B***
- Incorporate Low Impact Development measures in accordance with the ***Design Brief Phase 1B***, ***LID Guide***, ***LID Demonstration Project*** and ***LID Checklist.***

5.3 Proposed Stormwater Management System

It was previously contemplated in the ***Design Brief Phase 1B*** that minor system drainage from the site would be evenly split between storm sewers on Michael Stoqua Street and Moses Tennisco Street. However, the current proposal has all of the minor system drainage discharging to the existing 375 mm storm sewer within Michael Stoqua Street.

Based on current ***City Guidelines***, the minor system discharge to the existing storm sewer system is restricted to the 5-year flow through the use of on-site controls in the form of Inlet Control Devices (ICDs) implemented within catch basins.

As discussed in ***Section 5.1***, the quantity controls for major flow from Block 22 will be provided by the dry pond south of the subject site and through the Eastern SWM Facility outlined in the ***Design Brief Phase 1B***.

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. No additional quality controls are required as confirmed by the RVCA in ***Appendix A.***

A storm design sheet was prepared to support the capacity of the internal and external storm sewer system, refer to ***Appendix D*** for the calculation sheet and ***Drawing 11*** for the drainage area figure. The overall Runoff Coefficient from the site is less than what was allocated in the ***Design Brief Phase 1B*** and therefore, no additional quantity or quality controls are required.

5.4 Hydraulic Grade Line (HGL) Analysis & Overland Flow Depth

Detailed DDSWMM and SWMHYMO models will be prepared for the internal minor and major system to determine the conveyance of the minor system and review major system their relation to the critical underside of footing (USF) and surrounding house grade (SHG) for Block 4, which is the only proposed block with basements.

A minimum 0.30 m freeboard is required between the 100-year HGL and the USF which will not extend to the footing during the 100-year + 20% events.

A freeboard of 0.30 m between the 100-year hydraulic grade line and the underside of footing is targeted. As the 100-year hydraulic grade line is anticipated to be contained within the proposed storm sewers, the proposed underside of footing for Block 4 (88.02 m) is more than 0.30 m above the highest obvert of the proposed storm sewer (87.59 m). A detailed HGL analysis confirming that the proposed underside of footing elevation is 0.30 m (or greater) above the 100-year hydraulic grade line and that the 100 year + 20% stress test hydraulic grade line does not reach the underside of footing is forthcoming.

The depth of flow may extend adjacent to the right-of-way provided that the water level must not touch any part of the building envelope and must remain below the lowest building opening during the stress test event (100 year + 20%). There must be at least 15 cm of vertical clearance between the spill elevation on the street and the ground elevation at the nearest building envelope.

5.5 Low Impact Development (LID) Practices

LID measures are proposed in accordance with the ***Design Brief Phase 1B, LID Guide, LID Demonstration Project*** and ***LID Checklist***. It is proposed that flow from rooftops, sidewalks, landscaped areas and access lanes be directed to storage chambers in the form of oversized perforated pipes surrounded by granular material. Flow will enter the storage chambers through the network of area drains and catch basins proposed throughout the property. Refer to ***Drawing 4*** for perforated pipe locations and ***Drawing 7*** for storage chamber details.

The granular base below the overflow elevation has been sized in accordance with the ***LID Guide, LID Demonstration Project*** and ***LID Checklist*** and based on infiltration rates, to ensure a maximum drawdown time of 48 hours. Based on ***PG5345-MEMO.05***, an infiltration rate of ***140 mm/day*** was estimated for the soil in Block 22.

The storage chambers are designed with the perforated pipes underlain with 350 mm of 50 mm clear stone, with clear stone extending 150 mm to either side of the perforated

pipe and another 75 mm layer of clear stone above the obvert of the pipe. The perforated pipe and clear stone are wrapped in a non-woven needle punched geotextile or woven monofilament geotextile.

Details of the storage chambers are shown on ***Drawing 7***, accompanying this report.

All LID measures are designed to infiltrate or detain an equivalent of the 4 mm event over the site area and each LID measure must treat the minimum of the 15 mm event. A total infiltration requirement of 4 mm or ***18.4 m^3*** and a total treatment volume of the 15 mm event, or ***24.8 m^3*** is required per the ***LID Guide, LID Demonstration Project*** and ***LID Checklist***. The filter media, clear stone and perforated pipe result in a treatment volume of ***25.2 m^3,*** exceeding the 15 mm volume described above. Calculations are included in ***Appendix D.***

5.6 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.

There is sufficient capacity within the existing storm sewers within Michael Stoqua Street to convey the proposed stormwater drainage plan.

It is anticipated that the 100-year hydraulic grade line will be contained within the proposed storm sewers and the USF for Block 4 is greater than 0.30 m above the obvert of the proposed storm sewers at all locations. A detailed HGL analysis confirming that the proposed underside of footing elevation is 0.30 m (or greater) above the 100-year hydraulic grade line and that the 100 year + 20% stress test hydraulic grade line does not reach the underside of footing is forthcoming.

LID practices in the form of underground storage chambers consisting of oversized perforated pipes surrounded by granular material are proposed to capture infiltration runoff from the site, in accordance with the ***LID Guide***, ***LID Demonstration Project*** and ***LID Checklist.***

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

6.0 EROSION AND SEDIMENT CONTROL

Soil erosion occurs naturally and is a function of soil type, climate and topography. During construction the extent of erosion losses is exaggerated due to the removal of vegetation and the top layer of soil becoming agitated.

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

Silt fence will be installed around the perimeter of the site and will be cleaned and maintained throughout construction. Silt fence will remain in place until the working areas have been stabilized and re-vegetated.

Catch basins will have SILTSACKs or an approved equivalent installed under the grate during construction to protect from silt entering the storm sewer system.

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

Erosion and sediment controls must be in place during construction. The following recommendations to the contractor will be included in contract documents:

- Limit extent of exposed soils at any given time;
- Re-vegetate exposed areas as soon as possible;
- Minimize the area to be cleared and grubbed;
- Protect exposed slopes with plastic or synthetic mulches;
- Install silt fence to prevent sediment from entering existing ditches;
- No refueling or cleaning of equipment near existing watercourses;
- Provide sediment traps and basins during dewatering;
- Install filter cloth between catch basins and frames;
- Plan construction at proper time to avoid flooding; and
- Establish material stockpiles away from watercourses, so that barriers and filters may be installed.

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

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

Refer to ***Drawing 9*** for the proposed Erosion and Sediment Control Plan.

7.0 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 City of Ottawa and a water distribution model completed for the site, sufficient pressure exists to support the development. Anticipated pressures slightly exceed the maximum allowable pressures stipulated by the City of Ottawa and pressure reducing valves might be required.

Based on estimated fire flow per the ***FUS***, there is sufficient capacity within the local fire hydrants to provide the required fire flow.

The proposed development is anticipated to have a peak wet weather flow of ***1.36 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 ***Design Brief Phase 1B.***

A detailed stormwater HGL analysis for site is forthcoming.

LID practices in the form of underground storage chambers consisting of oversized perforated pipes surrounded by granular material are proposed to capture infiltration runoff from the site, in accordance with the ***LID Guide, LID Demonstration Project*** and ***LID Checklist.***

Prepared by,
David Schaeffer Engineering Ltd.

Per: Anthony Temelini, P.Eng

Prepared by,
David Schaeffer Engineering Ltd.

Per: Jennifer Ailey, P.Eng

z:\projects\17-948_wateridge_block 22\b_design\b3_reports\b3-2_servicing (dsel)\subm4\fsr_2020-05-26_948_block22_ajt.docx

APPENDIX A

Pre-Consultation / Geotechnical Memos

DEVELOPMENT SERVICING STUDY CHECKLIST

17-948 25/05/2020

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, Drawing 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 2.1
☒	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.	Section 3.2
☐	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 5.2, 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 5.2, 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.	Section 5.2, 5.3, 5.4
☒	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.	Section 5.2, 5.3
☐	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 5.2, 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.	Section 5.4
☐	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.	Section 6.0
☐	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.	Appendix A
☒	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

Pre-Application Consultation Meeting Notes

1400 Hemlock Road – D07-01-20-0072

March 23, 2020 – 10:00am

Teleconference

Attendees

City of Ottawa

- Jean-Charles Renaud
- Mark Fraser
- Christopher Moise
- Wally Dubyk

Applicant Team

- Mina Rassa
- Jillian Normand
- Daniel Potechin

Community Association

- Jane Thompson
- Lysanne Brault

Project overview

18 rear lane towns, 20 stacked towns. There is currently a Site Plan approval (D07-12-17-0111) on the site. Mattamy wishes to revise the plans. Part of the Wateridge subdivision.

Comments from staff

Transportation (Wally Dubyk)

- Private road to include asphalt that will sustain the weight of an emergency vehicle
- Signs at either end of the private connection to ensure members of the pubic are aware that Kizis Private is a private road.
- Are the sidewalks depressed?
    - Yes
- Is there still a mid-block MUP proposed?
    - No

Planning (Jean-Charles Renaud)

- Why is an urban development over parked? Removal of parking spaces would provide opportunities for additional amenity space and a secure bike parking location.
- Could the parking area be optimized by providing angled spaces?
- Why is there a need for parallel parking?
- Ensure that the Secondary Plan's minimum density targets are still being met. The site is at the edge of the designation, closer to a higher density designation, which means it should hold more, not less, density.
- If there are no longer any trees on the property a TCR will not be required.
- The environmental planner suggested that the provisions for landscaping include trees at least as proposed in the currently approved SPC, not less.

Engineering (Mark Fraser)

- **Additional comments are attached to the follow-up email**
- Updated plans and studies will be needed
- Updated site servicing report - demonstrate consistency with higher level study. Use block 15 as examples.
- Noise assessment -provide copy of 2017 study, with addendum
- Geotech report - memo stating that details have been reviewed and that the findings are still valid
- Will be requesting memos similar to block 15
- ESA - not required, but provide copy of RSC
- Plans - updated engineering plans will be required
- Comments - all units to be serviced interior to the site. Perimeter metering.
    - Question from applicant
        - Service connection to side roads ok?
            - If condo, all units to be serviced from interior
            - Expectation from the city is still to have servicing from internal to the site.
        - Tree plantings - building will meet zoning first.
            - This has proven to be problematic on other sites and will need to be
- Hydro transformers - bollards location to be adjusted

Urban Design (Christopher Moise)

- **Additional comments attached to the follow-up email**
- Is there no better location for hydro transformer?
- Appreciate massing and elevation information. Understand within the block.
- More details of surrounding context would be useful in order to better understand relationships
- Now have front door facing rear internal. Look at relationship.
- This proposal less suitable than previous
- Building only 1m from curb. Problematic?

- Unsure about the quality of amenity space, relationship with other buildings. Blank wall conditions nearby. Massing drawings would be helpful.
- Reallocating parking to remove parallel spaces. Confusing overall design. Parking area needs rethinking.

Comments from the Community

- Seen alot of revisions to this site plan. Now it is segmented. Not ideal to keep revising with less quality. Should be at least as good as previous plans.
- Agree with Christopher Moise RE: parking and relationship of units. Now is unbalanced with changes in types of units.
- Used to be trees. Lost alot of these. Now looking only at garages, no trees.
- What variances required?
    - No variances required
- Landscaped area less than 30%
    - Intent is to meet this requirement
- Landscaping not shown on plans right now.
- Landscaped strip along south now gone. Landscaping being eroded between revisions.
- Problems with Molok. People that do pickup can be difficult. Could provide info regarding this. Could pass along.
- This plan is inferior to before

From: Renaud, Jean-Charles <Jean-Charles.Renaud@ottawa.ca>
Sent: Thursday, April 2, 2020 3:58 PM
To: Mina Rassa <Mina.Rassa@mattamycorp.com>
Cc: Moise, Christopher <christopher.moise@ottawa.ca>; Fraser, Mark <Mark.Fraser@ottawa.ca>; jtarch@rogers.com; Lysanne Brault <lbrault7@gmail.com>; Dubyk, Wally <Wally.Dubyk@ottawa.ca>
Subject: 1400 Hemlock - Preconsultation Followup

Good afternoon Mina,

Further to our meeting on March 23, 2020, regarding the proposal for development at 1400 Hemlock Road, please find attached the minutes of the meeting as well as the studies and plans list.

Below are some supplementary comments from various disciplines:

Planning

- Please ensure continued conformity with the Secondary Plan, particularly as it relates to the density minimum targets. Include justification in support of the reduced density in this revised proposal.
- A Site Plan Control – Complex application will be required.

Urban Design

Comments:

- Please provide a massing drawing and elevations for information;
- More detail of the surrounding context would help determine streetscape relationships with adjacent built form (adjacent building footprints, etc.);
- The facing frontages of the stacked towns is lost from the previous approved plan. The new condition is a challenge because frontages now face the rear of the new townhouse building (which will be a dead space at grade), and the facing semi-private balconies of the towns will be one level above the public entrances across the parking lot which is a less compatible relationship than facing stacked towns;
- The private lane was previously a true lane with garages facing the sides of the stacked towns, which was a more compatible relationship;

Questions/Observations:

- Town house at the top of the south-west group is very close to the drive aisle (1m);
- Not sure what the quality of the amenity space in the south-east corner will be if the adjacent building is four storeys? More detail would be helpful to determine this, especially a section showing height of the building compared to the width of the amenity area. How will this adjacent wall be designed?
- Would removing the bottom one-way lane from the parking area allow for relocation of the parallel spaces?

- Perhaps alternatives to the parking layout will open up more opportunities for landscaping and a reduction in hard surface circulation;

Engineering

Comments**:**

- Updated engineering plans and studies are required to be submitted to support this project.
- Updated Site Servicing and Stormwater Management Report (SWM) to be provided. Highly recommend using the report prepared in support of Block 15 as a baseline example for the level of analysis and information required to support this project.
- **HGL Analysis** to be completed and included as part of the Site Servicing and SWM report if basements are being proposed.
- The proposed **site servicing and SWM design to be consistent with higher-level studies and plans**. Excerpts from relevant higher level studies and plans shall be discussed and provided in the Appendix of the report as supporting documentation. Any deviations will be required to be discussed and may require an update or addendum to the subdivision MSS to support the change(s) at the discretion of the City.
- **Low Impact Development (LID)** measures to be implemented as per the Wateridge Phase 1B Developer's Checklist, prepared by Aquafor Beech Ltd., dated October 22, 2019 and infiltration targets achieved.
- Consult with the Rideau Valley Conservation Authority regarding water quality criteria for the subject block prior to submission an application to establish any water quality control restrictions, criteria and measures for the site. Correspondence and clearance shall be provided in the Appendix of the report as supporting documentation.
- Include a copy of the previously approved 2017 transportation noise assessment report and provide a **transportation noise assessment addendum** similar to the addendum provided for Block 15 to update the analysis and recommendation for this site plan revision.
- Provide a copy of the geotechnical report and **a memorandum** stating that the details of this site plan have been reviewed from a geotechnical perspective and the findings and recommendations of the reports are valid for the site plan revision. Update report if determined to be necessary.
- Similar geotechnical memorandums that were required to support approval of Block 15 will be required for this project (ex. review of servicing installation impact of adjacent building foundations, infiltration rates specific to this site, landscaping plan review, grading plan review, etc.)
- Provide a **copy of the Record of Site Condition (RSC)** acknowledged by the Ministry for this site and **a memorandum** prepared by an environmental consultant confirming that no potential contaminating activities have taken place within the RSC area since the filling of the RSC.
- **Plan and Profile drawings** are required to be submitted as part of the engineering drawing package.
- All townhouse units are to be serviced internal to the site with only one storm and one sanitary sewer connection to the street.
- Site to be **perimeter metered** similar to Block 15.
- Request new boundary conditions to update hydraulic analysis.
- **All six (6) conditions listed in the Tree Planting in Sensitive Marine Clay Soils-2017 Guidelines are required to be satisfied if it is determined that clay soils are present in this area**. Note that if the plasticity index of the soil is determined to be less than 40% a minimum separation between a street tree and the proposed building foundations of 4.5m

shall be achieved. A memorandum to be provided from geotechnical engineer similar to Block 15.

- The consultant shall determine if this project will be subject to an Environmental Compliance addressing approval (ECA) for Private Sewage Works. It shall be determined if the exemptions set out under Ontario Regulation 525/98: *Approval Exemptions* are satisfied. All regulatory approvals shall be documented and discussed in the report. If the SWM works are servicing one parcel of land under one ownership an ECA would not be required however if the intention is to create POTL to a condominium corporation or multiple condominium corporations an ECA will be required prior to registration of any condominium proposal.
- Any proposed light fixtures (both pole-mounted and wall mounted) must be part of the approved Site Plan. All external light fixtures must meet the criteria for Full Cut-off Classification as recognized by the Illuminating Engineering Society of North America (IESNA or IES), and must result in minimal light spillage onto adjacent properties (as a guideline, 0.5 fc is normally the maximum allowable spillage). In order to satisfy these criteria, the please provide the City with a **Site Lighting Plan, Photometric Plan and Certification (Statement) Letter** from an acceptable professional engineer stating that the design is compliant.

Required Engineering Plans and Studies:

PLANS:

- Existing Conditions and Removals Plan
- Site Servicing Plan
- Grade Control and Drainage Plan
- Erosion and Sediment Control Plan
- Details Plan
- Pre-Development (Approved Drainage Patterns) Drainage Area Plan
- Post-Development Drainage Area/Stormwater Management Plan
- Legal Survey Plan
- Site Lighting Plan and Photometric Plan

REPORTS:

- Site Servicing and Stormwater Management Report
- Geotechnical Study
- Updated Noise Study
- Copy of the Record of Site Condition acknowledged by the Ministry and a Memorandum prepared by an environmental consultant confirming No Potential Contaminating Activities have taken place in the RSC area since filling the RSC.

<u>Next Steps</u>

- Applications for Site Plan Control, Complex will be required
- A list of required studies and plans is attached
- Please note that the preconsultation comments are valild for one year. If you submit a development application after this time you may be required to meet for another pre-consultation meeting and/or the submission requirements may change
- Prior to making a complete submission, I also encourage you to discuss the proposal with the area Councillor, Rawlson King, local community associations as well as immediate neighbours.

JC

Jean-Charles Renaud, **MCIP/*MICU*, RPP/*UPC***

Planner II | *Urbaniste II*
Development Review, Central | *Examen des projets d'aménagement, Central*
Planning, Infrastructure and Economic Development Department | *Services de la planification, de l'infrastructure et du développement économique*
City of Ottawa | *Ville d'Ottawa*
110 Laurier Avenue West. Ottawa, ON | *110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1*
613.580.2424 ext./poste 27629

*****Please note that, while my work hours may be affected by the current situation, I still have access to email and telephone. Feel free to schedule telephone calls if you wish to discuss something with me over the telephone*****

'

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david schaeffer engineering ltd
SMART SUBDIVISIONS™

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

May 26, 2020

Jean-Charles Renaud
Planner II, Development Review Services
Planning, Infrastructure and Economic Development
City of Ottawa
110 Laurier Avenue West, 4th Floor
K1P 1J1

Re: **Wateridge Village Phase 1B: Block 22**
Fourth Submission for SPA (Municipal File No. D07-01-20-0072)

This submission is submitted to address the comments provided via email from the City of Ottawa on April 2, 2020, following a teleconference that was held on March 23, 2020. Meeting minutes from said teleconference were circulated in the e-mail with the comments from April 2.

The responses to the comments are as follows:

Meeting Minutes from March 23, 2020
Engineering Comments (Mark Fraser)

Comment 1: Additional comments are attached to the follow-up email.

Response: Noted.

Comment 2: Updated site servicing report - demonstrate consistency with higher level study. Use Block 15 as examples.

Response: The site servicing report has been updated to demonstrate consistency with higher level studies and follows the general format that was used in the reporting for Block 15.

Comment 3: Noise assessment - provide copy of 2017 study, with addendum.

Response: To be provided by others.

Comment 4: Geotech report - memo stating that details have been reviewed and that the findings are still valid.

Response: A revised geotechnical report dated April 24, 2020 has been prepared by Paterson Group. Geotechnical memos prepared by Paterson Group providing

david schaeffer engineering ltd
SMART SUBDIVISIONS™

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

recommendations and confirming the review of the proposed servicing and grading design are included with this submission.

Comment 5: Will be requesting memos similar to Block 15.

Response: See response to Comment 4.

Comment 6: ESA - not required, but provide copy of RSC.

Response: To be provided by others.

Comment 7: Plans - updated engineering plans will be required.

Response: Please refer to the engineering plans, Revision 10 dated May 26, 2020 included with this submission.

Comment 8: Comments - all units to be serviced interior to the site. Perimeter metering. If condo, all units to be serviced from interior. Expectation from the City is still to have servicing from internal to the site.

Response: Water, sanitary and storm servicing for the proposed development is all internal to the site as requested. Water perimeter meters are included in the vicinity of both connections to the existing 200 mm watermains, but located within the development.

Comment 9: (From applicant): Tree plantings - building will meet zoning first. (City): This has proven to be problematic on other sites and will need to be [reviewed].

Response: Refer to the landscape plan which has been incorporated into the Site Plan included with this submission.

Comment 10: Hydro transformers - bollards location to be adjusted

Response: The proposed Hydro transformer location will be adjusted through the CUP process, which will be initiated once the proposed servicing design has been advanced.

david schaeffer engineering ltd
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120 Iber Road, Unit 103
Stittsville, Ontario K2S 1E9
Tel (613) 836-0856
Fax (613) 836-7183
www.DSEL.ca

E-mail from Jean-Charles Renaud from April 2, 2020
Engineering Comments

Comment 1: Updated engineering plans and studies are required to be submitted to support this project.

Response: Please refer to the engineering plans, Revision 10 dated May 26, 2020 included with this submission.

Comment 2: Updated Site Servicing and Stormwater Management Report (SWM) to be provided. Highly recommend using the report prepared in support of Block 15 as a baseline example for the level of analysis and information required to support this project.

Response: The site servicing report has been updated to demonstrate consistency with higher level studies and follows the general format that was used in the reporting for Block 15.

Comment 3: HGL Analysis to be completed and included as part of the Site Servicing and SWM report if basements are being proposed.

Response: An HGL Analysis is currently underway and will be included as a follow up to this submission. As discussed in Section 5.4, at this time, the 100-year HGL is anticipated to be fully contained within the proposed storm sewers and is not anticipated to impact the underside of footing elevations for Block 4, which is the only block with basements.

Comment 4: The proposed **site servicing and SWM design to be consistent with higher-level studies and plans**. Excerpts from relevant higher-level studies and plans shall be discussed and provided in the Appendix of the report as supporting documentation. Any deviations will be required to be discussed and may require an update or addendum to the subdivision MSS to support the change(s) at the discretion of the City.

Response: The site servicing report has been updated to demonstrate consistency with higher level studies and follows the general format that was used in the reporting for Block 15. Excerpts from relevant higher-level studies and plans are included in the Appendix of the report.

Comment 5: Low Impact Development (LID) measures to be implemented as per the Wateridge Phase 1B Developer's Checklist, prepared by Aquafor Beech Ltd., dated October 22, 2019 and infiltration targets achieved.

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Response: LID measures are included in the proposed design and consists of storage chambers in the form of over-sized perforated pipes surrounded by clear stone and geotextile material. Details for the proposed LID measures are provided on Drawing 7 and discussed in Section 5.6 of the site servicing report.

Comment 6: Consult with the Rideau Valley Conservation Authority regarding water quality criteria for the subject block prior to submission an application to establish any water quality control restrictions, criteria and measures for the site. Correspondence and clearance shall be provided in the Appendix of the report as supporting documentation.

Response: Correspondence with the RVCA is included in Appendix A of the site servicing report. Per the e-mail from Jamie Batchelor dated May 6, 2020, the proposed development does not require any additional quality control measures.

Comment 7: Include a copy of the previously approved 2017 transportation noise assessment report and provide a **transportation noise assessment addendum** similar to the addendum provided for Block 15 to update the analysis and recommendation for this site plan revision.

Response: To be provided by others.

Comment 8: Provide a copy of the geotechnical report and **a memorandum** stating that the details of this site plan have been reviewed from a geotechnical perspective and the findings and recommendations of the reports are valid for the site plan revision. Update report if determined to be necessary.

Response: A copy of the revised geotechnical report by Paterson Group dated April 24, 2020 is included with this submission. The geotechnical memos are referenced in the site servicing report and included in Appendix A of the report.

Comment 9: Similar geotechnical memorandums that were required to support approval of Block 15 will be required for this project (ex. review of servicing installation impact of adjacent building foundations, infiltration rates specific to this site, landscaping plan review, grading plan review, etc.).

Response: See response to Comment 8.

Comment 10: Provide a **copy of the Record of Site Condition (RSC)** acknowledged by the Ministry for this site and **a memorandum** prepared by an environmental consultant confirming that no potential contaminating activities have taken place within the RSC area since the filling of the RSC.

david schaeffer engineering ltd
SMART SUBDIVISIONS™

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

Response: To be provided by others.

Comment 11: Plan and Profile drawings are required to be submitted as part of the engineering drawing package.

Response: Plan and profile drawings for Kizis Private, the Parking Lot and Servicing Block are included with this submission. Refer to Drawings 4 and 5.

Comment 12: All townhouse units are to be serviced internal to the site with only one storm and one sanitary sewer connection to the street.

Response: All townhouse units are serviced internal to the site with only one storm and one sanitary connection to the existing servicing network on Michael Stoqua Street,

Comment 13: Site to be **perimeter metered** similar to Block 15.

Response: Water perimeter meters are included in the vicinity of both connections to the existing 200 mm watermains, but located within the development. Refer to Drawing 3.

Comment 14: Request new boundary conditions to update hydraulic analysis.

Response: Boundary conditions were requested and provided by the City on May 15, 2020. The boundary conditions and the hydraulic analysis are included in Appendix B of the site servicing report.

Comment 15: All six (6) conditions listed in the Tree Planting in Sensitive Marine Clay Soils-2017 Guidelines are required to be satisfied if it is determined that clay soils are present in this area. Note that if the plasticity index of the soil is determined to be less than 40% a minimum separation between a street tree and the proposed building foundations of 4.5 m shall be achieved. A memorandum to be provided from geotechnical engineer similar to Block 15.

Response: Refer to PG5345-MEMO.01 dated May 15, 2020 prepared by Paterson Group and included in Appendix A of the site servicing report.

Comment 16: The consultant shall determine if this project will be subject to an Environmental Compliance addressing approval (ECA) for Private Sewage Works. It shall be determined if the exemptions set out under Ontario Regulation 525/98: *Approval Exemptions* are satisfied. All regulatory approvals shall be documented and discussed in the report. If the SWM works are servicing one parcel of land under one ownership an ECA

david schaeffer engineering ltd
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120 Iber Road, Unit 103
Stittsville, Ontario K2S 1E9
Tel (613) 836-0856
Fax (613) 836-7183
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would not be required however if the intention is to create POTL to a condominium corporation or multiple condominium corporations an ECA will be required prior to registration of any condominium proposal.

Response: Blocks 1, 2 and 3 will undergo separate Part Lot Control processes for individual ownership severances while Block 4, Kizis Private and the parking area will undergo a separate Part Lot Control Process to form a single ownership. As such, an ECA Approval will be required through the Ministry of the Environment, Conservation and Parks (MECP) through the Direct Submission process as the development does not fall under the exemptions set out in O.Reg 525/98.

Comment 17: Any proposed light fixtures (both pole-mounted and wall mounted) must be part of the approved Site Plan. All external light fixtures must meet the criteria for Full Cut-off Classification as recognized by the Illuminating Engineering Society of North America (IESNA or IES), and must result in minimal light spillage onto adjacent properties (as a guideline, 0.5 fc is normally the maximum allowable spillage). In order to satisfy these criteria, the please provide the City with a **Site Lighting Plan, Photometric Plan and Certification (Statement) Letter** from an acceptable professional engineer stating that the design is compliant.

Response: To be provided by others, once the electrical design has been advanced.

Best regards,
David Schaeffer Engineering Ltd.

Anthony Temelini, P.Eng.
Junior Project Manager
T: (613) 875-7862
E: atemelini@dsel.ca

Steve Merrick

From: Winston Yang <Winston.Yang@ibigroup.com>
Sent: Wednesday, August 16, 2017 11:50 AM
To: Adam Fobert; Jean Lachance
Cc: Jillian Normand; Jim Moffatt
Subject: RE: 918 Mattamy - Wateridge: IBI Servicing Review

Hi Adam and Jean,

I have reviewed the impact as per DSEL design for Block 15, 22 and 24.

Upon review of the proposed grading plans for Blocks 15, 22, and 24, we found the leave grades provided by DSEL to be reasonable.
We do not have a conceptual plan for Block 19 yet. The leave grades for that block seem low for a typical basement development. However they might be fine if underground parking is planned.

For the Servicing side, the storm and sanitary outlets location for each block were changed compared to the MSS and Design Brief.
Then we have implemented the changes DSEL made into our sewer design and have examined the capacity for each downstream sewers.
The result shows that the downstream sewers for storm and sanitary have the capacity to convey the flow for all new outlets for blocks, 15, 22 and 24.

In order to minimize the impact and cost, we are going to shift some manholes to accommodate the new outlets base on DSEL design.
For Block 22, MH210 and MH210A can be shifted to the south to replace the STM101 and SAN1 along Michael Stoqua Street.
For Block 24, MH213 and MH213A can be shifted to the south to replace the STM101 and SAN1 along Moses Tenisco Street. At the same time, MH212 and MH212A will be shifted to the south in order to reduce the length of the sewers.
For Block 15, there is no choice, the manhole STM101 and SAN1 are required for Squadron Crescent.
Since the typical 1200mm Dia. Manholes have been already ordered by the contractor.
We will contact the contractor to find out any further impacts will be caused by shifting the manholes.

For the storm section below. DSEL met the IBI criteria for the proposed lots.
In regards to Block 19, the drainage areas should be corresponded to IBI Lot141, Lot 167 in Phase 1A and Lot208B, Lot209 in Phase 1B.
And the IBI 100 year capture rate is 475l/s (283l/s+63l/s+46l/s+83l/s). Please considered in your design later on.

Should you have any questions please do not hesitate to contact either Jim or me.

Yours truly,

Winston Yang P.Eng.

email Winston.Yang@ibigroup.com web www.ibigroup.com

IBI GROUP
Suite 400, 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel +1 613 225 1311 fax +1 613 225 9868

From: Adam Fobert [mailto:AFobert@dsel.ca]
Sent: Tuesday, August 15, 2017 5:27 PM
To: Winston Yang <Winston.Yang@ibigroup.com>; Jim Moffatt <jmoffatt@IBIGroup.com>
Cc: Jean Lachance <JLachance@clc.ca>; Jillian Normand <Jillian.Normand@mattamycorp.com>
Subject: 918 Mattamy - Wateridge: IBI Servicing Review

Hello Jim and Winston,

How is your review of our site servicing is coming along? I have reviewed your Design Brief's for Phase 1A and 1B and have compared the analysis contained within to our proposed design.

I offer the following considerations based on my review:

General:
DSEL proposed one storm and one sanitary connection to each block. The City indicated that this was their expectation during our pre-consultation as it is their standard practice for multi-block parcels.

Block 15: The servicing brief shows three connections to Squadron Crescent. DSEL are proposing one connection downstream of the contemplated connections.

Block 22: The surrounding grades slope from east to west. The servicing brief shows a drainage divide mid-block, where half the site drains to Moses Tenisco and the other to Michael Stoqua . Moses Tenisco is 1.14m higher than Michael Stoqua at the proposed road connection points. As such, to avoid fighting grades DSEL proposed storm and sanitary connections to Michael Stoqua only.

Block 24: Moses Tenisco slopes from north to south 1.1m from Hemlock to Mikinak. The servicing brief shows a drainage divide mid-block with connections to Moses Tenisco and Mikinak. DSEL proposed a storm and sanitary outlet at the southern road connection on Moses Tenisco based on Mattamy's proposed site. This avoids fighting grades internally.

Wastewater:
Block 15:
IBI Servicing Brief = 487.3p
Mattamy Proposal = 335p

Proposed connections are downstream of IBI contemplated connections. Population is less than included in servicing brief. Therefore, we do not expect servicing issues with Block 15.

Block 22:
IBI Servicing Brief ~ 105p (note that I am interpolating since half of Block 22 is included in northern half of Block 24.)
Mattamy Proposal = 52p

IBI servicing brief assumed 52.5p tributary to Moses Tenisco. Therefore, we do not expect capacity issues.

Block 24:

IBI Servicing Brief ~284.4p (note that I am interpolating based on the population shown on phase 1A southern half of block 24).

Mattamy Proposal = 364p

DSEL reviewed the available capacity in the receiving sewers and did not see any capacity issues.

Note: Mattamy's proposed servicing eliminates the need for 63.8m of sanitary sewer on Moses Tennisco from MH213A to MH212A. Savings to CLC.

Stormwater:

I have reviewed Appendix E of the servicing briefs to compare our calculations to the assumptions used in the model.

Review of the Summary of DDSWMM Parameters

Block 15:

IBI Servicing brief: No storage assumed. 5 and 100 year capture 396L/s

Mattamy's proposal: 275m3 of storage provided. DSEL's estimated 5-year peak 357.4L/s

Block 19:

IBI Servicing brief: No storage assumed. 194 + 57 (note that Lot 209 and 208B are missing from chart).

Mattamy's proposal: TBD.

Block 22:

IBI Servicing brief: No storage assumed. 5 and 100 year (46 + 46) 92L/s

Mattamy's proposal: 46.5m3 of storage provided. DSEL's estimated 5-year peak 87L/s.

Block 24:

IBI Servicing brief: No Storage. 5 and 100 year capture (162 +162) 324L/s.

Mattamy's proposal: 27.3m3 of storage provided. DSEL's estimated 5-year peak 325.7L/s.

Let me know if you have any comments or questions. Thank you for your time.

Adam Fobert, P.Eng.
Manager of Site Plan Design

DSEL
david schaeffer engineering ltd.

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

office: (613) 836-0856
direct: (613) 836-0626
cell: (613) 222-9493
email: afobert@DSEL.ca

Genavieve Greenberg

From: Jim Moffatt <jmoffatt@IBIGroup.com>
Sent: Tuesday, October 1, 2019 11:26 AM
To: Genavieve Greenberg; Ed Ireland; Karlinda Hinds
Cc: Jillian Normand; Adam Fobert
Subject: RE: Wateridge at Rockcliffe Phase 1B Servicing Confirmation (Block 15)

All sewers and watermains in Wateridge Village Phase 1B, including those on Squadron Crescent and downstream, are in service. If you require any further confirmation of Phase 1B services or have other questions about this Phase, just call me.

From: Genavieve Greenberg [mailto:GGreenberg@dsel.ca]
Sent: Friday, September 27, 2019 11:00 AM
To: Jim Moffatt <jmoffatt@IBIGroup.com>; Ed Ireland <ed.ireland@IBIGroup.com>; Karlinda Hinds <Karlinda.Hinds@ibigroup.com>
Cc: Jillian Normand <Jillian.Normand@mattamycorp.com>; Adam Fobert <AFobert@dsel.ca>
Subject: RE: Wateridge at Rockcliffe Phase 1B Servicing Confirmation (Block 15)

Good morning Jim,

We are working on the servicing plan for this block currently.

We have been asked by the City just to obtain confirmation that the services within Squadron Crescent and the rest of Phase 1B are in fact “in service”. Would it be possible to have that confirmed?

Thank you,

Genavieve Greenberg
Project Coordinator/ Junior Designer

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext. 569
email: ggreenberg@DSEL.ca

From: Jim Moffatt <jmoffatt@IBIGroup.com>
Sent: Friday, September 27, 2019 10:17 AM
To: Ed Ireland <ed.ireland@IBIGroup.com>; Karlinda Hinds <Karlinda.Hinds@ibigroup.com>
Cc: Genavieve Greenberg <GGreenberg@dsel.ca>
Subject: RE: Wateridge at Rockcliffe Phase 1B Servicing Confirmation (Block 15)

Do we have a plan from Dsel showing the servicing requirements for Block 15. We provided sewer outlets near the north west portion of the site.

From: Ed Ireland
Sent: Friday, September 27, 2019 10:06 AM
To: Jim Moffatt <jmoffatt@IBIGroup.com>; Karlinda Hinds <Karlinda.Hinds@ibigroup.com>
Cc: GGreenberg@dsel.ca
Subject: FW: Wateridge at Rockcliffe Phase 1B Servicing Confirmation (Block 15)

Jim and Karlinda,

Can you email Genavieve the Wateridge files she needs and the construction group must have some correspondence with the City regarding service installation.

Ed

From: Genavieve Greenberg [mailto:GGreenberg@dsel.ca]
Sent: Friday, September 27, 2019 10:00 AM
To: Ed Ireland <ed.ireland@IBIGroup.com>
Subject: Wateridge at Rockcliffe Phase 1B Servicing Confirmation (Block 15)

Good morning Ed,

We have been requested by the City to obtain correspondence to confirm that the surrounding services for the proposed development are in service. Would you be able to provide confirmation that all of Wateridge Village at Rockcliffe Phase 1B are in service. Would you be able to confirm this for us?

I was also wondering if you might be able to send the most recent drawings for Phase 1B and if possible CAD for the Ponding Plan, Drawing No. 751.

I will give you a call this morning to discuss these items. If you have any questions at all please feel free to reach out to me.

Thank you,

Genavieve Greenberg
Project Coordinator/ Junior Designer

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext. 569
email: ggreenberg@DSEL.ca

Anthony Temelini

From: Jamie Batchelor <jamie.batchelor@rvca.ca>
Sent: May 6, 2020 1:24 PM
To: Anthony Temelini
Cc: Jennifer Ailey
Subject: RE: 948 - Wateridge Village - Phase 1B Block 22 Water Quality Requirements

Good Afternoon Anthony,

If the flows are still ultimately being directed to the Eastern SWM facility before being discharged to a watercourse (in keeping with the original intent in the overall drainage plan, then The RVCA would not require any further onsite water quality control measures save and accept LID's or best management practices where appropriate.

Jamie Batchelor, MCIP, RPP
Planner, ext. 1191
Jamie.batchelor@rvca.ca

Rideau Valley Conservation Authority
3889 Rideau Valley Drive
PO Box 599, Manotick ON K4M 1A5
T 613-692-3571 | 1-800-267-3504 F 613-692-0831 | www.rvca.ca

From: Anthony Temelini <ATemelini@dsel.ca>
Sent: Tuesday, May 5, 2020 2:48 PM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Cc: Jennifer Ailey <JAiley@dsel.ca>
Subject: 948 - Wateridge Village - Phase 1B Block 22 Water Quality Requirements

Hi Jamie,

I'm writing to you regarding the proposed development known as Wateridge Village – Phase 1B Block 22, located at 1400 Hemlock Road, which proposes 20 back-to-back stacked townhomes, 18 rear lane townhomes and surface parking on 0.46 ha of land. Please see the attached map from GeoOttawa and the current site plan for your reference.

The subject property is located within the Ottawa River watershed and was contemplated in the overall design for Wateridge Village at Rockcliffe Phase 1B, prepared by IBI Group. 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.

The drainage plan per the approved servicing report by IBI Group is attached and shows the subject lands with a runoff coefficient of 0.80 with flow directed to the Eastern SWM Facility. Please note that the approved drainage plan contemplated splitting storm flows from the site to Michael Stoqua Street and Moses Tennisco Street, but the current

storm strategy proposes sending all of the minor system drainage to Michael Stoqua Street as the City of Ottawa has requested a singular connection to the existing storm sewer system.

The current design for the development will direct minor system flow to the Eastern SWM Facility with major flow directed to the dry pond south of the site and ultimately to the Eastern SWM facility via the minor storm sewer system, which is generally consistent with the approved design by IBI Group. It should also be noted that the design for Block 22 will incorporate LID measures.

Based on this information, can you please confirm if any additional quality controls are required for Wateridge Village – Phase 1B Block 22?

Please feel free to contact me should you have any questions or if you would like to discuss.

Thank you,

Anthony Temelini, P.Eng.
Junior Project Manager

DSEL
david schaeffer engineering ltd.

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

cell: (613) 875-7862
phone: (613) 836-0856 ext.524
email: atemelini@dsel.ca

re: **Landscaping Plan Review - Block 22**
Wateridge Village Residential Development - Phase 1B - Block 22
335 St. Laurent Boulevard - Ottawa

to: Mattamy Homes - **Ms. Jillian Normand** - Jillian.Normand@mattamycorp.com

date: May 13, 2020

file: PG5345-MEMO.01

Further to your request and authorization, Paterson Group (Paterson) prepared the current memorandum to provide a review of the landscaping drawings for Block 22 of the aforementioned residential development. It should be noted that Block 22 is located along both, City of Ottawa publicly owned roads and on a private road. The following memorandum should be read in conjunction with Paterson Report PG5345-1 dated April 24, 2020.

Landscaping Plan Review

Paterson reviewed the following landscaping plan prepared by Nak Design Strategies and grading plan prepared by DSEL regarding the aforementioned development:

- ❏ Block 22 Site Plan - Job No. Mattamy - Wateridge, File No. D07-12-17-0111, Drawing No. A2, General Revision dated June 19, 2018.
- ❏ Planting Plan - Blocks 22 - Job No. 20-076, Sheet No. L-02, Revision 2 dated May 5, 2020.
- ❏ Grading Plan - Wateridge Block 22 - Phase 1- Project No. 17-948, Sheet No. 2, Revision 1, undated.

Blocks Adjacent to Publicly Owned Roads

Based on the landscaping plans provided, the proposed tree planting is in compliance with the recommendations provided by Paterson and is considered acceptable from a geotechnical perspective, provided the items noted below are addressed. Atterberg testing was completed at two (2) borehole locations across the overall site, all with plasticity index results of less than 40%. This satisfies the first condition for reducing the tree foundation setback to **4.5 m** in the City of Ottawa guideline “Tree Planting in Sensitive Marine Clay Soils - 2017 Guidelines.”

The following conditions are also required to be met based on the tree planting guidelines:

- ❏ The proposed trees should have a minimum setback of 4.5 m from the proposed foundation walls. Based on our review of the landscaping plan, a 4.5 m setback has been provided for all street trees, **with the exception of Block 2 - Unit 6.** It was noted that the 4.5 m setback intersected with the majority of stair and porch

structures fronting onto a publicly owned road.

- ❏ The underside of footing is required to be 2.1 m below finished grade at the locations of the trees. Reference should be made to Table 1 below and following comments regarding the underside of footing elevations.
- ❏ Adequate soil volumes are required to be provided for the proposed trees - 25 cubic meters for small trees and 30 cubic meters for medium trees. This should be confirmed by the landscape architect.
- ❏ Tree species are required to be small to medium size, confirmed by the landscape architect. Reference should be made to the section below for comments regarding the tree species and appropriate setbacks from building foundation walls.
- ❏ The foundation walls are required to have a minimum of two 15-M bars in the upper and lower sections of the foundation walls. This should be indicated on the drawings for the relevant blocks foundation wall. Reference should be made to the additional comments below.
- ❏ Grading surrounding the tree should be designed to promote draining towards the tree root zone. This should be confirmed by the landscape architect and civil engineer.

Table 1 below provides a summary of the landscaping and grading information for the relevant Blocks:

Table 1 - Landscaping Plan and Grading Details

Block - Unit	Underside of Footing Elevation	Lowest Prop. Finished Grade	Foundation Depth (m)	Underside of Engineered Pad (If Required)	Tree to Foundation (m)
1-1	89.20	89.86	0.66	87.76	5.3
1-2	89.20	89.92	0.72	87.82	6.6
1-3	89.20	89.98	0.78	87.88	6.7
1-4	89.20	90.04	0.84	87.94	6.4
1-5	89.20	90.10	0.90	88.00	7.8
1-6	89.20	90.16	0.96	88.06	7.8
2-1	89.37	90.32	0.95	88.22	7.7
2-2	89.37	90.32	0.95	88.22	6.4
2-3	89.37	90.37	1.00	88.27	6.6
2-4	89.37	90.43	1.06	88.33	6.4
2-5	89.37	90.50	1.13	88.40	6.4
2-6	89.37	90.60	1.23	88.50	3.1
3-1	89.23	90.31	1.08	88.21	6.1
3-2	89.23	90.25	1.02	88.15	7.2
3-3	89.23	90.19	0.96	88.09	6.3
3-4	89.23	90.20	0.97	88.10	7.2

Table 1 - Landscaping Plan and Grading Details					
Block - Unit	**Underside of Footing Elevation**	**Lowest Prop. Finished Grade**	**Foundation Depth (m)**	**Underside of Engineered Pad (If Required)**	**Tree to Foundation (m)**
3-5	89.23	90.22	0.99	88.12	6.5
3-6	89.23	90.24	1.01	88.14	6.1
4-1	88.02	89.46	1.44	87.36	8.4
4-2	88.02	89.55	1.53	87.45	8.6
4-3	88.02	89.58	1.56	87.48	8.6
4-4	88.02	89.61	1.59	87.51	8.6
4-5	88.02	89.64	1.62	87.54	8.5
4-6	88.02	89.92	1.90	87.82	5.9
4-7	88.02	89.88	1.86	N/A	N/A
4-8	88.02	89.82	1.80	N/A	N/A
4-9	88.02	89.78	1.76	N/A	N/A
4-10	88.02	89.72	1.70	N/A	N/A

Based on our review, the following outstanding issues need to be completed for the proposed development to qualify for the reduced tree planting setback:

Item A: Underside of Footing Elevation

Based on our review, a 2.1 m depth to underside of footing has not been provided for the blocks where trees have less than 10 m horizontal separation from the foundation wall.

It is understood that the City of Ottawa would accept reducing the required soil cover down to 1.9 m provided that additional measures be taken and approved by the geotechnical consultant. The following summarizes our justification for a reduced soil cover based on the subsurface profile, groundwater table and the proposed tree planting setback:

Based on our review of the proposed site conditions, the proposed footings along the front of the lots can be placed with a minimum 1.9 m soil cover provided that a minimum 300 mm thick granular pad be placed between the underside of footing and the underlying silty clay deposit. The rationale for this is that tree roots cannot penetrate a compacted granular fill. In addition, the groundwater table is well below the granular pad which makes it too deep for the roots to reach and impact the underlying silty clay material that is considered consolidated as a result of the surcharge program. Therefore, provided a minimum 300 mm thick granular pad is in place, the 1.9 m soil cover between the underside of pad to finished grade is sufficient from a geotechnical perspective.

based on our review of the proposed USF levels, it is our understanding that footing depths range between 0.66 to 1.9 m below proposed finished grade. To compensate for the reduced foundation depth, an engineered fill pad (OPSS Granular A or Granular B Type II) can be placed below the footing to a depth of 1.9 m below proposed finished grade surrounding the building. The engineered fill should be placed in 300 mm thick loose lifts and compacted to a minimum 98% of the material's SPMDD and approved by Paterson at the time of construction. The engineered fill pad will effectively increase the depth between the finished grade and the underlying silty clay deposit to the required 1.9 m which achieves the same goal as lowering the footing from a tree planting perspective. More recommendations will follow in Item D below. Reference can be made to Figure 1 attached for additional information.

These recommendations are required for Block 1, Block 2, Block 3 and Block 4 - Unit 1 through Unit 6.

Item B: Tree Species

The landscaping architect should confirm that the tree species placed within 7.5 m of the foundation wall consist of small and medium size trees with a mature tree height less than or equal to 14 m. It is understood that the tree heights listed on the plan are the mature heights of these trees in natural conditions and not in city conditions.

Item C: Additional Reinforcing Requirements

As required by the guidelines, the foundation walls should be provided with a minimum of two 15-M bars in the upper and lower sections of the foundation walls. This should be indicated on the relevant drawings and reviewed by Paterson at the time of construction. This requirement applies to **all residential structures** adjacent to ROW trees within Block 22 of Phase 1B.

Provided these remaining conditions have been met, the landscaping drawings noted above are in compliance with the City of Ottawa tree planting guidelines.

Item D: Trees within 4.5 m of Front Stairs or Porches

Based on our review of the above noted drawings, the footing depths were found to be at a minimum of 0.6 m below proposed finished grade or lower. Based on the newest tree planting guidelines, the footings need to be placed at a minimum depth of 2.1 m below finished grade or an approved reduced depth of 1.9 m..

It is understood that a number of the stair case structures have 2 or 3 risers extending horizontally beyond the foundation walls towards publicly owned roads within the 4.5 m allowable tree planting horizontal separation, which includes **Block 1, Block 2, Block 3 and Block 4 - Unit 1 through Unit 6**.

In order to avoid lowering the footings and/or have differential settlement due to part of the riser being within the 4.5 m tree setback, it is recommended that where the front porch footings/risers are located within the 4.5 m setback, a granular backfill be introduced. Where the 1.9 m soil cover is not satisfied, the native material within the footprint of the front porch footings should be sub-excavated to a maximum 300 below the USF level and replaced with a granular pad consisting of OPSS Granular A or Granular B Type II placed in 300 mm loose lifts and compacted to 98% of the material's SPMDD. The granular pad should only be extended horizontally a minimum of 600 mm beyond the face of the foundation wall (towards the interior side of the front porch). It is important to note that a minimum 3H:1V frost taper will be required to transition from the granular pad to the native soil. Please refer to Figure 1 attached.

In addition, the backfill against the front facing porch foundation should also be backfilled with the above noted granular material. The horizontal extent of the foundation wall backfill should be dependent on the extent of the risers above, a minimum of 300 mm wide layer should be provided beyond the lowest riser.

We trust that this information satisfies your immediate requirements.

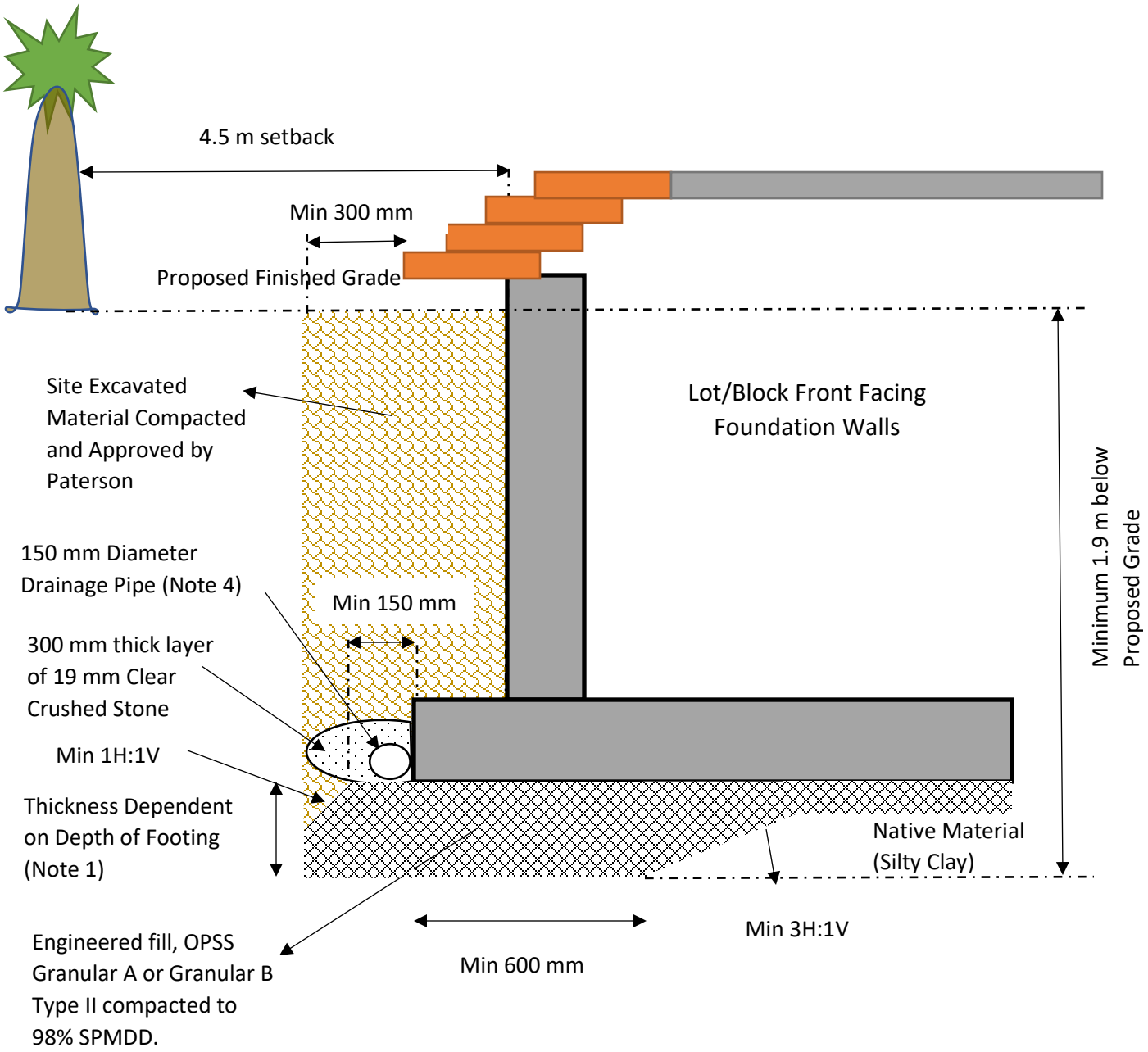
Best Regards,

Paterson Group Inc.

Drew Petahtegoose, B.Eng.

Faisal I. Abou-Seido, P.Eng.

Figure 1 – Engineered Pad Below USF For Tree Planting Purposes



Notes:

- Note 1: Where front porch footings have a minimum depth below finished grade of 1.9 m, the granular pad below the footings will not be required.
- Note 2: The thickness of the engineered pad is dependent of the depth of footings below proposed grade. The thickness of the engineered pad can be calculated by subtracting the depth of footing from 1.9 m.
- Note 3: The placement of the engineered fill should be reviewed and approved in the field by Paterson personnel.
- Note 4: The 150 mm diameter perforated, corrugated drainage pipe should be geotextile wrapped, placed at the founding level and connected to a positive outlet with a gravity connection.

patersongroup **memorandum**

consulting engineers

re: **Grading Plan Review**
Wateridge Residential Development - Phase 1B - Block 22
335 St. Laurent Boulevard - Ottawa

to: Mattamy Homes - **Ms. Jillian Normand** - Jillian.Normand@mattamycorp.com
cc: DSEL - **Ms. Jennifer Ailey** - JAiley@dsel.ca
date: May 15, 2020
file: PG5345-MEMO.02

Further to your request and authorization, Paterson Group (Paterson) prepared the current memorandum to provide a review of the grading plan for Block 22 of the aforementioned residential development. The following memorandum should be read in conjunction with Paterson Report PG5345-1 dated April 24, 2020.

Relevant design information is presented in Table 1 - Summary of Design Details for the subject blocks. The relevant design and inspection information includes the following:

- ❏ Legal block number
- ❏ Original ground surface elevation
- ❏ Proposed finished grade elevation
- ❏ Bearing resistance values
- ❏ Proposed USF elevation
- ❏ Seismic site class
- ❏ Approximate proposed frost cover depth
- ❏ Approximate engineered fill thickness

Grading Plan Review

Paterson reviewed the following grading plan prepared by DSEL regarding the aforementioned development:

- ❏ Grading Plan - Block 22 - Job No. 17-948, Sheet 2, Revision 1, undated.

Based on our review of the above noted grading plan, the proposed grade raises within Block 22 of the aforementioned development are acceptable from a geotechnical perspective. Based on the grading plans provided, no grade raise exceedances were noted and the proposed grades are considered acceptable for the proposed buildings within Block 22 from a geotechnical perspective.

Where existing fill is encountered directly below the underside of footing (USF), the footings may be required to be lowered to an undisturbed, native bearing surface. Alternatively, a zero-entry, vertical trench can be excavated below the USF down to a native material and in-filled with engineered fill, compacted to a minimum 98% of the material's SPMDD or lean concrete mix (Minimum 15 MPa, 28 day strength). The in-filled trenches should be extended a minimum 150 mm beyond the footing face on all directions.

Table 1 attached to this memo presents our summary of design details for the current phase.

We trust that this information satisfies your immediate requirements.

Best Regards,

Paterson Group Inc.

Drew Petahtegoose, B.Eng.

Faisal I. Abou-Seido, P.Eng.

Table 1 - Summary of Grading Design Details - Wateridge Village - Block 22

Legal Lot/ Block Number	Underside of Footing Elevation (Proposed) (m)	Original GS Front (m)	Proposed GS Front (m)	Original GS Rear (m)	Proposed GS Rear (m)	Approx. Proposed Frost Cover Depth (m)	Minimum Bearing Capacity - Serviceability Limit States (kPa)	Seismic Site Class	Permissible Grade Raise (m)	Above Permissible Grade Raise Front (m)	Above Permissible Grade Raise Front	Approximte Engineered Fill Thickness (m)	LWF required in Garage and Front Porch (m)	LWF Required (m)
Block 1 - Unit 1	89.20	88.50	89.92	88.50	89.48	0.72	150.00	C	2.00	n/a	n/a	1.00	n/a	n/a
Block 1 - Unit 2	89.20	88.60	89.98	88.50	89.56	0.78	150.00	C	2.00	n/a	n/a	0.90	n/a	n/a
Block 1 - Unit 3	89.20	88.70	90.04	88.50	89.64	0.84	150.00	C	2.00	n/a	n/a	0.80	n/a	n/a
Block 1 - Unit 4	89.20	88.80	90.10	88.50	89.73	0.90	150.00	C	2.00	n/a	n/a	0.70	n/a	n/a
Block 1 - Unit 5	89.20	88.90	90.16	88.50	89.81	0.96	150.00	C	2.00	n/a	n/a	0.60	n/a	n/a
Block 1 - Unit 6	89.20	89.00	90.43	88.60	90.13	1.23	150.00	C	2.00	n/a	n/a	0.50	n/a	n/a
Block 2 - Unit 1	89.37	89.10	90.43	88.60	90.13	1.06	150.00	C	2.00	n/a	n/a	0.57	n/a	n/a
Block 2 - Unit 2	89.37	89.20	90.37	88.70	90.02	1.00	150.00	C	2.00	n/a	n/a	0.47	n/a	n/a
Block 2 - Unit 3	89.37	89.30	90.43	88.70	90.10	1.06	150.00	C	2.00	n/a	n/a	0.37	n/a	n/a
Block 2 - Unit 4	89.37	89.40	90.50	88.75	90.18	1.13	150.00	C	2.00	n/a	n/a	0.30	n/a	n/a
Block 2 - Unit 5	89.37	89.50	90.55	88.75	90.26	1.18	150.00	C	2.00	n/a	n/a	0.30	n/a	n/a
Block 2 - Unit 6	89.37	89.60	90.60	88.80	90.40	1.23	150.00	C	2.00	n/a	n/a	0.30	n/a	n/a
Block 3 - Unit 1	89.23	88.90	90.31	88.85	90.13	1.08	150.00	C	2.00	n/a	n/a	0.63	n/a	n/a
Block 3 - Unit 2	89.23	88.90	90.25	88.70	90.16	1.02	150.00	C	2.00	n/a	n/a	0.63	n/a	n/a
Block 3 - Unit 3	89.23	88.90	90.20	88.60	90.18	0.97	150.00	C	2.00	n/a	n/a	0.63	n/a	n/a
Block 3 - Unit 4	89.23	88.85	90.22	88.55	90.20	0.99	150.00	C	2.00	n/a	n/a	0.68	n/a	n/a
Block 3 - Unit 5	89.23	88.80	90.22	88.50	90.22	0.99	150.00	C	2.00	n/a	n/a	0.73	n/a	n/a
Block 3 - Unit 6	89.23	88.75	90.24	88.50	90.25	1.01	150.00	C	2.00	n/a	n/a	0.78	n/a	n/a
Block 4 - Unit 1	88.02	88.40	89.46	-	-	1.44	150.00	C	2.00	n/a	n/a	n/a	n/a	n/a
Block 4 - Unit 2	88.02	88.35	89.58	-	-	1.56	150.00	C	2.00	n/a	n/a	n/a	n/a	n/a
Block 4 - Unit 3	88.02	88.35	89.61	-	-	1.59	150.00	C	2.00	n/a	n/a	n/a	n/a	n/a
Block 4 - Unit 4	88.02	88.30	89.64	-	-	1.62	150.00	C	2.00	n/a	n/a	0.30	n/a	n/a
Block 4 - Unit 5	88.02	88.25	89.69	-	-	1.67	150.00	C	2.00	n/a	n/a	0.30	n/a	n/a
Block 4 - Unit 6	88.02	88.20	89.92	-	-	1.90	150.00	C	2.00	n/a	n/a	0.30	n/a	n/a
Block 4 - Unit 7	88.02	88.25	89.88	-	-	1.86	150.00	C	2.00	n/a	n/a	0.30	n/a	n/a
Block 4 - Unit 8	88.02	88.30	89.85	-	-	1.83	150.00	C	2.00	n/a	n/a	0.30	n/a	n/a
Block 4 - Unit 9	88.02	88.30	89.78	-	-	1.76	150.00	C	2.00	n/a	n/a	0.30	n/a	n/a
Block 4 - Unit 10	88.02	88.35	89.72	-	-	1.70	150.00	C	2.00	n/a	n/a	n/a	n/a	n/a

DSEL Grading Plans Reviewed: Grading Plan - Wateridge - Block 22 - Project 17-948 - Sheet No. 2 - Revision 1, undated.

Note: Bearing Capacities noted in the table are based on engineered fill being placed over an undisturbed, native in-situ soil bearing surface. Based on the proposed USF elevations, in-situ silty clay and/or glacial till is anticipated to be encountered below the existing fill as a suitable bearing medium.

Note: Approximate fill thickness estimated based on subexcavating up to 300 mm below the original ground surface elevation observed during the geotechnical investigations. Existing ground surface elevations may differ from original ground surface elevations encountered during the geotechnical investigations.

patersongroup **memorandum**

consulting engineers

re: **Geotechnical Review of Site Servicing Drawings**
Wateridge Residential Development - Phase 1B - Block 22
335 St-Laurent Boulevard - Ottawa

to: Mattamy Homes - **Ms. Jillian Normand** - Jillian.Normand@mattamycorp.com

to: DSEL - **Ms. Jennifer Ailey** - JAiley@dsel.ca

date: May 15, 2020

file: PG5345-MEMO.03

Further to your request and authorization, Paterson Group (Paterson) prepared the current memorandum to provide a geotechnical review of the design drawings prepared by DSEL for Block 22 of the aforementioned residential development. The following memorandum should be read in conjunction with Paterson Report PG5245-1 dated April 24, 2020.

Geotechnical Review

Paterson has reviewed the following set of site service drawings, cross-sections and grading plans prepared by DSEL:

- ❏ Grading Plan - Block 22 - Job No 17-948, Sheet 2, Revision 1, undated.
- ❏ Site Servicing Plan - Block 22 - Job No. 17-948, Sheet 3, Revision 1, undated.

From a geotechnical perspective, the relevant recommendations (i.e., adequate frost protection of services, pavement structure drainage, pipe bedding and backfill) provided in Paterson Report PG5245-1 dated April 24, 2020, have been sufficiently incorporated into the above-noted drawings.

Clay Seals

To reduce long-term lowering of the groundwater level within the north portion of the site, clay seals should be provided in the service trenches at the locations shown on the plans attached to the present memorandum. Typically, clay seals are recommended to be placed within service trenches where silty clay is present at invert level. Paterson has reviewed the available service profile drawings for the current phase. Based on our review and existing subsoils information, the silty clay will be encountered at the lowest service invert level. It is therefore recommended that clay seals be provided in the service trenches at the locations depicted on the aforementioned site servicing planprepared by DSEL.

The seals should be at least 1.5 m long (in the trench direction) and should extend from trench wall to trench wall. Should trench walls extend beyond the anticipated trench width inferred by the location of the clay seal depicted on the aforementioned site servicing planprepared by DSEL, the clay seal is recommended to extend the full trench width. The seals should extend from the frost line and fully penetrate the bedding, subbedding and cover material. The barriers should consist of relatively dry and compactable brown silty clay placed in maximum 225 mm thick loose layers and compacted to a minimum of 95% of the SPMDD.

It should be noted that a grading plan review and subsequent recommendations will be completed under a separate memorandum report for the subject site.

We trust this memorandum meets your immediate requirements.

Best Regards,

Paterson Group Inc.

Drew Petahtegoose, B.Eng.

Faisal I. Abou-Seido, P.Eng.

patersongroup

consulting engineers

memorandum

re: **Geotechnical Recommendations - Review of Servicing Installation Impact on Adjacent Building Foundations**
Wateridge Village Residential Development - Phase 1B - Block 22
335 St-Laurent Boulevard - Ottawa

to: Mattamy Homes - **Ms. Jillian Normand** - Jillian.Normand@mattamycorp.com

cc: DSEL - **Ms. Jennifer Ailey**- JAiley@dsel.ca

date: May 15, 2020

file: PG5345-MEMO.04

Paterson Group (Paterson) has prepared the current memorandum report to provide geotechnical recommendations for supporting the building footings directly adjacent to the proposed service structures at the aforementioned site. The following memorandum should be read in conjunction with Paterson Report PG5345-1 dated April 24, 2020.

Background Information

Paterson reviewed the following plan and sketches provided by David Schaeffer Engineering Limited (DSEL) for servicing at the aforementioned residential development:

- ❏ Cross Sections - Wateridge - Block 22 - Project No. 17-948 - Sheet 8, Revision 1 undated.

Based on the cross section details provided by DSEL, cross sections 2-2 and 4-4 have service structures located within the lateral support zone of the adjacent building foundations:

- ❏ Section 2-2: The underside of the bedding for the water chamber structure will be located at approximately 85.85 m and the underside of footing is located at an elevation of 89.20 m. Therefore, the vertical separation is approximately 3.35 m with a lateral separation of approximately 0.30 m which does not include the additional trench excavation (approximately 0.3 m).

- ❏ Section 4-4: The underside of the bedding for the water chamber structure will be located at approximately 86.70 m and the underside of footing is located at an elevation of 89.37 m. Therefore, the vertical separation is approximately 2.67 m with a lateral separation of approximately 0.30 m which does not include the additional trench excavation.

Based on the proposed service and structure locations with respect to the adjacent building foundations, the following backfilling program is recommended to ensure that adequate lateral support is provided to the adjacent buildings.

Recommendations

Section 2-2

In order to ensure that the lateral support zone of the proposed footings (1H:1V from the face of footing) are not impacted by the storage structure, the lateral support zone for the footings should be dropped below the underside of excavation below the proposed water chamber structure which was measured to be at an elevation of 85.85 m.

In order to accomplish this, a lean-concrete (15 MPa, 28 day strength) in-filled trench extending to an elevation of 85.75 m is recommended to be placed below the footings of the west foundations walls for Block 1. Additionally, the trench should be extended below the north and south-facing foundation walls by tapering the underside of the lean-concrete upward at a 3H:1V incline to match the proposed USF elevations beneath the north south-facing footings. The near vertical, zero entry trench should extend at least 300 mm beyond the footing footprint along the west side of Block 1 and extend a minimum of 2 m horizontally beyond the footing face along the north and south foundation walls, parallel to the storage tank structure. The near vertical, zero entry trench should be reviewed and approved by Paterson at the time of construction.

Section 4-4

In order to ensure that the lateral support zone of the proposed footings (1H:1V from the face of footing) are not impacted by the storage structure, the lateral support zone for the footings should be dropped below the underside of excavation below the proposed water chamber structure which was measured to be at an elevation of 86.70 m.

In order to accomplish this, a lean-concrete (15 MPa, 28 day strength) in-filled trench extending to an elevation of 86.55 m is recommended to be placed below the footings of the west foundations walls for Blocks 2. Additionally, the trench should be extended below the north and south-facing foundation walls by tapering the underside of the lean-concrete upward at a 3H:1V incline to match the proposed USF elevations beneath the north and south-facing footings. The near vertical, zero entry trench should extend at least 300 mm beyond the footing footprint along the west side of the blocks and extend a minimum of 2 m horizontally beyond the footing face along the north and south foundation walls, parallel to the storage tank structure. The near vertical, zero entry trench should be reviewed and approved by Paterson at the time of construction.

Other Services

All other services were reviewed to be in conformance with our recommendations without interfering with the lateral support zone of footings.

We trust that this information is satisfactory to meet your immediate requirements.

Paterson Group Inc.

Drew Petahtegoose, B.Eng.

Faisal I. Abou-Seido, P.Eng.

patersongroup **memorandum**

consulting engineers

re:	**Geotechnical Review - Infiltration Rates** **Wateridge Village Residential Development - Phase 1B - Block 22** **335 St-Laurent Boulevard - Ottawa**
to:	Mattamy Homes - **Ms. Jillian Normand** - Jillian.Normand@mattamycorp.com
to:	DSEL - **Ms. Jennifer Ailey** - JAiley@dsel.ca
date:	May 15, 2020
file:	PG5345-MEMO.05

Further to your request, Paterson Group (Paterson) carried out a review of available information obtained from geotechnical information within the vicinity of Block 22 of the proposed Wateridge Village Residential Development. The following memorandum should be read in conjunction with Paterson Report PG5345-1 dated April 24, 2020.

Background

The purpose of this review was to provide a range of theoretical infiltration rates to be encountered within the subsoils below the proposed low-impact development (LID) infiltration system for the aforementioned site.

The subsurface profile encountered at the test hole locations in Block 22 of the proposed development generally consisted of an overlaying fill extending to a maximum depth of 1.2 m below existing grade, underlain by a very stiff to stiff brown silty clay, which in turn is underlain by a brown to grey glacial till with a fine matrix consisting of silty clay and silty sand with gravel and cobbles.

Geotechnical Commentary

The field saturated hydraulic conductivity (K_{fs}) values were selected using Engineering Technologies Canada (ETC) Ltd and based on a clay. Reference tables provided in the most recent ETC Pask Permeameter User Guide. The infiltration rates were determined using Appendix C of the Low Impact Development Stormwater Management Planning and Design Guide (CVC 2011). It should be noted that a safety correction factor of 3.5 was used when calculating the infiltration rate to account for any variations in the soil.

Based on the theoretical calculations, the infiltration rate of the subsoils below the proposed infiltration system for Block 22 will be approximately **140 to 200 mm/day**.

Please note that the values in this memorandum report are strictly theoretical and based on values obtained in similar materials during previous investigations in the surrounding area. It should also be noted that it was assumed the infiltration system will be installed within the silty clay layer of the subsurface.

We trust that this information is satisfactory for your immediate requirements.

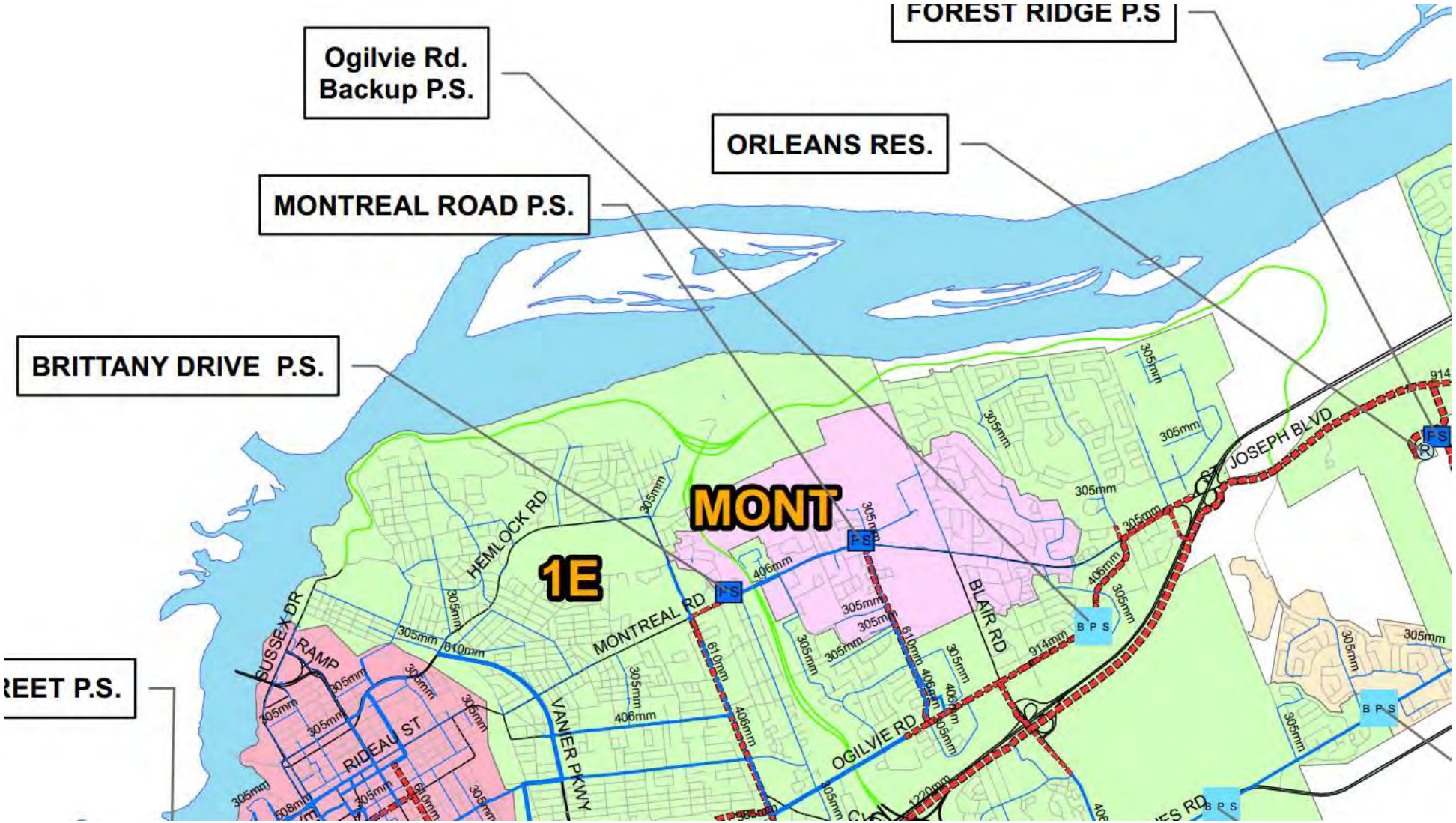
Paterson Group Inc.

Drew Petahtegoose, B.Eng.

Faisal I. Abou-Seido, P.Eng.

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
SUSSEX DR
RAMP
MONTREAL RD
VANIER PKWY
RIDEAU ST
OGILVIE RD
BLAIR RD
ST. JOSEPH BLVD
305mm
406mm
610mm
914mm
1220mm
508mm
B P S
P S

Mattamy Homes
Wateridge - Block 22
Proposed Site Conditions

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	38	103
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	103	28.8	20.0	141.3	98.1	213.4	148.2

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
Restaurant*	125 L/seat/d	-	0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Light	35,000 L/gross ha/d	-	0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Heavy	55,000 L/gross ha/d	-	0.00	0.0	0.0	0.0	0.0	0.0
Total I/CI Demand			0.0	0.0	0.0	0.0	0.0	0.0
Total Demand			**28.8**	**20.0**	**141.3**	**98.1**	**213.4**	**148.2**
Total Demand			28.8	20.0	141.3	98.1	213.4	148.2
Total Demand+10%			**31.7**	**22.0**	**155.4**	**107.9**	**234.8**	**163.0**

* Estimated number of seats at 1 seat per $9.3m^2$

Block 1
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: Wood Frame

C	1.5		*Type of Construction Coefficient per FUS Part II, Section 1*
A	1251.5	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	11674.4	L/min	
	12000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible -15%

Fire Flow	**10200.0**	**L/min**

3. Reduction for Sprinkler Protection

Non-Sprinklered 0%

Reduction	**0**	**L/min**

4. Increase for Separation Distance

	Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC	
N	Wood Frame	30.1m-45m	29	3	87	5%	
S	Wood Frame	10.1m-20m	29	3	87	14%	
E	Wood Frame	0m-3m	15	3	45	23%	
W	Wood Frame	20.1m-30m	15	3	45	8%	
		% Increase				**50%**	*value not to exceed 75%*

Increase	**5100.0**	**L/min**

Lw = Length of the Exposed Wall
Ha = number of storeys of the adjacent structure. Max 5 stories
LH = Length-height factor of exposed wall. Value rounded up.
EC = Exposure Charge

Total Fire Flow

Fire Flow	15300.0	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section*
	15000.0	**L/min**	*rounded to the nearest 1,000 L/min*

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

Block 2
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: Wood Frame

C	1.5		*Type of Construction Coefficient per FUS Part II, Section 1*
A	1250.2	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	11668.0	L/min	
	12000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible	-15%	
Fire Flow	**10200.0**	**L/min**

3. Reduction for Sprinkler Protection

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

4. Increase for Separation Distance

	Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC	
N	Wood Frame	30.1m-45m	29	3	87	5%	
S	Wood Frame	10.1m-20m	29	3	87	14%	
E	Wood Frame	20.1m-30m	15	3	45	8%	
W	Wood Frame	0m-3m	15	3	45	23%	
		% Increase				**50%**	*value not to exceed 75%*

Increase	**5100.0**	**L/min**

Lw = Length of the Exposed Wall
Ha = number of storeys of the adjacent structure. Max 5 stories
LH = Length-height factor of exposed wall. Value rounded up.
EC = Exposure Charge

Total Fire Flow

Fire Flow	15300.0	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	15000.0	**L/min**	*rounded to the nearest 1,000 L/min*

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

Block 3
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: Wood Frame

C	1.5		*Type of Construction Coefficient per FUS Part II, Section 1*
A	1218.8	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	11520.5	L/min	
	12000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible -15%

Fire Flow	**10200.0**	**L/min**

3. Reduction for Sprinkler Protection

Non-Sprinklered 0%

Reduction	**0**	**L/min**

4. Increase for Separation Distance

	Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC	
N	Wood Frame	10.1m-20m	15	3	45	13%	
S	Wood Frame	30.1m-45m	15	3	45	5%	
E	Wood Frame	20.1m-30m	29	3	87	9%	
W	Wood Frame	20.1m-30m	29	3	87	9%	
		% Increase				**36%**	*value not to exceed 75%*

Increase	**3672.0**	**L/min**	

Lw = Length of the Exposed Wall
Ha = number of storeys of the adjacent structure. Max 5 stories
LH = Length-height factor of exposed wall. Value rounded up.
EC = Exposure Charge

Total Fire Flow

Fire Flow	13872.0	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	14000.0	**L/min**	*rounded to the nearest 1,000 L/min*

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

Block 4
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: Wood Frame

C	1.5		*Type of Construction Coefficient per FUS Part II, Section 1*
A	2318.2	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	15888.6	L/min	
	16000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible	-15%	
Fire Flow	**13600.0**	**L/min**

3. Reduction for Sprinkler Protection

Sprinklered	-30%	
Reduction	**-4080**	**L/min**

4. Increase for Separation Distance

	Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC	
N	Wood Frame	10.1m-20m	19	4	76	14%	
S	Wood Frame	>45m	19	4	76	0%	
E	Wood Frame	20.1m-30m	31	4	124	10%	
W	Wood Frame	20.1m-30m	31	4	124	10%	
		% Increase				**34%**	*value not to exceed 75%*

Increase	**4624.0**	**L/min**

Lw = Length of the Exposed Wall
Ha = number of storeys of the adjacent structure. Max 5 stories
LH = Length-height factor of exposed wall. Value rounded up.
EC = Exposure Charge

Total Fire Flow

Fire Flow	14144.0	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	14000.0	**L/min**	*rounded to the nearest 1,000 L/min*

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

Anthony Temelini

From: Fraser, Mark <Mark.Fraser@ottawa.ca>
Sent: May 22, 2020 2:01 PM
To: Anthony Temelini
Cc: Jennifer Ailey
Subject: RE: 948 - Wateridge Village Phase 1B Block 22 Boundary Condition Request
Attachments: Wateridge Village Phase 1B Block 22 May 2020.pdf; geoOttawa.pdf; block 22 Site Plan- 2020 May 4 _ec.pdf; wtr-2020-05-07_948_ggg.pdf; wtr-2020-05-07_948_ggg_water demand.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Anthony,

Please find below boundary conditions, HGL, for hydraulic analysis at **1400 Hemlock Road [BLOCK 22] within Wateridge Village Phase 1B** (zone MONT) assumed to be connected to the 203mm dia. watermain on Michael Stoqua Street and the 203mm dia. watermain on Moses Tennisco Street (see attached PDF for locations) for both existing and future conditions.

Domestic and Fire Flow Water Demands:
Type of Development: Residential (18 rear lane townhome units and 20 back-to-back stacked townhome units)
Average Day Demand = 0.36 L/s
Maximum Day Demand = 1.80 L/s
Peak Hour Demand = 2.72 L/s
Fire Flow Demand = 15,000 L/min
HGL has been provided for the higher fire flow (Blocks 1 and 2) since that will govern the design.

Existing Conditions Based on Current Pump Operations:
(HGL is the same at both connections)
Minimum HGL = 146.7m
Maximum HGL = 147.0m ***The maximum pressure is estimated to be more than 80 psi.*** *A pressure check at completion of construction is recommended to determine if pressure control is required.*
Max Day + FireFlow (250L/s) = 140.0m

Future Conditions Based on a Proposed HGL Target of 143.0m at Montreal Road P.S:
(HGL is the same at both connections)
Minimum HGL = 143.0m
Maximum HGL = 143.0m
Max Day + FireFlow (250L/s) = 136.0m

These are based on computer model simulation.

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

Regards,

Mark Fraser, P. Eng.
Project Manager, Planning Services
Development Review Central Branch
City of Ottawa | Ville d'Ottawa
Planning, Infrastructure and Economic Development Department
110 Laurier Avenue West. 4th Floor, Ottawa ON, K1P 1J1
Tel:613.580.2424 ext. 27791
Fax: 613-580-2576
Mail: Code 01-14
Email: Mark.Fraser@ottawa.ca

From: Fraser, Mark
Sent: May 15, 2020 3:38 PM
To: Anthony Temelini <ATemelini@dsel.ca>
Cc: Jennifer Ailey <JAiley@dsel.ca>
Subject: RE: 948 - Wateridge Village Phase 1B Block 22 Boundary Condition Request

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Max Day + FireFlow (250L/s) = 140.0m

Please note the following:

- ***Boundary conditions provided above are for existing conditions****. Upgrades to the Montreal and Brittany pump stations are currently being planned to support the CFB Rockcliffe development. The City plans to control the discharge HGL to 143.0m. Furthermore, the current plan is to use a different pumping strategy that will try to maintain a constant HGL of 143.0m even during peak hour and/or fire flow conditions.*
- ***Boundary conditions will be forthcoming for future pump operation conditions*** *as requested. Our model currently does not include the future pumping changes into the zone Mont so the model has to be modified and the future HGL target reconfirmed.*

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

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Mark Fraser, P. Eng.
Project Manager, Planning Services
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Tel:613.580.2424 ext. 27791
Fax: 613-580-2576
Mail: Code 01-14
Email: Mark.Fraser@ottawa.ca

From: Anthony Temelini <ATemelini@dsel.ca>
Sent: May 11, 2020 2:47 PM
To: Fraser, Mark <Mark.Fraser@ottawa.ca>
Cc: Jennifer Ailey <JAiley@dsel.ca>
Subject: RE: 948 - Wateridge Village Phase 1B Block 22 Boundary Condition Request

Hi Mark,

Thanks for confirming.

Can you please ensure that the Water Resources Unit provides us with two (2) sets of boundary conditions, one for the Montreal Pressure Zone under current conditions and one for the Montreal Pressure Zone under future conditions (after the upgrades described in the attached excerpt have been made)?

Please let us know.

Thank you,

Anthony Temelini, P.Eng.
Junior Project Manager

DSEL
david schaeffer engineering ltd.

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

cell: (613) 875-7862
phone: (613) 836-0856 ext.524
email: atemelini@dsel.ca

From: Fraser, Mark <Mark.Fraser@ottawa.ca>
Sent: May 11, 2020 9:18 AM
To: Anthony Temelini <ATemelini@dsel.ca>
Cc: Jennifer Ailey <JAiley@dsel.ca>
Subject: RE: 948 - Wateridge Village Phase 1B Block 22 Boundary Condition Request

Hi Anthony,

The below request for boundary conditions has been sent to the Water Resources Unit. Please note that it can take approx. 5-10 business days to receive boundary conditions. I will forward you the boundary conditions once received.

Regards,

Mark Fraser
Project Manager, Planning Services
Development Review Central Branch
City of Ottawa | Ville d'Ottawa
Planning, Infrastructure and Economic Development Department
110 Laurier Avenue West. 4th Floor, Ottawa ON, K1P 1J1
Tel:613.580.2424 ext. 27791
Fax: 613-580-2576
Mail: Code 01-14
Email: Mark.Fraser@ottawa.ca

From: Anthony Temelini <ATemelini@dsel.ca>
Sent: May 08, 2020 1:31 PM
To: Fraser, Mark <Mark.Fraser@ottawa.ca>
Cc: Jennifer Ailey <JAiley@dsel.ca>
Subject: 948 - Wateridge Village Phase 1B Block 22 Boundary Condition Request

Hi Mark,

Per the attached engineering comments from April 2, please note that we are proceeding with the boundary condition request for Wateridge Village – Phase 1B Block 22:

1. Location of Service / Street Number: 1400 Hemlock Road.

2. Development information and fire flow requirements:

- Proposed residential development with 18 rear lane townhomes and 20 back-to-back stacked townhomes.
- Back-to-back stacked townhomes will have automatic sprinklers.
- Perimeter meters to be used.
- It is anticipated that the development will have two (2) connection points to existing services (see attached geoOttawa markup):
    - Connection 1 to the existing 200 mm diameter watermain on Michael Stoqua Street;
    - Connection 2 to the existing 200 mm diameter watermain on Moses Tennisco Street;
- It is anticipated that required **fire flows will range from 233 L/s** (14,000 L/min) **to 250 L/s** (15,000 L/min) per the attached calculations.

3. Anticipated demands for the development have been calculated per the attached spreadsheet, with an additional 10% contingency to be conservative:

	L/min	L/s	L/s (+10%)
Avg. Daily	20.0	0.33	0.36
Max Day	98.1	1.64	1.80
Peak Hour	148.2	2.47	2.72
Min Hour	10.0	0.17	0.19

Can you please forward the boundary condition request to the City's water modelling group and confirm once it has been submitted?

Please let us know when we can expect to receive the boundary conditions.

Thank you,

Anthony Temelini, P.Eng.
Junior Project Manager

DSEL
david schaeffer engineering ltd.

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

cell: (613) 875-7862
phone: (613) 836-0856 ext.524
email: atemelini@dsel.ca

'

Hydraulic Capacity and Modeling Analysis Wateridge Village Phase 1B - Block 22 Development

Final Report

Prepared for:
David Schaeffer Engineering Ltd.
120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

Prepared by:
GeoAdvice Engineering Inc.
Unit 203, 2502 St. John's Street
Port Moody, BC V3H 2B4

Submission Date: May 25, 2020

Contact: Mr. Werner de Schaetzen, Ph.D., P.Eng.
Project: 2020-019-DSE

Document History and Version Control

Revision No.	Date	Document Description	Revised By	Reviewed By
R0	May 20, 2020	Draft	Ferdinand de Schoutheete	Werner de Schaetzen
R1	May 22, 2020	Final	Ferdinand de Schoutheete	Werner de Schaetzen
R2	May 25, 2020	Final	Ferdinand de Schoutheete	Werner de Schaetzen

Statement of Qualifications and Limitations

This document represents GeoAdvice Engineering Inc. best professional judgment based on the information available at the time of its completion and as appropriate for the project scope of work. Services performed in developing the content of this document have been conducted in a manner consistent with that level and skill ordinarily exercised by a member of the engineering profession currently practicing under similar conditions. No

warranty, express or implied is made.

Contents

1 Introduction

GeoAdvice Engineering Inc. ("GeoAdvice") was retained by David Schaeffer Engineering Ltd. ("DSEL") to size the water main network for the Wateridge Village Phase 1B - Block 22 development ("Development") in the City of Ottawa, ON ("City").

The development is located at 1400 Hemlock Road between Michael Stoqua Street and Moses Tennisco Street. To the west of the development there is an existing 200 mm trunk main on Michael Stoqua Street, and to the east there is an existing 200 mm trunk main on Moses Tennisco Street.

The development consists of 18 rear-lane townhomes and 20 back-to-back stacked townhomes.

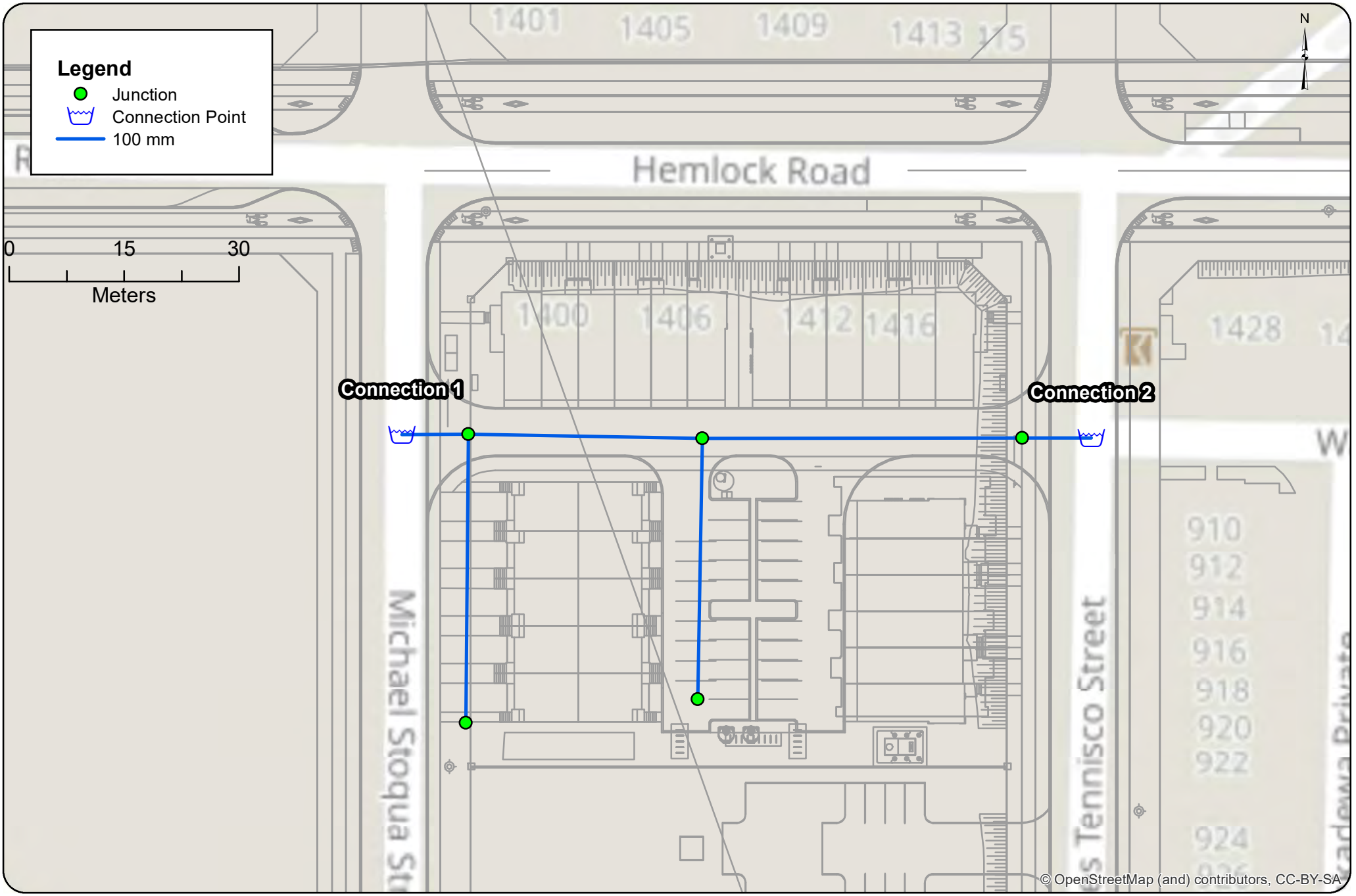
The development model will have two (2) connections to the City water distribution system:

- Connection 1: Existing 200 mm diameter watermain on Michael Stoqua Street; and
- Connection 2: Existing 200 mm diameter watermain on Moses Tennisco Street.

The development site is shown in **Figure 1.1** with the final recommended pipe diameters.

This report describes the assumptions and results of the hydraulic modeling and capacity analysis using InfoWater (Innovyze), a GIS water distribution system modeling and management software application.

The results presented in this report are based on the analysis of steady state simulations. No extended period simulations were completed in this analysis to assess the water quality or to assess the hydraulic impact on storage and pumping.



GeoAdvice Engineering Inc.

Project: **Hydraulic Capacity and Modeling Analysis**
Wateridge Village Phase 1B Development
Client: **David Schaeffer Engineering Ltd.**
Date: **May 2020**
Created by: **FdS**
Reviewed by: **WdS**

Site Layout and Connection Points

Figure 1.1

2 Modeling Considerations

2.1 Water Main Configuration

The water main network was modeled based on development layout provided by DSEL to GeoAdvice on May 12, 2020.

2.2 Elevations

Elevations of the modeled junctions were assigned based on the grading plan of the development provided by DSEL to GeoAdvice on May 12, 2020.

2.3 Consumer Demands

Demand calculations were completed by DSEL. A summary of the rates and peaking factors used for this development is shown in **Table 2.1** below.

Table 2.1: City of Ottawa Demand Rate and Peaking Factors

Demand Type	Amount	Unit
Average Day Demand		
Residential	280	L/c/d
Maximum Daily Demand		
Residential	4.9 x avg. day	L/c/d
Peak Hour Demand		
Residential	7.4 x avg. day	L/c/d
Minimum Hour Demand		
Residential	0.5 x avg. day	L/c/d

Table 2.2 summarizes the water demand calculations for the Wateridge Village Phase 1B - Block 22 Development.

Table 2.2: Development Demand Calculations

Dwelling Type	Number of Units	Unit Rate*	Pop	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)	Minimum Hour Demand (L/s)
Townhouse	38	2.7 cap/unit	103	0.33	1.63	2.46	0.17
Total (+ 10 %)				**0.37**	**1.80**	**2.72**	**0.19**

***City of Ottawa Design Guidelines**

Demands were uniformly distributed to all the nodes in the model.

2.4 Fire Flow Demand

Fire flow calculations were also completed by DSEL and are summarized in **Table 2.3** below.

Table 2.3: Fire Flow Requirements at 140 kPa (20 psi)

Development Type	Fire Flow (L/s)
Block 1 and 2	250
Block 3 and 4	233

A hydrant spacing analysis according to the City of Ottawa Design Guidelines has been conducted and the results are summarized in **Section 5.3**.

2.5 Boundary Conditions

The boundary conditions were provided by the City of Ottawa in the form of Hydraulic Grade Line (HGL) at the following locations:

- Connection 1: Existing 200 mm diameter watermain on Michael Stoqua Street; and
- Connection 2: Existing 200 mm diameter watermain on Moses Tennisco Street.

The above connection points are illustrated in **Figure 1.1**.

The table below summarizes the boundary conditions used to size the Wateridge Village Phase 1B - Block 22 development water network.

Table 2.4: Existing Boundary Conditions (Provided by DSEL on May 15, 2020)

Condition	Connection 1 HGL (m)	Connection 2 HGL (m)
Min Hour (maximum pressure)	147.0	147.0
Peak Hour (minimum pressure)	146.7	146.7

On May 22, 2020, the City provided the future boundary conditions after the modeling and sizing was completed as shown below.

Table 2.5: Future Boundary Conditions (Provided by DSEL on May 22, 2020)

Condition	Connection 1 HGL (m)	Connection 2 HGL (m)
Min Hour (maximum pressure)	143.0	143.0
Peak Hour (minimum pressure)	143.0	143.0

The future boundary conditions are based on a proposed HGL target of 143.0 m at the Montreal Road pump station. The future HGLs are about 4 m lower compared to the existing HGLs. The pressure results presented in this report are based on the existing boundary conditions and the predicted pressures will thus decrease by about 4 m (6 psi) in the future. No additional modeling was completed using the future boundary conditions as it has no impact on the proposed pipe sizes.

Existing and future boundary conditions can be found in **Appendix A**.

3 Hydraulic Capacity Design Criteria

3.1 Pipe Characteristics

Pipe characteristics used for the development are outlined in **Table 3.1** below.

Table 3.1: Model Pipe Characteristics

Diameter (mm)	Hazen Williams C-Factor (/)
100	110

3.2 Pressure Requirements

As outlined in the City of Ottawa Design Guidelines, the generally accepted best practice is to design new water distribution systems to operate between 350 kPa (50 psi) and 480 kPa (70 psi). The maximum pressure at any point in the distribution system in occupied areas outside of the public right-of-way shall not exceed 552 kPa (80 psi). Pressure requirements are outlined in **Table 3.2.**

Table 3.2: Pressure Requirements

Demand Condition	Minimum Pressure		Maximum Pressure	
	(kPa)	(psi)	(kPa)	(psi)
Normal Operating Pressure (maximum daily flow)	350	50	480	70
Peak Hour Demand (minimum allowable pressure)	276	40	-	-
Maximum Fixture Pressure (Ontario Building Code)	-	-	552	80
Maximum Distribution Pressure (minimum hour check)	-	-	552	80
Maximum Day Plus Fire	140	20	-	-

4 Hydraulic Capacity Analysis

The proposed water mains within the development were sized to the minimum diameter which would satisfy the peak hour demand. Modeling was carried out for minimum hour and peak hour using InfoWater. The boundary conditions provided by DSEL on May 15, 2020 were used to size the network, and the results are presented in the following sections.

Detailed pipe and junction model input data can be found in **Appendix B**.

4.1 Development Pressure Analysis

The modeling results indicate that the development can be adequately serviced by the proposed water main layout shown in **Figure 1.1**. Modeled service pressures for the development are summarized in **Table 4.1**.

Table 4.1: Summary of Available Service Pressures

Minimum Hour Demand Maximum Pressure	Peak Hour Demand Minimum Pressure
82 psi	80 psi

As outlined in the City of Ottawa Design Guidelines, the generally accepted best practice is to design new water distribution systems to operate between 50 psi and 70 psi. The maximum pressure at any point in the distribution system in occupied areas outside of the public right-of-way shall not exceed 80 psi. As such, based on the City boundary conditions, pressure reducing valves may be required.

Detailed pipe and junction result tables and maps can be found in **Appendix C**.

5 Other Servicing Considerations

5.1 Water Supply Security

The City of Ottawa Design Guidelines allow single feed systems for developments up to a total average day demand of 50 m^3/day and require two (2) feeds if the development exceeds 50 m^3/day for supply security, according to Technical Bulletin ISDTB-2014-02.

The Wateridge Village Phase 1B - Block 22 development services a total average day demand of 29 m^3/day (0.33 L/s); as such, only one (1) feed is required.

5.2 Valves

No comment has been made in this report with respect to exact placement of isolation valves within the distribution network for the Wateridge Village Phase 1B - Block 22 development other than to summarize the City of Ottawa Design Guidelines for number, location, and spacing of isolation valves:

- Tee intersection – two (2) valves
- Cross intersection – three (3) valves
- Valves shall be located 2 m away from the intersection
- 300 m spacing for 150 mm to 400 mm diameter valves
- Gate valves for 100 mm to 300 mm diameter mains
- Butterfly valves for 400 mm and larger diameter mains

Drain valves are not strictly required under the City of Ottawa Design Guidelines for water mains under 600 mm in diameter. The Guidelines indicate that “small diameter water mains shall be drained through hydrant via pumping if needed.”

Air valves are not strictly required under the City of Ottawa Design Guidelines for water mains up to and including 400 mm in diameter. The Guidelines indicate that air removal “can be accomplished by the strategic positioning of hydrant at the high points to remove the air or by installing or utilizing available 50 mm chlorination nozzles in 300 mm and 400 mm chambers.”

The detailed engineering drawings for the Wateridge Village Phase 1B - Block 22 development are expected to identify valves in accordance with the requirements noted above.

5.3 Hydrants

City of Ottawa Design Guidelines for maximum hydrant spacing are the following:

- 125 m for single family unit residential areas on lots where frontage at the street line is 15 m or longer;
- 110 m for single family unit residential areas on lots where frontage at the street line is less than 15 m and for residential areas zoned for row housing, doubles or duplexes; and
- 90 m for institutional, commercial, industrial, apartments and high-density areas.

Proposed hydrant locations were provided by DSEL to GeoAdvice on May 15, 2020.

Table 5.1 summarizes the available fire flow for each block based on the number of hydrants in the vicinity of the development.

Table 5.1: Fire Hydrant Spacing Analysis

Block Number	Required Fire Demand (L/min)	Number of Fire Hydrants within 75 m	Number of Fire Hydrants within 75 m and 150 m	Available Fire Flow* (L/min)
Block 1	15,000	1	3	17,033
Block 2	15,000	1	3	17,033
Block 3	14,000	1	3	17,033
Block 4	14,000	1	3	17,033

***As per Table 18.5.4.3 of City of Ottawa ISTB-2018-02**

As shown in the table above, the available fire flow is higher than the required fire flow demand for each block.

6 Conclusions

The hydraulic capacity and modeling analysis of the Wateridge Village Phase 1B - Block 22 development yielded the following conclusions:

- The proposed water main network can deliver all required domestic flows under the provided boundary conditions.
- Domestic pressures expected to range between 80 psi and 82 psi.
- Pressure reducing valves may be required, since maximum pressures are predicted exceed the City of Ottawa Design Guidelines.

Submission

Prepared by:

Ferdinand de Schoutheete
Hydraulic Modeler

Approved by:

Dec 15 2020

LICENSED PROFESSIONAL ENGINEER
W. B. F. de Schaetzen
100116349
PROVINCE OF ONTARIO

Werner de Schaetzen, Ph.D., P.Eng.
Senior Modeling Review / Project Manager

Appendix A Boundary Conditions

Appendix A.1 Existing Boundary Conditions Provided by DSEL on May 15, 2020.

Gmail

Ferdinand de Schoutheete <ferdinand.geoadvice@gmail.com>

Fwd: FW: 948 - Wateridge Village Phase 1B Block 22 Boundary Condition Request

Werner de Schaetzen - GeoAdvice <werner@geoadvice.com>
To: Ferdinand de Schoutheete <Ferdinand@geoadvice.com>

15 May 2020 at 12:57

---------- Forwarded message ----------
From: **Jennifer Ailey** <JAiley@dsel.ca>
Date: Fri, May 15, 2020 at 12:49 PM
Subject: FW: 948 - Wateridge Village Phase 1B Block 22 Boundary Condition Request
To: werner de schaetzen <werner@geoadvice.com>
CC: Anthony Temelini <ATemelini@dsel.ca>

Hi Werner,

I hope you're keeping well. Please see below and attached for the boundary conditions. Please let me know if you have any questions.

I hope you enjoy the long weekend.

Thanks,

Jennifer Ailey, P.Eng.
Project Manager

DSEL
david schaeffer engineering ltd.

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

Phone: (613) 836-0856 ext. 526
Cell: (613) 222-6476
Email: jailey@dsel.ca

From: Fraser, Mark <Mark.Fraser@ottawa.ca>
Sent: May 15, 2020 3:38 PM
To: Anthony Temelini <ATemelini@dsel.ca>
Cc: Jennifer Ailey <JAiley@dsel.ca>
Subject: RE: 948 - Wateridge Village Phase 1B Block 22 Boundary Condition Request

Hi Anthony,

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Type of Development: Residential (18 rear lane townhome units and 20 back-to-back stacked townhome units)

Average Day Demand = 0.36 L/s

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Peak Hour Demand = 2.72 L/s

Fire Flow Demand = 15,000 L/min

HGL has been provided for the higher fire flow (Block 1 and 2) since that will govern the design.

Existing Conditions based on Current Pump Operations (HGL is the same at both connections):

Minimum HGL = 146.7m

Maximum HGL = 147.0m. ***The maximum pressure is estimated to be more than 80 psi.*** *A pressure check at completion of construction is recommended to determine if pressure control is required.*

Max Day + FireFlow (250L/s) = 140.0m

Please note the following:

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Regards,

Mark Fraser, P. Eng.

Project Manager, Planning Services

Development Review Central Branch

City of Ottawa | Ville d'Ottawa

Planning, Infrastructure and Economic Development Department

110 Laurier Avenue West, 4th Floor, Ottawa ON, K1P 1J1

Tel.613.580.2424 ext. 27791

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To: Fraser, Mark <Mark.Fraser@ottawa.ca>
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Please let us know.

Thank you,

Anthony Temelini, P.Eng.

Junior Project Manager

DSEL

david schaeffer engineering ltd.

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

Appendix A.2 Future Boundary Conditions Provided by DSEL on May 22, 2020.

Subject: RE: 948 - Wateridge Village Phase 1B Block 22 Boundary Condition Request

Fraser, Mark <Mark.Fraser@ottawa.ca>
to Anthony Temelini, Jennifer Ailey

Hi Anthony

Please find below boundary conditions, HGL, for hydraulic analysis at **1400 Hemlock Road [BLOCK 22] within Wateridge Village Phase 1B** (zone MONT) assumed to be connected to PDF for locations) for both existing and future conditions.

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Regards,

Mark Fraser, P. Eng.
Project Manager, Planning Services
Development Review Central Branch
City of Ottawa | Ville d'Ottawa
Planning, Infrastructure and Economic Development Department
110 Laurier Avenue West, 4th Floor, Ottawa ON, K1P 1J1
Tel:613.580.2424 ext. 27791
Fax: 613-580-2576
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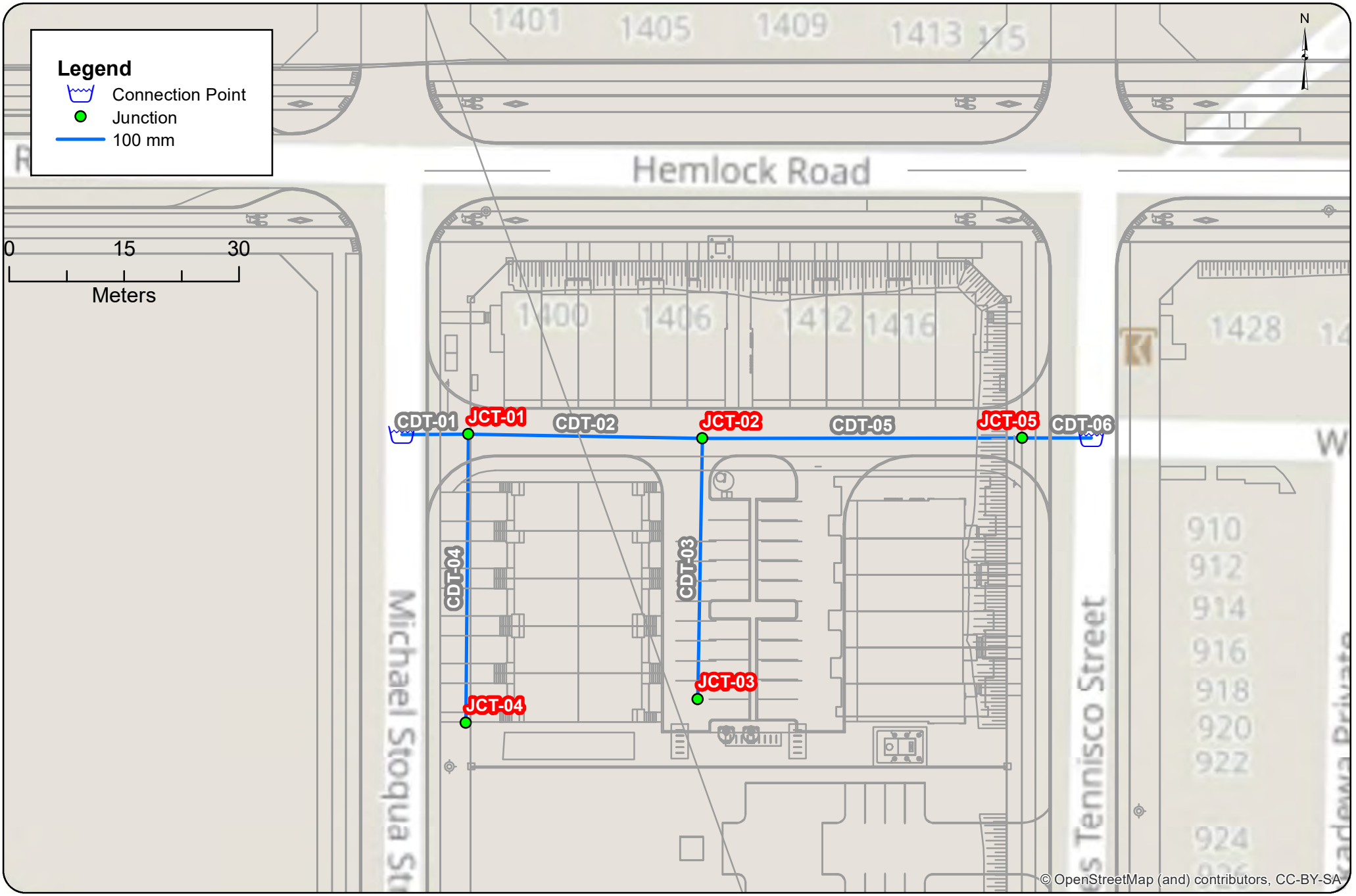
Hi Anthony,

Please find below boundary conditions, HGL, for hydraulic analysis at **1400 Hemlock Road [BLOCK 22] within Wateridge Village Phase 1B** (zone MONT) assumed to be connected to PDF for locations).

Domestic and Fire Flow Water Demands:
Type of Development: Residential (18 rear lane townhome units and 20 back-to-back stacked townhome units)
Average Day Demand = 0.36 L/s
Maximum Day Demand = 1.80 L/s
Peak Hour Demand = 2.72 L/s
Fire Flow Demand = 15,000 L/min
HGL has been provided for the higher fire flow (Blocks 1 and 2) since that will govern the design.

Existing Conditions based on Current Pump Operations (HGL is the same at both connections):

Appendix B Pipe and Junction Model Inputs



GeoAdvice Engineering Inc.

Project: **Hydraulic Capacity and Modeling Analysis**
Wateridge Village Phase 1B Development
Client: **David Schaeffer Engineering Ltd.**
Date: **May 2020**
Created by: **FdS**
Reviewed by: **WdS**

System Layout

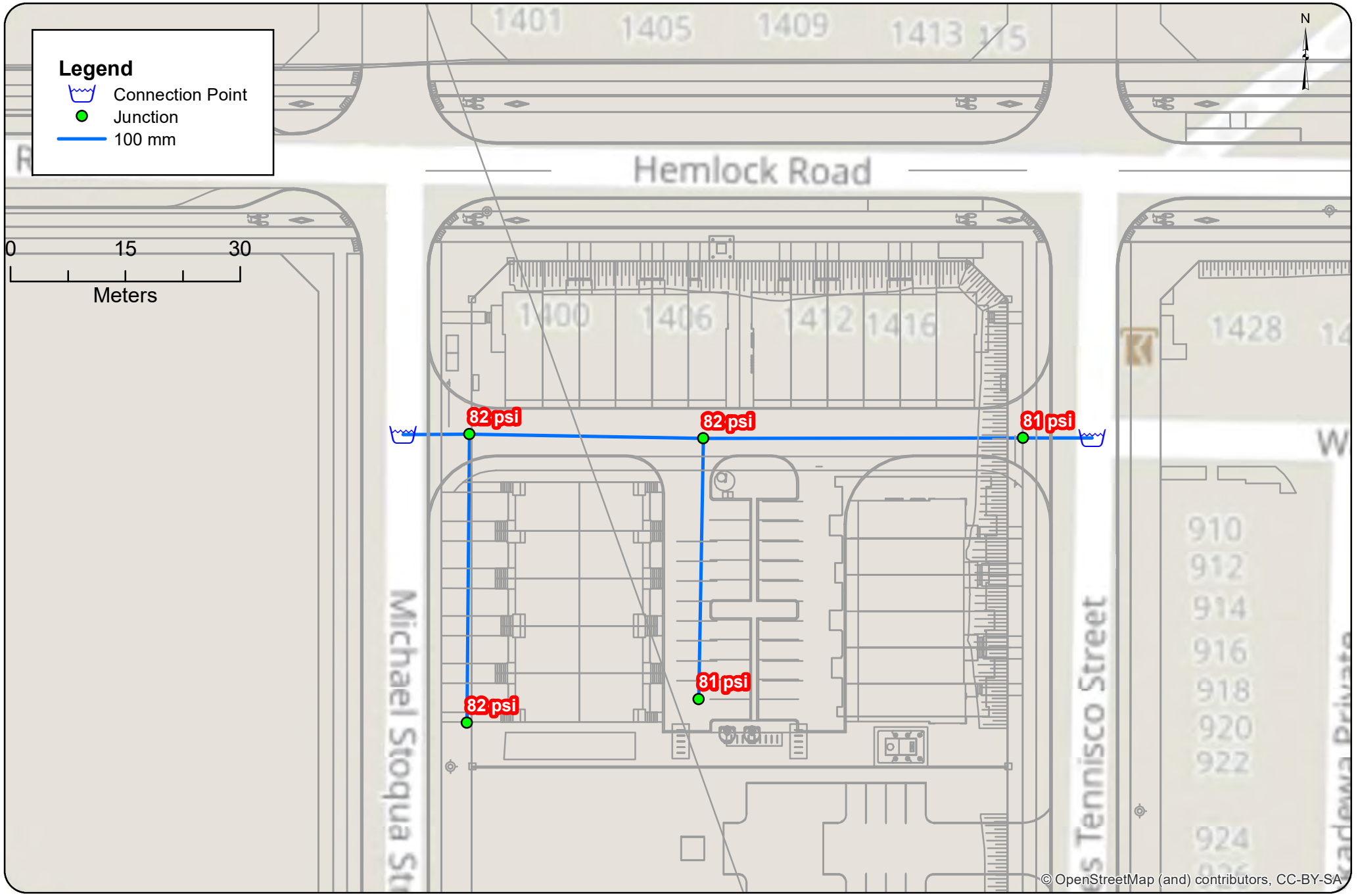
Figure B.1

Model Inputs

ID	From	To	Length (m)	Diameter (mm)	Roughness
CDT-01	RES_01	JCT-01	8.65	100	110
CDT-02	JCT-01	JCT-02	30.59	100	110
CDT-03	JCT-02	JCT-03	34.06	100	110
CDT-04	JCT-01	JCT-04	37.08	100	110
CDT-05	JCT-02	JCT-05	41.73	100	110
CDT-06	JCT-05	RES_02	9.00	100	110

ID (Char)	Elevation (m)	ADD (L/s)
JCT-01	89.12	0.07
JCT-02	89.61	0.07
JCT-03	89.79	0.07
JCT-04	89.57	0.07
JCT-05	90.33	0.07

Appendix C MHD and PHD Model Results



GeoAdvice Engineering Inc.

Project: **Hydraulic Capacity and Modeling Analysis**
Wateridge Village Phase 1B Development
Client: **David Schaeffer Engineering Ltd.**
Date: **May 2020**
Created by: **FdS**
Reviewed by: **WdS**

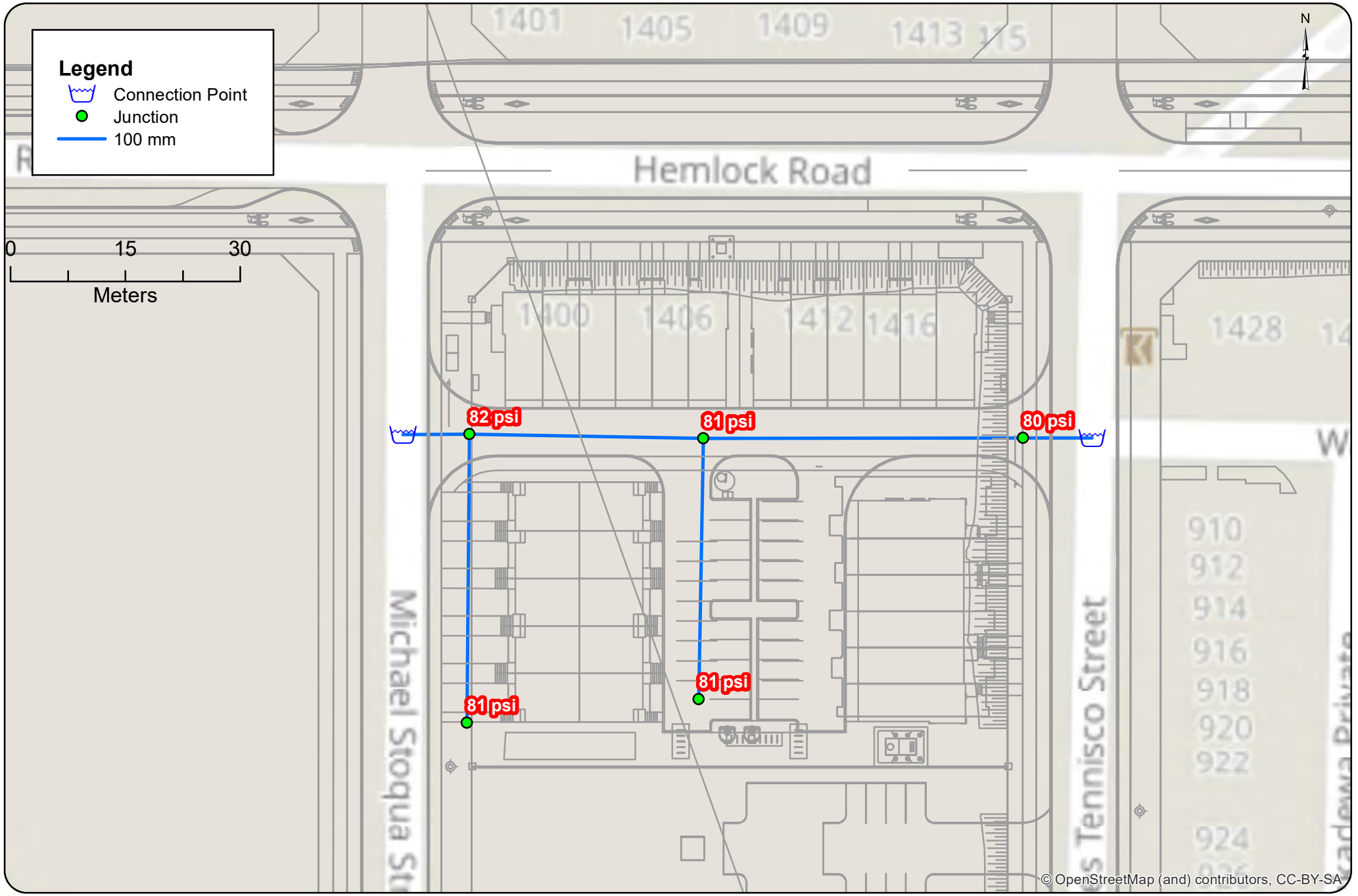
MHD Results

Figure C.1

Minimum Hour Demand Modeling Results

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/km)
CDT-01	RES_01	JCT-01	8.65	100	110	0.11	0.01	0.00	0.01
CDT-02	JCT-01	JCT-02	30.59	100	110	0.03	0.00	0.00	0.00
CDT-03	JCT-02	JCT-03	34.06	100	110	0.04	0.00	0.00	0.00
CDT-04	JCT-01	JCT-04	37.68	100	110	0.04	0.00	0.00	0.00
CDT-05	JCT-02	JCT-05	41.73	100	110	-0.04	0.01	0.00	0.00
CDT-06	JCT-05	RES_02	9.00	100	110	-0.08	0.01	0.00	0.00

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (psi)
JCT-01	0.04	89.12	147	82
JCT-02	0.04	89.61	147	82
JCT-03	0.04	89.79	147	81
JCT-04	0.04	89.57	147	82
JCT-05	0.04	90.33	147	81



GeoAdvice Engineering Inc.

Project: **Hydraulic Capacity and Modeling Analysis**
Wateridge Village Phase 1B Development
Client: **David Schaeffer Engineering Ltd.**
Date: **May 2020**
Created by: **FdS**
Reviewed by: **WdS**

PHD Results

Figure C.2

Peak Hour Demand Modeling Results

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/km)
CDT-01	RES_01	JCT-01	8.65	100	110	1.56	0.20	0.01	0.84
CDT-02	JCT-01	JCT-02	30.59	100	110	0.48	0.06	0.00	0.09
CDT-03	JCT-02	JCT-03	34.06	100	110	0.54	0.07	0.00	0.12
CDT-04	JCT-01	JCT-04	37.68	100	110	0.54	0.07	0.00	0.12
CDT-05	JCT-02	JCT-05	41.73	100	110	-0.60	0.08	0.01	0.14
CDT-06	JCT-05	RES_02	9.00	100	110	-1.14	0.15	0.00	0.47

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (psi)
JCT-01	0.54	89.12	147	82
JCT-02	0.54	89.61	147	81
JCT-03	0.54	89.79	147	81
JCT-04	0.54	89.57	147	81
JCT-05	0.54	90.33	147	80

APPENDIX C

Wastewater Collection

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											(full)		
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)	(%)	(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: 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

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 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
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	2 of 2

REVIEWED BY
DEVELOPMENT REVIEW SERVICES BRANCH

Signed ______________________

Date ______________________2017

Plan Number ______________________

LEGEND :

S16B 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			
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
17/06/07
PROVINCE OF ONTARIO

N

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

Mattamy Homes
Wateridge Block 22
Wastewater Flow per Brief

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		105
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	**105**	
Average Domestic Flow	**0.43**	**L/s**
Peaking Factor	**4.00**	
Peak Domestic Flow	**1.70**	**L/s**

Total Estimated Average Dry Weather Flow Rate	**0.43**	**L/s**
Total Estimated Peak Dry Weather Flow Rate	**1.70**	**L/s**
Total Estimated Peak Wet Weather Flow Rate	**1.83**	**L/s**

Wateridge Block 22
Proposed Site Conditions

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

Site Area 0.460 **ha**

Extraneous Flow Allowances

Infiltration / Inflow (Dry)	**0.02**	**L/s**
Infiltration / Inflow (Wet)	**0.13**	**L/s**
Infiltration / Inflow (Total)	**0.15**	**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	38	104
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	**104**	
Average Domestic Flow	**0.34**	**L/s**
Peaking Factor	**3.59**	
Peak Domestic Flow	**1.21**	**L/s**

Institutional / Commercial / Industrial Contributions

Property Type	**Unit Rate**		**No. of Units**	**Avg Wastewater (L/s)**
Commercial floor space*	5	$L/m^2/d$		0.00
Hospitals	900	L/bed/d		0.00
School	70	L/student/d		0.00
Industrial - Light**	35,000	L/gross ha/d		0.00
Industrial - Heavy**	55,000	L/gross ha/d		0.00

Average I/C/I Flow	**0.00**
Peak Institutional / Commercial Flow	0.00
Peak Industrial Flow**	0.00
Peak I/C/I Flow	**0.00**

** assuming a 12 hour commercial operation*
*** peak industrial flow per City of Ottawa Sewer Design Guidelines Appendix 4B*

Total Estimated Average Dry Weather Flow Rate	**0.36**	**L/s**
Total Estimated Peak Dry Weather Flow Rate	**1.23**	**L/s**
Total Estimated Peak Wet Weather Flow Rate	**1.36**	**L/s**

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

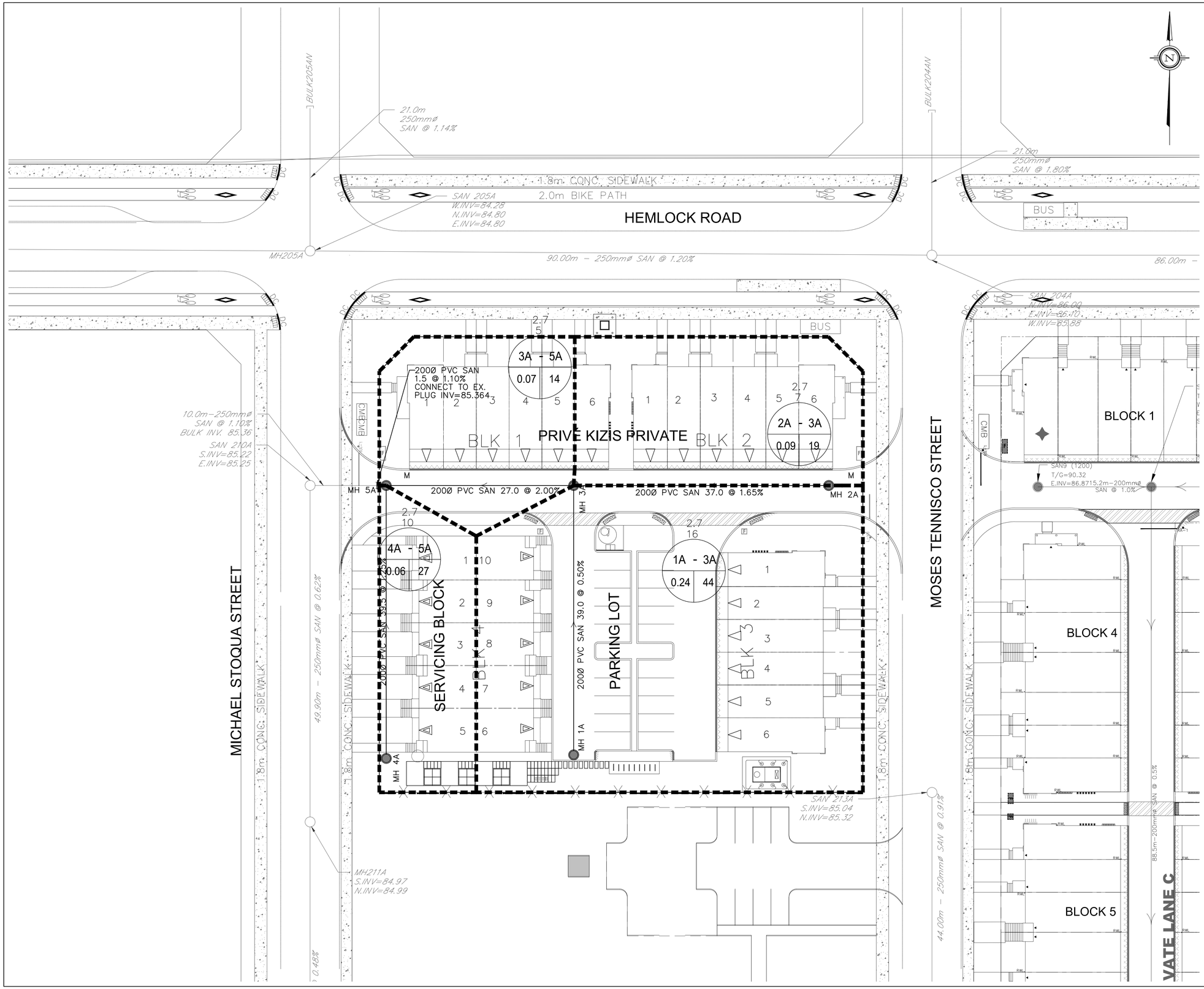
LOCATION			RESIDENTIAL AREA AND POPULATION									COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
SERVICING BLOCK																													
	4A	5A	0.06	10		10	27	0.06	27	3.69	0.32		0.00		0.00		0.00	0.00	0.06	0.06	0.02	0.34	39.5	200	1.25	36.67	0.01	1.17	0.36
To PRIVÉ KIZIS PRIVATE, Pipe 5A - 6A								0.06	27				0.00		0.00		0.00			0.06									
PARKING LOT																													
	1A	3A	0.24	16		16	44	0.24	44	3.66	0.52		0.00		0.00		0.00	0.00	0.24	0.24	0.08	0.60	39.0	200	0.50	23.19	0.03	0.74	0.31
To PRIVÉ KIZIS PRIVATE, Pipe 3A - 5A								0.24	44				0.00		0.00		0.00			0.24									
PRIVÉ KIZIS PRIVATE																													
	2A	3A	0.09	7		7	19	0.09	19	3.71	0.23		0.00		0.00		0.00	0.00	0.09	0.09	0.03	0.26	37.0	200	1.65	42.13	0.01	1.34	0.37
Contribution From PARKING LOT, Pipe 1A - 3A								0.24	44				0.00		0.00		0.00		0.24	0.33									
	3A	5A	0.07	5		5	14	0.40	77	3.62	0.90		0.00		0.00		0.00	0.00	0.07	0.40	0.13	1.03	27.0	200	2.00	46.38	0.02	1.48	0.59
Contribution From SERVICING BLOCK, Pipe 4A - 5A								0.06	27				0.00		0.00		0.00		0.06	0.46									
	5A	210A						0.46	104	3.59	1.21		0.00		0.00		0.00	0.00	0.00	0.46	0.15	1.36	11.0	200	1.10	34.40	0.04	1.09	0.53

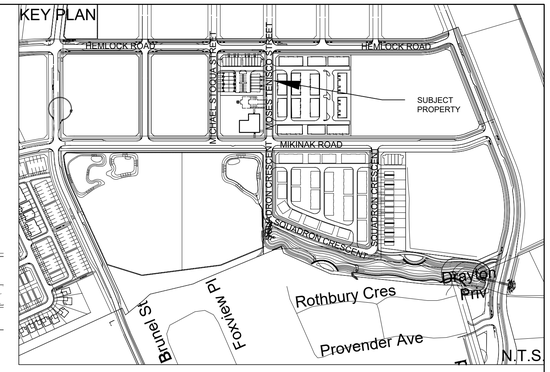
LICENSED PROFESSIONAL ENGINEER
S. L. MERRICK
100185523
2020-05-25
PROVINCE OF ONTARIO

DESIGN PARAMETERS

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

Designed:	GGG	PROJECT:	**Mattamy Homes - Wateridge Block 22**
Checked:	SLM	LOCATION:	**City of Ottawa**
Dwg. Reference:	11	File Ref: 17-948	Date: **25 May 2020**
Sanitary Drainage Plan, Dwgs. No.			Sheet No. 1 of 1





LEGEND

- SANITARY DRAINAGE BOUNDARY
- 2.7 / 7 — POPULATION PER UNIT / NUMBER OF UNITS
- 2A - 3A — UPSTREAM MH TO DOWNSTREAM MH
- 0.09 / 19 — AREA IN HECTARES / TOTAL POPULATION
- PROPOSED SANITARY MANHOLE

NOT FOR CONSTRUCTION

No.	BY	DATE	DESCRIPTION
10	S.L.M.	20-05-26	ISSUED FOR SITE PLAN AMENDMENT
9	S.L.M.	18-07-19	ISSUED FOR MUNICIPAL APPROVAL

TOPOGRAPHIC INFORMATION
TOPOGRAPHIC INFORMATION PROVIDED BY IBI GROUP
PROJ. NO. 38298
DATED NOVEMBER 13, 2017

SITE PLAN INFORMATION
SITE PLAN PROVIDED BY KORSIAK URBAN PLANNING
DATED MAY 14, 2020

SITE SERVICING AND STORMWATER MANAGEMENT STUDY
SERVICING AND STORMWATER MANAGEMENT RECOMMENDATIONS PROVIDED BY DSEL
PROJ. NO. 17-948
DATED MAY 2020

GEOTECHNICAL STUDY
GEOTECHNICAL RECOMMENDATIONS PROVIDED BY PATERSON GROUP INC.
PROJECT NO. PG5345-1
DATED APRIL 24, 2020

BENCH MARK
ELEVATIONS ARE GEODETIC, REFERRED TO CITY OF OTTAWA VERTICAL BENCHMARK NO. 396
ELEV= 95.06 METERS

MATTAMY HOMES

WATERIDGE - BLOCK 22
PHASE 1

david schaeffer engineering ltd
120 Iber Road Unit 103
Stittsville, Ontario, K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

LICENSED PROFESSIONAL ENGINEER
S.L. MERRICK
100186523
2020-05-26
PROVINCE OF ONTARIO
DSEL 17-948

110 Laurier Ave W
Ottawa, Ontario, K1P 1J1
Tel. (613) 580-2400
www.Ottawa.ca

SANITARY DRAINAGE PLAN

DRAWN BY:	A.W.T.	CHECKED BY:	S.L.M.
DESIGNED BY:	S.L.M.	CHECKED BY:	A.D.F.
SCALE:	1:250		

0.0m 5.0m 10.0m

PROJECT No. 17-948

SHEET No. 10

CITY FILE No. D07-12-17-0111

CITY PLAN No. 17691

APPENDIX D

Stormwater Management

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= 0.30	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%

Definitions:
Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
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[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
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[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
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File Reference: 38298.5.7.1
Date: 7/8/2016
Sheet No: 1 of 2

REVIEWED BY
DEVELOPMENT REVIEW SERVICES BRANCH

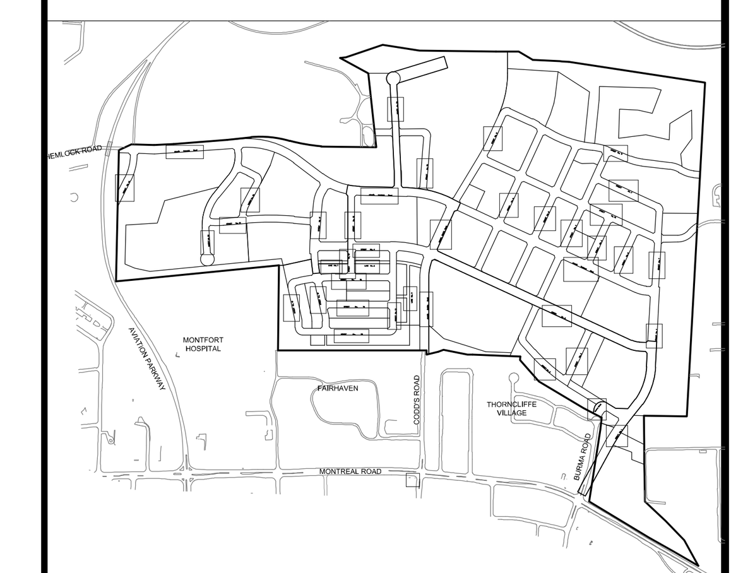
Signed ____________________

Date ____________________ 2017

Plan Number ____________________

LEGEND :

AREA NUMBER
RUNOFF COEFFICIENT
AREA IN HECTARES
POTENTIAL DRAINAGE DIRECTION



No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7			
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
17/06/07
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

STORAGE SUMMARY
BLOCK 15
TOTAL LID TREATMENT VOLUME

Total Area (sq.m)	4mm Volume (cu.m)
4600	18.4

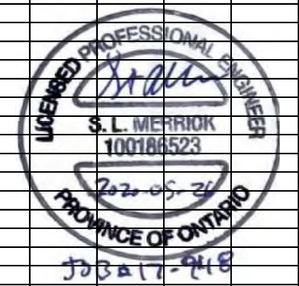
Area ID	Drainage Area (sq.m)	Volume Req. (cu.m) (15mm Storm)	Perf Pipe Size (mm)	Pipe Length (m)	Volume Pipe + Granular (cu.m)
CB 1A	380	5.7	450	16	5.73
CB 1B	480	7.2	375	26	7.34
CB 2A	790	11.9	450	34	12.17
Total	**1650**	**24.8**		**76.0**	**25.2**

* Refer to Drawing DS-2 for Bioretention Cross Section
** Volume calculation assumes 40% Void Ratio for the Filter Media

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

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

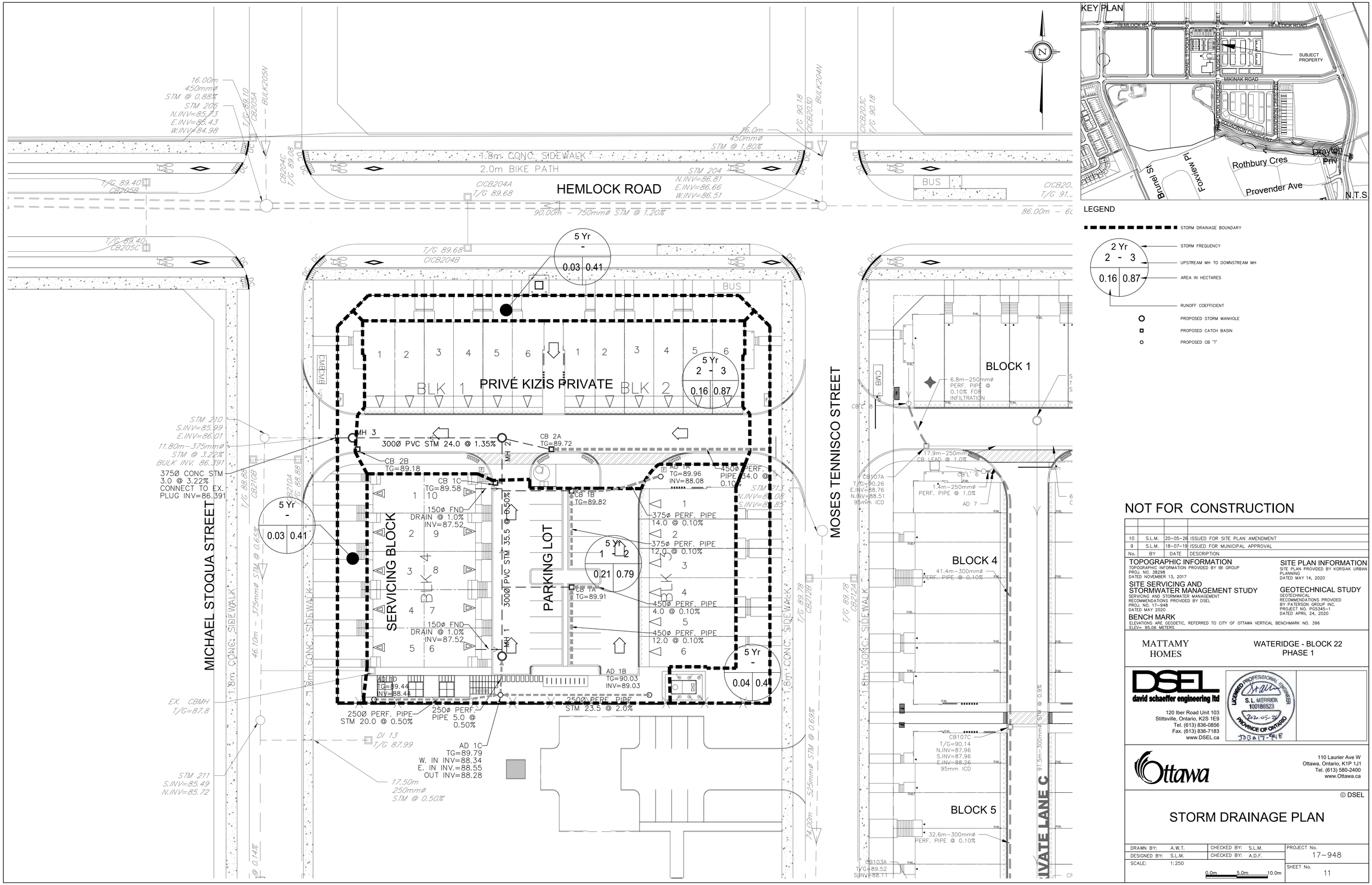
LOCATION			AREA (Ha) 2 YEAR				AREA (Ha) 5 YEAR				AREA (Ha) 10 YEAR				AREA (Ha) 100 YEAR				FLOW						SEWER DATA								
			AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO
Location	From Node	To Node	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	Conc. (min)	2 Year (mm/h)	5 Year (mm/h)	10 Year (mm/h)	100 Year (mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	LOW (min	Q/Q full
PARKING LOT																																
	1	2			0.00	0.00	0.21	0.79	0.46	0.46			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	48	300	300	PVC	0.50	35.5	68.38	0.97	0.61	0.70
To PRIVÉ KIZIS PRIVATE, Pipe 2 - 3						0.00				0.46				0.00				0.00	10.61														
PRIVÉ KIZIS PRIVATE																																
Contribution From PARKING LOT, Pipe 1 - 2						0.00				0.46				0.00				0.00	10.61														
	2	3			0.00	0.00	0.16	0.87	0.39	0.85			0.00	0.00			0.00	0.00	10.61	74.53	101.07	118.46	173.15	86	300	300	PVC	1.35	24.0	112.36	1.59	0.25	0.76
	3	210			0.00	0.00			0.00	0.85			0.00	0.00			0.00	0.00	10.86	73.64	99.84	117.02	171.03	85	375	375	PVC	3.22	14.5	314.62	2.85	0.08	0.27
To RUE MICHAEL STOQUA STREET, Pipe 2 - 3						0.00				0.85				0.00				0.00	10.95														
RUE MICHAEL STOQUA STREET																																
Contribution From PRIVÉ KIZIS PRIVATE, Pipe 3 - 210						0.00				0.85				0.00				0.00	10.95														
Per Storm Drainage Plan by IBI (Proj #: 38298) dated 2017-06-07							0.20	0.70	0.39	1.24			0.00	0.00				0.00	0.00														
	210	211			0.00	0.00	0.03	0.41	0.03	1.27			0.00	0.00			0.00	0.00	10.95	73.35	99.44	116.54	170.33	126	375	375	PVC	0.65	46.1	141.36	1.28	0.60	0.89



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

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

Designed: GGG	PROJECT: Mattamy - Wateridge Block 22		
Checked: SLM	LOCATION: City of Ottawa		
Dwg. Reference: 10	File Ref: 17-948	Date: 25 May 2020	Sheet No. SHEET 1 OF 1



NOT FOR CONSTRUCTION

No.	BY	DATE	DESCRIPTION
10	S.L.M.	20-05-26	ISSUED FOR SITE PLAN AMENDMENT
9	S.L.M.	18-07-19	ISSUED FOR MUNICIPAL APPROVAL

TOPOGRAPHIC INFORMATION
TOPOGRAPHIC INFORMATION PROVIDED BY IBI GROUP
PROJ. NO. 38298
DATED NOVEMBER 13, 2017

SITE PLAN INFORMATION
SITE PLAN PROVIDED BY KORSIAK URBAN PLANNING
DATED MAY 14, 2020

SITE SERVICING AND STORMWATER MANAGEMENT STUDY
SERVICING AND STORMWATER MANAGEMENT RECOMMENDATIONS PROVIDED BY DSEL
PROJ. NO. 17-948
DATED MAY 2020

GEOTECHNICAL STUDY
GEOTECHNICAL RECOMMENDATIONS PROVIDED BY PATERSON GROUP INC.
PROJECT NO. PG5345-1
DATED APRIL 24, 2020

BENCH MARK
ELEVATIONS ARE GEODETIC, REFERRED TO CITY OF OTTAWA VERTICAL BENCHMARK NO. 396
ELEV= 95.06 METERS

MATTAMY HOMES

WATERIDGE - BLOCK 22
PHASE 1

DSEL
david schaeffer engineering ltd
120 Iber Road Unit 103
Stittsville, Ontario, K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

LICENSED PROFESSIONAL ENGINEER S.L. MERRICK 100186523 2020-05-26 PROVINCE OF ONTARIO

Ottawa
110 Laurier Ave W
Ottawa, Ontario, K1P 1J1
Tel. (613) 580-2400
www.Ottawa.ca

STORM DRAINAGE PLAN

DRAWN BY:	A.W.T.	CHECKED BY:	S.L.M.
DESIGNED BY:	S.L.M.	CHECKED BY:	A.D.F.
SCALE:	1: 250		

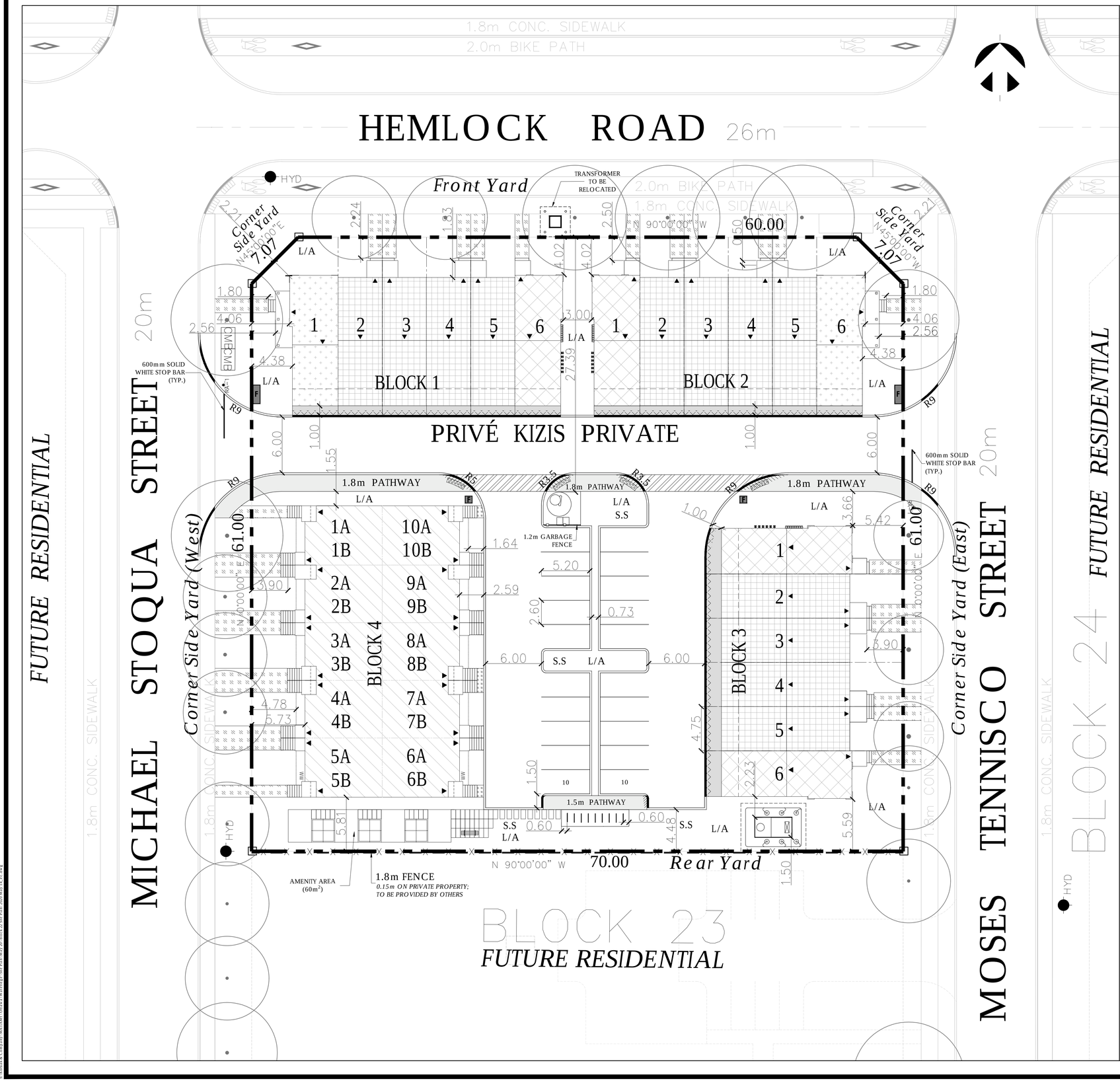
0.0m 5.0m 10.0m

PROJECT No. 17-948

SHEET No. 11

CITY FILE No. D07-12-17-0111 CITY PLAN No. 17691

DRAWINGS / FIGURES



SITE STATISTICS AND DEVELOPMENT DATA

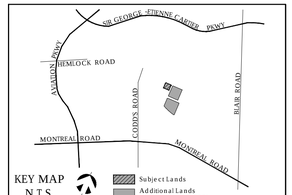
SITE AREA	4,594.19 m^2
PAVED AREA	1,346.40 m^2 (29%)
LANDSCAPED AREA	1,380.88 m^2 (30%)
TOTAL BUILDING COVERAGE	1,866.91 m^2 (41%)
TOTAL GROSS FLOOR AREA	4,647 m^2
TYPE A TOWNHOUSE MODEL (12)	1,702 m^2
TYPE B TOWNHOUSE MODEL (2)	312 m^2
TYPE C TOWNHOUSE MODEL (4)	622 m^2
STACKED TOWNS UPPER MODEL (10)	1,152 m^2
STACKED TOWNS LOWER MODEL (10)	859 m^2
DENSITY (UPH)	82.6
ZONE CATEGORY	R5Y[2457]

DWELLING BLOCK	DWELLING TYPE	GROUND FLOOR AREA (m2)	UNITS
BLOCK 1	REAR LANE TOWNS	402.49	6
BLOCK 2	REAR LANE TOWNS	402.49	6
BLOCK 3	REAR LANE TOWNS	401.88	6
BLOCK 4	STACKED TOWNS	500.72	20
	TOTAL	1,707.58	38

SECTION	ZONE PROVISION - PLANNED UNIT DEVELOPMENT	REQUIRED	PROPOSED
164 (Table)	MIN. LOT WIDTH (m)	N/A	N/A
164 (Table)	MIN. LOT AREA (m^2)	1,400 m^2	4,594.19 m^2
164 (Table)	MAX. BUILDING HEIGHT (m)	11.00 m	10.63 m
239 [2457]	MIN. FRONT YARD SETBACK (m)	3.00 m	4.02 m
239 [2457]	MIN. CORNER SIDE YARD SETBACK (m)	3.00 m	4.06 m
164 (Table)	MIN. REAR YARD SETBACK (m)	3.00 m	5.59 m
164 (Table)	MIN. INTERIOR YARD SETBACK (m)	3.00 m	N/A
101 (Table)	RESIDENT PARKING - REAR LANE TOWNS (18 @ 1/unit)	18	18
	STACKED (20 @ 0.5/unit)	10	20
239 [2457]	VISITOR PARKING	0	0
131 (Table)(1)	MIN. WIDTH OF PRIVATE WAY (m)	6.00 m	6.00 m
239 [2457]	SETBACK OF ANY WALL OF A RES. BUILDING TO PRIVATE WAY (m)	1.00 m	1.00 m
239 [2457]	MIN. SETBACK OF GARAGE DOOR TO PRIVATE WAY (m)	1.00 m	1.00 m
111A (Table)	BICYCLE PARKING (STACKED TOWNS)	10 (0.5/unit)	10
137 (Table)(7)	MIN. STACKED TOTAL AMENITY AREA (6m^2 per unit)	120 m^2	230 m^2*
	MIN. OF 50% OF THE REQUIRED TOTAL AMENITY AREA FOR COMMUNAL AMENITY AREA	60 m^2	60 m^2

*Includes an average of ±8.5m^2 per unit for terraces

SECTION	ADDITIONAL PROVISIONS	REQUIRED	PROPOSED
65 (6)	PERMITTED PROJECTIONS INTO YARDS: COVERED OR UNCOVERED BALCONY, PORCH, DECK	2.00 m (MAX) >1.0m to lot line	0.50 m 2.50 m
Table 65(5)	FIRE ESCAPES, OPEN STAIRWAYS, STOOP	>0.60m to lot line	1.80 m
106 (1)(a)	MIN. PERPENDICULAR PARKING SPACE SIZE	2.6 x 5.2 m	2.6 x 5.2 m
239 [2457]	MIN. DRIVEWAY WIDTH TO PARKING LOT (m)	6.00 m	6.00 m
239 [2457]	MIN. AISLE WIDTH TO SPACES (m)	6.00 m	6.00 m
107 (2)	MIN. DRIVEWAY WIDTH TO GARAGE (m)	2.60 m	4.75 m
109 (3)(b)	MAX. WALKWAY WIDTH PERMITTED IN YARD (m)	1.80 m	1.50 m
110 (Table)	MIN. LANDSCAPE BUFFER WIDTH PARKING LOT TO LOT LINE	1.50 m	4.48 m
	MIN. OF 15% OF LANDSCAPE AREA WITHIN AND SURROUNDING A PARKING LOT	15%	≥15%
110 (3)(b)	MIN. WASTE COLLECTION SETBACK TO LOT LINE (m)	3.00 m	27.39 m
55 (3)(e)(ii)	ACCESSORY STRUCTURE SETBACK (m)	0.60 m	1.50 m
55 (5)	PROJECTION HEIGHT (MAX) (m)	3.20 m	1.80 m
239 [2457]	UTILITY INSTALLATIONS SETBACK (m)	0.60 m	1.50 m
Table 131(4)	MIN. SEPARATION DISTANCE BETWEEN BUILDINGS WITHIN A PLANNED UNIT DEVELOPMENT (m)	1.20 m	3.00 m
111B (TABLE)	MIN. BICYCLE PARKING SPACE DIMENSIONS (m)	Width: 0.6 m Length: 1.8 m	0.6 m 1.8 m
111 (9)	MIN. BICYCLE PARKING SPACE ACCESS WIDTH AISLE (m)	1.5 m	1.5 m



KEY MAP N.T.S.

SCALE 1:200 (0 2 4 6 8 10 12)

LEGEND

- PATHWAY (PAVERS)
- WALKWAY TO ENTRY
- CROSSWALK (PAVERS)
- ASPHALT DRIVEWAY
- MOUNTABLE CURB
- CURB (0.2m)
- DEPRESSED CURB
- PORCH
- WINDOW WELL
- PROJECTION (STAIRS)
- L/A LANDSCAPED AREA
- TYPE A TOWNHOUSE (4.75m)
- TYPE B TOWNHOUSE (5.21m)
- TYPE C TOWNHOUSE (5.13m)
- STACKED DWELLING
- PROPOSED LOT BOUNDARY
- BLOCK BOUNDARY
- FENCE
- BIKE RACK
- HYDRO METERS
- GAS METERS
- S.S SNOW STORAGE AREA
- BENCH
- PATIO SLABS AND STEPPING STONES
- ENTRANCE
- # UNIT NUMBER
- HYD FIRE HYDRANT
- STOP SIGN
- 3 PHASE TRANSFORMER & SWITCHGEAR
- TRANSFORMER
- CMB CANADA POST MAIL BOX
- F ART WAYFINDING FEATURE
- F VEHICULAR GATEWAY FEATURE
- FOOD GARDEN
- TACTILE WALKING SURFACE INDICATOR

DATE (D.M.Y.)	REVISION	BY
14/05/20	Issue for Detailed Design	EC
25/03/20	Revise Site Plan for Site Plan Amendment	EC
01/03/18	Issue for Third Submission to City	SP
14/12/17	Issue for Second Submission to City	SP
28/07/17	Draft for review	SP

GENERAL NOTES

1. DO NOT SCALE DRAWINGS FOR PRINT.
2. THIS DRAWING IS THE EXCLUSIVE PROPERTY OF KORSIAK URBAN PLANNING AND MATTAMY HOMES. COPYBIGHT RESERVED.
3. SITE PLAN PREPARED IN ACCORDANCE WITH PLAN 4M-1581AND PLAN 4R-30196, PREPARED BY ANNIS O'SULLIVAN, VOLLEBEKK LTD.
4. TOWNHOUSE DWELLING UNITS ARE DESIGNED TO ACCOMMODATE CURBSIDE GARBAGE PICK-UP.
5. WALKWAYS AND CURBS TO BE TIED INTO PUBLIC ROW WHERE APPLICABLE.
6. REFERENCES CITY OF OTTAWA T.W.S.I. DETAIL SC7.3

PROJECT TEAM

SITE PLAN DESIGN: KORSIAK Urban Planning
LANDSCAPE ARCHITECTURE: NAK design strategies
MECHANICAL/ ELECTRICAL: LRJ
PLANNING: Stantec
TRANSPORTATION: NOVATECH
ARCHITECTURE: Q4A
NOISE: VALCOUSTICS Canada Ltd.
ENVIRONMENTAL: KILGOUR & Associates
CIVIL ENGINEER: DSEL
GEOTECHNICAL & STRUCTURAL: paterson group

mattamy HOMES

WATERIDGE VILLAGE: PHASE 1B
1400 HEMLOCK ROAD
BLOCK 22
PART OF LOTS 22 AND 23
CONCESSION 1 (OTTAWA FRONT)
GEOGRAPHIC TOWNSHIP OF GLOUCESTER
REGISTERED PLAN 4M-1559
CITY OF OTTAWA

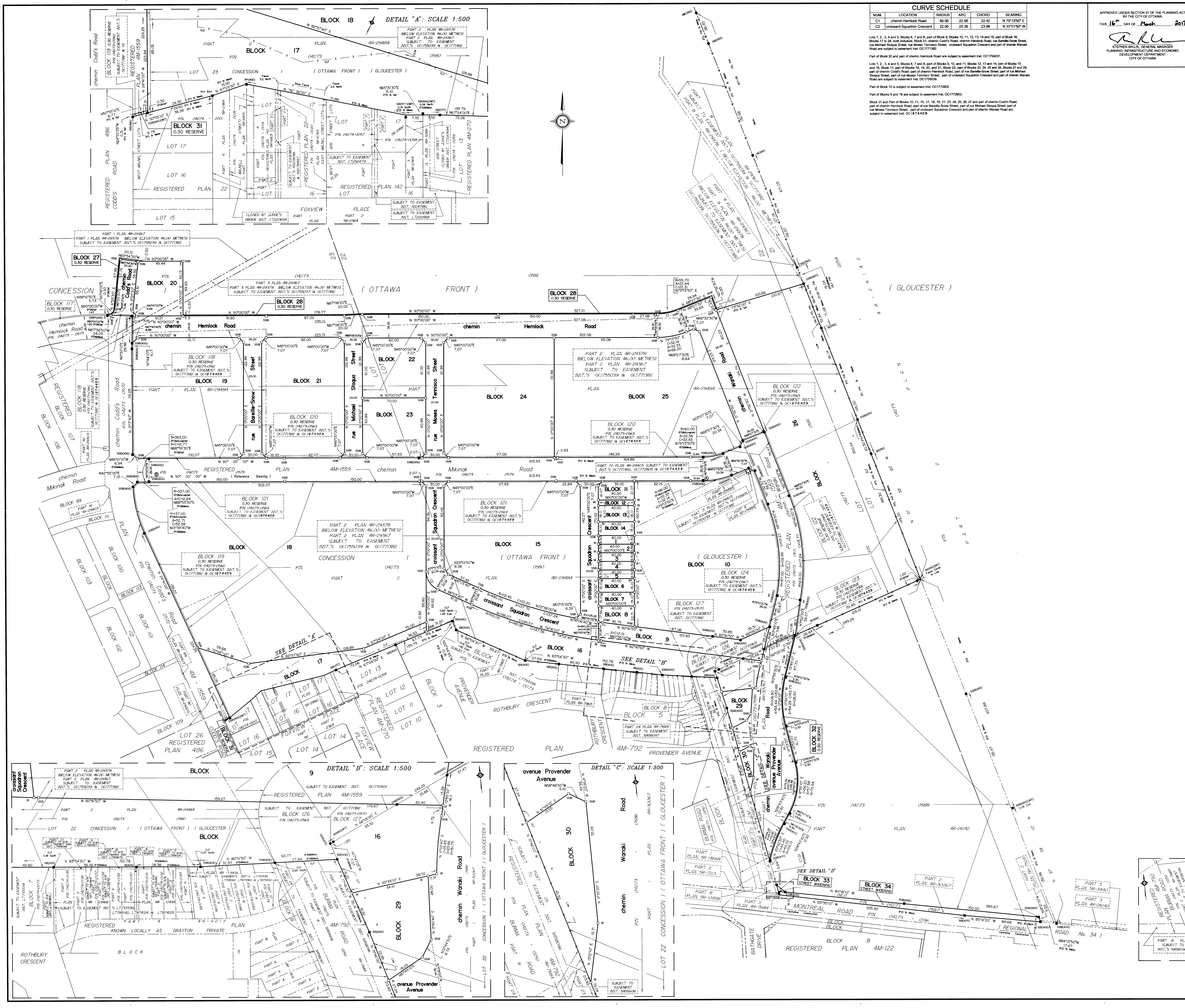
TITLE: BLOCK 22 SITE PLAN

DATE:	DRAWN BY: / CHECKED BY:	DRAWING NO.
May 14, 2020	EC CR	A2
FILE NO.: D07-12-17-0111		
JOB NO.: Mattamy - Wateridge		

D07-12-17-0111

DWG #17691

X:\Admin\& Company\MATTAMY\Ottawa\Wateridge\Site Plan\May 20\block 23\Site Plan - 2020.May.14.cc.dwg



CURVE SCHEDULE					
NUM.	LOCATION	RADIUS	ARC	CHORD	BEARING
C1	chemin Hemlock Road	60.00	22.56	22.42	N 79°13'50" E
C2	croissant Squadron Crescent	22.00	25.36	23.98	N 33°01'50" W

Lots 1, 2 , 3, 4 and 5, Blocks 6, 7 and 8, part of Block 9, Blocks 10, 11, 12, 13, 14 and 15, part of Block 16, Blocks 17 to 28, both inclusive, Block 31, chemin Codd's Road, chemin Hemlock Road, rue Bareille-Snow Street, rue Michael Stoqua Street, rue Moses Tennisco Street, croissant Squadron Crescent and part of chemin Wanaki Road are subject to easement Inst. OC1771382.

Part of Block 20 and part of chemin Hemlock Road are subject to easement Inst. OC1755037.

Lots 1, 2 , 3, 4 and 5, Blocks 6, 7 and 8, part of Blocks 9, 10, and 11, Blocks 12, 13 and 14, part of Blocks 15 and 16, Block 17, part of Blocks 18, 19, 20, and 21, Block 22, part of Blocks 23, 24, 25 and 26, Blocks 27 and 28, part of chemin Codd's Road, part of chemin Hemlock Road, part of rue Bareille-Snow Street, part of rue Michael Stoqua Street, part of rue Moses Tennisco Street, part of croissant Squadron Crescent and part of chemin Wanaki Road are subject to easement Inst. OC1755039.

Part of Block 10 is subject to easement Inst. OC1772805.

Part of Blocks 9 and 16 are subject to easement Inst. OC1772902.

Block 31 and Part of Blocks 10, 11, 15, 17, 18, 19, 21, 23, 24, 25, 26, 27 and part of chemin Codd's Road, part of chemin Hemlock Road, part of rue Bareille-Snow Street, part of rue Michael Stoqua Street, part of rue Moses Tennisco Street, part of croissant Squadron Crescent and part of chemin Wanaki Road are subject to easement Inst. OC1874459.

APPROVED UNDER SECTION 51 OF THE PLANNING ACT BY THE CITY OF OTTAWA.

THIS 16th DAY OF March, 2017

STEPHEN WILLIS, GENERAL MANAGER
PLANNING, INFRASTRUCTURE AND ECONOMIC DEVELOPMENT DEPARTMENT
CITY OF OTTAWA

PLAN 4M- 1581

I CERTIFY THAT THIS PLAN IS REGISTERED IN THE LAND REGISTRY OFFICE FOR THE LAND TITLES DIVISION OF OTTAWA-CARLETON NO. 4 AT 15:55 O'CLOCK ON THE 17 DAY OF March 2016 AND ENTERED IN THE PARCEL REGISTER FOR PROPERTY IDENTIFIERS 04273-0561, 04273-0562, 04273-0563, 04273-0564, 04273-0565, 04273-0566, 04273-0567, 04273-0569, 04273-0570, 04273-0580, 04273-0581, 04273-0586 and 04273-0587

AND THE REQUIRED CONSENTS ARE REGISTERED AS PLAN DOCUMENT NO. OC1874890

Representative for LAND REGISTRAR

This plan comprises all of the land identified by PIN's 04273-0561, 04273-0562, 04273-0563, 04273-0564, 04273-0565, 04273-0566, 04273-0567, 04273-0569, 04273-0570, 04273-0580 04273-0586 and 04273-0587 and part of the land identified by PIN 04273-0581.

PLAN OF SUBDIVISION OF
PART OF LOTS 21, 22 And 23 CONCESSION 1 (OTTAWA FRONT)
Geographic Township of Gloucester
And
BLOCKS 118, 119, 120, 121, 122, 123, 124, 126 And 127 REGISTERED PLAN 4M-1559 CITY OF OTTAWA

Surveyed by Annis , O'Sullivan , Vollebekk Ltd.

Scale 1 : 1250

50 37.5 25 12.5 0 25 50 Metres

Metric

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

SURVEYOR'S CERTIFICATE
I CERTIFY THAT :

1. This survey and plan are correct and in accordance with the Surveys Act, the Surveyors Act and the Land Titles Act and the regulations made under them.
2. The survey was completed on the 22nd day of February, 2017.

Feb. 22, 2017
Date

E. H. Herweyer
Ontario Land Surveyor

OWNER'S CERTIFICATE
THIS IS TO CERTIFY THAT :

1. Lots 1, 2, 3, 4, 5, Blocks 6 to 26, both inclusive, Blocks 29, 30, the Streets, namely, rue Bareille-Snow Street, rue Michael Stoqua Street, rue Moses Tennisco Street, croissant Squadron Crescent, chemin Codd's Road, chemin Hemlock Road, avenue Provender Avenue and chemin Wanaki Road, the Street Widenings, namely, Blocks 33 and 34 and the Reserves, namely, Blocks 27, 28, 31 and 32 have been laid out in accordance with our instructions.
2. The Streets and Street Widenings are dedicated as public highways.

Dated the 16th day of March, 2017

Rodger Martin, Vice President,
Real Estate Ontario & Atlantic
Canada Lands Company CLC Limited
I have the authority to bind the corporation.

Dated the 16th day of March, 2017

Jean Lachance, Senior Director
Real Estate (Ottawa)
Canada Lands Company CLC Limited
I have the authority to bind the corporation.

NOTES AND LEGEND

—□—	denotes	Survey Monument Planted.
—■—	"	Survey Monument Found
SIB	"	Standard Iron Bar.
SSIB	"	Short Standard Iron Bar.
CC	"	Cut Cross.
IB	"	Iron Bar.
IBØ	"	Round Iron Bar.
IB	"	Iron Bar.
*	"	Survey Monument (0.3 long)
(WIT)	"	Witness
NT	"	Nontagential
CLF	"	Chain Link Fence
BF	"	Board Fence
R/W	"	Right-of-Way
(AOG)	"	Annis, O'Sullivan, Vollebekk Ltd.
(P1)	"	Registered Plan 4M-1559
(P2)	"	Plan 4R-26142
(P3)	"	Plan 4R-29484
(P4)	"	Plan 4R-29367
(P5)	"	Plan 4R-30067

Distances shown on curved limits are Arc distances unless otherwise noted.

Distances shown on this plan are ground distances and can be converted to grid distances by multiplying by the combined scale factor of 0.999947.

Bearings are grid, derived from the southerly limit of chemin Mikinak Road, shown to be N90°00'00" W on Registered Plan 4M-1559, and are referred to the Central Meridian of MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

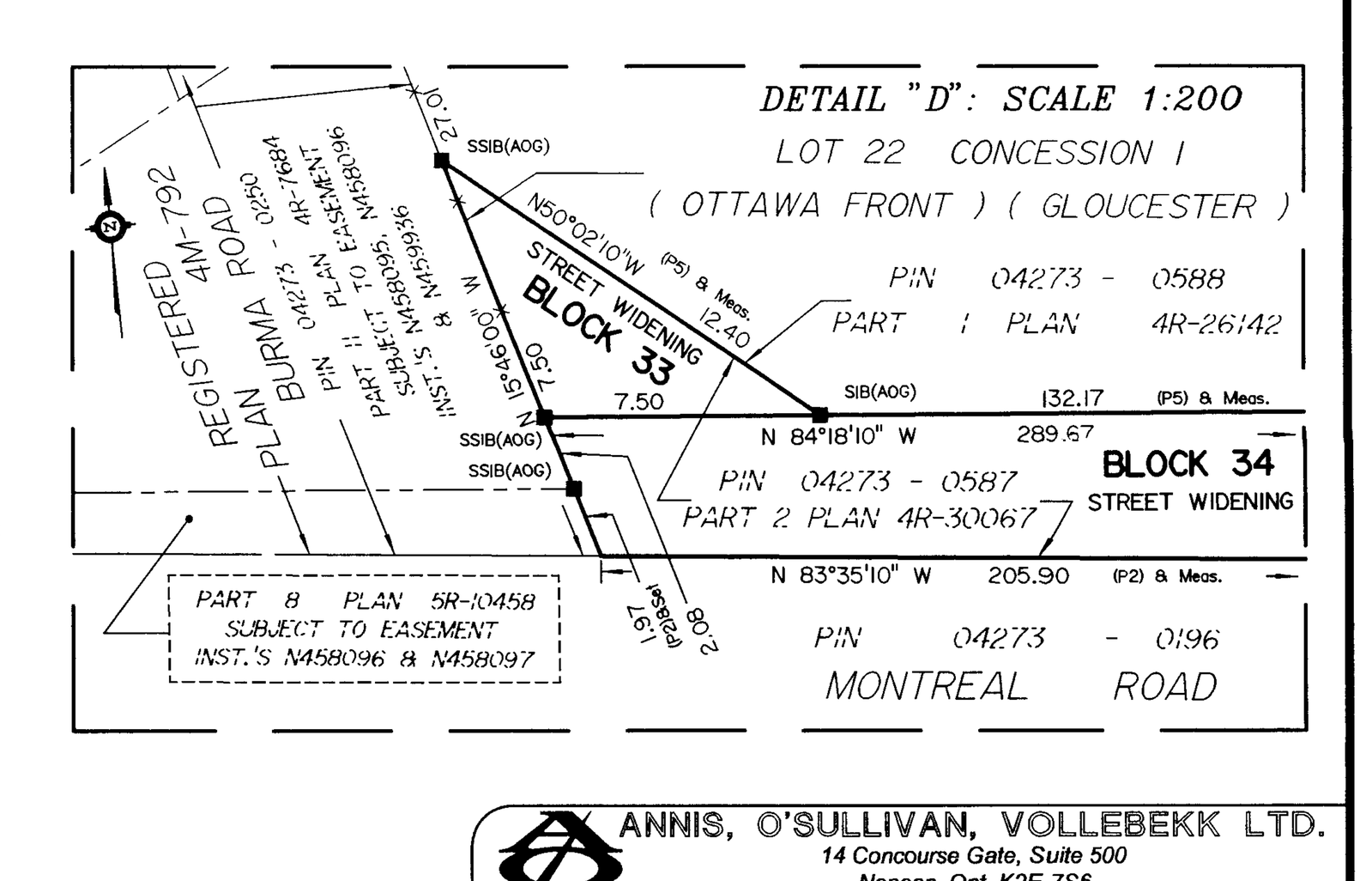
Coordinates are derived from Can-Net 2016 Real Time Network GPS observations referenced to Specified Control Points 01919680105 and 0198434761, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

Coordinate values are to urban accuracy in accordance with O. Reg. 216/10.

. 019198434761	Northing	5036178.12	Easting	372436.11
. 01919680146	Northing	5035456.42	Easting	372208.81
. Point A	Northing	5034986.54	Easting	373170.44
. Point B	Northing	5034986.54	Easting	372556.54

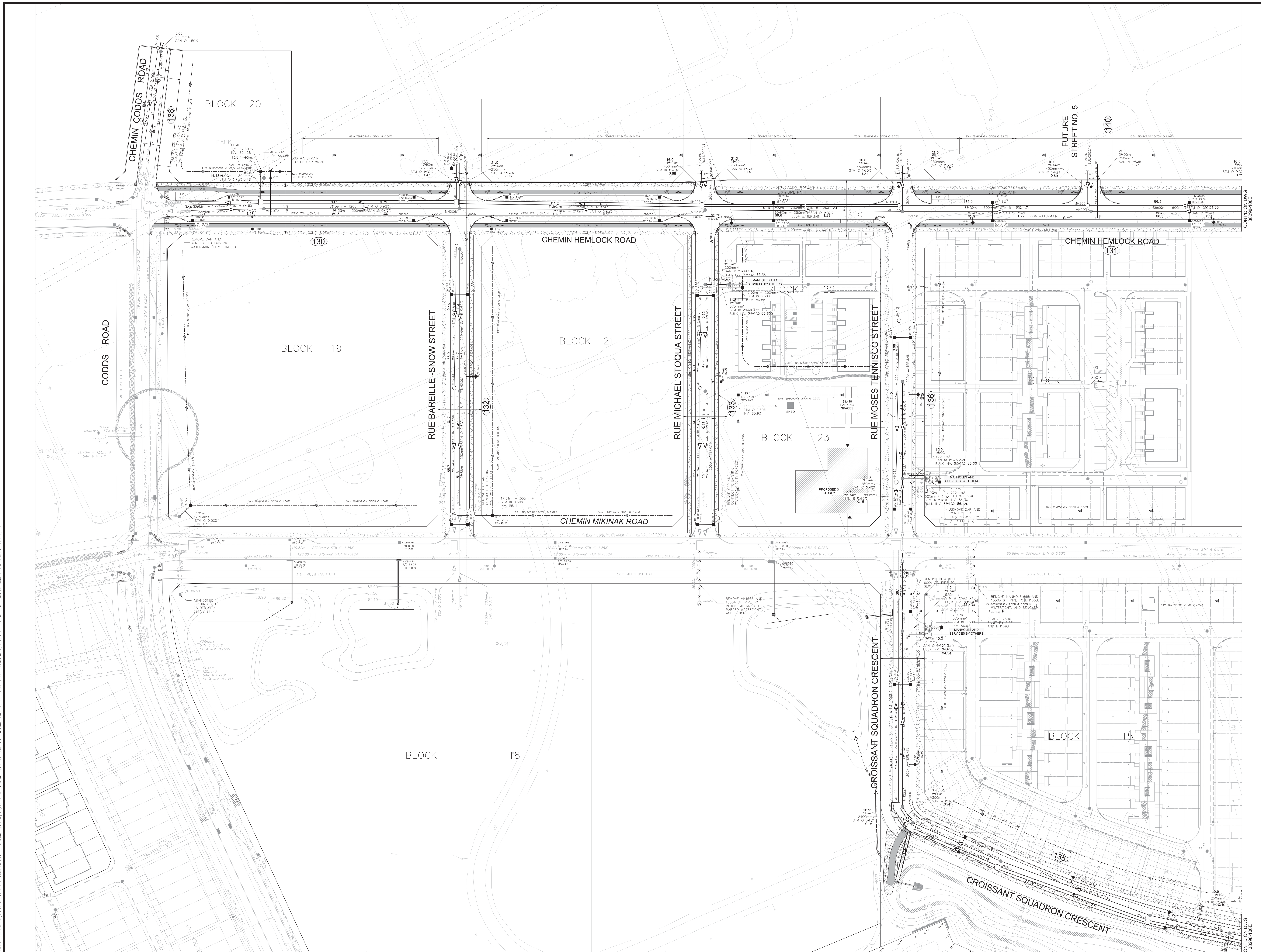
Caution: Coordinates cannot, in themselves, be used to re-establish corners or boundaries shown on this plan.

ELEVATION NOTES
1. Elevations are geodetic, referred to City of Ottawa Vertical Bench Mark No. 396 (01919680138), having an elevation of 95.06 metres.



ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com
Ontario Land Surveyors

Job No. 14710-14 CLC Pt Lts 21-23 CI OF GL Ph IB SUB F | N

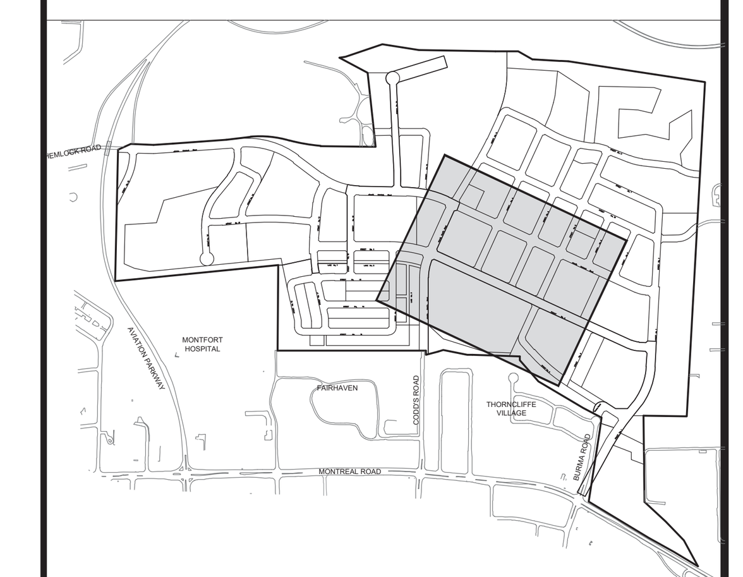


REVIEWED BY
DEVELOPMENT REVIEW SERVICES BRANCH

Signed ______________________

Date ______________________ 2017

Plan Number ______________________



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13			
12	AS BUILT	J.I.M.	2018:06:15
11	REVISED DITCH INLET LOCATION FOR BLOCKS 15, 18, 22 AND 24	J.I.M.	2018:02:02
10	REVISED CB222C & CB222D LOCATION	J.I.M.	2017:11:13
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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
18/06/15
PROVINCE OF ONTARIO

N

Drawing Title

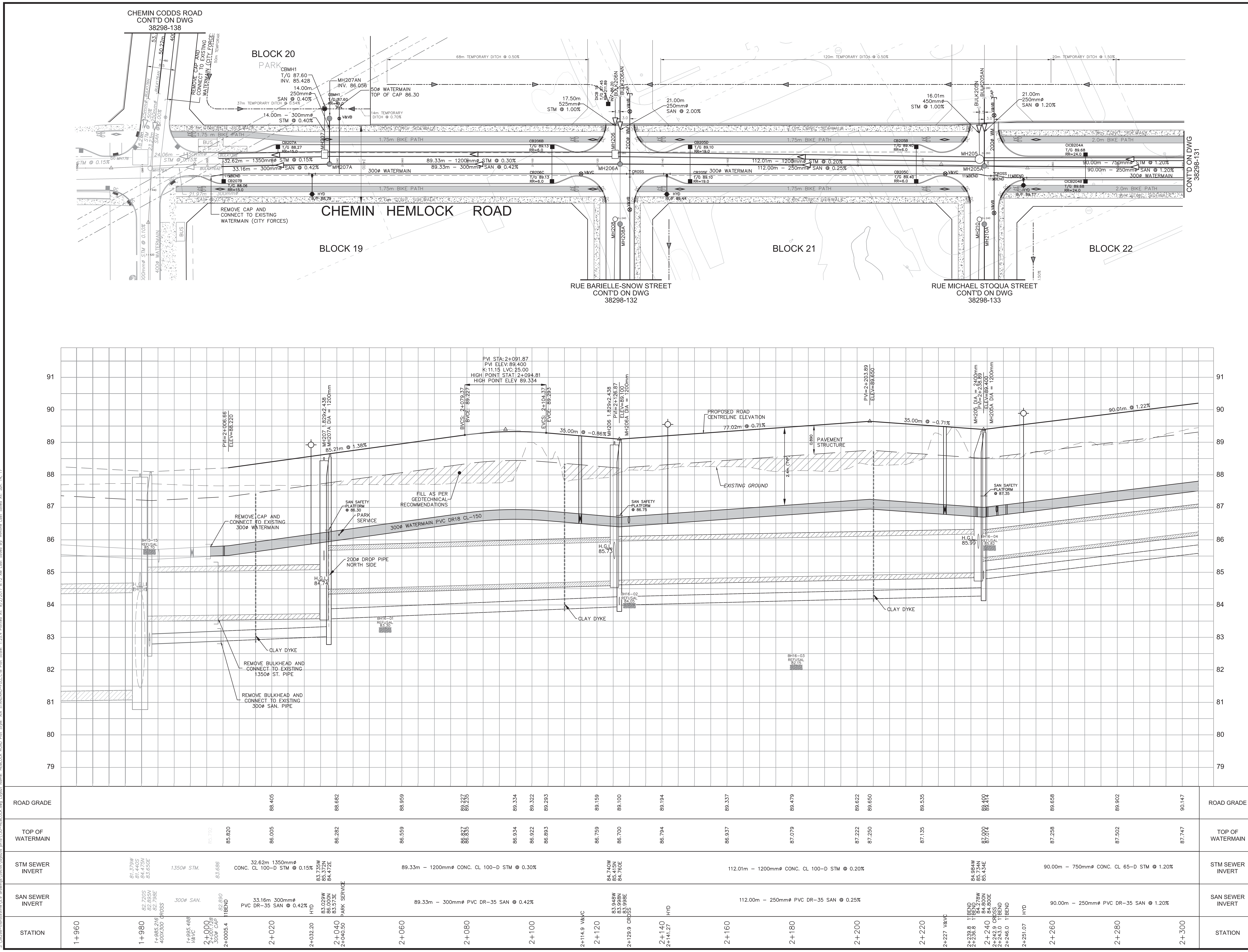
GENERAL PLAN OF SERVICES

Scale: 1 : 750

Design	Date
J.I.M.	MAY 2016
Drawn	**Checked**
M.M.	J.I.M.
Project No.	**Drawing No.**
38298	100D

D07-16-15-0003

#17063



CHEMIN CODDS ROAD
CONT'D ON DWG
38298-138
BLOCK 20
PARK
REMOVE CAP AND CONNECT TO EXISTING WATERMAIN (CITY FORCES)
CHEMIN HEMLOCK ROAD
BLOCK 19
BLOCK 21
BLOCK 22
RUE BARIELLE-SNOW STREET
CONT'D ON DWG
38298-132
RUE MICHAEL STOQUA STREET
CONT'D ON DWG
38298-133
CONT'D ON DWG
38298-131
1.75m BIKE PATH
2.0m BIKE PATH
300ø WATERMAIN
32.62m – 1350mmø STM @ 0.15%
33.16m – 300mmø SAN @ 0.42%
89.33m – 1200mmø STM @ 0.30%
89.33m – 300mmø SAN @ 0.42%
112.01m – 1200mmø STM @ 0.20%
112.00m – 250mmø SAN @ 0.25%
90.00m – 750mmø STM @ 1.20%
90.00m – 250mmø SAN @ 1.20%
MH207A
MH206A
MH205A
PVI STA: 2+091.87
PVI ELEV: 89.400
K: 11.15 LVC: 25.00
HIGH POINT STAT: 2+094.81
HIGH POINT ELEV 89.334
PROPOSED ROAD CENTRELINE ELEVATION
77.02m @ 0.71%
35.00m @ -0.86%
35.00m @ -0.71%
85.21m @ 1.38%
90.01m @ 1.22%
PAVEMENT STRUCTURE
EXISTING GROUND
FILL AS PER GEOTECHNICAL RECOMMENDATIONS
300ø WATERMAIN PVC DR18 CL-150
200ø DROP PIPE NORTH SIDE
CLAY DYKE
REMOVE BULKHEAD AND CONNECT TO EXISTING 1350ø ST. PIPE
REMOVE BULKHEAD AND CONNECT TO EXISTING 300ø SAN. PIPE
ROAD GRADE
TOP OF WATERMAIN
STM SEWER INVERT
SAN SEWER INVERT
STATION

REVIEWED BY
DEVELOPMENT REVIEW SERVICES BRANCH

Signed ______________________

Date ______________________ 2017

Plan Number ______________________

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Project Title

WATERIDGE VILLAGE AT ROCKCLIFFE
PHASE 1B

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
17/08/02
PROVINCE OF ONTARIO

N

Drawing Title

HEMLOCK ROAD

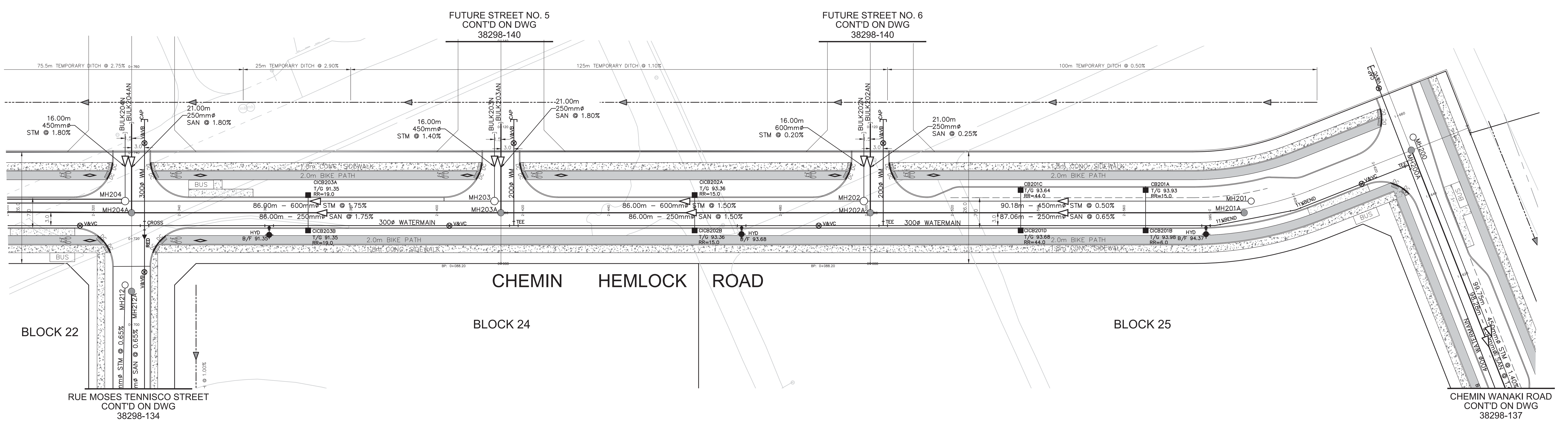
STA. 1+960 TO 2+300

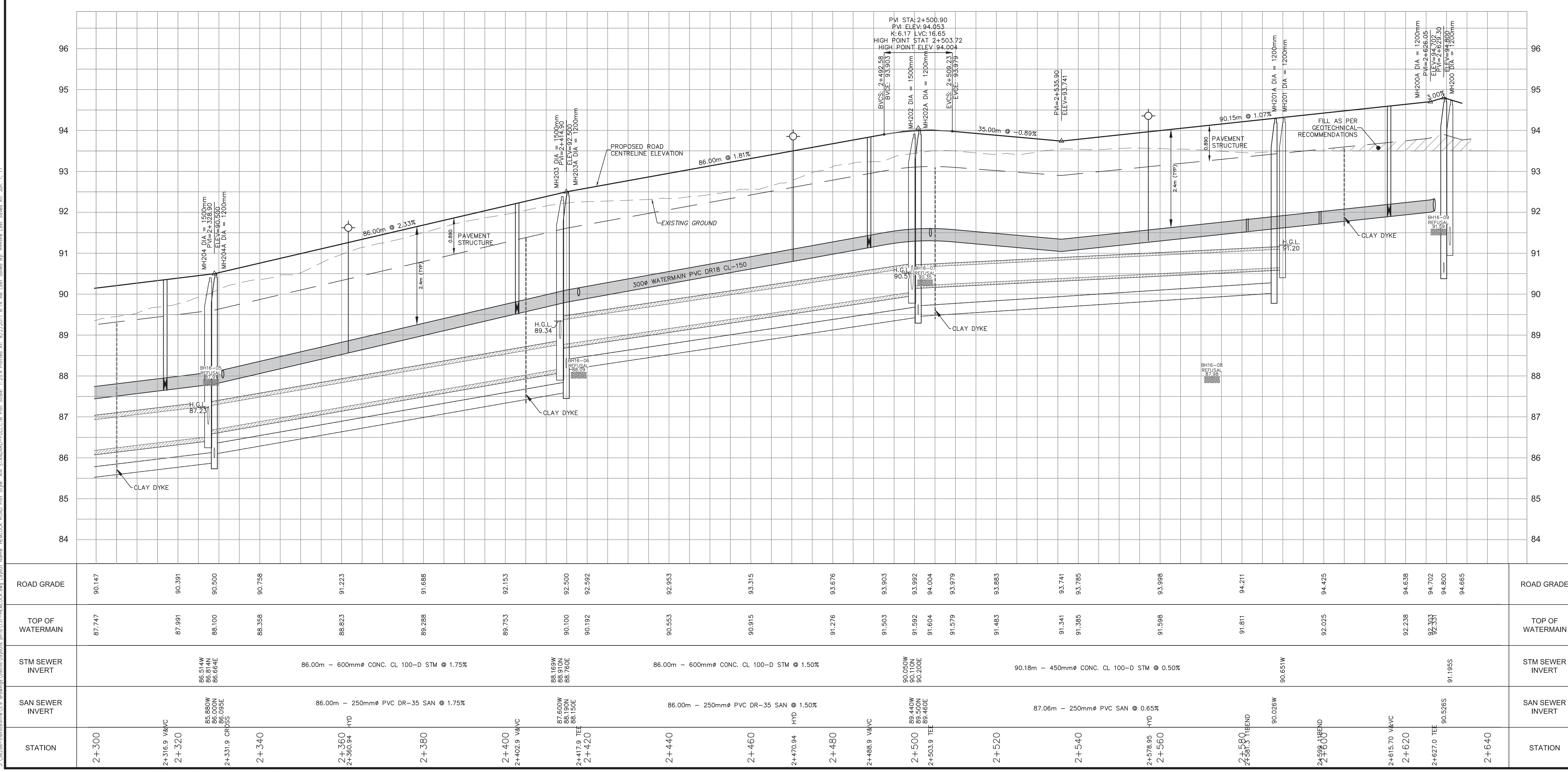
Scale
HORIZ. SCALE 1 : 500
VERT. SCALE 1 : 50

Design	Date
J.I.M.	MAY 2016
Drawn	Checked
M.M.	J.I.M.
Project No.	Drawing No.
38298	130

D07-16-15-0003

#17063





REVIEWED BY
DEVELOPMENT REVIEW SERVICES BRANCH

Signed ______________________

Date ______________________ 2017

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Project Title

WATERIDGE VILLAGE AT ROCKCLIFFE
PHASE 1B

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
17/08/02
PROVINCE OF ONTARIO

N

Drawing Title

HEMLOCK ROAD
STA. 2+300 TO WANAKI ROAD

Scale
HORIZ. SCALE 1 : 500
VERT. SCALE 1 : 50

Design	Date
J.I.M.	MAY 2016
Drawn	Checked
M.M.	J.I.M.
Project No.	Drawing No.
38298	131

D07-16-15-0003

#17063

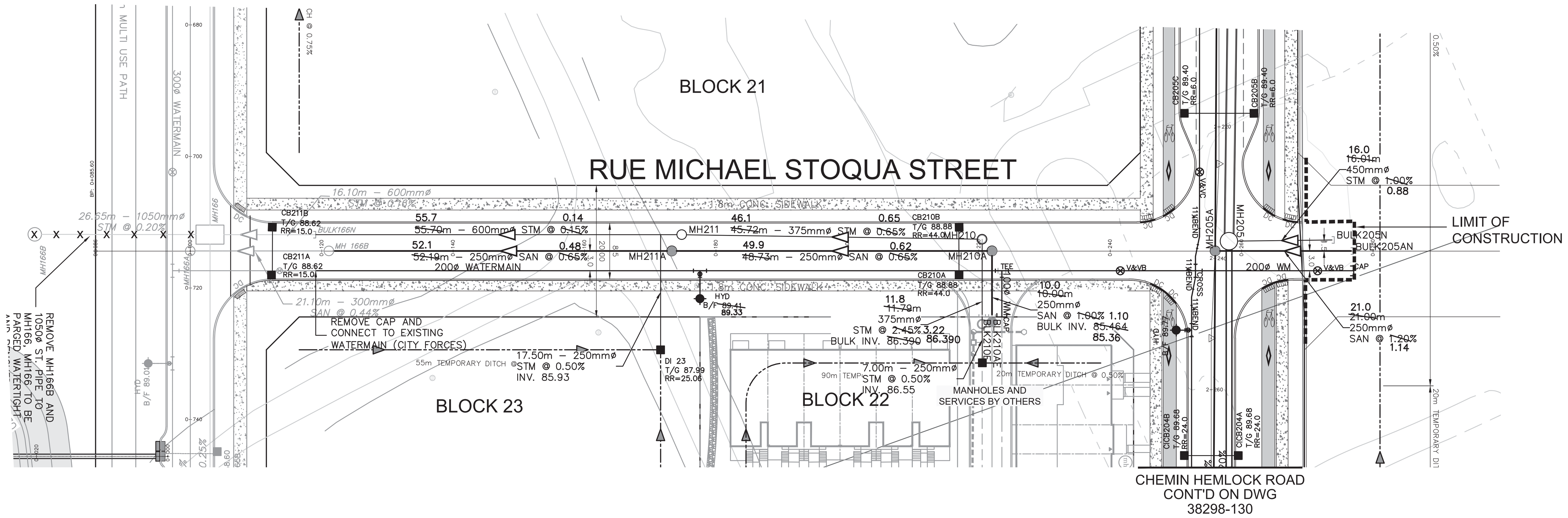
REVIEWED BY
DEVELOPMENT REVIEW SERVICES BRANCH

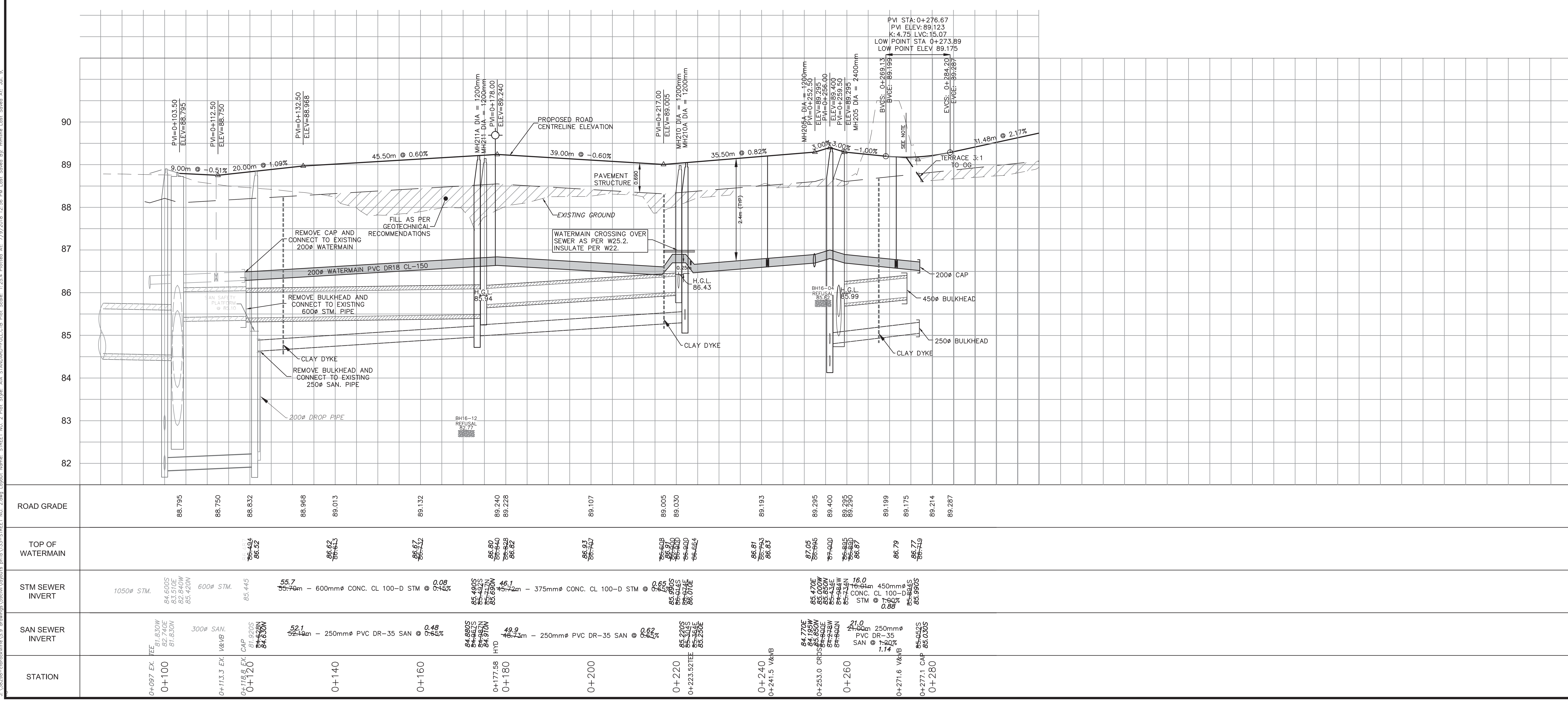
Signed ______________________

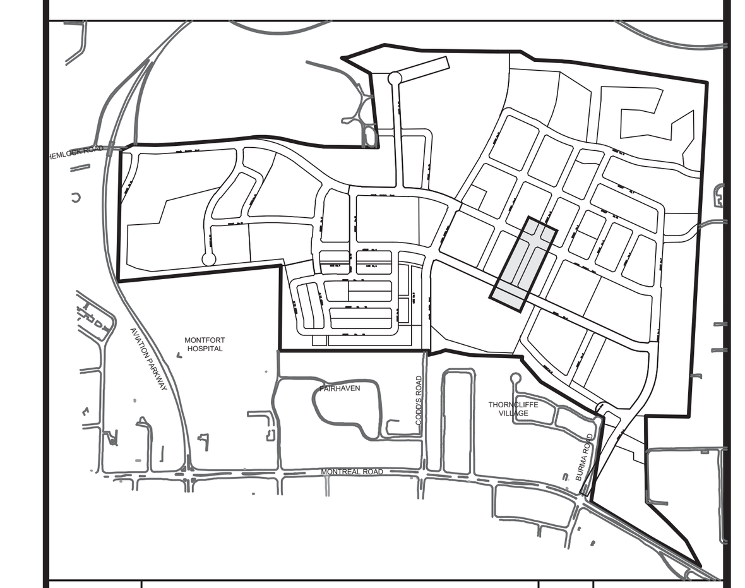
Date ______________________ 2017

Plan Number ______________________

NOTE:
FROM ±STA. 0+277-FUTURE ROAD CENTRE LINE PROFILE IS PROVIDED FOR CONTINUITY.







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Project Title

WATERIDGE VILLAGE AT ROCKCLIFFE

PHASE 1B

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
18/06/15
PROVINCE OF ONTARIO

Drawing Title

MICHAEL STOQUA STREET

MIKINAK ROAD TO HEMLOCK ROAD

Scale
HORIZ. SCALE 1 : 500
VERT. SCALE 1 : 50

Design	Date
J.I.M.	MAY 2016
Drawn	**Checked**
M.M.	J.I.M.
Project No.	**Drawing No.**
38298	133

D07-16-15-0003

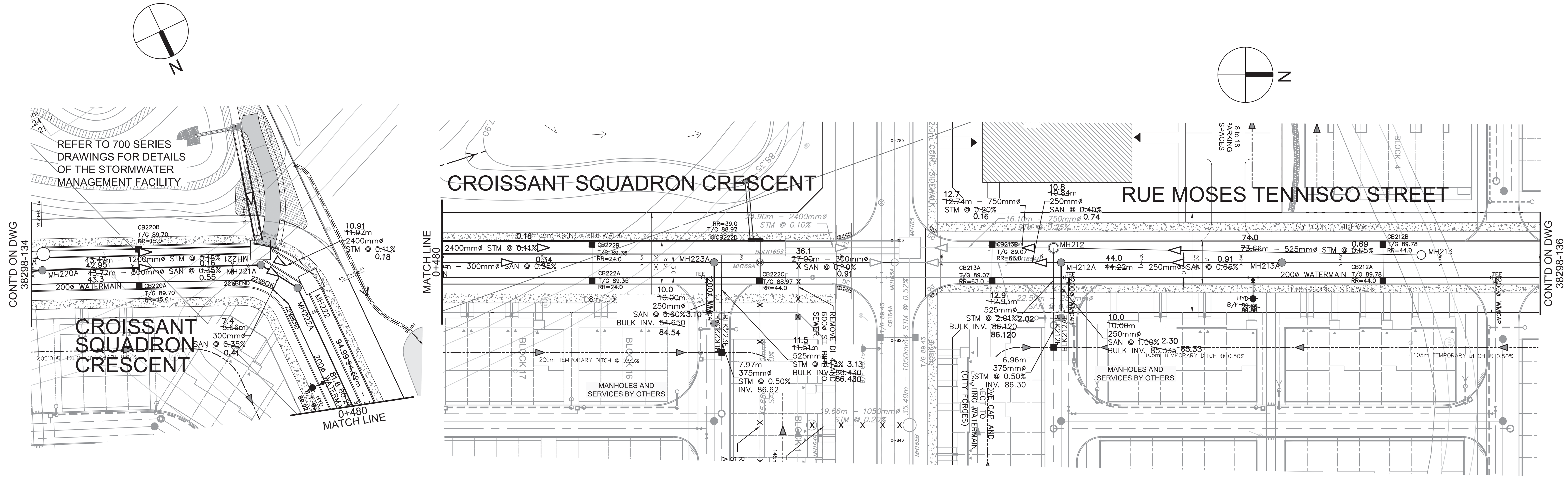
#17063

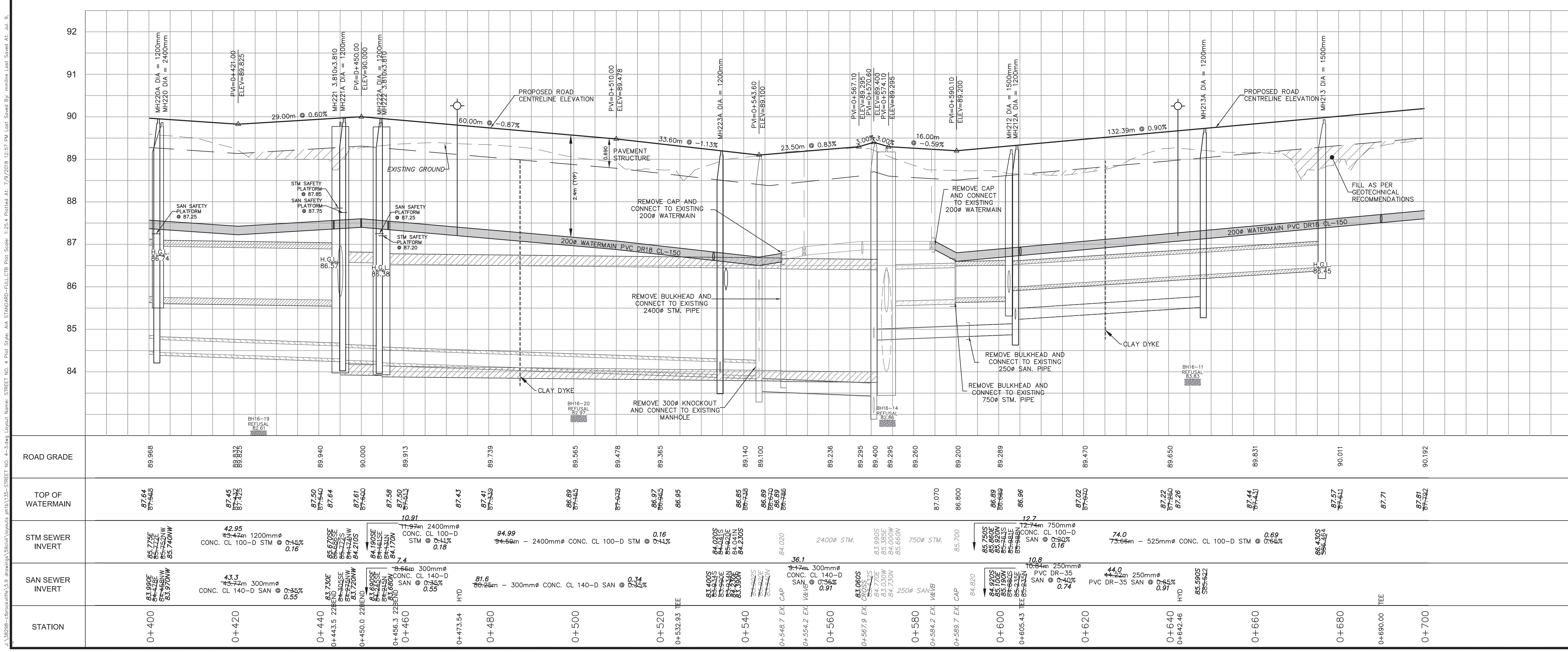
REVIEWED BY
DEVELOPMENT REVIEW SERVICES BRANCH

Signed ______________________

Date ______________________ 2017

Plan Number ______________________





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Project Title

WATERIDGE VILLAGE AT ROCKCLIFFE

PHASE 1B

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
18/06/15
PROVINCE OF ONTARIO

Drawing Title

SQUADRON CRESCENT MOSES TENNISCO STREET

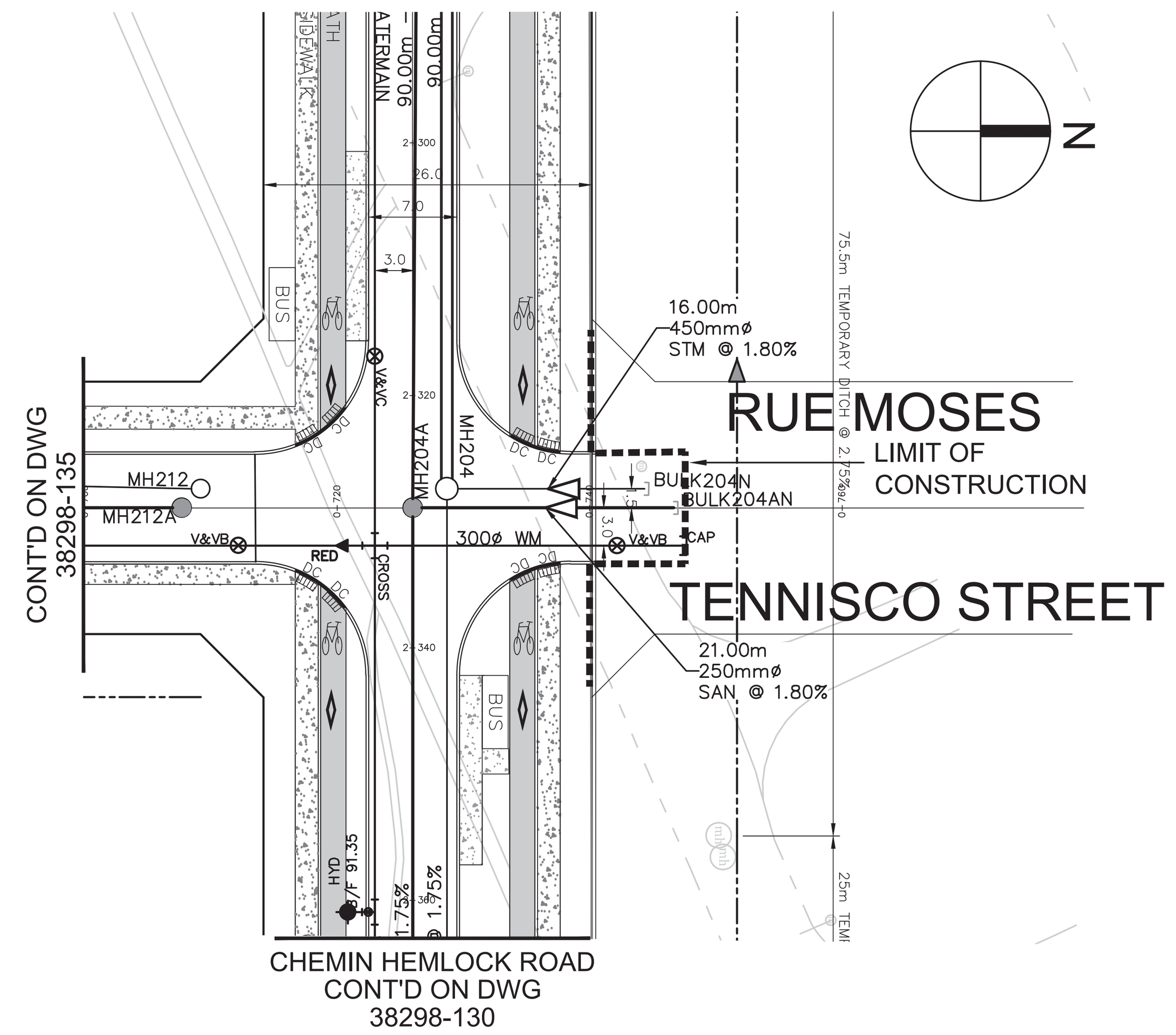
STA. 0+400 TO STA. 0+700

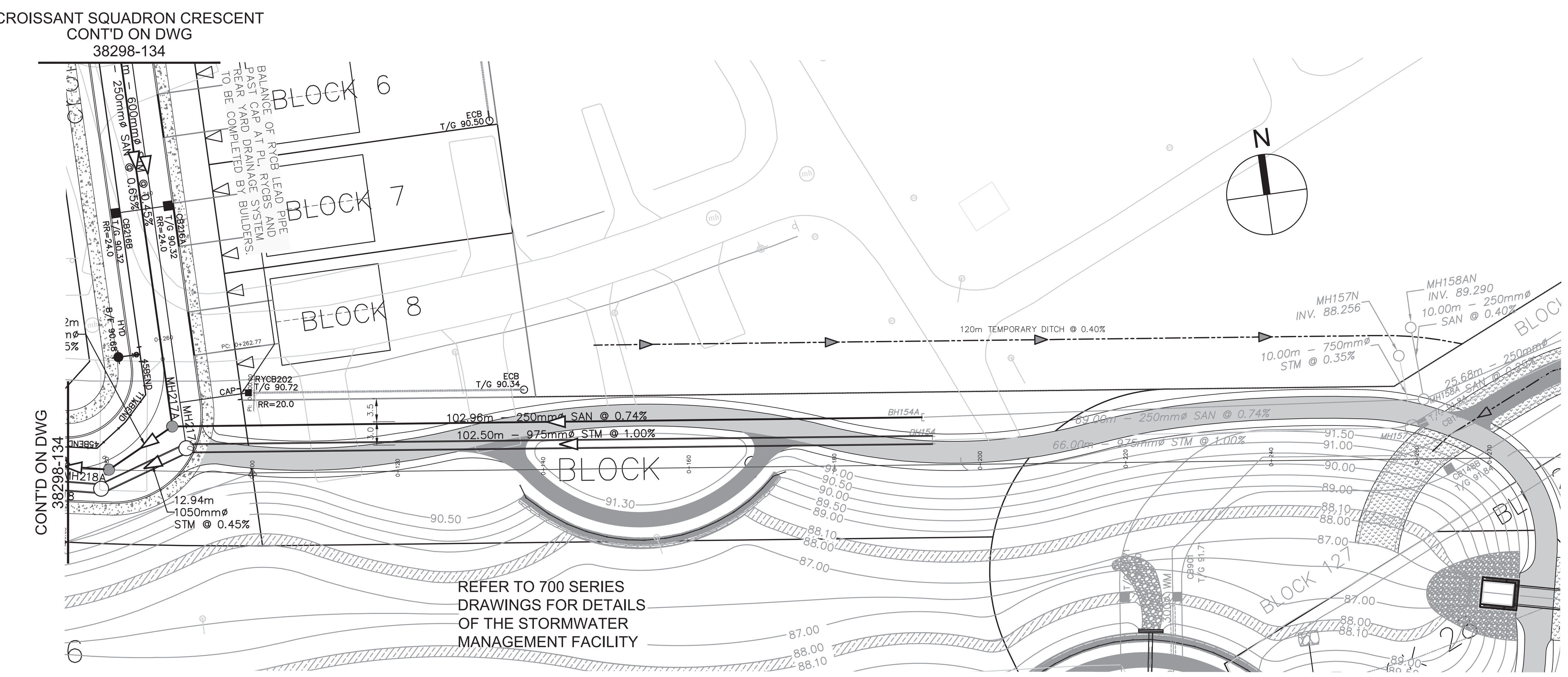
Scale
HORIZ. SCALE 1 : 500
VERT. SCALE 1 : 50

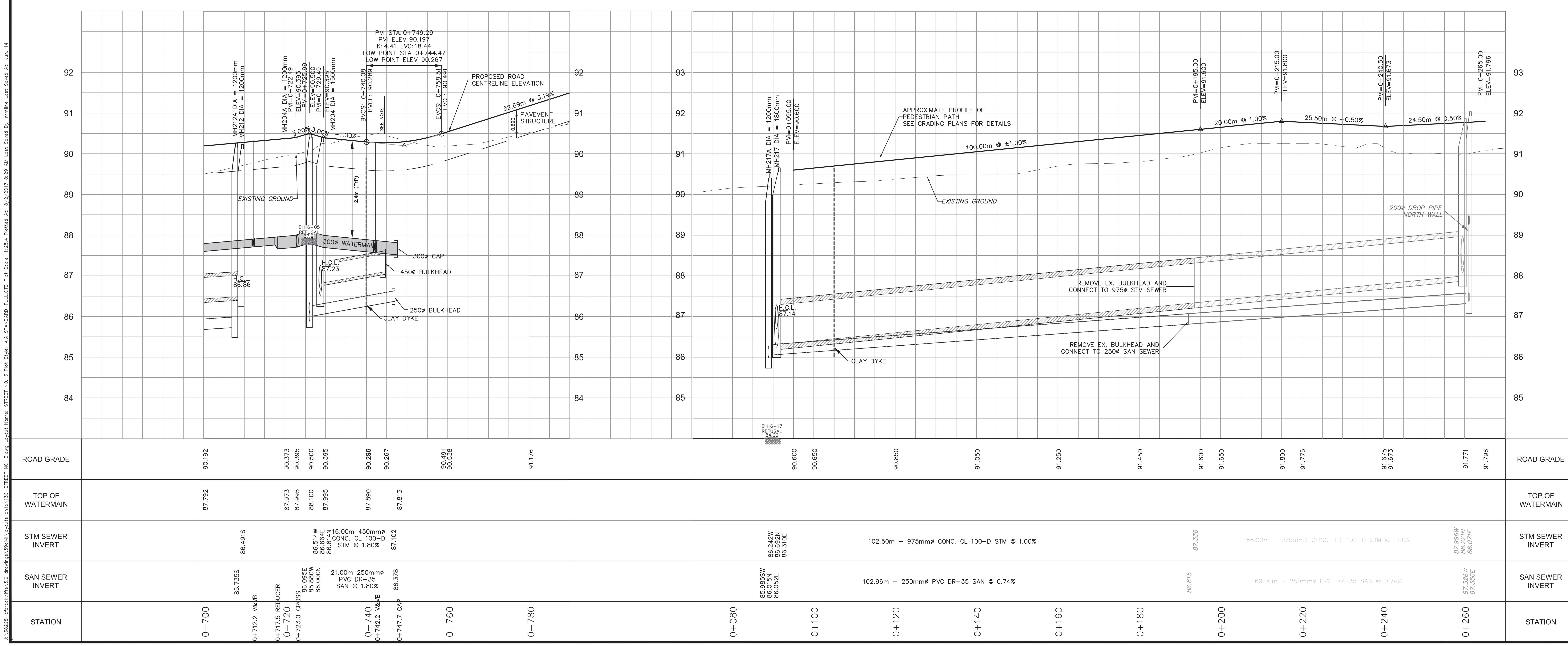
Design	Date
J.I.M.	MAY 2016
Drawn	Checked
M.M.	J.I.M.
Project No.	Drawing No.
38298	135

D07-16-15-0003

#17063







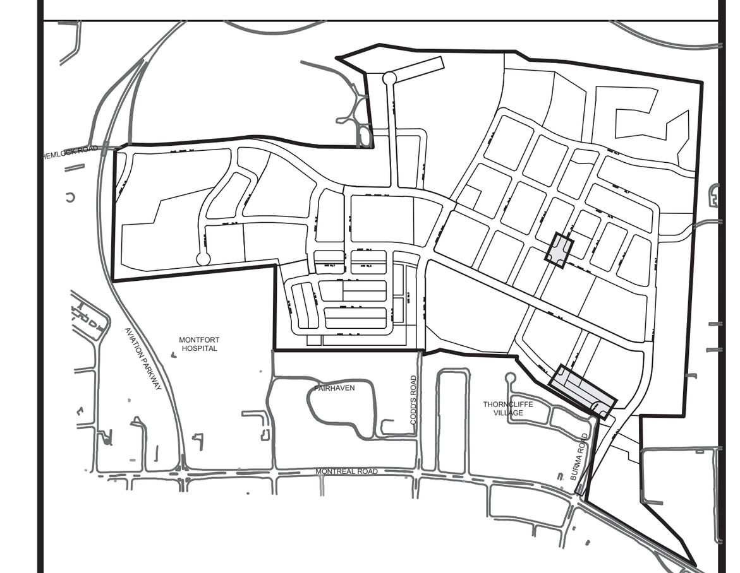
REVIEWED BY
DEVELOPMENT REVIEW SERVICES BRANCH

Signed ______________________

Date ______________________2017

Plan Number ______________________

NOTE:
FROM ±STA. 0+747.7-FUTURE ROAD CENTRE LINE PROFILE IS PROVIDED FOR CONTINUITY.



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

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
17/08/02
PROVINCE OF ONTARIO

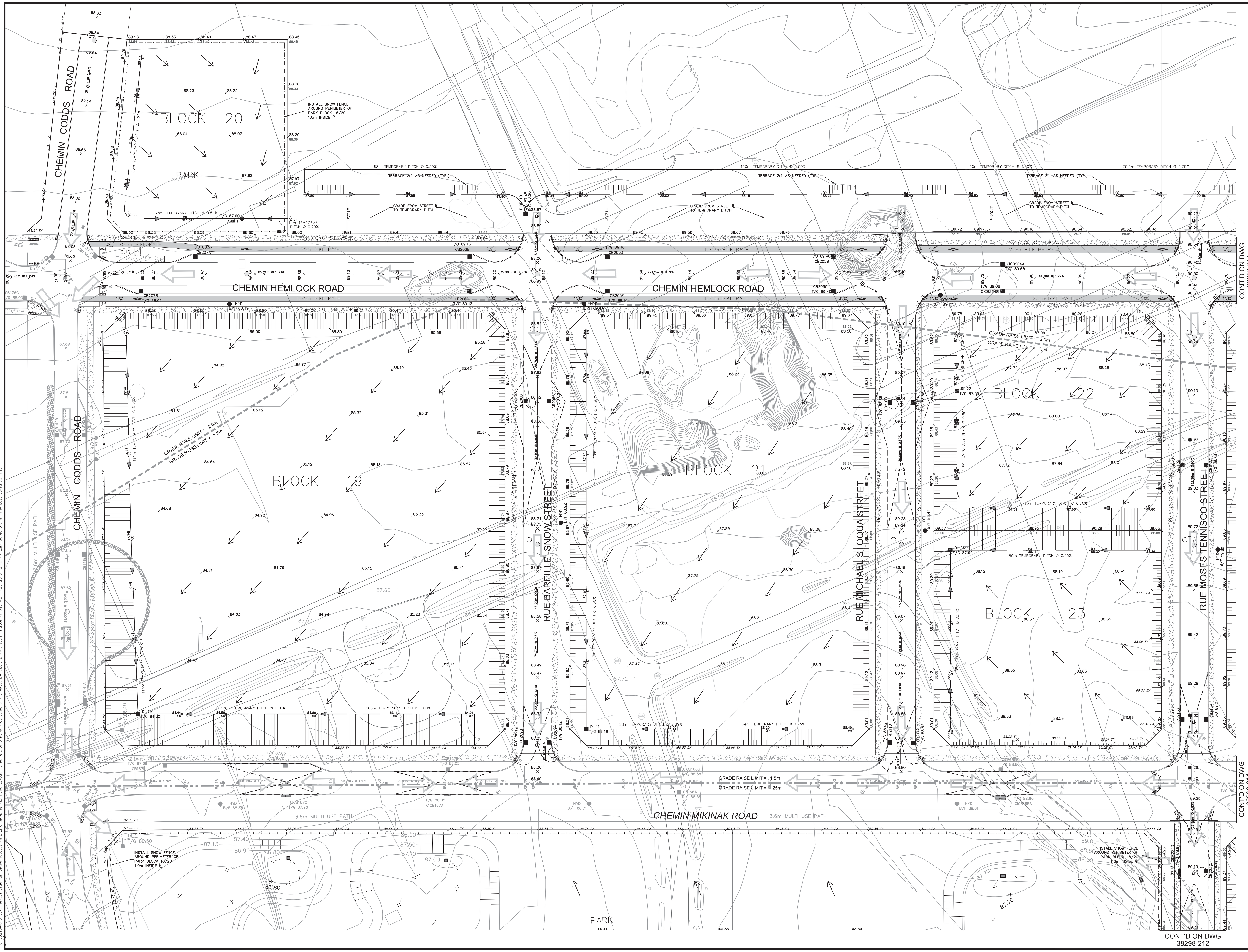
Drawing Title
MOSES TENNISCO STREET
STA. 0+700 TO STA. 0+780
BLOCK 9

Scale
HORIZ. SCALE 1 : 500
VERT. SCALE 1 : 50

Design	Date
J.I.M.	MAY 2016
Drawn	Checked
M.M.	J.I.M.
Project No.	Drawing No.
38298	136

D07-16-15-0003

#17063



GRADING & DRAINAGE APPROVED

Signed ______________________

Date ______________________ 2017

NOTES:

FOR GRADING LEGEND, DETAILS AND CROSS SECTIONS REFER TO DRAWINGS 38298-015 & 38298-016.

THE PROPOSED PARK BLOCK GRADING IS TEMPORARY AND ENSURES THE PROPERTY WILL HAVE POSITIVE DRAINAGE UNTIL THE FINAL PARK GRADING DESIGN IS IMPLEMENTED.

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9	REVISED GRADING FOR BLOCKS 15, 18, 22 AND 24	J.I.M.	2018:02:02
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
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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
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ibigroup.com

Project Title

WATERIDGE VILLAGE AT ROCKCLIFFE
PHASE 1B

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
18/02/02
PROVINCE OF ONTARIO

N

Drawing Title

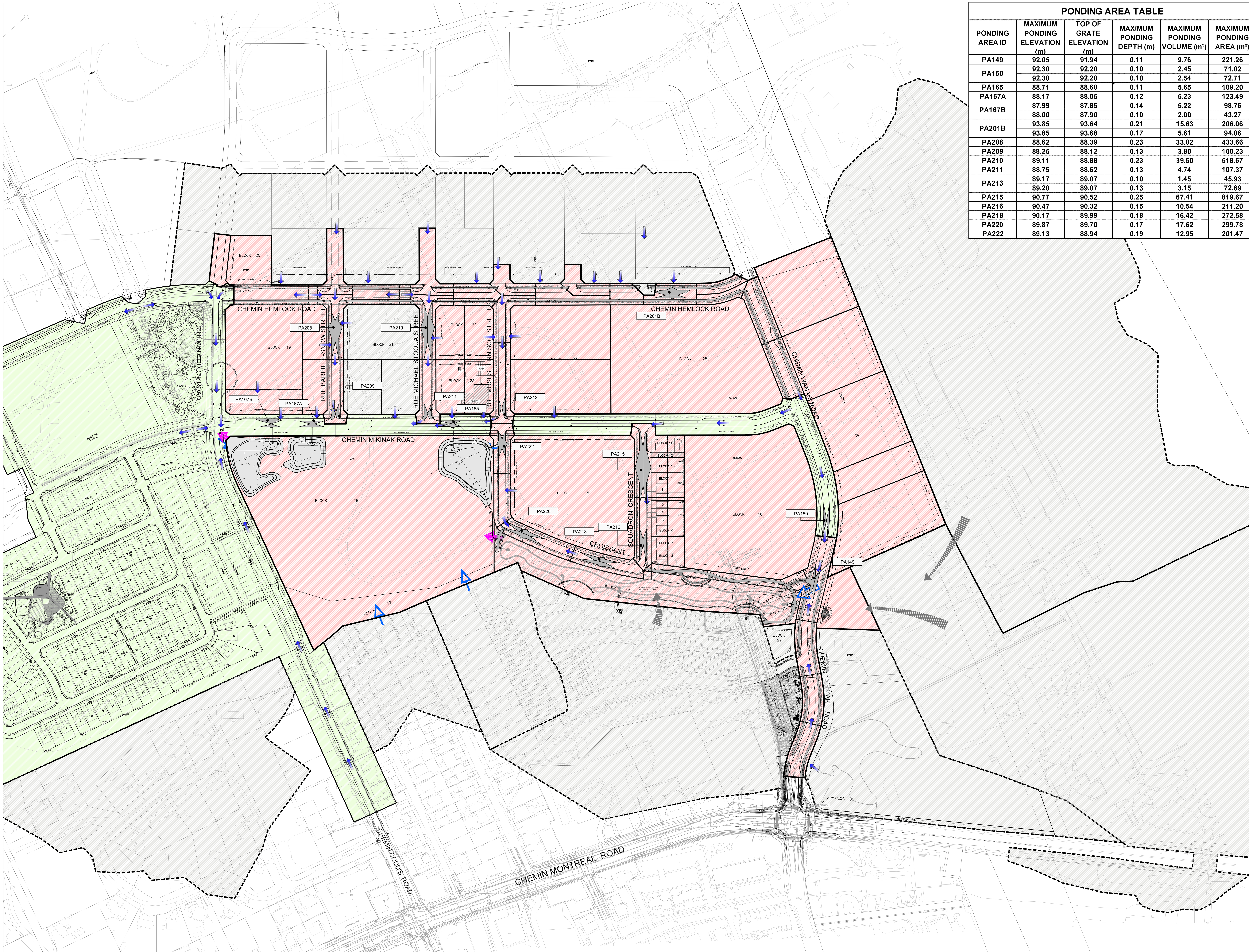
GRADING PLAN

Scale 1 : 500

Design	Date
J.I.M.	MAY 2016
Drawn	Checked
M.M.	J.I.M.
Project No.	Drawing No.
38298	210

D07-16-15-0003

#17063



PONDING AREA TABLE

PONDING AREA ID	MAXIMUM PONDING ELEVATION (m)	TOP OF GRATE ELEVATION (m)	MAXIMUM PONDING DEPTH (m)	MAXIMUM PONDING VOLUME (m^3)	MAXIMUM PONDING AREA (m^2)
PA149	92.05	91.94	0.11	9.76	221.26
PA150	92.30	92.20	0.10	2.45	71.02
	92.30	92.20	0.10	2.54	72.71
PA165	88.71	88.60	0.11	5.65	109.20
PA167A	88.17	88.05	0.12	5.23	123.49
PA167B	87.99	87.85	0.14	5.22	98.76
	88.00	87.90	0.10	2.00	43.27
PA201B	93.85	93.64	0.21	15.63	206.06
	93.85	93.68	0.17	5.61	94.06
PA208	88.62	88.39	0.23	33.02	433.66
PA209	88.25	88.12	0.13	3.80	100.23
PA210	89.11	88.88	0.23	39.50	518.67
PA211	88.75	88.62	0.13	4.74	107.37
PA213	89.17	89.07	0.10	1.45	45.93
	89.20	89.07	0.13	3.15	72.69
PA215	90.77	90.52	0.25	67.41	819.67
PA216	90.47	90.32	0.15	10.54	211.20
PA218	90.17	89.99	0.18	16.42	272.58
PA220	89.87	89.70	0.17	17.62	299.78
PA222	89.13	88.94	0.19	12.95	201.47

REVIEWED BY
DEVELOPMENT REVIEW SERVICES BRANCH

Signed ____________________

Date ____________________ 2016

Plan Number ____________________

LEGEND:

- PHASE 1B DRAINAGE AREA
- PHASE 1A DRAINAGE AREA
- EXTERNAL DRAINAGE AREA
- PA116 — POND ID
- MAJOR FLOW
- TOTAL FLOW
- MAJOR FLOW TO PARK DRY POND
- MAJOR FLOW TO BURMA SWMF
- EMERGENCY OVERLAND FLOW
- MH136 MANHOLE ID

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7			
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5	REVISED PER MOECC COMMENTS	J.I.M.	2017:06:07
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	P.S.	2016:07:11

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SOCIÉTÉ IMMOBILIÈRE DU CANADA
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613 998 7777

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
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Project Title

WATERIDGE VILLAGE AT ROCKCLIFFE

PHASE 1B

J.I. MOFFATT
17/06/16

N

Drawing Title

PONDING PLAN

Scale 1:2000

Design	Scale
P.S.	JULY 2016
Drawn	**Checked**
S.V.	P.S.
Project No.	**Drawing No.**
38298	751

D07-16-15-0003

#17063