BAYVIEW HOSPITALITY GROUP

1000 AND 1050 TAWDINA STREET, RESIDENTIAL DEVELOPMENT, OTTAWA, ON

DESIGN BRIEF

AUGUST 15, 2022
1ST SUBMISSION

1000 AND 1050 TAWDINA STREET, RESIDENTIAL DEVELOPMENT, OTTAWA, ON

DESIGN BRIEF

BAYVIEW HOSPITALITY GROUP

SITE PLAN APPLICATION
1ST SUBMISSION

PROJECT NO.: 221-00473-00
DATE: AUGUST 2022

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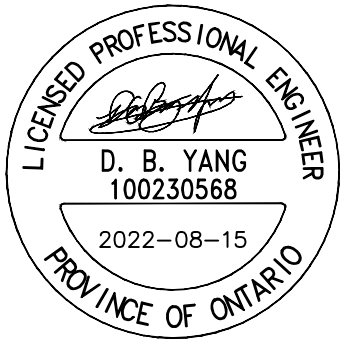

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1 GENERAL

1.1 EXECUTIVE SUMMARY

WSP was retained by Bayview Hospitality Group to provide servicing and grading design services for the proposed new residential development consists of three residential developments sites across 1000 and 1050 Tawadina Street, located at the northeast corner of Codd's Road and Hemlock Road within the Wateridge Subdivision developed by Canada Land Company (CLC). The construction of sewers and base course asphalt is complete on Codd's Road, Hemlock Road and Barielle Snow Street, on which the three properties will front. All services for the three development sites will be available from Codd's Road and Barielle-Snow Street. The subjected developments are bounded by the Phase 1 and Phase 2 of the subdivision development. The future Phase 2A, 2C and 2D subdivision development is proposed north of the site along Tawadina Road which is currently under construction. This report outlines findings and calculations pertaining to the servicing of the proposed development for building 1, 2 and 3 with a gross lot area of 0.519 Ha, 0.374 Ha and 0.374 Ha respectively.

The surrounding neighbourhood is being developed by CLC with the IBI Group providing engineering design services. Information regarding the proposed municipal services was provided by IBI, as described in Design Brief – Wateridge Village at Rockcliffe Phase 1B, Project: 38298-5.2.2, Revised June 16, 2017. And the services have been modified once again during construction of phase 2B, changes have been made on Design Brief – Wateridge Village at Rockcliffe Phase 2B, Project: 118863-5.2.2, revised April 2019. Excerpts from the two Design Briefs are provided in Appendix A of this report.

Currently the land proposed for the residential development is the predeveloped vacant land mainly covered by grass and it is part of the Wateridge Subdivision Development. The total study area for all three sites were considered to be 0.519 Ha, 0.374 Ha and 0.374 Ha in size. The site for Building 1 is bounded by existing residential development to the east, and future residential development to the north, west and south. Building 2 is bounded by future residential development to the north, east and south, and future park to the west. Building 3 is bounded by future residential development to the north, east and west, and future park to the south.

They are blocks 11, 12, 13 from the registered plan 4m-1651, City of Ottawa (refer to Appendix A for the Topographical Survey Plan by Annis, O'Sullivan, Vollebekk Ltd, February 2022). Based on the topographic survey, the ground is sloping from Tawadina Road down to Hemlock Street, temporary swales and ditch inlet catchbasins have been installed to convey the overland runoff to the existing storm sewers along Codd's Road and Hemlock Street. Significant infrastructure has been previously installed around the perimeter of the development lands as part of the development of the Wateridge subdivision. Most of the infrastructure have been designed with enough capacity to accommodate the future development of the subject sites. The existing piped stormwater system within Wateridge subdivision development Phase 2B conveys drainage to the existing eastern SWM facility next to the Sir-George Etienne Cartier then discharges to the existing Ottawa River to the north.

As per the Wateridge Subdivision Development 2B Design Briefs by IBI Group, the following criteria apply: runoff from all storm events up to and including the 1:100 year event must be restricted to a calculated rate based on an imperviousness ratio of 0.86, ICD restricted flow of 366 l/s and 370 l/s for Block 12 and Block 11 respectively.

Also, as per the Wateridge Subdivision Development 1B Design Briefs by IBI Group, runoff from all storm events up to and including the 1:100 year event must be restricted to a calculated rate based on an imperviousness ratio of 0.86, 100 year capture flow rate would be 174 l/s, 95 l/s and 128 l/s for drainage area EX230B, EX206B and EX205B.

From both design briefs, the subject sites do not need to provide additional storage to accommodate runoff from the 1:100 year event. Stormwater quality control is also not required for these sites.

Design of a drainage and stormwater management system in this development have been prepared in accordance with the following documents:

- Sewer Design Guidelines, City of Ottawa, October 2012;
- Stormwater Management Planning and Design Manual, Ministry of the Environment, March 2003; and
- Stormwater Management Facility Design Guidelines, City of Ottawa, April 2012

This report was prepared utilizing servicing design criteria obtained from available sources, and outlines the design for water, sanitary wastewater, and stormwater facilities.

The format of this report matches that of the servicing study checklist found in Section 4 of the City of Ottawa's Servicing Study Guidelines for Development Applications, November 2009.

The following municipal services are available within Campeau Drive and Cordillera Street to the development as recorded from as-built drawings from City of Ottawa:

Codd's Road:

- 750 mm concrete storm sewer, 250mm PVC sanitary sewer and 406mm PVC watermain.

Bareille-Snow Street:

- 525mm concrete storm sewer, 250mm PVC sanitary and 203mm PVC watermain.

Hemlock Road:

- 1200mm concrete storm sewer, 250mm PVC sanitary and 305mm PVC watermain.

It is proposed that:

- On-site stormwater management systems, employing roof storage and LID features such as soil amendment at the landscaping area encourage for infiltration will be provided to attenuate flow rates leaving the sites as much as possible to achieve the developed flow rate by IBI Group. Existing drainage patterns, previously established controlled flow rates and storm sewers will be maintained. Refer to final Geotechnical Investigation report for soil amendment recommendations.

1.2 DATE AND REVISION NUMBER

This version of the report is the first revision, dated August 15, 2022.

1.3 LOCATION MAP AND PLAN

The proposed residential developments at 1000 and 1050 Tawdina Street, in the City of Ottawa at the location shown in Figure 1-1 below.

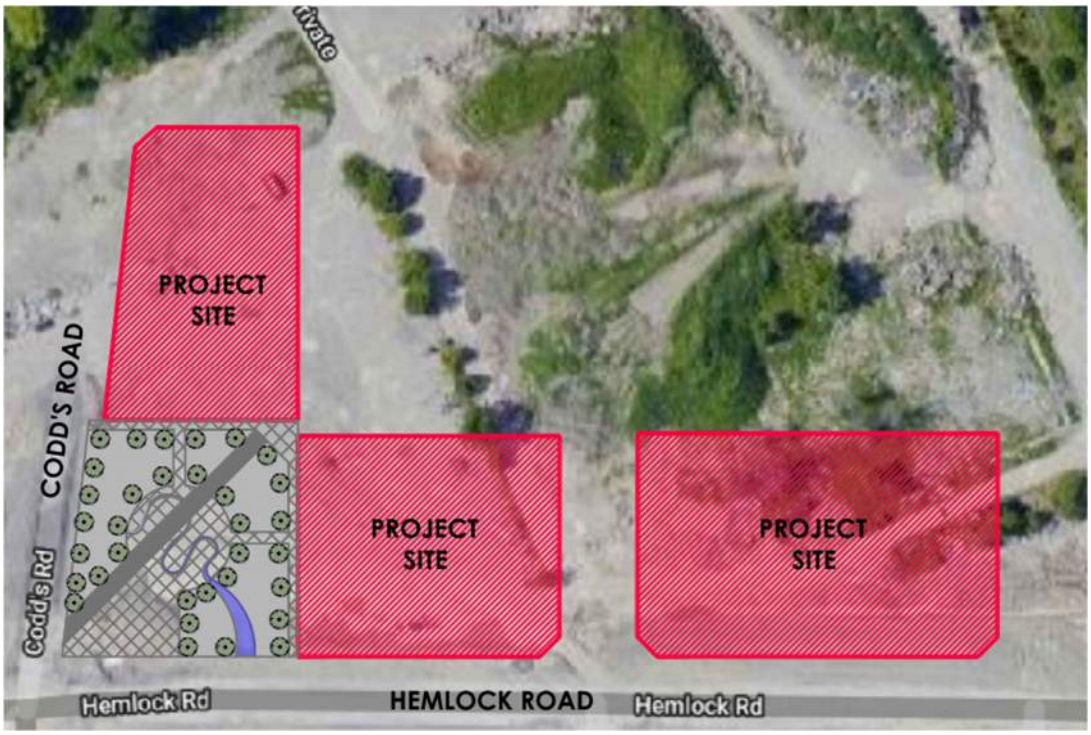


Figure 1-1 Site Location

1.4 PRE-CONSULTATION MEETINGS

A pre-consultation meeting was held with the City of Ottawa on February 3, 2022. Notes from this meeting are provided in Appendix A.

1.5 HIGHER LEVEL STUDIES

The review for servicing has been undertaken in conformance with, and utilizing information from, the following documents:

- Ottawa Sewer Design Guidelines, Second Edition, Document SDG002, October 2012, City of Ottawa including:
    - Technical Bulletin ISDTB-2012-4 (20 June 2012)
    - Technical Bulletin ISDTB-2014-01 (05 February 2014)
    - Technical Bulletin PIEDTB-2016-01 (September 6, 2018)
    - Technical Bulletin ISDTB-2018-01 (21 March 2018)
    - Technical Bulletin ISDTB-2018-04 (27 June 2018)

- Ottawa Design Guidelines – Water Distribution, July 2010 (WDG001), including:
    - Technical Bulletin ISDTB-2014-02 (May 27, 2014)
    - Technical Bulletin ISTB-2018-02 (21 March 2018)
- Stormwater Management Planning and Design Manual, Ontario Ministry of the Environment and Climate Change, March 2003 (SMPDM).
- Design Guidelines for Drinking-Water Systems, Ontario Ministry of the Environment and Climate Change, 2008 (GDWS).
- Fire Underwriters Survey, Water Supply for Public Fire Protection (FUS), 2022.

1.6 AVAILABLE EXISTING AND PROPOSED INFRASTRUCTURE

A municipal sanitary sewer, a municipal storm sewer and a watermain are located within both Codd's Road and Bareille-Snow Street right of way. A new sanitary sewer, two new storm sewers and a new water service will be connected to the existing sewers along Codd's Road from the proposed development of building 3. A new sanitary sewer, two new storm sewers and a new water service will be connected to the existing sewers along Bareille-Snow Street from both the proposed development of building 1 and 2. Ultimately, the storm flows from Codd's Road and Bareille-Snow Street (servicing the three sites) to the Hemlock Road storm sewer are intended to be directed to a permanent stormwater management pond that will provide quality and quantity treatment for most of the phase 1 and phase 2 development of the Wateridge Subdivision, and including the three subjected sites. Quality control is also not required on the subjected sites. The existing boundary roads at the site will remain open.

1.7 CONCEPT LEVEL MASTER GRADING PLAN

A detailed grading plan for all three sites have been developed, matching the existing overland flow pattern of directing overflow drainage to Hemlock Road. The site topographic survey, included in Appendix A, provides evidence of direction of overland flow of all three sites.

The proposed grading will be reviewed by the geotechnical engineer. The geotechnical investigation was completed in August 2022 by Yuri Mendez Engineering. The grading along the site boundaries bordering Wateridge lands have been coordinated with Wateridge's engineering consultant. The site topographic survey provides evidence of direction of overland flow of the site. Minor grade changes will be made to grades at the development perimeter for the proposed entrances.

Grading will employ smooth transitions from the new work areas to existing grades with less than 4.0% slope. No changes will be made to grades at the development perimeter other than the locations mentioned above.

1.8 GEOTECHNICAL SUTDY

A geotechnical investigation report has been prepared by Yuri Mendez Engineering (Memo No. 44-BHH-R0, May 24, 2022), and its recommendations has been taken into account in developing the engineering specifications. Yuri Mendez Engineering has also prepared a follow up commentary based on a geotechnical review of the proposed grading plan to access the soil amendment at the landscaping area. The letter can be found in Geotechnical report.

2 WATER DISTRIBUTION

2.1 CONSISTENCY WITH MASTER SERVICING STUDY AND AVAILABILITY OF PUBLIC INFRASTRUCTURE

There are an existing 406mm diameter municipal watermain along Codd's Road and 203mm diameter municipal watermain along Bareille-Snow Street providing water to building 1, 2 and 3.

All buildings will be protected with supervised automatic fire protection sprinkler system and will require dual 203mm diameter water services. The fire department connection for Building 1 and 2 are located at the south side of the buildings fronting to Hemlock Road. They are within 45m from the existing municipal fire hydrant on Hemlock Road. The fire department connection for Building 3 is located at the west side of the building fronting to Codd's Road which is within 45m from one of the existing municipal fire hydrants on Codd's Road. No changes are required to the existing City water distribution system to allow servicing for all three properties.

All three buildings will be serviced with dual water services connections and an isolation valve in between will be made to the existing 203mm diameter municipal watermain on Bareille-Snow Street for the proposed Building 1 and 2, and made to the existing 406mm diameter municipal watermain on Codd's Road for Building 3. The Dual 203mm diameter private water services connecting the existing municipal watermain will provide redundancy for the proposed buildings. The dual 203mm dia. water services will be extended 1 meter away from the building mechanical room.

2.2 SYSTEM CONSTRAINTS AND BOUNDARY CONDITIONS

Boundary conditions have been provided by the City of Ottawa at the 406mm diameter watermain on Codd's Road for the Building 3 development and at the 203mm diameter watermain on Bareille-Snow Street and for both Building 1 and 2 developments, and are included in Appendix B. A maximum fire flow of 117 l/s (7,000 l/min) was used for Building 1 development and 67 l/s (400 l/min) was used for both Building 2 and 3 which were calculated in Section 2.4. The boundary conditions were supplied by the City of Ottawa, based on fire flows and domestic demands estimated by WSP for the proposed residential development.

The IBI hydraulic modelling indicated the hydraulic pressure for different scenario conditions were also shown below, based on fire flows and domestic demands estimated by IBI Group for the proposed developments.

Table 2-1: Boundary Conditions

BOUNDARY CONDITIONS			
SCENARIO	Building 1 Bareille-Snow Street	Building 2 Bareille-Snow Street	Building 3 Codd's Road
Maximum HGL	143	143	143
Minimum HGL (Peak Hour)	143	143	143

Max Day + Fire Flow (117 l/s)	141.1	N/A	N/A
Max Day + Fire Flow (67 l/s)	N/A	142.1	142.8

Table 2-2: IBI Hydraulic Modelling Results from Phase 1B

	Hydraulic Modelling Results @ J62	Hydraulic Modelling Results @ J32	Hydraulic Modelling Results @ J64
Basic Day (MAX HGL) at HGL 143.0m	520.6 kPa	537.8 kPa	527.9 kPa
Peak Hour (MIN HGL) at HGL 142.0m	506.9 kPa	524.0 kPa	514.1 kPa
Max Day + Fire Flow at HGL 139.5 – 140.2m	773.2 l/s	872.3 l/s	804.4 l/s

Table 2-3: IBI Hydraulic Modelling Results from Phase 2B

	Hydraulic Modelling Results @ J62	Hydraulic Modelling Results @ I16	Hydraulic Modelling Results @ J64
Basic Day (MAX HGL) at HGL 143.0m	559.5 kPa	560.9 kPa	566.8 kPa
Peak Hour (MIN HGL) at HGL 142.0m	506.7 kPa	508.1 kPa	514.0 kPa
Max Day + Fire Flow at HGL 139.5 – 140.2m	862.9 l/s	469.1 l/s	810.9 l/s

2.3 CONFIRMATION OF ADEQUATE DOMESTIC SUPPLY AND PRESSURE

Water demands are based on Table 4.2 of the Ottawa Design Guidelines – Water Distribution. As previously noted, the development is considered as institutional development, consisting of an Athletics and Recreation Centre providing food service, gymnasium and leisure facilities. A water demand calculation sheet is included in Appendix B, and the total water demands are summarized as follows:

	Building 1	Building 2	Building 3
Average Day	1.27 l/s	0.77 l/s	0.79 l/s
Maximum Day	3.17 l/s	1.92 l/s	1.97 l/s
Peak Hour	6.97 l/s	4.22 l/s	4.33 l/s

The 2010 City of Ottawa Water Distribution Guidelines stated that the preferred practice for design of a new distribution system is to have normal operating pressures range between 345 kPa (50 psi) and 552 kPa (80 psi) under maximum daily flow conditions. Other pressure criteria identified in the guidelines are as follows:

Minimum Pressure	Minimum system pressure under peak hour demand conditions shall not be less than 276 kPa (40 psi)
Fire Flow	During the period of maximum day demand, the system pressure shall not be less than 140 kPa (20 psi) during a fire flow event.
Maximum Pressure	Maximum pressure at any point the distribution system shall not exceed 689 kPa (100 psi). In accordance with the Ontario Building/Plumbing Code, the maximum pressure should not exceed 552 kPa (80 psi). Pressure reduction controls may be required for buildings where it is not possible/feasible to maintain the system pressure below 552 kPa.

Building 1 at Bareille-Snow Street:

Water pressure at municipal connection check:

Min. HGL @ Building 1 – Pavement elevation = 143.0m – 88.99m = 54.01m = 529.52 kPa

Water pressure at building connection (at average day) check:

Max. HGL @ Building 1 – Finished floor elevation = 143.0m – 89.77 = 53.23m = 521.87 kPa

Water pressure at building connection (at max. hour demand) check:

Min. HGL @ Building 1 – Finished floor elevation = 143.0m-89.77m = 53.23m = 521.87 kPa

Water pressure at building connection (at max. day + fire demand):

(Max Day + Fire) HGL @ Connection 1 - Finished floor elevation = 141.1m-89.77m = 51.33m = 503.25 kPa

The minimum water pressure inside the building at the connection is determined with the minimum HGL condition, resulting in a pressure of 521.87 kPa which exceed the minimum requirement of 276 kPa per the guidelines.

Building 2 at Bareille-Snow Street:

Water pressure at municipal connection check:

Min. HGL @ Building 2 – Pavement elevation = 143.0m – 89.50m = 53.05m = 520.11 kPa

Water pressure at building connection (at average day) check:

Max. HGL @ Building 2 – Finished floor elevation = 143.0m – 89.47 = 53.53m = 524.82 kPa

Water pressure at building connection (at max. hour demand) check:

Min. HGL @ Building 2 – Finished floor elevation = 143.0m-89.47m = 53.53m = 524.82 kPa

Water pressure at building connection (at max. day + fire demand):

(Max Day + Fire) HGL @ Connection 2 - Finished floor elevation = 142.1m-89.47m = 52.63m = 515.99 kPa

The minimum water pressure inside the building at the connection is determined with the minimum HGL condition, resulting in a pressure of 524.82 kPa which exceed the minimum requirement of 276 kPa per the guidelines.

Building 3 at Codd's Road:

Water pressure at municipal connection check:

Min. HGL @ Building 3 – Pavement elevation = 143.0m – 90.19m = 52.81m = 517.76 kPa

Water pressure at building connection (at average day) check:

Max. HGL @ Building 3 – Finished floor elevation = 143.0m – 90.85 = 52.15m = 511.29 kPa

Water pressure at building connection (at max. hour demand) check:

Min. HGL @ Building 3 – Finished floor elevation = 143.0m-90.85m = 52.15m = 511.29 kPa

Water pressure at building connection (at max. day + fire demand):

(Max Day + Fire) HGL @ Connection 3 - Finished floor elevation = 142.80m-90.85m = 51.95m = 509.33 kPa

The minimum water pressure inside the building at the connection is determined with the minimum HGL condition, resulting in a pressure of 511.29 kPa which exceed the minimum requirement of 276 kPa per the guidelines.

2.4 CONFIRMATION OF ADEQUATE FIRE FLOW PROTECTION

The fire flow rate has been calculated using the Fire Underwriters Survey (FUS) method. The method takes into account the type of building construction, the building occupancy, the use of sprinklers and the exposures to adjacent structures. Assuming fire resistive construction and a fully supervised sprinkler system, a fire flow demand of 7000 l/min (117 l/s) for Building 1, 4000 l/min (67 l/s) for Building 2 and Building 3 have been calculated. A copy of the calculation is included in Appendix B.

For Building 1, the demand of 7,000 l/min can be delivered through two existing municipal fire hydrants. One existing municipal fire hydrant is located at the intersection of Bareille-Snow Street and Hemlock Road is within 45 m of the building FDC, and is rated at 5,700 l/min. The other existing municipal fire hydrant is located at Bareille-Snow Street, slightly north of the site, is within 95m of the FDC and is rated at 3,800 l/min. The two hydrants have a combined total of 9,500 l/min.

For Building 2 the demand of 4,000 l/min can be delivered through two existing municipal fire hydrants. One existing municipal fire hydrant is located at Hemlock Road which is within 45 m of the building FDC, and is rated at 5,700 l/min. The other existing municipal fire hydrant is located at the intersection of Bareille-Snow Street and Hemlock Road, is within 85m of the FDC and is rated at 3,800 l/min. The two hydrants have a combined total of 9,500 l/min.

For Building 3 the demand of 4,000 l/min can be delivered through two existing municipal fire hydrants. One existing municipal fire hydrant is located at Codd's Road which is within 45 m of the building FDC, and is rated at 5,700 l/min. The other existing municipal fire hydrant is located at the intersection of Codd's Road and Tawadina Road, is within 80m of the FDC and is rated at 3,800 l/min. The two hydrants have a combined total of 9,500 l/min.

The proposed buildings will be serviced by dual 203 mm services off the existing municipal watermain. The services will run into the water entry room. The proposed buildings will be fully sprinklered and fire protection will be provided with the fire department Siamese connection within 45 m of the existing public fire hydrant from municipal Street.

The boundary condition for Maximum Day and Fire Flow results in a pressure of 503.25 kPa, 515.99 kPa and 509.33 kPa at the ground floor level for Building 1, 2 and 3 respectively. In the guidelines, a minimum residual pressure of 140 kPa must be maintained in the distribution system for a fire flow and maximum day event. As a pressure of approximate 500 kPa is achieved, the fire flow requirement is exceeded.

2.5 CHECK OF HIGH PRESSURE

High pressure is not a concern. The maximum water pressure inside the building at the connection is determined with the maximum HGL condition, resulting in a pressure of 521.87 kPa, 524.82 kPa and 511.29 kPa for Building 1, 2 and 3 which are less than the 552 kPa threshold in the guideline in which pressure control is required. Based on this result, pressure control is not required for all the proposed building.

2.6 RELIABILITY REQUIREMENTS

DMA chamber as per city of Ottawa standard W3 and shot off valve will be provided at the study boundary for all Building 1, 2 and 3 from Bareille-Snow Street and Codd's Road. For both building 1 and 2, water can be supplied to the private watermain from both side of Bareille-Snow Street, north and south, and can be isolated. For building 3, water can be supplied to the private watermain from both side of Codd's Road.

2.7 DESCRIPTION OF PROPOSED WATER DISTRIBUTION NETWORK

A 203 mm private watermain looping is proposed to be provided into the proposed building. The two 203 mm private water services will be merge inside the building before connecting to the water meter. No private hydrant is required for all three sites.

3 WASTEWATER DISPOSAL

3.1 DESIGN CRITERIA

In accordance with the City of Ottawa's Sewer Design Guidelines, the following design criteria have been utilized in order to predict wastewater flows generated by the subject site and complete the sewer design;

- Minimum Velocity 0.6 m/s
- Maximum Velocity 3.0 m/s
- Manning Roughness Coefficient 0.013
- Average sanitary flow for residential use 280 L/cap/day
- Average sanitary flor for commercial use 28,000 L/Ha/day
- Commercial/Institutional Peaking Factor 1.5
- Infiltration Allowance (Total) 0.33 L/s/Ha
- Minimum Sewer Slopes – 200 mm diameter 0.32%

3.2 CONSISTENCY WITH MASTER SERVICING STUDY

For Building 1 and 2, the outlet for the private sanitary sewer network is the 250 mm diameter municipal sewer on Bareille-Snow Street.

For Building 3, the outlet for the private sanitary sewer network is the 250 mm diameter municipal sewer on Codd's Road.

The Ottawa Sewer Design Guidelines provide estimates of sewage flows based on residential development. A sanitary design sheet has been attached to Appendix C for reference.

3.3 DESCRIPTION OF EXISTING SANITARY SEWER

The outlet sanitary sewer for Building 1 and 2 is the existing 250 mm diameter sewer on Bareille-Snow Street. The outlet sanitary sewer for Building 3 is the existing 250 mm diameter sewer on Codd's Road. Both of these local sewers will outlet to 375mm diameter sewer on Codd's Road south of Hemlock Road. The 375mm trunk sewer will outlet to Codd's Road Shaft 2400mm diameter sewer, then discharge to municipal wastewater treatment facility.

3.4 VERIFICATION OF AVAILABLE CAPACITY IN DOWNSTREAM SEWER

For Building 1 and 2, the capacity of the downstream 250 mm diameter sewer on Bareille-Snow Street at 2.05% slope is 85.14 l/s, which is adequate for the flow assumptions from the proposed building 1 and 2, 4.50 l/s and 2.8 l/s, plus the external areas assumed by IBI Group. This existing sewer at Bareille-Snow Street also services approximately 8.825 ha of the future development on the north side of Building 1 and 2. Based on the assumption from Wateridge Subdivision Phase 2B, those future area generates a proportional flow of 22.56 l/s, then the combined existing and anticipated flow estimate is 28.45 l/s.

For Building 3, the capacity of the downstream 250 mm diameter sewer on Codd's Road at 1.50% slope is 72.83 L/s, which is adequate for the flow assumptions from the proposed Building 3, 2.87 l/s. This existing sewer also services approximately 0.60 ha of the future area on the west side of Codd's Road. This existing area generates a proportional flow of 1.58 l/s, then the combined existing and anticipated flow estimate is 4.35 l/s.

3.5 CALCULATIONS FOR NEW SANITARY SEWER

A sanitary sewer design sheet is provided for all three buildings. See Appendix C for details.

3.6 DESCRIPTION OF PROPOSED SEWER NETWORK

The proposed sanitary sewer network on site for all three buildings will consist of a 200 mm diameter building service, and one new 1200 mm diameter manhole for each building.

4 SITE STORM SERVICING

4.1 EXISTING CONDITION

The subjected property is located within the Wateridge Subdivision Development area east of Codd's Road, north of Hemlock Street and South of Tawadina Street. Runoff from the subjected lands is ultimately directed to the existing SWM pond next to Sir-George-Etiene-Cartier Parkway. The existing SWM pond ultimately outlets to the Ottawa River. The available drainage outlet for Building 1 and 2 is the 525 mm diameter concrete storm sewer on Bareille-Snow Street. The available drainage outlet for Building 3 is the 750 mm diameter concrete storm sewer on Codd's Road. Runoff from these sewers will eventually be conveyed to the existing SWM pond via the 3000 mm diameter concrete trunk sewer along Hemlock Road, east of Codd's Road and Hemlock Road intersection.

Based on the IBI Phase 1B and 2B Design Briefs, drainage released from the site to the City storm sewer are show as follow.

Table 4-1: IBI Storm Water Modelling Results from Phase 1B July 2017

Drainage Area ID	Area (ha)	Downstream MH	IMP%	5 year Modeled Flow Rate (l/s)	100 year Captured Flow Rate (l/s)
LOT230B (Building 3)	0.34	S231	0.86	174	174
EX206B (Building 2)	0.46	S206	0.86	93	95
EX205B (Building 1)	0.63	S205	0.86	127	128

Table 4-2: IBI Storm Water Modelling Results from Phase 2B April 2019

	Area (ha)	Downstream MH	IMP%	ICD Control Rate (l/s)
B340 (Building 2 and 3)	1.24	S231	0.86	366
B309 (Building 1)	1.24	S308	0.86	370

Since Phase 2B Design Brief is the latest design report, the allowable release rate for each site will be calculated based on the assumption IBI has made on the Phase 2B Design Brief. The total study area for all three sites were considered to be 0.519 Ha, 0.374 Ha and 0.374 Ha in size. Thus, the allowable release rate for each site will be 154.90 l/s, 110.39 l/s and 110.39 l/s for Building 1, 2 and 3 respectively.

4.2 ANALYSIS OF AVAILABLE CAPACITY IN PUBLIC INFRASTRUCTURE

Using the Rational Method, with coefficient of 0.25 for pervious areas, 0.75 for gravel areas and 0.9 for impervious areas, and a 10-minute time of concentration, results in an estimated 2-year flow of 75.22 l/s from Building 1, 50.22 l/s from

Building 2, and 58.32 l/s from Building 3. The receiving 525 mm diameter storm sewer on Bareille-Snow Street has been designed with the capacity to accept 358.26 l/s from Building 1 and 2, and other future areas. And the receiving 750 mm diameter storm sewer on Codd's Road has also been designed with the capacity to accept 246.92 l/s from Building 3 and other future areas. Capacity in the minor system is not a concern. Refer to storm sewer design on Appendix D for details.

4.3 DRAINAGE DRAWING

Drawing C06, C07 and C08 shows the receiving storm sewer and site storm sewer network for Building 1, 2 and 3. Drawing C03, C04 and C05 provide proposed grading and drainage, and includes existing grading information. Site sub-area information and storm sewer design sheet attached in Appendix D.

4.4 WATER QUANTITY CONTROL OBJECTIVE

The water quantity objective for the site is to limit the flow release to 154.90 l/s, 110.39 l/s and 110.39 l/s for Building 1, 2 and 3. Excess flows above this limit for the subjected site up to those generated by the 100 year storm event from drainage on the sites are temporarily stored on site.

No provision is required on the subjected sites to accommodate any flow from the adjacent lands. All flows exceeding the defined minor system capacity and on-site storage capability will enter the major system, with overflow to the City right of way.

ICDs are proposed to be used on the outlet to restrict the flow rate leaving the site. In theory, the runoff water will be detained on site up to the 100-yr rainfall event, and for those scenarios exceeding 100-yr rainfall event, the runoff water will be discharged offsite once all the available storage areas have reached their maximum capacities. The ponded water will not reach the spill elevation under 100 year and lesser events. The site has more storage capacity than required as a result of the grading design. This will allow extra detention of water on the site during extreme events, and will reduce stress on the downstream stormwater management pond. Detail water quantity calculation attached in Appendix D.

4.5 WATER QUALITY CONTROL OBJECTIVE

The site is not required to achieve water quality objectives. Water quality objectives are achieved through downstream works as noted in the IBI Design Brief.

4.6 DESIGN CRITERIA

The stormwater system was designed following the principles of dual drainage, making accommodation for both major and minor flow.

Some of the key criteria include the following:

- Design Storm (minor system) — 1:2 year return (Ottawa)
- Rational Method Sewer Sizing
- Initial Time of Concentration — 10 minutes
- Runoff Coefficients
  - Landscaped Areas — C = 0.25
  - Asphalt/Concrete — C = 0.90
  - Traditional Roof — C = 0.90
- Pipe Velocities — 0.80 m/s to 6.0 m/s
- Minimum Pipe Size — 250 mm diameter (200 mm CB Leads and service pipes)

4.7 PROPOSED MINOR SYSTEM

The detailed design for this site will maintain the existing storm sewer network to Codd's Road and Hemlock Road intersection of the development site. The drainage system consists of a series of manholes, catchbasins and storm sewers leading to the outlet manhole for each site. All drainage areas on the site are collected in the site piped drainage system.

It is also customary for larger buildings to be provided with piped storm services for roof drainage. There are no downspouts proposed. Separate outlet pipes are provided for foundation drains and roof drains, and therefore roof drainage will not negatively impact the foundation. The storm services are connected to the storm sewer downstream of inlet control which is downstream of the controlled flow point, ensuring an unobstructed flow for these areas.

Using the above noted criteria, the existing on-site storm sewers were sized accordingly. A detailed storm sewer design sheet and the associated post development storm sewer drainage area plan are included in Appendix C.

4.8 STORMWATER MANAGEMENT

The subjected sites will be limited to release rate of 154.90 l/s, 110.39 l/s and 110.39 l/s established by IBI Group, this will be achieved through the inlet control devices.

Flows generated that are in excess of the site's allowable release rate will be stored on site in surface storage areas or by the use of roof top storage and gradually released into the minor system so as not to exceed the site's allocation.

The maximum surface retention depth of the developed areas will be limited to maximum 350mm during a 1:100 year event. Maximum ponding levels are 350mm prior to spill over.

No surface ponding will occur during a 2 year and 5 year event, and only minimal ponding will occur during a 100 year event.

Overland flow routes will be provided in the grading to permit emergency overland flow from the site. The overflow routes will eliminate any increase in ponding depth for events exceeding 100 years.

At certain locations within the site, the opportunity to store runoff is limited due to grading constraints and building geometry. These locations are located at the perimeter of the site where it is necessary to tie into public boulevards, and it is not always feasible to capture or store stormwater runoff.

The site grading and ponding has been designed to control water generated during the 1:100-year event, with no overflow leaving the site at this control level. Please refer to the SWM Calculations in Appendix C.

4.9 ON-SITE DETENTION

Any excess storm water up to the 100-year event is to be stored on-site in order to not surcharge the downstream municipal storm sewer system. Detention will be provided in parking and landscape areas and building rooftops, where feasible. As previously noted, the volume of storage is dependent on the characteristics of each individual drainage area. It should be noted that greater than 0.30 m of vertical separation has been provided from all maximum ponding elevations to lowest building openings.

The following Tables summarizes the stormwater management including storage requirements during the 1:100-year events for all three sites.

Table 4-3: SWM Summary for Building 1

Drainage Area ID	Total Area (Ha)	Controlled/ Uncontrolled	Runoff Coefficient		Outlet Location	Total Storage Provided (m^3)	100-Year Controlled	
			2 & 5 Year	100 Year			Restricted Flow (L/s)	Required Storage (m^3)
S101	0.159	Controlled	0.80	0.89	CBMH104	13.09	52.67	10.55
S-BLDG1	0.197	Controlled	0.90	0.99	STMH101	73.58	22.68	50.83
S102	0.084	Uncontrolled	0.68	0.76	STMH101	0	31.70	0
S103	0.079	Uncontrolled	0.58	0.66	ROW	0	25.90	0
TOTAL	**0.519**					**86.67**	**132.95**	**61.37**

Table 4-4: SWM Summary for Building 2

Drainage Area ID	Total Area (Ha)	Controlled/ Uncontrolled	Runoff Coefficient		Outlet Location	Total Storage Provided (m^3)	100-Year Controlled	
			2 & 5 Year	100 Year			Restricted Flow (L/s)	Required Storage (m^3)
S201	0.098	Controlled	0.74	0.82	CBMH203	16.50	27.45	7.47
S-BLDG2	0.124	Controlled	0.90	0.99	STMH201	46.35	11.40	35.44
S202	0.105	Uncontrolled	0.59	0.67	STMH201	0	34.90	0
S203	0.047	Uncontrolled	0.66	0.74	ROW	0	17.30	0
TOTAL	**0.374**					**62.85**	**91.05**	**42.91**

Table 4-5: SWM Summary for Building 3

Drainage Area ID	Total Area (Ha)	Controlled/ Uncontrolled	Runoff Coefficient		Outlet Location	Total Storage Provided (m^3)	100-Year Controlled	
			2 & 5 Year	100 Year			Restricted Flow (L/s)	Required Storage (m^3)
S301	0.098	Controlled	0.51	0.59	CB302	10	29.70	0
S302	0.030	Controlled	0.53	0.61	CB301	5	13.96	0

S-BLDG3	0.159	Controlled	0.90	0.99	STMH301	59.63	11.40	49.31
S203	0.123	Uncontrolled	0.70	0.78	STMH101	0	47.60	0
TOTAL	**0.374**					74.63	**102.65**	**49.31**

In all instances the required storage is met with surface ponds which retain the stormwater and discharge at the restricted flow rate to the sewer system. Refer to the grading plan for storage information.

The following Table summarizes the inlet control devices to be utilized on all three sites.

Table 4-6: ICD Type

Structure ID	PROPOSED ICD			
	100-YR Head	Flow (L/s)	Type	OUTLET DIA.
CBMH104	3.07	52.67	120 mm Dia. Circular ICD	300 mm Dia. PVC
CBMH203	2.64	27.45	90 mm Dia. Circular ICD	300 mm Dia. PVC
CB302	3.88	3.88	85 mm Dia. Circular ICD	300 mm Dia. PVC
CB301	3.45	13.96	60 mm Dia. Circular ICD	300 mm Dia. PVC

As demonstrated above, the site uses new inlet control devices to restrict the 100 year storm event to the criteria approved by the City of Ottawa. Restricted stormwater will be contained onsite by utilizing surface ponding storage. In the 100 year event, there will be no overflow off-site from restricted areas.

The sum of restrictions on the sites are 132.95 l/s, 91.05 l/s and 102.65 l/s, which are less than the maximum allowable release of 154.90 l/s, 110.39 l/s and 110.39 noted in Section 4.9.

4.10 WATERCOURSES

The minor flow will be directed to existing SWM pond and ultimately directed to the Ottawa.

4.11 IMPACTS TO RECEIVING WATERCOURSES

No significant negative impact is anticipated to downstream receiving watercourses due to proposed quantity and quality control measures, the separation of the site from the eventual receiving watercourse as a result of discharge through City owned sewers, and the existing stormwater management pond on the south side of Sir-George-Etienne Cartier Parkway.

4.12 FILL CONSTRAINTS

There are no known fill constraints applicable to this site related to any floodplain. The site is generally being raised higher relative to existing conditions. No fill constraints related to soil conditions are anticipated, as confirmed in the geotechnical report.

5 SEDIMENT AND EROSION CONTROL

5.1 GENERAL

During construction, existing storm sewer system can be exposed to sediment loadings. A number of construction techniques designed to reduce unnecessary construction sediment loadings will be used including;

- Filter cloths will remain on open surface structures such as manholes and catchbasins until these structures are commissioned and put into use;
- Installation of silt fence, where applicable, around the perimeter of the proposed work area.

During construction of the services, any trench dewatering using pumps will be fitted with a "filter sock." Thus, any pumped groundwater will be filtered prior to release to the existing surface runoff. The contractor will inspect and maintain the filter sock as needed including sediment removal and disposal.

All catchbasins, and to a lesser degree, manholes, convey surface water to sewers. Consequently, until the surrounding surface has been completed, these structures will be covered to prevent sediment from entering the minor storm sewer system. These measures will stay in place and be maintained during construction and build-out until it is appropriate to remove them.

During construction of any development both imported and native soils are placed in stockpiles. Mitigative measures and proper management to prevent these materials entering the sewer system are needed.

During construction of the deeper watermains and sewers, imported granular bedding materials are temporarily stockpiled on site. These materials are however quickly used up and generally placed before any catchbasins are installed.

Refer to the Erosion and Sedimentation Control Plan C09, C10 and C11 provided in Appendix E.

6 APPROVAL AND PERMIT REQUIREMENTS

6.1 GENERAL

The proposed development is subject to site plan approval and building permit approval.

No approvals related to municipal drains are required.

No permits or approvals are anticipated to be required from the Ontario Ministry of Transportation, National Capital Commission, Parks Canada, Public Works and Government Services Canada, or any other provincial or federal regulatory agency.

7 CONCLUSION CHECKLIST

7.1 CONCLUSIONS AND RECOMMENDATIONS

It is concluded that the proposed development can meet all provided servicing constraints and associated requirements. It is recommended that this report be submitted to the City of Ottawa in support of the application for site plan approval.

7.2 COMMENTS RECEIVED FROM REVIEW AGENCIES

This is the first submission.

APPENDIX

A

- PRE-CONSULTATION MEETING NOTES
- TOPOGRAPHIC SURVEY PLAN
- DESIGN BRIEF BY IBI GROUP (EXCERPTS ATTACHED)
- IBI GROUP SWM PLANS FOR WATERIDGE VILLAGE

1000/1050 Tawadina Road, Ottawa
Meeting Date: Thursday, February 3, 2022
PC2022-0013
MS Teams

Attendees:

City of Ottawa:
Allison Hamlin, File Lead, Senior Planner
Wally Dubyk, Transportation
Christopher Moise, Urban Designer
Parthvi Patel, Student Planner

Applicant Team:
Rod Price
Alnoor Gulamani
Sameer Gulamani

Wateridge Community Association:
Jane Thompson
Darren Kipp

Subject: Proposal for a four-building, 9-storey development at 1000/1050 Tawadina Road

Proposal Details:

- Development of 4 nine storey apartment buildings, with a total of 480 units with ground floor commercial
- One level of underground parking should accommodate each building. Street level visitor parking will be tucked behind and away from street views.

Technical Comments – City Staff

Urban Design Comments – Christopher Moise

- All mixed-use blocks are subject to review by the Urban Design Review Panel. If the mixed-use components stand apart from the proposed blocks, they will be subject to internal review, if they fit within the blocks, this project will have to attend the UDRP.
- There is some very strong design direction in the CDP on pages 101 and 102, which speak to several issues that have not been addressed yet (such as articulation and active frontages). It is encouraged to look at this document closely to help in the design development phase.
- How is this project aligned with the master plan, the master plan had a different vision for how the ground plane is being treated? The landscaping thoughts around the outside of these blocks is appreciated, but the inside of these blocks seem to be largely vehicle oriented. The percentage of vehicular infrastructure may need to be thought through to be more efficient with less runs and dead ends in roads.

- Consider the treatment of landscaping between the commercial and street and how the building transitions down to the park – more of an urbanized landscape.
- The building has a very long frontage, consider looking into its articulation how to make that space more interactive with the environment and community.
- The massing model shows a commercial sized floor at-grade, any private units at grade will be problematic, the ground floor should be a combination of commercial and amenity space for tenants.

Planning Comments – Allison Hamlin

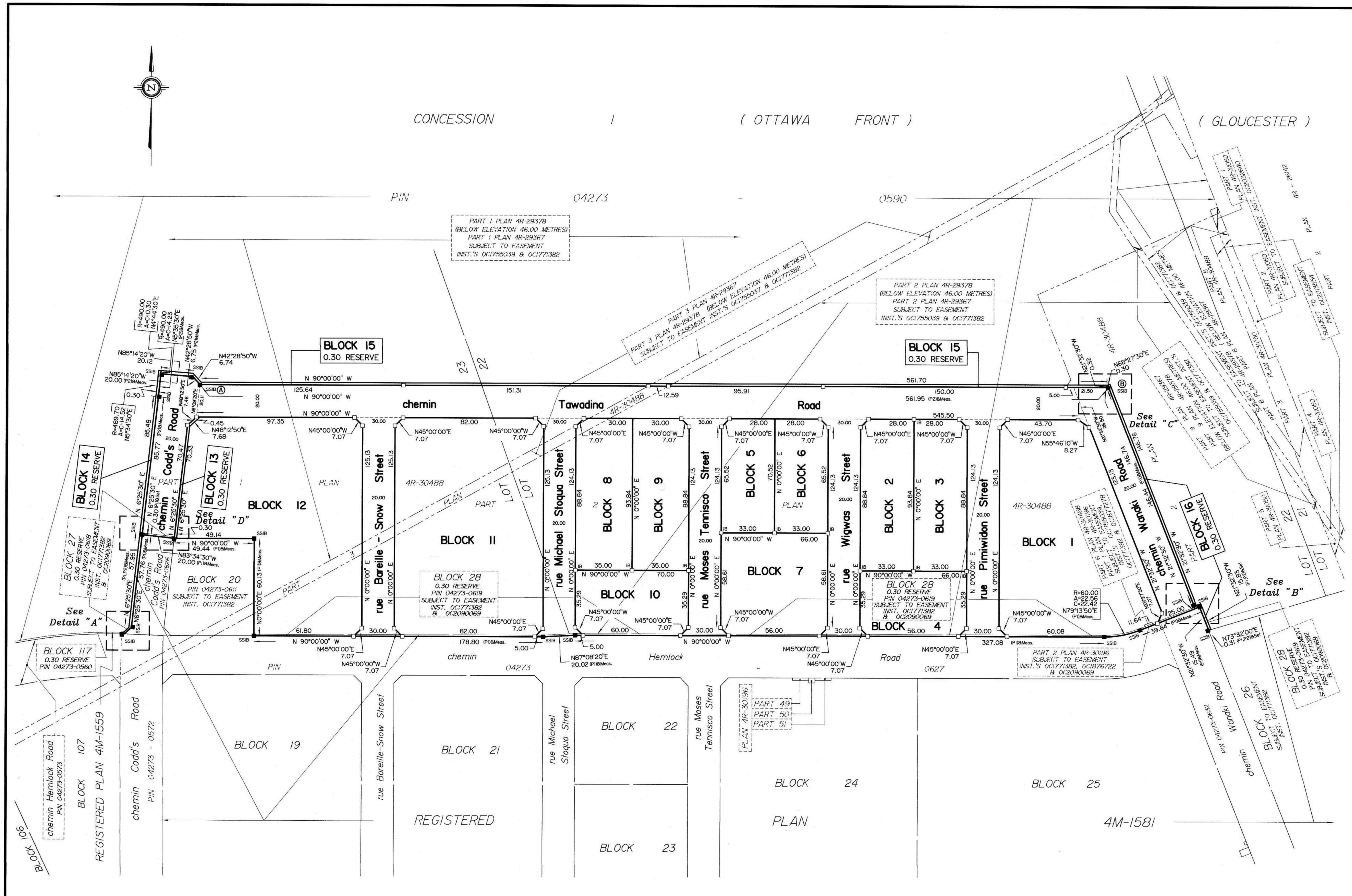
- There needs to be a greater consideration of how the surface areas can be less car-oriented
- There is some commercial proposed, but not every unit along the ground floor is commercial. In the future, it is likely that more people and tenants are to come to the area. Consider examining a commercial frontage along Hemlock.
- There are active frontage requirements, ensure that all units have a main door, not just an entrance from the hallway.

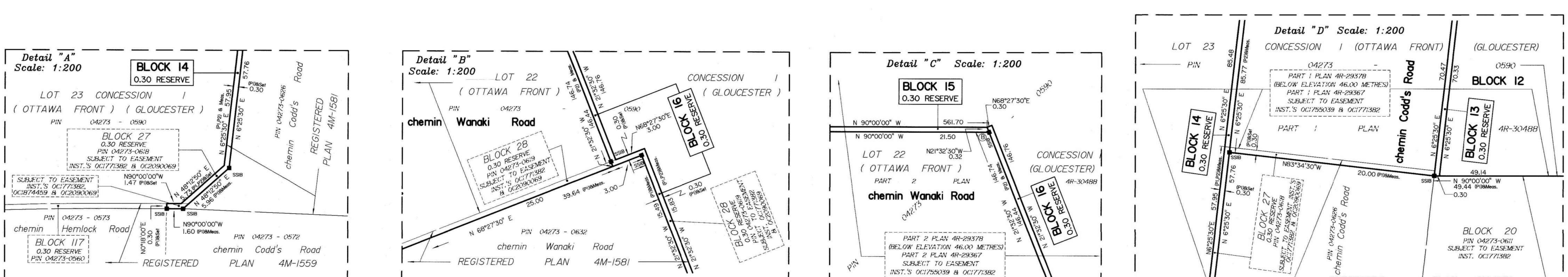
Transportation Comments – Wally Dubyk

- Submit a screening form to determine if a transportation impact assessment report will be required.
- The laneways should be at least 6 meters wide to accommodate a fire truck.
- Show where bicycle parking spaces will be located.

Community Comments – Jane Thompson, Darren Kipp

- The secondary plan mentions building frontages. Hemlock is the main street, which is the building frontage. This same frontage wraps around the two parks and is envisioned as a space that has cafes and commercial. This is the core of the community, and it is critical that both sides of the square have commercial uses as residential uses will be uncomfortable and won't reflect the intention of the space.
- The space should be designed so that it is convertible to commercial in the future.
- Groceries, pharmacies, restaurants, stores, and basic community services are some commercial uses that the community is looking for.
- A large community concern is that there is a lack of street parking as current parking is overtaken by demand. Residents on site will have trouble looking for parking outside of the site if it is not provided.





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

THIS 25 DAY OF February, 2020

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

PLAN 4M- 1651

I CERTIFY THAT THIS PLAN IS REGISTERED IN THE LAND REGISTRY OFFICE FOR THE LAND TITLES DIVISION OF OTTAWA-CARLETON NO. 4 AT 11:36 O'CLOCK ON THE 3rd DAY OF March 2020 AND ENTERED IN THE PARCEL REGISTER FOR PROPERTY IDENTIFIERS 04273-0590, 04273-0618 AND 04273-0619

AND THE REQUIRED CONSENTS ARE REGISTERED AS PLAN DOCUMENT NO. OC2197707

C. Holloway
REPRESENTATIVE FOR LAND REGISTRAR

This plan comprises all of PIN 04273-0618 and 04273-0619 and part of PIN 04273-0590.

Blocks 1 to 16, both inclusive, rue Bareille-Snow Street, chemin Codd's Road, rue Michael Stoqua Street, rue Moses Tennisco Street, rue Pimiwidon Street, chemin Tawadina Road, chemin Wanaki Road and rue Wigwas Street are subject to easement Inst. OC1771382.

Part of Blocks 8, 11, 12 and 15, Part of rue Bareille-Snow Street, Part of rue Michael Stoqua Street and Part of chemin Tawadina Road are subject to easement Inst. OC1755037.

Blocks 2, 3, 5, 6, 9 and 13 and Part of Blocks 1, 4, 7, 8, 10, 11, 12, 14, 15 and 16, Part of rue Bareille-Snow Street, Part of rue Michael Stoqua Street, Part of rue Moses Tennisco Street, Part of rue Pimiwidon Street, Part of chemin Tawadina Road, Part of chemin Wanaki Road and Part of rue Wigwas Street are subject to easement Inst. OC1755039.

Part of Block 1 is subject to easement Inst. OC1876722.

Part of Block 1 is subject to easement Inst. OC1877278.

Part of Block 14 is subject to easement Inst. OC1874459.

Part of Blocks 1, 4, 7, 10, 11, 12, 14, 16, chemin Wanaki Road, rue Pimiwidon Street, rue Wigwas Street, rue Moses Tennisco Street, rue Michael Stoqua Street, rue Bareille-Snow Street and chemin Codd's Road are subject to easement Inst. OC2090069.

PLAN OF SUBDIVISION OF

PART OF LOTS 22 And 23 CONCESSION 1 (OTTAWA FRONT)

Geographic Township of Gloucester
And

BLOCKS 27 And 28 REGISTERED PLAN 4M-1581 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 15th day of November, 2019.

FEB.7,2020
Date

E. H. Herweyer
Ontario Land Surveyor

OWNER'S CERTIFICATE

THIS IS TO CERTIFY THAT :

1. Blocks 1 to 12, both inclusive, and the Streets, namely, rue Bareille-Snow Street, chemin Codd's Road, rue Michael Stoqua Street, rue Moses Tennisco Street, rue Pimiwidon Street, chemin Tawadina Road, chemin Wanaki Road and rue Wigwas Street and the Reserves, namely, Blocks 13, 14, 15 and 16 have been laid out in accordance with our instructions.
2. The Streets are dedicated to City of Ottawa as public highways.

Dated the 5th day of February, 2020

Tara Dinsmore, Vice President,
Real Estate (National Captial Region, Atlantic and Acquisitions)
Canada Lands Company CLC Limited
I have the authority to bind the corporation.

Dated the 5th day of February 2020

Chris Millier, Acting Senior Director
Real Estate (National Captial Region, Atlantic and Acquisitions)
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.
CLF	"	Chain Link Fence
BF	"	Board Fence
(AOG)	"	Annis, O'Sullivan, Vollebekk Ltd.
(P1)	"	Registered Plan 4M-1581
(P2)	"	(AOG) Plan, December 11, 2017

All found survey monuments are (AOG), unless otherwise noted.

All planted survey monuments are SSIB's unless otherwise noted.

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 Can-Net 2016 Real Time Network GPS observations on reference points A and B, shown hereon, having a bearing of N 90°00'00" W and are referenced to Specified Control Points 01919680105 and 019198434761, 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.

. 01919680105	Northing	5024915.16	Easting	373971.65
. 019198434761	Northing	5036178.12	Easting	372436.11
. Point A	Northing	5035324.64	Easting	372560.98
. Point B	Northing	5035324.64	Easting	373122.90

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. 18904-18 CLC Pt Lts 22 23 CI OF GL SUB 2B F N

I REQUIRE THIS PLAN TO BE DEPOSITED UNDER THE LAND TITLES ACT.

DATE:____________

____
ANDREW J. BROXHAM
ONTARIO LAND SURVEYOR

PLAN 4R-

RECEIVED AND DEPOSITED

DATE: ____________

____
REPRESENTATIVE FOR LAND REGISTRAR FOR THE LAND TITLES DIVISION OF OTTAWA-CARLETON NO. 4.

SCHEDULE

AREA (Sq.m.) below	AREA (Sq.m.) above	PART	BLOCK	CONCESSION/PLAN	PIN
	2.25	1	ALL OF 13	4M-1651	ALL OF 04273-0842
	0.91	2			
	16.75	3			
	1.20	4			
	2.28	5			
2.25		6			
0.91		7			
16.75		8			
1.20		9			
2.28		10			
	3.59	11	ALL OF 12	4M-1651	ALL OF 04273-0841
	10.80	12			
	3341.2	13			
3.59		14			
10.80		15			
3341.2		16			
	4.50	17			
	3.00	18			
	5256.9	19			
	2.12	20			
4.50		21			
3.00		22			
5256.9		23			
2.12		24			
	1133.3	25			
	462.9	26			
	2120.8	27			
	18.40	28			
1133.3		29			
462.9		30			
2120.8		31			
18.40		32			
	12.00	33	ALL OF 11	4M-1651	ALL OF 04273-0840
	4.50	34			
	3730.1	35			
	640.3	36			
	2800.9	37			
12.00		38			
4.50		39			
3730.1		40			
640.3		41			
2800.9		42			
	4.50	43			
	3.00	44			
	5162.2	45			
	24.44	46			
4.50		47			
3.00		48			
5162.2		49			
24.44		50			

Parts 6 to 10 (both inclusive), 14, 15, 16, 21 to 24 (both inclusive), 29 to 32 (both inclusive), 38 to 42 (both inclusive), 47 to 50 (both inclusive): Subject to easement Inst. OC1771382.

Parts 11 to 50 (both inclusive) : Subject to easement Inst. OC2201021.

Parts 28, 32, 46, 50 : Subject to easement Inst. OC2090069.

Parts 20, 24, 26, 30, 36, 41 : Subject to easement Inst. OC1755037.

STRATA PLAN OF SURVEY OF

BLOCKS 11, 12, 13
REGISTERED PLAN 4M-1651
CITY OF OTTAWA
Surveyed by Annis, O'Sullivan, Vollebekk Ltd.

Scale 1 : 250

10 7.5 5.0 2.5 0 5 10 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 __ day of ________, 2022.

____
Date

____
Andrew J. Broxham
Ontario Land Surveyor

Notes & Legend

—□—	Denotes	Survey Monument Planted
—■—	"	Survey Monument Found
SIB	"	Standard Iron Bar
SSIB	"	Short Standard Iron Bar
IB	"	Iron Bar
(WIT)	"	Witness
(AOG)	"	Annis, O'Sullivan, Vollebekk Ltd.
Meas.	"	Measured
(P1)	"	Registered Plan 4M-1651
(P2)	"	Registered Plan 4M-1581
↑	"	Continues Without Limit
Ⓥ	"	Vertical Limit
Ⓗ	"	Horizontal Limit

Parts 1 to 50 (both inclusive) are limited vertically.

All found survey monuments are (AOG) 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 Can-Net 2016 Real Time Network GPS observations on reference points A and B, shown hereon, and are referenced to Specified Control Points 01919680105 and 019198434761, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

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. 019198434761	Northing	5036178.12	Easting	372436.11
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. Point B	Northing	5035304.64	Easting	372798.60

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Ontario Land Surveyors

Job No. 21181-20 CLC Blk 11&12 R D1 | ig

CANADA LANDS COMPANY
SOCIÉTÉ IMMOBILIÈRE DU CANADA

REPORT
Project: 38298-5.2.2

DESIGN BRIEF
WATERIDGE VILLAGE AT ROCKCLIFFE PHASE 1B

Prepared for CANADA LANDS COMPANY
by IBI GROUP
JUNE 07, 2017
JUNE 16, 2017

portion of the Thorncliffe development (Area EXTRNW) was directed to the proposed park dry pond (Area P167) for attenuation prior to being released to the minor system.

The area delineation was based on the semi-lumped storm drainage areas presented in the 2015 Rockcliffe MSS and was slightly modified to tie-in with the detail drainage area plan.

- NRC Lands (DDSWMM ID: EXNRCN, EXNRCS, EX143, EX145, EX144, EXP147)

  Total flow from the NRC lands was directed to the proposed retrofitted Burma SWM Facility as established in the August 2015 MSS. Detailed discussion was provided in **Section 5.3.5.2**. The area delineation was based on the semi-lumped storm drainage areas presented in the August 2015 MSS. The lengths and impervious values are also consistent with the August 2015 MSS.

  No on-site storage has been assumed for the NRC lands except for EX145. On-site storage requirements up to the 100 year storm event has been determined for EX145.

Drawing 750 presents the external areas contributing major and minor flow to the subject site including their segment IDs.

5.4.2.11 Summary of Design Parameters

The below **Table 5-3** summarizes the main hydrological parameters used in the DDSWM model. The storm drainage area plan (**Drawing 750**) is provided within **Appendix E**, along with the rational method storm sewer design sheet and model output files.

Table 5-3: Hydrological Parameters and Modeling Results

Drainage Area		Downstream Segment ID‡	MH	IMP Ratio (%)	Segment Length (m)	Subcatchment Width (m)	Road ROW Cross Section (m)	Ponding Area ID¶	Maximum Storage Available (m^3)	5 Year Modeled Flow (l/s)*	100 Year Captured Flow (l/s)†
Segment ID	Area (ha)										
WATERIDGE VILLAGE - PHASE 1B											
Street Segments											
S144	0.18	S145	S144	0.71	67.00	67.00	26			32	19
S145	0.15	S147A	S145	0.71	57.00	57.00	26			26	21
S147A	0.14	S149	S147	0.71	65.00	65.00	26			25	23
S200	0.20	S214	S200	0.71	78.00	78.00	26			36	19
S201A1	0.08	S201B	S201	0.71	63.00	63.00	26			15	10
S201A2	0.08	S201B	S201	0.71	63.00	63.00	26			15	4
S201B	0.15	S202A	S201	0.71	64.50	64.50	26	PA201B	21.24	26	88
S202A	0.10	S203A	S202	0.71	41.00	41.00	26			18	26
S203A	0.16	S212	S203	0.71	90.00	90.00	26			29	35
S203B	0.09	S203A	S203	0.71	56.00	64.00	26			17	27
S204A	0.14	S205A	S204	0.71	57.50	115.00	26			27	41
S204B	0.08	S212	S204	0.71	52.00	62.00	26			15	24
S205A	0.08	S210	S205	0.71	47.00	67.00	20			15	163
S205B	0.03	S210	S205	0.71	13.00	26.00	24			6	5
S205C	0.14	S206A	S205	0.71	57.50	57.50	24			25	38
S206A	0.06	S208	S206	0.71	35.00	55.00	20			11	163
S206B	0.03	S208	S206	0.71	11.00	22.00	24			6	5

Drainage Area		Downstream Segment ID‡	MH	IMP Ratio (%)	Segment Length (m)	Subcatchment Width (m)	Road ROW Cross Section (m)	Ponding Area ID¶	Maximum Storage Available (m^3)	5 Year Modeled Flow (l/s)*	100 Year Captured Flow (l/s)†
Segment ID	Area (ha)										
S207	0.22	S142	S207	0.71	90.00	90.00	24			40	30
S208	0.19	S209	S208	0.71	77.00	77.00	20	PA208	33.02	35	149
S209	0.20	S167A	S209	0.71	77.00	77.00	20	PA209	3.80	36	38
S210	0.20	S211	S210	0.71	77.00	77.00	20	PA210	39.50	36	88
S211	0.17	S165	S211	0.71	77.00	77.00	20	PA211	4.74	31	30
S212	0.08	S213	S212	0.71	57.00	98.00	20			14	73
S213	0.40	S165	S213	0.71	78.00	78.00	20	PA213	3.15	62	126
S214	0.19	S152	S214	0.71	74.00	74.00	20			33	30
S215	0.38	S216	S215	0.76	89.00	89.00	20	PA215	67.41	69	68
S216	0.28	S218	S216	0.76	89.00	89.00	20	PA216	10.54	53	48
S218	0.17	S220	S218	0.71	88.00	88.00	20	PA218	16.42	32	30
S220	0.18	S222A	S220	0.71	91.00	91.00	20	PA220	17.62	33	30
S222A	0.12	S222B	S222	0.71	59.00	59.00	20			22	48
S222B	0.14	CB222B	CB222B	0.71	60.50	60.50	20	PA222B	12.95	22	79**
S231	0.12	S142	S231	0.71	61.00	61.00	20			22	21
									Total Flow for Street Segments to Minor System (l/s)		1597
Rear Yards and Semi_lumped Areas											
BRMA	1.64	DUMBRM	NONE	0.14	184.50	369.00	N/A			66	0
LOT141	0.96	LOT167	S141	0.86	108.00	216.00	N/A			194	283
LOT164	0.80	S164A	S164	0.86	90.00	180.00	N/A			162	164
LOT167	0.28	S167B	S167	0.86	31.50	63.00	N/A			57	83
LOT200	0.91	S200	S200	0.86	102.38	204.75	N/A	100yr S.C.	109.00¥	184	184
LOT209	0.20	S167A	S209	0.86	77.00	77.00	N/A			43	46
LOT210	0.23	S210	S210	0.86	25.88	51.75	N/A			46	44
LOT211	0.23	S165	S211	0.86	25.88	51.75	N/A			46	46
LOT213	0.23	S165	S213	0.86	25.88	51.75	N/A			46	44
LOT214	0.84	S214	S214	0.86	94.50	189.00	N/A	100yr S.C	97.00¥	170	174
LOT220	1.96	S222A	S220	0.86	220.50	441.00	N/A			396	396
LT208B	0.20	S208	S208	0.86	22.50	45.00	N/A			40	63
LT212A	0.80	S212	S212	0.86	90.00	180.00	N/A			162	162
LT212B	0.23	S212	S212	0.86	25.88	51.75	N/A			46	46
P167A	3.05	CELL1	S167S	0.23	342.56	685.13	N/A			187	190
P167B	3.05	CELL2	S167S	0.23	342.56	685.13	N/A			187	190
P207	0.32	S207	S207	0.14	36.00	72.00	N/A			13	19
R215	0.14	R216	S215	0.51	70.00	70.00	N/A			19	20
R216A	0.14	R216B	S216	0.51	68.00	68.00	N/A			19	20
R216B	0.06	MH217	S216	0.51	21.00	21.00	N/A			8	15
SC157	2.62	S149	S157	0.86	294.75	589.50	N/A	100yr S.C	294.00¥	529	529
SC162	2.49	S164B1	S162	0.86	280.13	560.25	N/A	100yr S.C	250.00¥	503	529
SWM1	0.37	USBRM	USBRM	0.86	41.63	83.25	N/A			74	159

Drainage Area		Downstream Segment ID‡	MH	IMP Ratio (%)	Segment Length (m)	Subcatchment Width (m)	Road ROW Cross Section (m)	Ponding Area ID¶	Maximum Storage Available (m^3)	5 Year Modeled Flow (l/s)*	100 Year Captured Flow (l/s)†
Segment ID	Area (ha)										
Total Flow for Semi-lumped Area to Minor System (l/s)											3246.80
Total Flow from Street and Semi-lumped Area to Minor System (l/s)											4843.70
External Areas											
EX143	0.33	S144	S143	0.86	37.13	74.25	N/A			67	67
EX144	0.55	EX145	S144	0.14	61.88	123.75	N/A			22	26
EX145	2.74	S145	S145	0.86	308.25	616.50	N/A	100yr S.C	352.00¥	554	554
EX147	0.13	EXTRNE	S147	0.86	40.00	29.25	N/A			26	26
EX166	0.61	S166	S166	0.86	68.63	137.25	N/A			123	128
EX201	0.56	S201B	S201	0.86	63.00	126.00	N/A			113	165
EX202A	0.90	EX202B	S202	0.86	101.25	202.50	20			182	265
EX202B	0.35	S202A	S202	0.86	39.38	78.75	20			71	103
EX202C	0.20	S203B	S202	0.86	22.50	45.00	N/A			40	59
EX203	0.73	S203B	S203	0.86	82.13	164.25	20	PA203B	5.30€	147	215
EX204A	0.72	S204A	S204	0.86	81.00	162.00	20	PA204B	7.82€	145	145
EX204B	0.47	S204A	S204	0.86	52.88	105.75	N/A			95	139
EX205A	0.81	S205A	S205	0.86	91.13	182.25	20	PA205A	45.01€	164	165
EX205B	0.63	S205C	S205	0.86	70.88	141.75	N/A			127	128
EX206A	1.02	S206A	S206	0.86	114.75	229.50	20	PA206A	46.77€	206	206
EX206B	0.46	S207	S206	0.86	51.75	103.50	N/A			93	95
EX208A	0.81	S208	S208	0.86	91.13	182.25	N/A			164	164
EX231A	0.86	S231	S231	0.86	96.75	193.50	20			174	174
EX231B	0.30	S231	S231	0.86	33.75	67.50	N/A			61	64
EXNRCN	18.39	USBRM	USBRM	0.71	450.00	1200.00	N/A			2578	4847
EXNRCS	18.65	USBRM	USBRM	0.71	514.00	2628.00	N/A			2994	5641
EXP147	0.40	SWM1	S147	0.14	45.00	90.00	N/A			16	15
EXP203	0.44	S204B	S203	0.14	49.50	99.00	N/A			18	20
EXTFOX	1.90	CELL3	OUT	0.86	213.75	427.50	N/A			384	311
EXTRNE	0.99	BRMA	BURMA	0.71	111.38	222.75	N/A			169	340
EXTRNC	5.70	BRMA	BURMA	0.71	239.00	4282.50	N/A			1086	2076
EXTRNN	0.53	BRMA	BURMA	0.71	59.63	119.25	N/A			91	172
EXTRNW	2.18	CELL1	BURMA	0.71	193.00	981.00	N/A			399	435
WATERIDGE VILLAGE - PHASE 1A AREA - TRIBUTARY TO PHASE 1B											
Street Segments											
S176C	0.05	S142	S176	0.76	40.00	40.00	26	PA176C	1.14	10	10
S176D	0.13	S142	S176	0.76	95.00	95.00	26	PA176D	2.58	26	26
S176E	0.09	S142	S176	0.76	80.00	80.00	26			18	11
S142	0.18	S141B	S142	0.76	108.00	108.00	26			34	34
S141B	0.15	S141A	S141	0.76	57.00	57.00	26	PA141B	13.02	26	332
S141A	0.16	S168	S141	0.76	70.50	70.50	26	PA141A	5.35	31	35
S141C	0.09	S168	S141	0.76	42.00	42.00	26	PA141C	3.79	18	20

Drainage Area		Downstream Segment ID‡	MH	IMP Ratio (%)	Segment Length (m)	Subcatchment Width (m)	Road ROW Cross Section (m)	Ponding Area ID¶	Maximum Storage Available (m^3)	5 Year Modeled Flow (l/s)*	100 Year Captured Flow (l/s)†
Segment ID	Area (ha)										
S130	0.38	OUTS	S130	0.76	67.00	134.00	26			72	32
S132	0.37	S134	S132	0.76	67.00	134.00	26			71	34
S134	0.47	S136	S133	0.76	86.00	172.00	26			88	54
S136	0.24	S137	S136	0.76	83.00	166.00	26			46	27
S137	0.35	S139	S137	0.76	77.00	77.00	26			61	47
S139	0.37	S168	S139	0.76	84.00	84.00	26	PA139	56.27	64	259
S168	0.12	CELL3	S168	0.76	97.00	97.00	26	PA168	3.20	24	41
S161	0.24	S162A	S161	0.76	90.00	90.00	26			46	27
S162A	0.12	S164B2	S162	0.76	83.00	83.00	26			23	23
S162B	0.10	S164B1	S162	0.76	83.00	83.00	26			20	5
S164B1	0.12	S164A	S164	0.76	102.00	102.00	26			23	11
S164B2	0.10	S164A	S164	0.76	102.00	102.00	26			19	18
S164A	0.18	S222B	S164	0.76	70.00	70.00	26			30	15
S165	0.21	CB165A	CB165A	0.76	63.00	63.00	26			39	88**
S166	0.13	S167A	S166	0.76	125.00	125.00	26			27	40
S167A	0.17	CB167A	CB167A	0.76	47.00	47.00	26	PA167A	5.23	30	89**
S167B	0.13	CB167C	CB167C	0.76	50.00	50.00	26	PA167B	6.72	25	67**
S167C	0.02	S168	S167	0.76	20.00	20.00	26			4	3
S152	0.23	S150	S152	0.76	100.00	100.00	26	PA152	6.50	41	88
S150	0.20	S149	S150	0.76	97.00	97.00	26	PA150	4.99	39	47
S151	0.02	S150	S151	0.76	15.00	15.00	26			4	4
S149	0.29	DUMBRM	S149	0.76	120.00	120.00	26	PA149	9.76	53	107
P141	0.86	S141B	S141	0.14	96.75	193.50	N/A			35	35
LOT152	0.92	S152	S152	0.86	103.50	207.00	N/A	100yr S.C	110.00¥	186	186
LOT151	0.41	S150	S151	0.86	46.13	92.25	N/A	100yr S.C	50.00¥	83	83
LOT150	0.96	S150	S150	0.86	108.00	216.00	N/A	100yr S.C	114.00¥	194	194

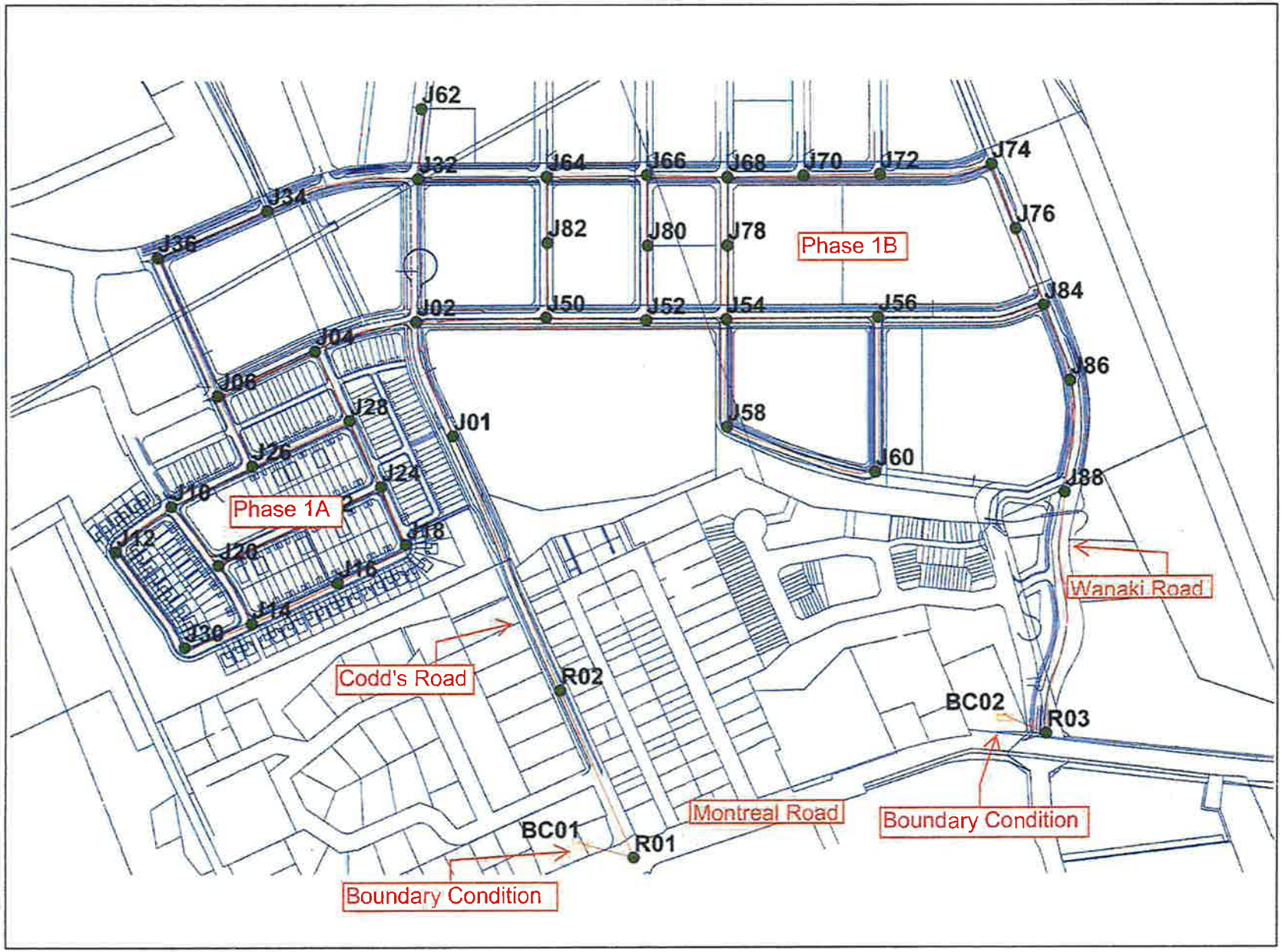
Notes:

* 5 year generated flow values are from the DDSWMM file (38298-PH1B-5CH.dat/out) presented on the CD in Appendix E.
† Minor flow restriction is from the DDSWMM output files 38298-PH1B-100CH.dat/out presented on the CD in Appendix E.
‡ Downstream segment presented is the segment which that area ultimately drains to and excludes the dummy segments introduced for routing. The dummy segment characteristics are presented in Appendix E.
¥ On-site storage assumed up to the 100 year storm event for self-contained sites.
€ Ponding volume assumed for external areas based on the macro grading plan from the MSS
¶ See Drawing 751 for ponding area ID presented in Appendix E.
** For catch basins connecting to the cells, the ICDs were sized in XPSWMM model (38298-Ph1B-100CH(06-15).out) presented on the CD in Appendix E.

5.4.3 Results of Hydrological Modeling

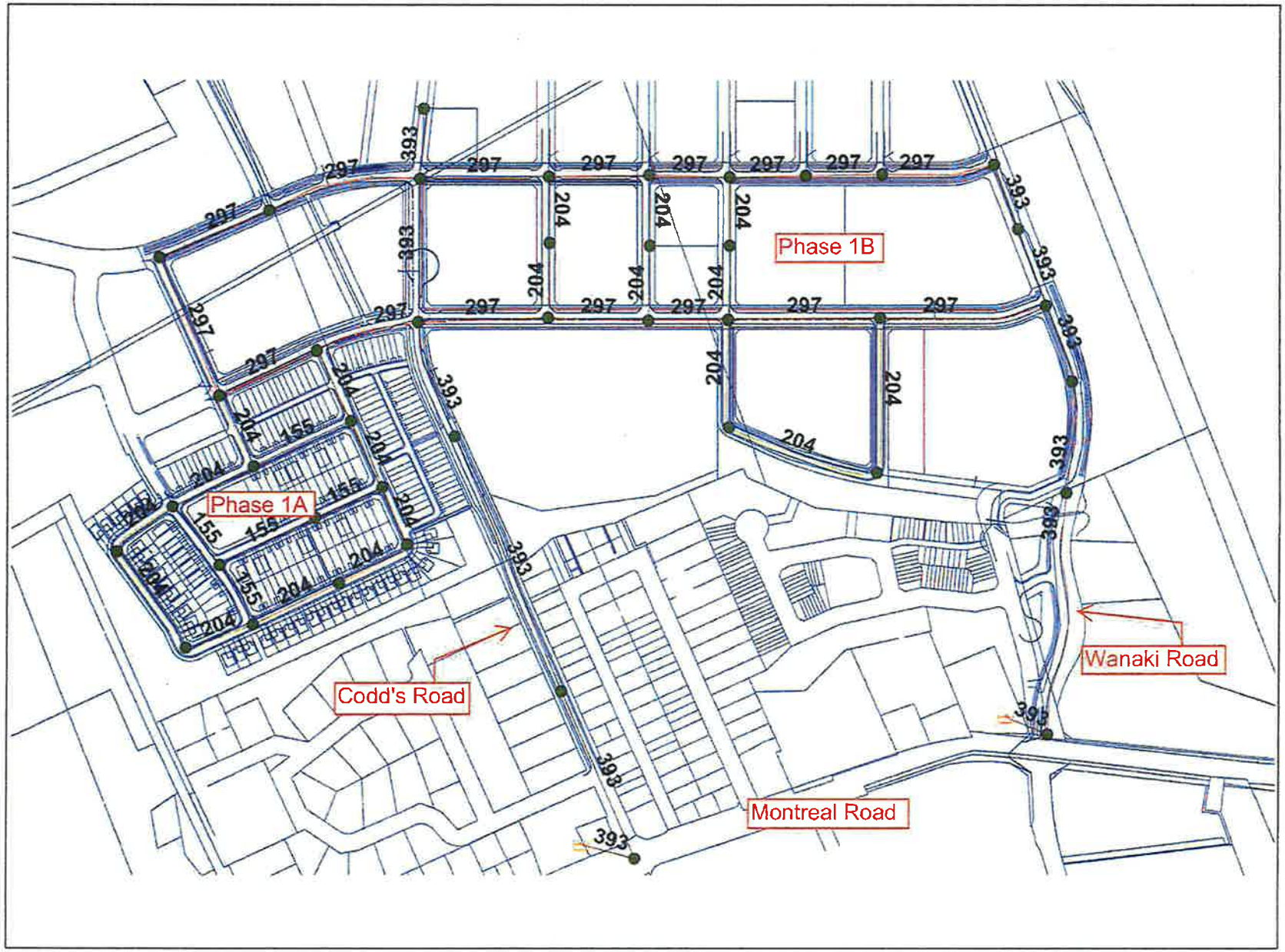
The storage available on-site, and its corresponding maximum depth, and the results of the DDSWMM major system evaluation for the subject site are presented in**Table 5-4**. Also included in **Table 5-4** is the duration of ponding and amount of ponding utilized for the 5 year, 100 year Chicago, and the stress test storm events. The ponding plan for the subject site is presented in **Appendix E** on **Drawing 751.** The DDSWMM output files are presented in **Appendix E**.

Phase 1B - Node ID's



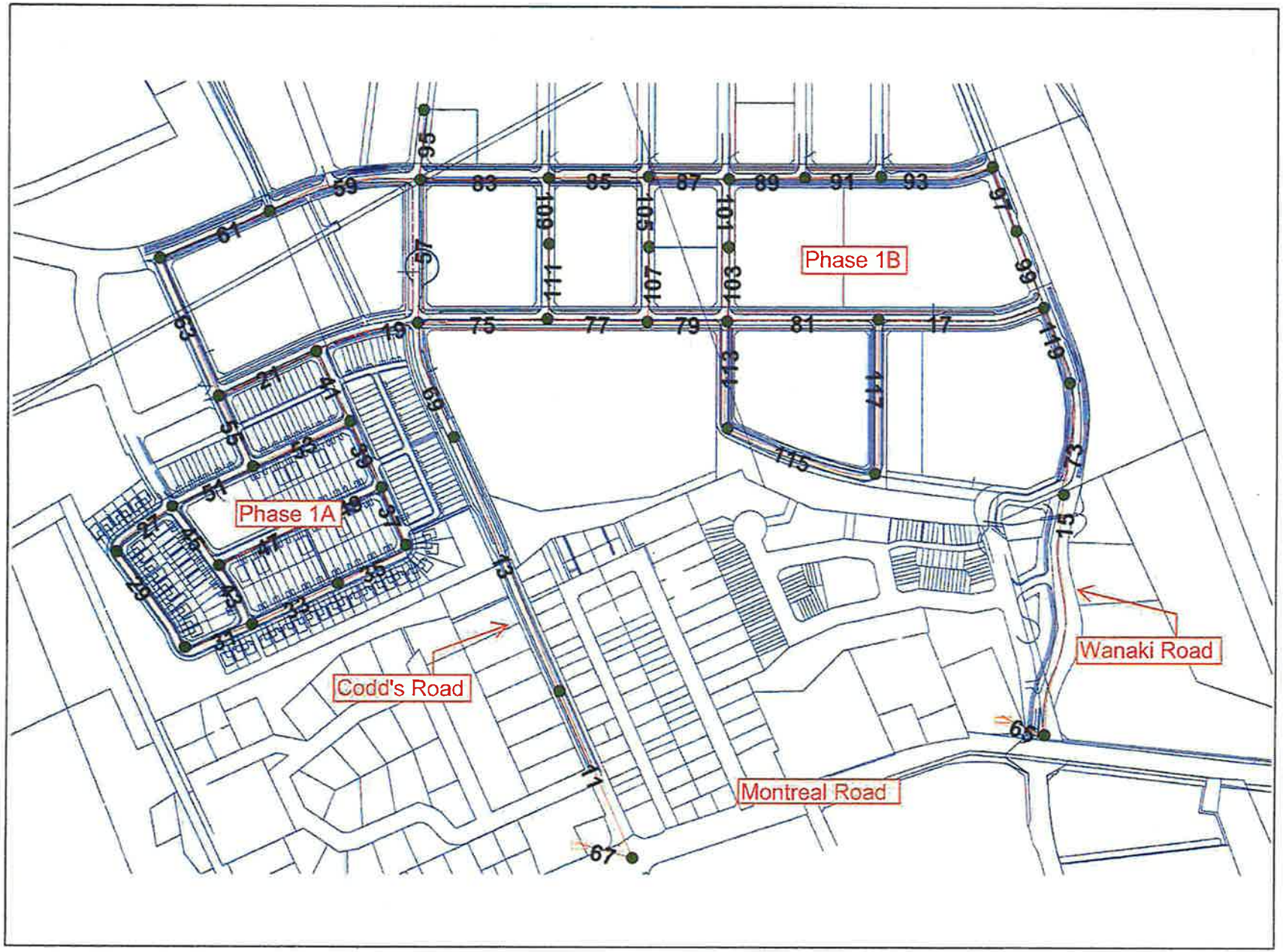
Date: Wednesday, June 29, 2016

Phase 1B - Pipe Sizes



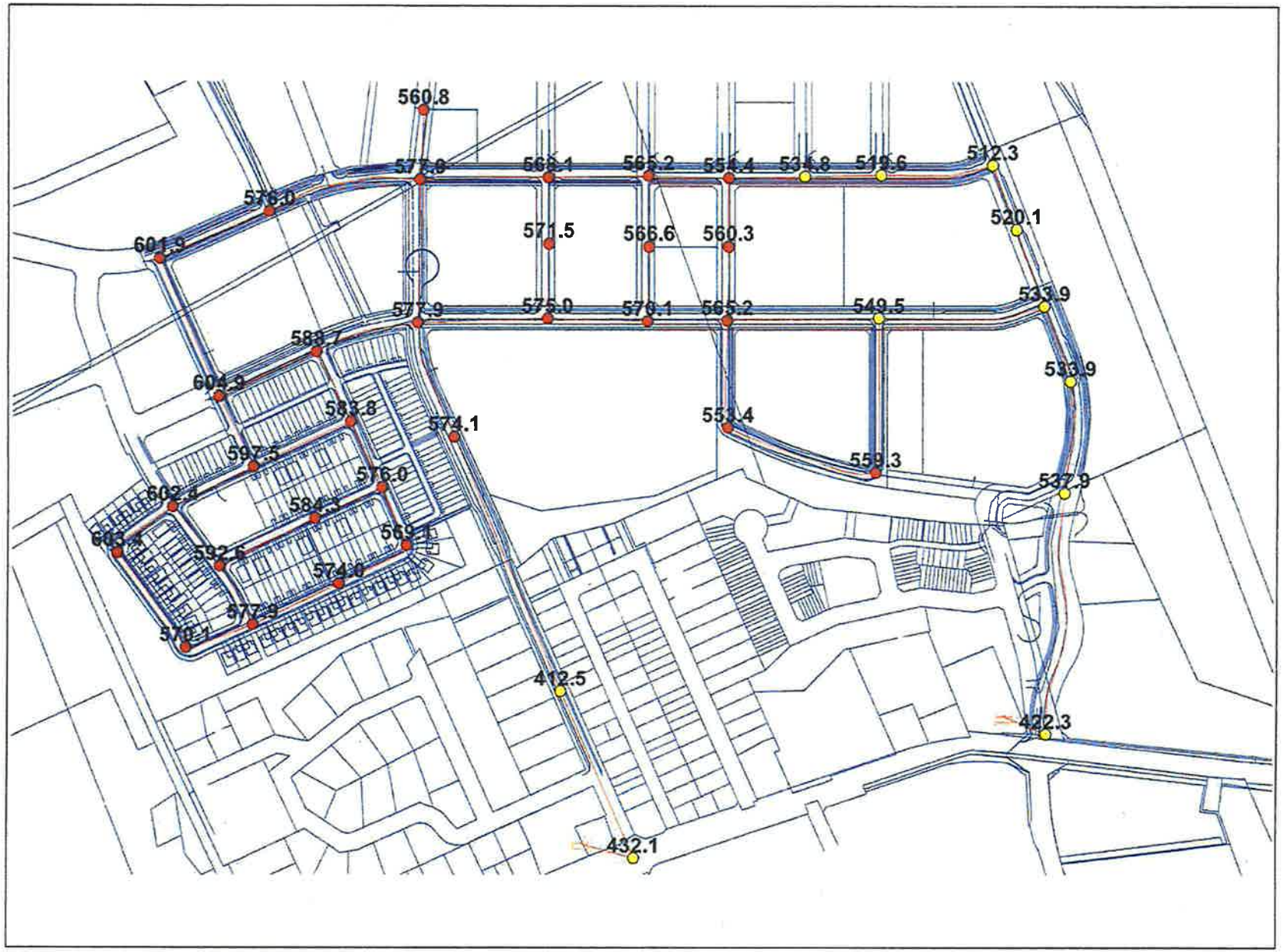
Date: Wednesday, June 29, 2016

Phase 1B - Pipe ID's



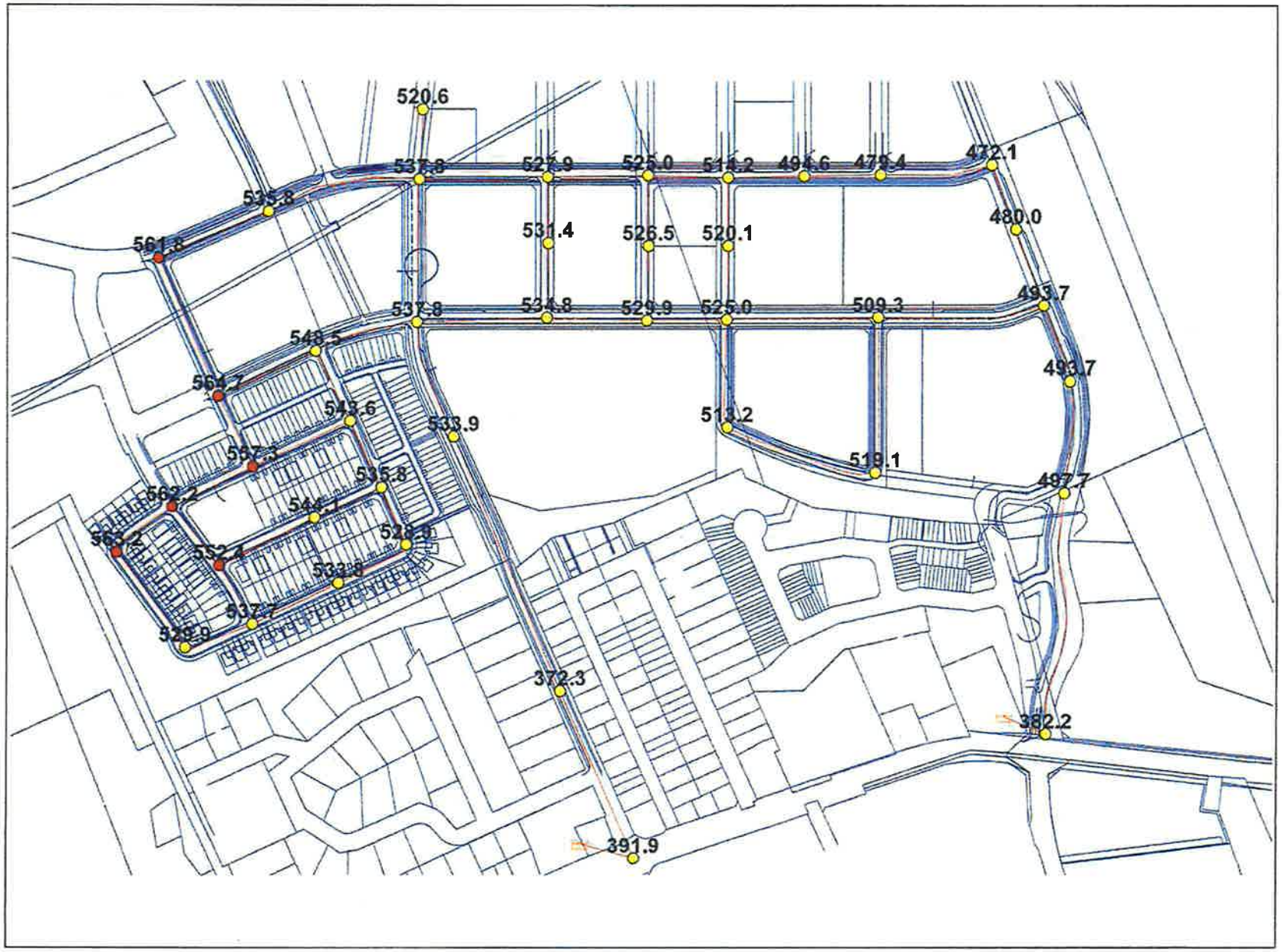
Date: Wednesday, June 29, 2016

Phase 1B - Basic Day (Max HGL) Pressures (kPa) Existing HGL 147.1m



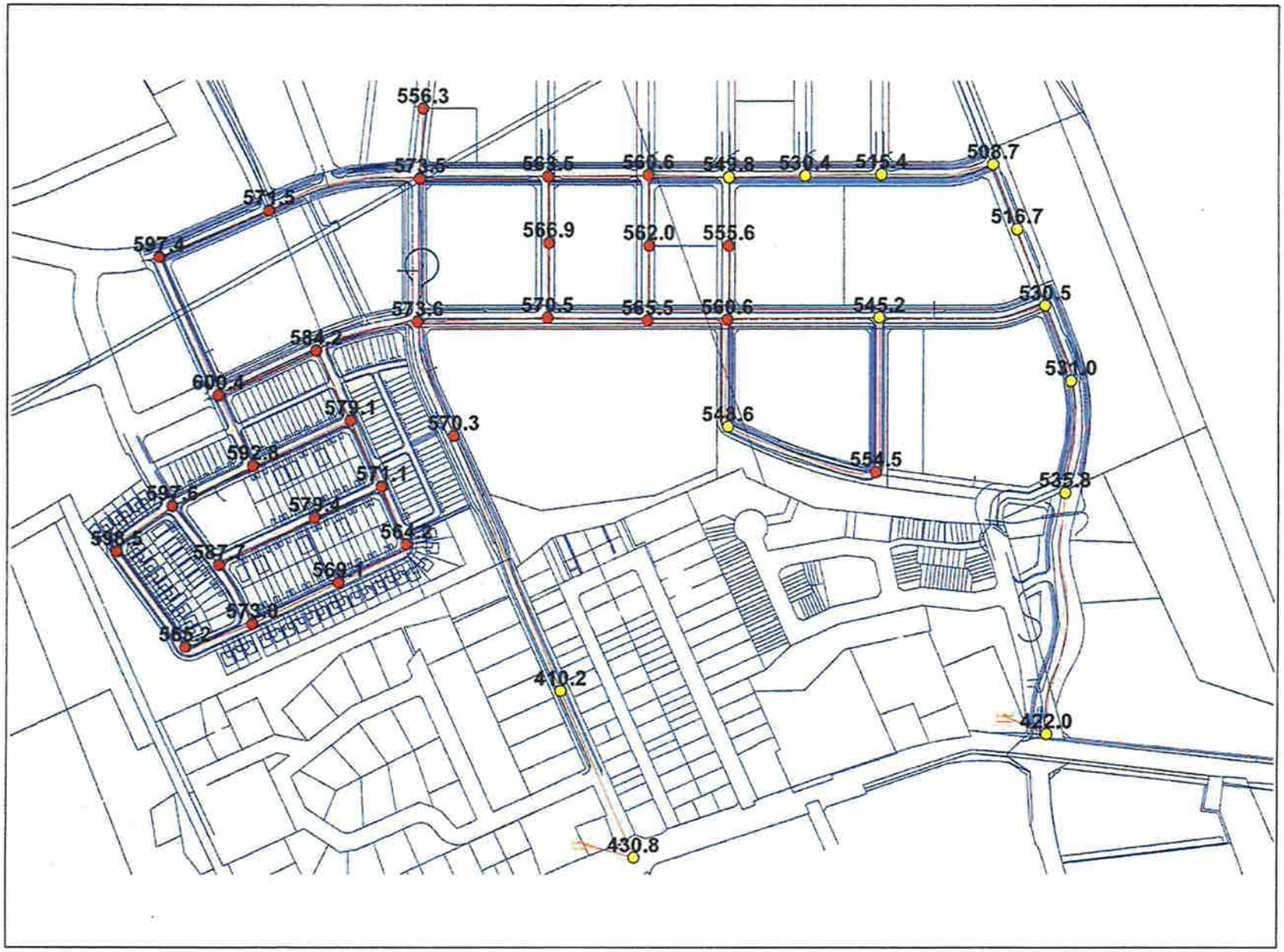
Date: Wednesday, June 29, 2016

Phase 1B - Basic Day (Max HGL) Pressures (kPa) Future HGL 143.0m



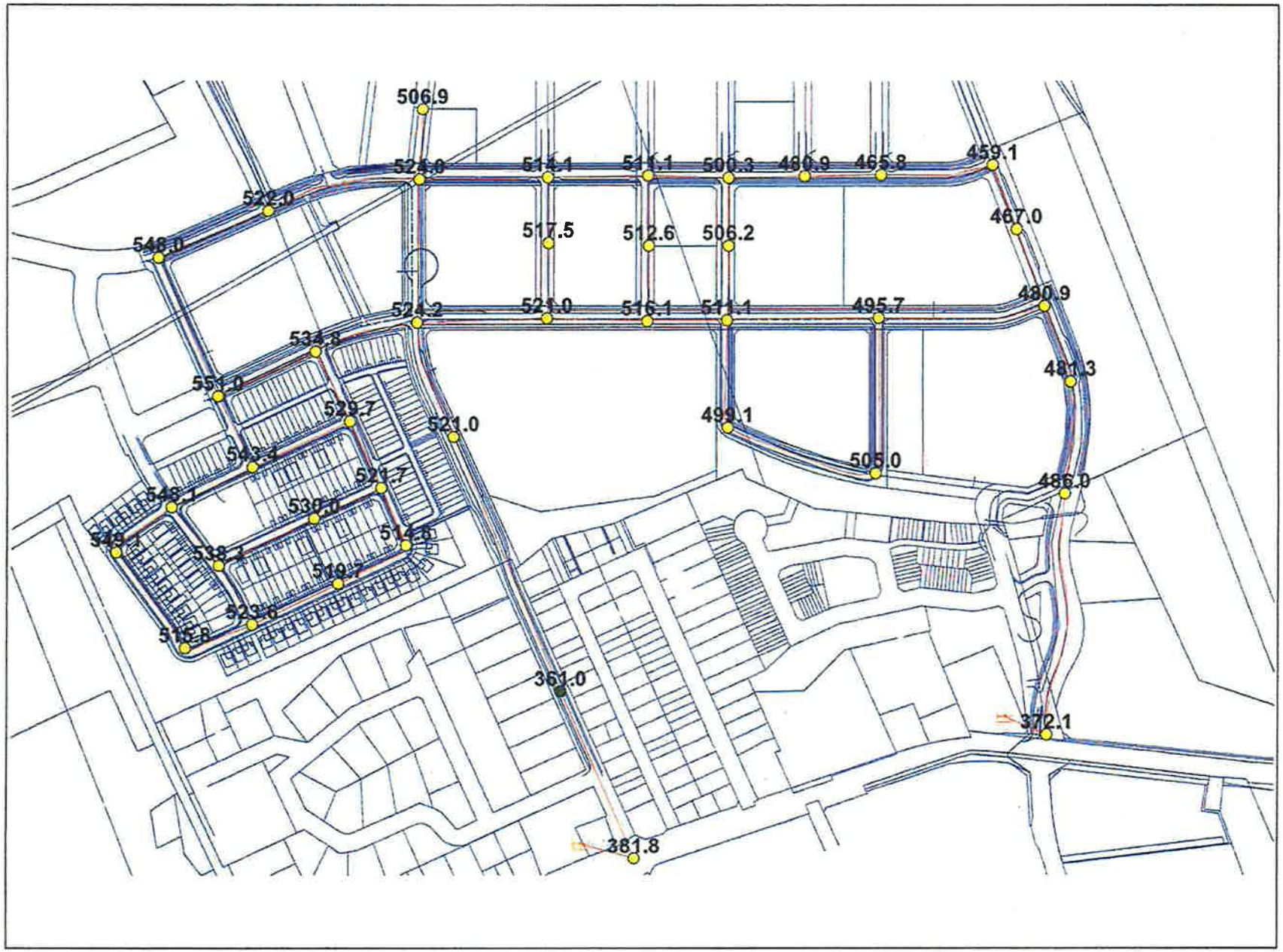
Date: Wednesday, June 29, 2016

Phase 1B - Peak Hour Pressures (kPa) Existing HGL 147.0 - 147.1m



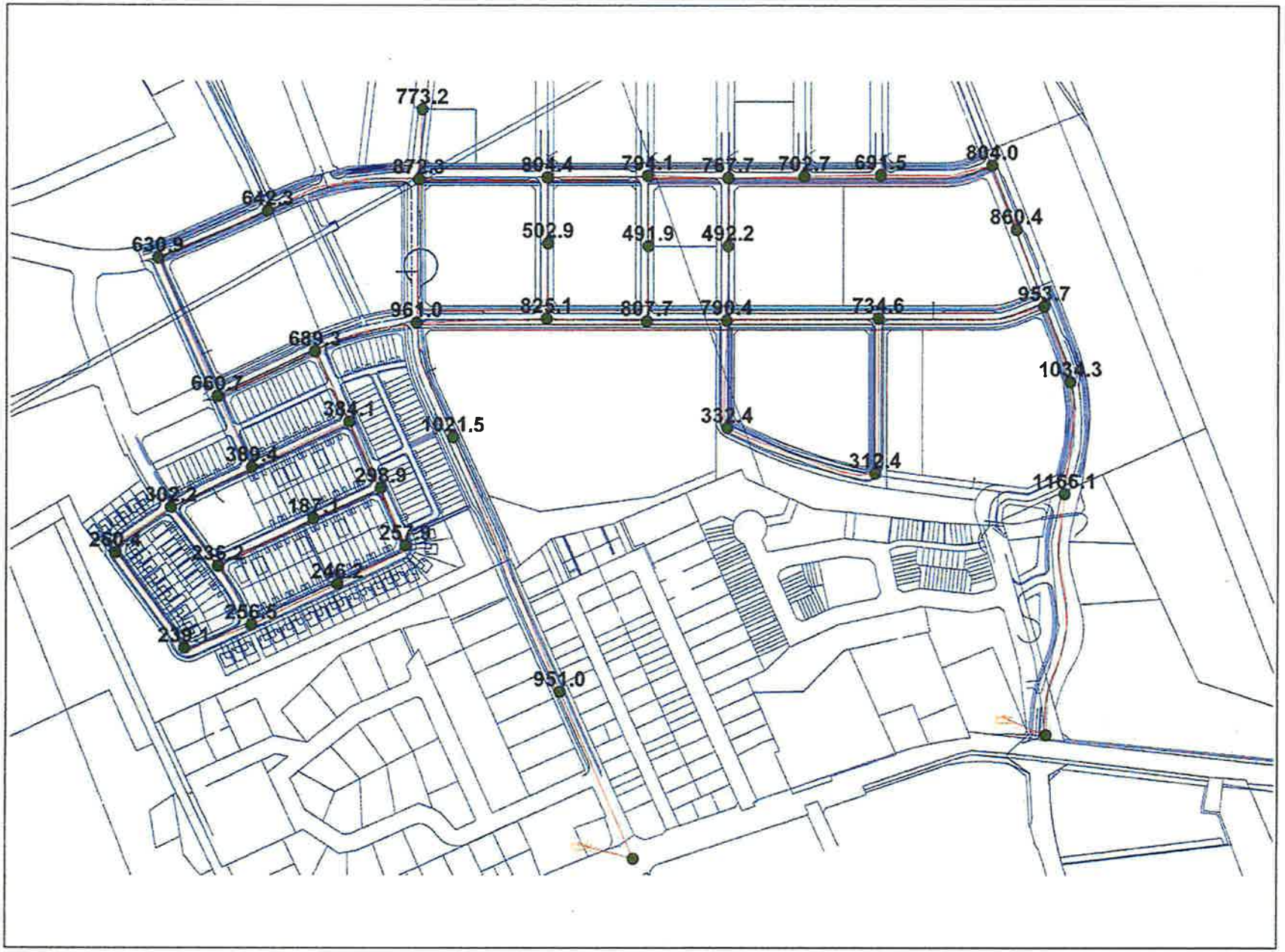
Date: Wednesday, June 29, 2016

Phase 1B - Peak Hour Pressures (kPa) Future HGL 142.0m



Date: Wednesday, June 29, 2016

Phase 1B - Max Day Fireflows (l/s) HGL 139.5 - 140.2m



Date: Wednesday, June 29, 2016

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SANITARY SEWER DESIGN SHEET

Former CFB Rockcliffe
City of Ottawa
Canada Lands Company

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

Design Parameters:

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

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 350 L/day 300 L/day
3. Infiltration allowance: 0.28 L/s/Ha
4. Residential Peaking Factor:
Harmon Formula = 1+(14/(4+P^0.5))
where P = population in thousands

Designed: WY

Checked: JIM

Dwg. Reference: 38298-501

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

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

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

Design Parameters:

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

Notes:

1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 350 L/day 300 L/day
3. Infiltration allowance: 0.28 L/s/Ha
4. Residential Peaking Factor:
   Harmon Formula = 1+(14/(4+P^0.5))
   where P = population in thousands

Designed: WY

Checked: JIM

Dwg. Reference: 38298-501

No.	Revision	Date
1.	City submission No. 1	7/8/2016
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:** 2 of 2

REVIEWED BY
DEVELOPMENT REVIEW SERVICES BRANCH

Signed _____

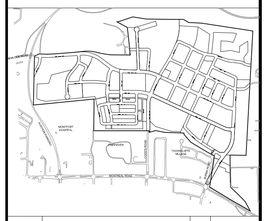
Date _____ 2017

Plan Number _____

LEGEND :

S168
2.01|0.80

AREA NUMBER
RUNOFF COEFFICIENT
AREA IN HECTARES
POTENTIAL DRAINAGE DIRECTION



No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7			
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

PROFESSIONAL ENGINEER
J. I. MOFFATT
17/06/07
PROVINCE OF ONTARIO

Drawing Title

SANITARY 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	501A

D07-16-15-0003

#17063

IBI GROUP
400-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
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STORM SEWER DESIGN SHEET

Former CFB Rockcliffe
City of Ottawa
Name of Client/Developer

LOCATION				AREA (Ha)										RATIONAL DESIGN FLOW												SEWER DATA								
STREET	AREA ID	FROM	TO	C= 0.20	C= 0.30	C= 0.45	C= 0.50	C= 0.56	C= 0.60	C= 0.65	C= 0.70	C= 0.73	C= 0.80	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm) DIA	W	H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (5yr) (L/s)	(%)
Phase 1B																																		
Hemlock Road	S201A-B, EX201	MH201	MH202								0.31		0.56	1.85	1.85	10.00	1.17	11.17	104.19	122.14	178.56	192.62				192.62	210.32	90.18	450			0.50	1.281	17.70	8.41%
Future Street No. 6	EX202A	BULK202N	MH202										0.90	2.00	2.00	12.23	0.27	12.50	93.72	109.82	160.45	187.60				187.60	286.47	16.00	600			0.20	0.982	98.87	34.51%
Hemlock Road	S202A, EX202B-C	MH202	MH203								0.10		0.55	1.42	5.27	12.50	0.53	13.03	92.61	108.50	158.52	487.86				487.86	784.52	86.00	600			1.50	2.688	296.66	37.81%
Future Street No. 5	S203B, EX203	BULK203N	203								0.09		0.73	1.80	1.80	10.88	0.12	11.00	99.76	116.92	170.90	179.44				179.44	351.93	16.00	450			1.40	2.144	172.49	49.01%
Hemlock Road	S203A, EXP203	MH203	MH204		0.44						0.16			0.68	7.75	13.03	0.49	13.53	90.49	106.01	154.87	700.89				700.89	847.38	86.00	600			1.75	2.903	146.49	17.29%
rue Moses Tennisco Street	S204B, EX204A	BULK204N	MH204								0.08		0.72	1.76	1.76	10.89	0.11	11.00	99.72	116.87	170.81	175.20				175.20	399.05	16.00	450			1.80	2.431	223.85	56.10%
Hemlock Road	S204A, EX204B	MH204	MH205								0.14		0.47	1.32	10.82	13.53	0.54	14.07	88.63	103.82	151.66	958.99				958.99	1,272.26	90.00	750			1.20	2.790	313.27	24.62%
rue Michael Stoqua Street	S205A, EX205A	BULK205N	MH205								0.08		0.81	1.96	1.96	11.15	0.15	11.30	98.49	115.42	168.69	192.75				192.75	297.43	16.01	450			1.00	1.812	104.68	35.20%
Hemlock Road	S205B-C, EX205B	MH205	MH206								0.17		0.63	1.73	14.51	14.07	1.20	15.26	86.70	101.55	148.32	1,257.92				1,257.92	1,818.95	112.01	1200			0.20	1.558	561.03	30.84%
Temp Ditch	FUTURE PHASE	DI 10	BULK206N		7.68									6.41	6.41	59.66	0.16	59.82	33.08	38.61	56.13	211.89				211.89	297.43	17.03	450			1.00	1.812	85.54	28.76%
rue Bareille-Snow Street	S206A, EX206A	BULK206N	MH206								0.06		1.02	2.39	2.39	10.85	0.15	11.00	99.91	117.09	171.14	238.30				238.30	448.66	17.50	525			1.00	2.008	210.35	46.89%
Hemlock Road	S206B, EX206B	MH206	MH207								0.03		0.46	1.08	17.98	15.26	0.78	16.04	82.71	96.86	141.44	1,486.80				1,486.80	2,227.75	89.33	1200			0.30	1.908	740.96	33.26%
Block 20	P207	CBMH207N	MH207		0.32									0.27	0.27	10.00	0.27	10.27	104.19	122.14	178.56	27.81				27.81	63.80	14.00	300			0.40	0.874	36.00	56.42%
Hemlock Road	S207	MH207	*BULK176E*								0.22			0.43	18.67	16.04	0.37	16.42	80.33	94.05	137.32	1,499.75				1,499.75	2,156.55	32.62	1350			0.15	1.460	656.80	30.46%
Phase 1A																																		
Ex. Hemlock Road	S176C	*BULK176E*	*MH176*								0.02			0.04	18.71	16.42	0.27	16.69	79.24	92.78	135.45	1,482.57				1,482.57	2,156.55	*24.06*	*1350*			*0.15*	1.460	673.98	31.25%
Phase 1B																																		
Codd's Road	S230, LOT230A-B	230	231								0.16		0.70	1.87	1.87	10.00	0.63	10.63	104.19	122.14	178.56	194.65				194.65	364.28	84.30	450			1.50	2.219	169.63	46.57%
Codd's Road	S231, LOT231	231	*BULK176N*								0.12		0.30	0.90	2.77	10.63	0.36	11.00	100.96	118.34	172.97	279.55				279.55	549.49	53.76	525			1.50	2.459	269.94	49.12%
Phase 1A																																		
Ex. Codd's Road	---	*BULK176N*	*MH176*											0.00	2.95	11.77	0.29	12.06	95.69	112.12	163.84	281.96				281.96	339.63	*18.21*	*525*			*1.50*	0.919	57.67	16.98%
Phase 1B																																		
chemin Wanaki Road	S200, LOT200	MH200	MH214								0.20		0.91	2.41	2.41	10.00	0.78	10.78	104.19	122.14	178.56	251.42				251.42	351.93	99.75	450			1.40	2.144	100.51	28.56%
chemin Wanaki Road	S214, LOT214	MH214	*BULK152N*								0.19		0.84	2.24	4.65	10.78	0.42	11.20	100.27	117.52	171.77	466.34				466.34	535.93	46.51	600			0.70	1.836	69.59	12.99%
Phase 1B																																		
chemin Wanaki Road	EX143	BULK143E	MH143										0.33	0.73	0.73	10.00	0.29	10.29	104.19	122.14	178.56	76.47				76.47	129.34	20.00	375			0.50	1.134	52.87	40.88%
chemin Wanaki Road		MH143	MH144											0.00	0.73	10.29	0.37	10.66	102.67	120.34	175.92	75.35				75.35	258.68	50.50	375			2.00	2.269	183.33	70.87%
chemin Wanaki Road	S144, EX144	MH144	MH145		0.55						0.18			0.81	1.54	10.66	0.30	10.97	100.81	118.15	172.70	155.54				155.54	258.68	41.15	375			2.00	2.269	103.14	39.87%
chemin Wanaki Road	S145, EX145	MH145	MH146								0.15		2.74	6.39	7.93	10.97	0.28	11.24	99.35	116.44	170.18	787.69				787.69	1,324.21	48.01	750			1.30	2.904	536.53	40.52%
chemin Wanaki Road		MH146	MH147											0.00	7.93	11.24	0.25	11.49	98.06	114.92	167.95	777.46				777.46	2,296.77	38.53	1050			0.65	2.570	1519.32	66.15%
chemin Wanaki Road	S147C	BULK147E	MH147		0.40									0.33	0.33	10.00	0.28	10.28	104.19	122.14	178.56	34.76				34.76	71.33	16.51	300			0.50	0.978	36.58	51.27%
chemin Wanaki Road	EX147	BULK 147W	MH147	0.16										0.09	0.09	12.00	0.32	12.32	94.70	110.96	162.13	8.42				8.42	71.33	18.72	300			0.50	0.978	62.91	88.19%
chemin Wanaki Road		MH147	MH170											0.00	8.35	12.32	0.09	12.41	93.35	109.38	159.81	779.62				779.62	2,296.77	13.96	1050			0.65	2.570	1517.16	66.06%
chemin Wanaki Road	S147A	MH170	BOX CULVERT								0.14			0.27	8.62	12.41	0.10	12.51	92.98	108.94	159.17	801.83				801.83	2,296.77	15.00	1050			0.65	2.570	1494.94	65.09%
Phase 1B																																		
rue Moses Tennisco Street	S212, LOT212A-B	MH212	MH213								0.15		1.03	2.58	2.58	10.00	0.66	10.66	104.19	122.14	178.56	269.09				269.09	361.72	63.80	525			0.65	1.619	92.63	25.61%
rue Moses Tennisco Street	S213, LOT213	MH213	*BULK165N*								0.21		0.23	0.92	3.50	10.66	0.82	11.47	100.85	118.20	172.77	353.25				353.25	519.40	55.71	750			0.20	1.139	166.15	31.99%
Temp Ditch	BLOCK 24	DI 1	MH165N		1.60									1.33	1.33	26.41	0.25	26.66	58.73	68.69	100.13	78.37				78.37	129.34	17.03	375			0.50	1.134	50.96	39.40%
Phase 1A																																		
Ex. Street No. 3	---	*BULK165N*	*MH165*											0.00	3.50	11.47	0.24	11.71	97.01	113.68	166.14	339.81				339.81	519.40	*16.10*	*750*			*0.20*	1.139	179.59	34.58%

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

Notes:
1. Mannings coefficient (n) = 0.013

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

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

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Ottawa, Ontario K1S 5N4 Canada
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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:
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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
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Notes:
1. Mannings coefficient (n) = 0.013

Designed: WY
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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

CANADA LANDS COMPANY
SOCIÉTÉ IMMOBILIÈRE DU CANADA

REPORT
Project: 118863-5.2.2

DESIGN BRIEF
WATERIDGE VILLAGE AT ROCKCLIFFE PHASE 2B

Prepared for CANADA LANDS COMPANY
by IBI GROUP
APRIL 2019

DRAINAGE AREA ID	AREA (HA)	D/S SEGMENT ID	XPSWMM NODE ID	IMP RATIO [TP (H)]	SEGMENT LENGTH (M)	SUBCATCHMENT WIDTH (M)	AVAILABLE STATIC PONDING (M^3)
B325A	0.151	DNCC[6]	MH325	0.86	51	102	0[1]
S325	0.072	DNCC[6]	MH325	0.71	36	72	0
B325	0.16	DNCC[6]	MH325	0.86	54	107	0[1]
B191	0.761	DESWM2[5]	MH191	0.86	134	268	0[1]
P331	6.15	ESWM1[5]	EXSTMH	0.14	320	640	0
B9	0.12	S176D	MH305	0.07	151	302	0[1]
Future Phases 2C and 2D							
S305	0.3	P331	MH305	0.71	161	321	7.50[1]
EXTA	8.01	DEDP[2]	EXSTMH	0.86	901	1802	200.25[1]
EXTB	3.68	DEDP[2]	EXSTMH	0.86	414	828	0
Relevant Existing Phases 1A and 1B							
S201A1	0.08	S201B	MH201	0.71	63	63	0
S201A2	0.08	S201B	MH201	0.71	63	63	0
S201B	0.15	S202A	MH202	0.86	65	65	21.20
S202A	0.12	S203A	MH202	0.71	41	41	0
S203A	0.16	DS212	MH203	0.71	90	90	0
S204A	0.22	DS210[4]	MH204	0.71	58	115	0
S205B	0.0379	DS210[4]	MH205	0.71	13	26	0
S205C	0.148	DS208[4]	MH205	0.71	58	58	0
P207	0.32	S207	MH207	0.14	36	72	0
S231	0.22	DS142[4]	MH231	0.71	61	61	0
S207	0.22	DS142[4]	MH207	0.71	90	90	0
S176D	0.13	DS142[4]	MH176	0.76	95	95	2.60
S176E	0.09	DS142[4]	MH176	0.76	80	80	0
S206B	0.0382	DS208[4]	MH206	0.71	11	22	0
S176C	0.05	DS142[4]	MH176	0.76	40	40	1.14
S180	0.16	DNCC[6]	MH180	0.76	68	68	0

(1) Assumed ponding volume
(2) Future dry pond; major flow from a portion of EXTB will cascade north per MSS
(3) Adjustment to drainage area at interface of Phase 2B
(4) Existing Phase 1B
(5) North towards existing SWM facility
(6) West to external

Table 5-3 Minor Flow Capture

DRAINAGE AREA ID	CONTINUOUS/ SAG[1],[2]	ROAD TYPE	MINOR SYSTEM DESIGN TARGET	GENERATED FLOW ON INDIVIDUAL SEGMENT (DDSWMM SIMULATION) (L/S)	ICD (L/S)	NOTE
Phase 2B						
B326	Block	N/A	5	318	318	Minor system restriction for future development block

DRAINAGE AREA ID	CONTINUOUS/ SAG[1],[2]	ROAD TYPE	MINOR SYSTEM DESIGN TARGET	GENERATED FLOW ON INDIVIDUAL SEGMENT (DDSWMM SIMULATION) (L/S)	ICD (L/S)	NOTE
S326	Continuous	20m Row, 8.5m asphalt	5	29	12	
S318	Continuous	20m Row, 8.5m asphalt	5	24	25	
S317A	Sag	20m Row, 8.5m asphalt	5	6	19	
S300	Sag	20m Row, 8.5m asphalt	5	29	38	
S317	Sag	20m Row, 8.5m asphalt	5	10	19	
S301	Continuous	20m Row, 8.5m asphalt	5	25	12	
S315A	Sag	20m Row, 8.5m asphalt	5	7	19	
S315	Sag	20m Row, 8.5m asphalt	5	5	6	
S302	Continuous	20m Row, 8.5m asphalt	5	24	12	
S313	Sag	20m Row, 8.5m asphalt	5	19	25	
B317	Block	N/A	5	214	310	Minor system restriction for future development block
S316B	Continuous	20m Row, 8.5m asphalt	5	11	6	
S316A	Sag	20m Row, 8.5m asphalt	5	24	38	
R315	Rear Yard	N/A	5	46	56	
S315B	Continuous	20m Row, 8.5m asphalt	5	40	12	
S314B	Sag	20m Row, 8.5m asphalt	5	12	44	
S314A	Sag	20m Row, 8.5m asphalt	5	65	107	
R313	Rear Yard	N/A	5	32	39	
P312	Park	N/A	5	19	24	
S312B	Sag	20m Row, 8.5m asphalt	5	6	44	
S312A	Sag	20m Row, 8.5m asphalt	5	35	172	
R311	Rear Yard	N/A	5	49	56	
S311A	Continuous	20m Row, 8.5m asphalt	5	32	12	
S310B	Sag	20m Row, 8.5m asphalt	5	12	86	

DRAINAGE AREA ID	CONTINUOUS/ SAG[1],[2]	ROAD TYPE	MINOR SYSTEM DESIGN TARGET	GENERATED FLOW ON INDIVIDUAL SEGMENT (DDSWMM SIMULATION) (L/S)	ICD (L/S)	NOTE
S310A	Sag	20m Row, 8.5m asphalt	5	54	107	
S302A	Continuous	20m Row, 8.5m asphalt	5	29	12	
S311	Sag	20m Row, 8.5m asphalt	5	7	19	
S303	Sag	20m Row, 8.5m asphalt	5	33	56	
S304	Sag	20m Row, 8.5m asphalt	5	35	48	
S309	Continuous	20m Row, 8.5m asphalt	5	20	12	
S308	Continuous	20m Row, 8.5m asphalt	5	19	12	
S308A	Sag	20m Row, 8.5m asphalt	5	24	52	
B309	Block	N/A	5	249	370	Minor system restriction for future development block
S312C	Continuous	20m Row, 8.5m asphalt	5	38	12	
S316C	Block	N/A	5	24	24	Minor system restriction for future development block
S300A	Block	N/A	5	8	6	Minor system restriction for future development block
S301A	Continuous	20m Row, 8.5m asphalt	5	8	6	
S304A	Block	N/A	5	10	6	Minor system restriction for future development block
Future Phase 2A						
S340	Continuous	20m Row, 8.5m asphalt	5	32	12	
B340	Rear Yard	N/A	5	257	366	
B340A	Block	N/A	5	144	204	Minor system restriction for future development block
S319	Sag	20m Row, 8.5m asphalt	5	26	38	
B319	Rear Yard	N/A	100	395	490	
S320	Continuous	20m Row, 8.5m asphalt	5	32	12	
S322	Continuous	20m Row, 8.5m asphalt	5	30	25	
B180	Block	N/A	5	200	200	Minor system restriction for future development block
S190	Continuous	20m Row, 8.5m asphalt	5	33	12	

DRAINAGE AREA ID	CONTINUOUS/ SAG[1],[2]	ROAD TYPE	MINOR SYSTEM DESIGN TARGET	GENERATED FLOW ON INDIVIDUAL SEGMENT (DDSWMM SIMULATION) (L/S)	ICD (L/S)	NOTE
S190A	Sag	20m Row, 8.5m asphalt	5	20	24	
S190B	Sag	20m Row, 8.5m asphalt	5	20	63	
S191A	Sag	20m Row, 8.5m asphalt	5	7	63	
S191B	Sag	20m Row, 8.5m asphalt	5	6	6	
S191	Continuous	20m Row, 8.5m asphalt	5	21	12	
S192	Continuous	20m Row, 8.5m asphalt	5	24	12	
S193	Sag	20m Row, 8.5m asphalt	5	22	52	
P191	Park	N/A	5	22	24	
P193	Park	N/A	5	88	109	CB lead as restriction; 1.65m head, 200mm dia lead
B180A	Block	N/A	5	120	120	Minor system restriction for future development block
B325A	Block	N/A	5	34	34	Minor system restriction for future development block
S325	Continuous	20m Row, 8.5m asphalt	5	14	12	
B325	Block	N/A	5	36	36	Minor system restriction for future phase
B191	Block	N/A	5	162	162	Minor system restriction for future phase
P331	Park	N/A	5	226	226	
B9	Block	N/A	5	12	0	No CBs located in this green space block
Future Phases 2C and 2D						
S305	Sag	20m Row, 8.5m asphalt	5	58	60	
EXTA	Fut. Dev.	N/A	5	1609	1681	Minor system restriction for future phase
EXTB	Fut. Dev.	N/A	5	744	744	Minor system restriction for future phase
Relevant Existing Phases 1A and 1B						
S201A1	Continuous	26m Row, 9.5m asphalt	5		15	ICD(s) installed
S201A2	Continuous	26m Row, 9.5m asphalt	5		6	ICD(s) installed
S201B	Sag	26m Row, 9.5m asphalt	5		88	ICD(s) installed

DRAINAGE AREA ID	CONTINUOUS/ SAG[1],[2]	ROAD TYPE	MINOR SYSTEM DESIGN TARGET	GENERATED FLOW ON INDIVIDUAL SEGMENT (DDSWMM SIMULATION) (L/S)	ICD (L/S)	NOTE
S202A	Continuous	26m Row, 9.5m asphalt	5		30	ICD(s) installed
S203A	Continuous	26m Row, 9.5m asphalt	5		38	ICD(s) installed
S204A	Continuous	26m Row, 9.5m asphalt	5		48	ICD(s) installed
S205B	Continuous	24m Row, 12m asphalt	5		12	ICD(s) installed
S205C	Continuous	24m Row, 12m asphalt	5		38	ICD(s) installed
P207	Park	N/A	5		19	ICD(s) installed
S231	Continuous	20m Row, 8.5m asphalt	5		21	ICD(s) installed
S207	Continuous	24m Row, 12m asphalt	5		30	ICD(s) installed
S176D	Sag	26m Row, 9.5m asphalt	5		37	Replacing existing ICDs
S176E	Continuous	26m Row, 9.5m asphalt	5		11.4	ICD(s) installed
S206B	Continuous	24m Row, 12m asphalt	5		12	ICD(s) installed
S176C	Sag	24m Row, 12m asphalt	5		10	ICD(s) installed
S180	Continuous	26m Row, 9.5m asphalt	5		16.3	ICD(s) installed

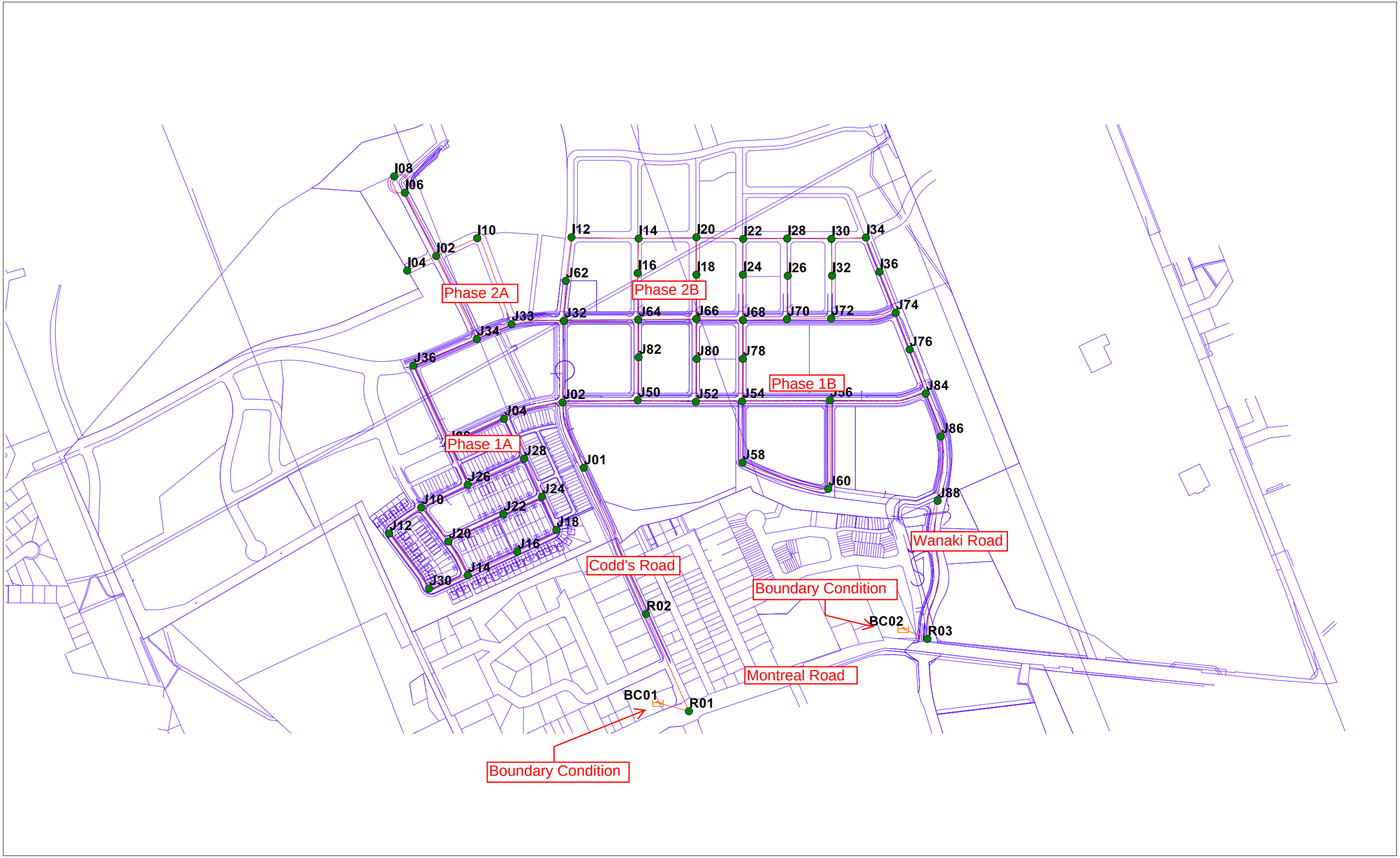
(1) Capture on continuous grade is limited to capacity of grate
(2) The minor flow restriction has been increased in sags to allow full capture of overflow from upstream segments on continuous grade during the design storm event without ponding.

5.4.3 Results of Hydrological Modeling

5.4.3.1 Street Segment Storage

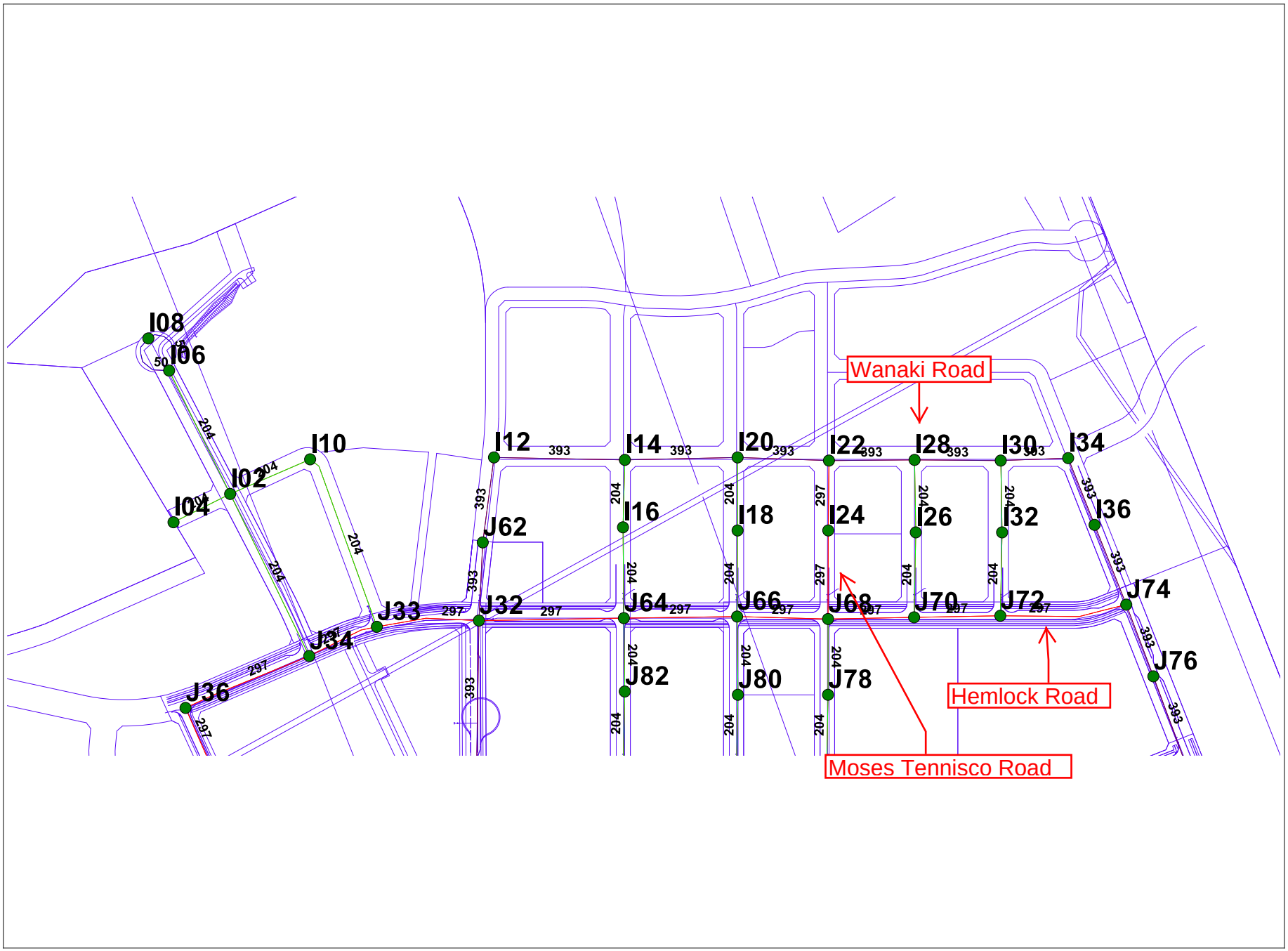
The storage available on-site storage and the results of the DDSWMM major system evaluation for the design storm are presented in **Table 5-4**. The ponding plan for the subject site is presented in **Appendix F** on **Drawings 600** and **601.** The DDSWMM output files are presented in **Appendix F**.

Wateridge Overall Model



Date: Thursday, December 06, 2018

Phase 2 Node ID's and Pipe Sizes

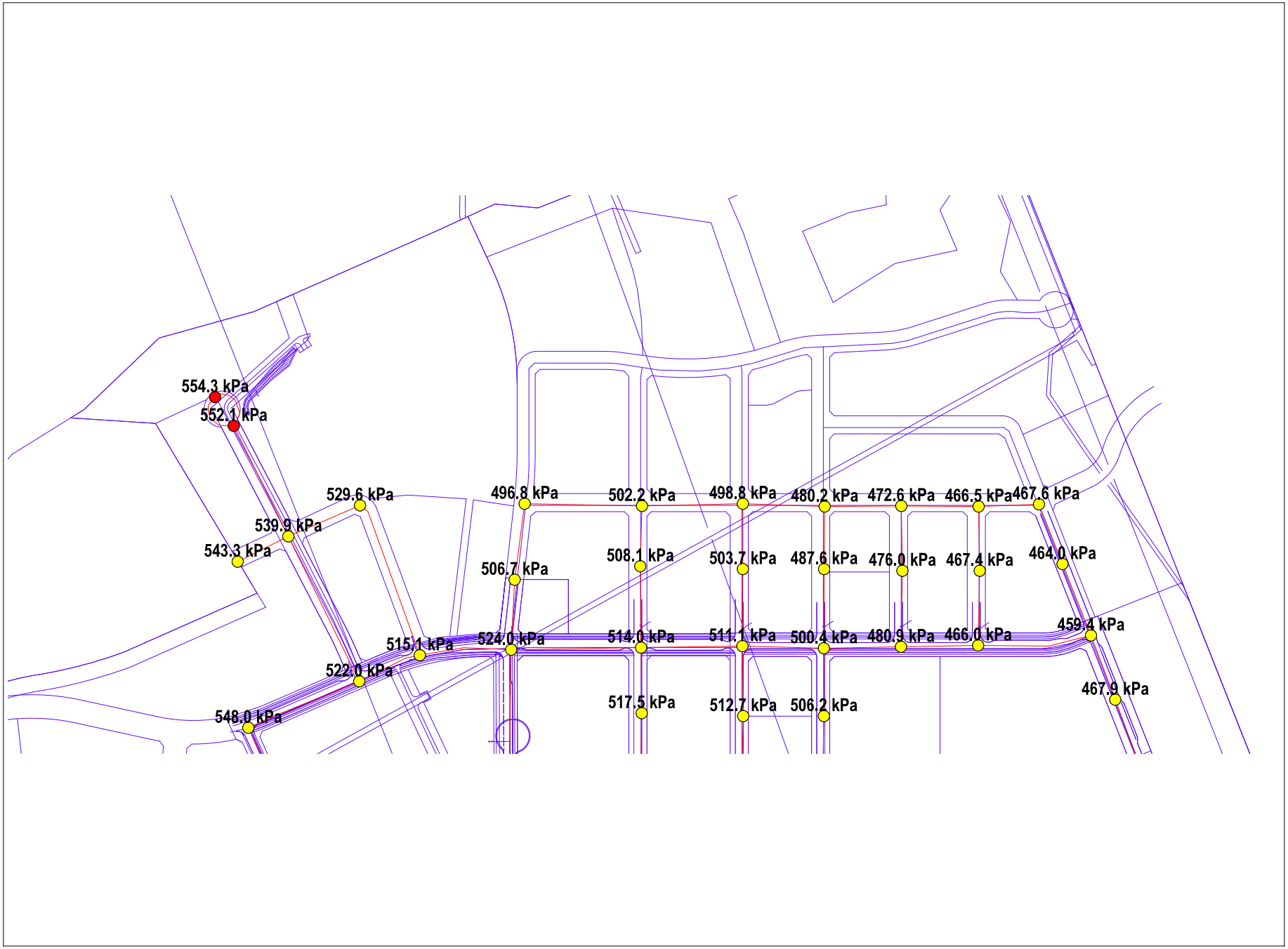


Date: Thursday, December 06, 2018

Phase 2 Basic Day (Max HGL) Pressures

Date: Thursday, December 06, 2018

Phase 2 Peak Hour Pressures



Date: Thursday, December 06, 2018

Phase 2 Max Day + Fire Design Fireflows

Date: Thursday, December 06, 2018

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

LEGEND
MH231A Existing infrastructure (shown for information only)

SANITARY SEWER DESIGN SHEET

Wateridge at Rockcliffe - Phase 2B
City of Ottawa
Canada Lands Company

LOCATION				RESIDENTIAL										ICI AREAS								INFILTRATION ALLOWANCE			FIXED FLOW (L/s)		TOTAL FLOW	PROPOSED SEWER DESIGN						
				AREA w/ Units (Ha)	UNIT TYPES				AREA w/o Units (Ha)	POPULATION		RES PEAK FACTOR	PEAK FLOW (L/s)	AREA (Ha)						ICI PEAK FACTOR	PEAK FLOW (L/s)	AREA (Ha)		FLOW				CAPACITY	LENGTH	DIA	SLOPE	VELOCITY (full)	AVAILABLE CAPACITY	
STREET	AREA ID	FROM MH	TO MH		SF	SD / TH/F	TH/S	APT		IND	CUM			INSTITUTIONAL		COMMERCIAL		INDUSTRIAL				IND	CUM	(L/s)	IND	CUM	(L/s)	(L/s)	(m)	(mm)	(%)	(m/s)	L/s	(%)
														IND	CUM	IND	CUM	IND	CUM														
Pimiwidon Street	MH317-1, MH317-2	MH317A	MH316A	1.50	1	104				284.2	284.2	3.47	3.20	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	1.50	1.50	0.50	0.00	0.00	3.69	41.62	83.50	250	0.45	0.821	37.93	91.13%
Pimiwidon Street	MH316A	MH316A	BULK202AN	0.16		1				2.7	286.9	3.47	3.23	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.16	1.66	0.55	0.00	0.00	3.77	41.62	43.56	250	0.45	0.821	37.84	90.93%
Pimiwidon Street	-	*BULK202AN*	*MH202A*							*0.0*	*286.9*	*3.47*	*3.23*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*1.66*	*0.55*	*0.00*	*0.00*	*3.77*	*40.68*	*21.00*	*250*	*0.43*	*0.803*	*36.91*	*90.72%*
Wigwas Street	MH315A	MH315A	MH314A	0.79	2	18				55.4	55.4	3.64	0.65	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.79	0.79	0.26	0.00	0.00	0.92	50.02	113.00	250	0.65	0.987	49.10	98.17%
Wigwas Street	MH314A	MH314A	BULK203AN	0.06						0.0	55.4	3.64	0.65	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.06	0.85	0.28	0.00	0.00	0.93	80.17	15.00	250	1.67	1.582	79.24	98.83%
Wigwas Street	-	*BULK203AN*	*MH203A*							*0.0*	*55.4*	*3.64*	*0.65*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*0.85*	*0.28*	*0.00*	*0.00*	*0.93*	*80.17*	*21.00*	*250*	*1.67*	*1.582*	*79.24*	*98.83%*
Moses Tennisco Street	MH313A	MH313A	MH312A	0.66	2	16				50.0	50.0	3.65	0.59	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.66	0.66	0.22	0.00	0.00	0.81	75.98	78.00	250	1.50	1.500	75.17	98.93%
Moses Tennisco Street	MH312A, PARK	MH312A	BULK204AN	0.21		2				5.4	55.4	3.64	0.65	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.21	0.87	0.29	0.00	0.00	0.94	89.90	48.98	250	2.10	1.774	88.96	98.95%
Park	PARK	MH350A	pipe	0.42						0.0	0.0	3.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.42	0.42	0.14	0.00	0.00	0.14	48.39	11.00	200	2.00	1.492	48.25	99.71%
Moses Tennisco Street	-	*BULK204AN*	*MH204A*							*0.0*	*55.4*	*3.64*	*0.65*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*0.87*	*0.29*	*0.00*	*0.00*	*0.94*	*89.90*	*21.00*	*250*	*2.10*	*1.774*	*88.96*	*98.95%*
Michael Stoqua Street	MH311A	MH311A	MH310A	0.44	1	9				27.7	27.7	3.69	0.33	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.44	0.44	0.15	0.00	0.00	0.48	70.74	78.00	250	1.30	1.396	70.26	99.33%
Michael Stoqua Street	MH310A	MH310A	BULK205AN	0.21		2				5.4	33.1	3.68	0.39	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.21	0.65	0.21	0.00	0.00	0.61	66.24	48.95	250	1.14	1.307	65.63	99.08%
Michael Stoqua Street	-	*BULK205AN*	*MH205A*							*0.0*	*33.1*	*3.68*	*0.39*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*0.65*	*0.21*	*0.00*	*0.00*	*0.61*	*66.24*	*21.00*	*250*	*1.14*	*1.307*	*65.63*	*99.08%*
Wanaki Road	MH200A	MH200A	MH318A							0.0	0.0	3.80	0.00	0.00	0.00	1.01	1.01	0.00	0.00	1.50	0.49	1.01	1.01	0.33	0.00	0.00	0.82	43.91	68.65	250	0.50	0.867	43.09	98.12%
Wanaki Road	MH318A	MH318A	MH300A							0.0	0.0	3.80	0.00	0.00	0.00	0.95	1.96	0.00	0.00	1.50	0.95	0.95	1.96	0.65	0.00	0.00	1.60	43.87	76.95	250	0.50	0.866	42.27	96.35%
Tawadina Road	MH300A	MH300A	MH301A	0.47		15				40.5	40.5	3.67	0.48	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.47	2.43	0.80	0.00	0.00	2.24	31.02	110.00	250	0.25	0.612	28.78	92.79%
Tawadina Road	MH301A	MH301A	MH302A	0.54		14				37.8	78.3	3.62	0.92	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.54	2.97	0.98	0.00	0.00	2.85	58.86	110.00	250	0.90	1.162	56.00	95.16%
Tawadina Road	MH302A	MH302A	MH303A	0.26		2				5.4	83.7	3.61	0.98	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.26	3.23	1.07	0.00	0.00	3.00	73.41	112.50	250	1.40	1.449	70.41	95.92%
Tawadina Road	MH303A	MH303A	MH304A	0.21						0.0	83.7	3.61	0.98	0.00	0.00	0.00	1.96	0.00	0.00	1.50	0.95	0.21	3.44	1.14	0.00	0.00	3.07	31.02	111.99	250	0.25	0.612	27.95	90.11%
Tawadina Road	MH305A	MH305A	MH304A	0.24						0.0	0.0	3.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.24	0.24	0.08	0.00	0.00	0.08	50.02	111.50	250	0.65	0.987	49.94	99.84%
Bareille-Snow Street	EXT-1	BULK304AN	MH304A	7.35				905		1629.0	1629.0	3.12	16.49	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	7.35	7.35	2.43	0.00	0.00	18.91	31.02	20.00	250	0.25	0.612	12.11	39.04%
Bareille-Snow Street	MH304A-1, MH304A-2	MH304A	MH308A	1.47				190		342.0	2054.7	3.06	20.38	0.00	0.00	0.00	1.96	0.00	0.00	1.00	0.64	1.47	12.50	4.13	0.00	0.00	25.14	31.02	119.13	250	0.25	0.612	5.87	18.94%
Bareille-Snow Street	MH308A	MH308A	BULK206AN	0.07						0.0	2054.7	3.06	20.38	0.00	0.00	0.00	1.96	0.00	0.00	1.00	0.64	0.07	12.57	4.15	0.00	0.00	25.17	88.83	17.00	250	2.05	1.753	63.66	71.67%
Bareille-Snow Street		BULK206AN	MH206A							0.0	2054.7	3.06	20.38	0.00	0.00	0.00	1.96	0.00	0.00	1.00	0.64	0.00	12.57	4.15	0.00	0.00	25.17	88.83	21.00	250	2.05	1.753	63.66	71.67%
Codd's Road	MH340A	MH340A	BLK231AN	1.78				278		500.4	500.4	3.38	5.48	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	1.78	1.78	0.59	0.00	0.00	6.07	75.98	70.00	250	1.50	1.500	69.91	92.01%
Codd's Road		*MH231A*	*BULK176AN*							*0.0*	*500.4*	*3.38*	*5.48*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*	*0.00*	*0.00*	*1.78*	*0.59*	*0.00*	*0.00*	*6.07*	*83.92*	*50.22*	*250*	*1.83*	*1.656*	*77.86*	*92.77%*

Design Parameters:

Residential			ICI Areas			
SF	3.4	p/p/u				
TH/F/SD	2.7	p/p/u	INST	28,000	L/Ha/day	
TH/S	2.3	p/p/u	COM	28,000	L/Ha/day	
APT	1.8	p/p/u	IND	35,000	L/Ha/day	MOE Chart
Other	60	p/p/Ha		17000	L/Ha/day	

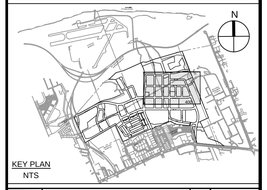
Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 280 L/day 200 L/day
3. Infiltration allowance: 0.33 L/s/Ha
4. Residential Peaking Factor:
Harmon Formula = 1+(14/(4+(P/1000)^0.5))0.8
where K = 0.8 Correction Factor
5. Commercial and Institutional Peak Factors based on total area,
1.5 if greater than 20%, otherwise 1.0

Designed: KH
Checked: JIM
Dwg. Reference: 118863-400

No.	Revision	Date
1	Submission No. 1 for City Review	2018-12-20
2	Submission No. 2 for City Review	2019-03-15
3	MECP Submission	2019-04-17

File Reference: 118863.5.7.1 **Date:** 2019-04-17 **Sheet No:** 1 of 1

SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS



KEY PLAN
NTS

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4			
3	MECP SUBMISSION	J.I.M.	2019/04/17
2	SUBMISSION NO. 2 FOR CITY REVIEW	J.I.M.	2019/03/15
1	SUBMISSION NO. 1 FOR CITY REVIEW	J.I.M.	2018/12/20

CANADA LANDS COMPANY
SOCIÉTÉ IMMOBILIÈRE DU CANADA

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tel 613 225 1311 fax 613 225 9868
ibigroup.com

Project Title

WATERIDGE VILLAGE AT ROCKCLIFFE

PHASE 2B

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
2019/04/17
PROVINCE OF ONTARIO

N

Drawing Title

SANITARY DRAINAGE AREA PLAN

Scale: 1:1500

Design	Date
K.H./S.T.	DECEMBER 2018
Drawn	Checked
M.M.	J.I.M.
Project No.	Drawing No.
118863	400

D07-16-15-0003

#17063

IBI GROUP
400-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
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ibigroup.com

LEGEND

Black text	5 year event curve design
Blue text	100 year event curve design
MH206	Existing infrastructure (shown for information only)

STORM SEWER DESIGN SHEET

Wateridge at Rockcliffe - Phase 2B
City of Ottawa
Canada Lands Company

LOCATION				AREA (Ha)										RATIONAL DESIGN FLOW													SEWER DATA									
STREET	AREA ID	FROM	TO	C= 0.20	C= 0.30	C= 0.40	C= 0.49	C= 0.57	C= 0.65	C= 0.66	C= 0.70	C= 0.73	C= 0.80	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (2) (mm/hr)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	2yr PEAK FLOW (L/s)	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 (2yr) (L/s)	(%)
Pimiwidon Street	S317A, B317	MH317	MH316							0.09			1.05	2.50	2.50	10.00	0.85	10.85	76.81	104.19	122.14	178.56		260.52				260.52	452.94	78.86	600			0.50	1.552	192.43	42.48%
Pimiwidon Street	S316A-B	MH316	BLK202N							0.33				0.61	3.11	10.85	0.74	11.59	73.70	99.92	117.11	171.17		310.34				310.34	320.28	49.00	600			0.25	1.097	9.94	3.10%
Pimiwidon Street		*BULK202N*	*MH202*											0.00	3.11	11.59	0.24	11.83	71.19	96.48	113.06	165.21		299.64				299.64	320.28	*16.00*	*600*			*0.25*	1.097	20.64	6.44%
Wigwas Street	S315, S315A-B, R315	MH315	MH314				0.41			0.31				1.13	1.13	10.00	0.99	10.99	76.81	104.19	122.14	178.56		117.46				117.46	141.68	73.88	375			0.60	1.243	24.23	17.10%
Wigwas Street	S314A-B	MH314	BULK203N							0.44				0.81	1.93	10.99	0.48	11.47	73.20	99.24	116.30	169.98		191.98				191.98	310.53	54.00	450			1.09	1.891	118.55	38.18%
Wigwas Street		*BULK203N*	*MH203*											0.00	1.93	11.47	0.18	11.64	71.60	97.04	113.71	166.18		187.73				187.73	247.07	*16.00*	*450*			*0.69*	1.505	59.34	24.02%
Moses Tennisco St	S313, R313	MH313	MH312				0.31			0.11				0.62	0.62	10.00	0.80	10.80	76.81	104.19	122.14	178.56		65.03				65.03	112.79	73.88	300			1.25	1.546	47.76	42.35%
Moses Tennisco St	S312A-C	MH312	BULK204N							0.45				0.83	1.45	10.80	0.37	11.17	73.88	100.17	117.40	171.59		145.22				145.22	400.16	54.00	450			1.81	2.437	254.94	63.71%
Park Block 7	P312	CBMH350	pipe	0.42										0.23	0.23	10.00	0.13	10.13	76.81	104.19	122.14	178.56		24.33				24.33	87.74	13.50	250			2.00	1.731	63.40	72.27%
Moses Tennisco St		*BULK204N*	*MH204*											0.00	1.68	11.17	0.11	11.28	72.60	98.41	115.33	168.56		165.66				165.66	400.16	*16.00*	*450*			*1.81*	2.437	234.50	58.60%
Michael Stoqua St	S311, S311A, R311	MH311	MH310				0.45			0.22				1.02	1.02	10.00	0.81	10.81	76.81	104.19	122.14	178.56		105.93				105.93	173.52	73.88	375			0.90	1.522	67.60	38.96%
Michael Stoqua St	S310A-B	MH310	BLK205N							0.37				0.68	1.70	10.81	0.53	11.34	73.83	100.11	117.33	171.49		169.73				169.73	279.02	53.99	450			0.88	1.700	109.29	39.17%
Michael Stoqua St		*BLK205N*	*MH205*											0.00	1.70	11.34	0.16	11.50	72.02	97.62	114.40	167.18		165.51				165.51	279.02	*16.00*	*450*			*0.88*	*1.700*	*113.50*	*40.68%*
Bareille-Snow St	S309, B309	MH309	MH308								0.10		1.24	2.95	2.95	10.00	0.74	10.74	76.81	104.19	122.14	178.56		307.62				307.62	375.37	74.73	525			0.70	1.680	67.76	18.05%
Bareille-Snow St	S308, S308A	MH308	BULK206N								0.25			0.49	3.44	10.74	0.32	11.06	74.07	100.43	117.71	172.05		345.38				345.38	536.52	46.47	525			1.43	2.401	191.14	35.63%
Bareille-Snow St		*BULK206N*	*MH206*											0.00	3.44	11.06	0.12	11.19	72.95	98.89	115.90	169.38		340.07				340.07	536.52	*17.50*	*525*			*1.43*	2.401	196.45	36.62%
Wanaki Road	B200, S200A	MH326	MH318								0.15		1.57	3.78	3.78	10.00	0.71	10.71	76.81	104.19	122.14	178.56		394.22				394.22	452.94	65.85	600			0.50	1.552	58.72	12.96%
Wanaki Road	S318	MH318	MH300								0.13			0.25	4.04	10.71	0.82	11.53	74.19	100.60	117.91	172.34		406.08				406.08	452.94	76.32	600			0.50	1.552	46.87	10.35%
Tawadina Road	S300, S300A	MH300	MH301								0.19			0.37	4.41	11.53	1.59	13.11	71.40	96.77	113.39	165.71		426.38				426.38	438.47	113.03	675			0.25	1.187	12.09	2.76%
Tawadina Road	S301, S301A	MH301	MH302								0.17			0.33	4.74	13.11	0.86	13.97	66.61	90.19	105.66	154.35		427.25				427.25	788.75	110.00	675			0.81	2.135	361.51	45.83%
Tawadina Road	S302, S302A	MH302	MH303								0.28			0.54	5.28	13.97	0.69	14.66	64.30	87.03	101.94	148.89		459.70				459.70	1,004.08	111.92	675			1.31	2.718	544.38	54.22%
Tawadina Road	S303	MH303	MH304								0.18			0.35	5.63	14.66	1.55	16.21	62.58	84.68	99.17	144.83		476.92				476.92	580.71	118.37	750			0.25	1.273	103.79	17.87%
Tawadina Road	S304, S304A	MH304	MH305								0.23			0.45	6.08	16.21	1.57	17.78	59.06	79.85	93.49	136.49		485.46				485.46	580.71	120.00	750			0.25	1.273	95.25	16.40%
Codd's Road	S340, B340, B340A	MH305	MH231								0.17		2.02	4.82	10.90	17.78	0.49	18.27	55.90	75.54	88.42	129.06		823.59				823.59	1,324.21	85.55	750			1.30	2.904	500.62	37.81%
Codd's Road	S231	MH231	*MH176*								0.12			0.23	11.14	18.27	0.45	18.72	54.99	74.29	86.96	126.92		827.38				827.38	1,218.10	71.97	750			1.10	2.671	390.72	32.08%
Block 1	-	DICB1	Pipe	1.05										0.58	0.58	61.68	0.20	61.88	24.06	32.28	37.67	54.75				31.97		31.97	62.04	14.59	250			1.00	1.224	30.07	48.47%
Block 11	-	DICB3	Pipe	1.24										0.69	0.69	81.62	0.19	81.81	19.53	26.16	30.52	44.31				30.55		30.55	62.04	13.63	250			1.00	1.224	31.49	50.76%
Block 12	-	DICB4	Pipe	1.24										0.69	0.69	80.96	0.23	81.19	19.65	26.32	30.70	44.58				30.74		30.74	60.47	16.78	250			0.95	1.193	29.73	49.17%
Block 8	-	DICB5	Pipe	0.66										0.37	0.37	28.47	0.15	28.62	41.47	55.87	65.32	95.20				34.93		34.93	62.04	11.20	250			1.00	1.224	27.11	43.69%

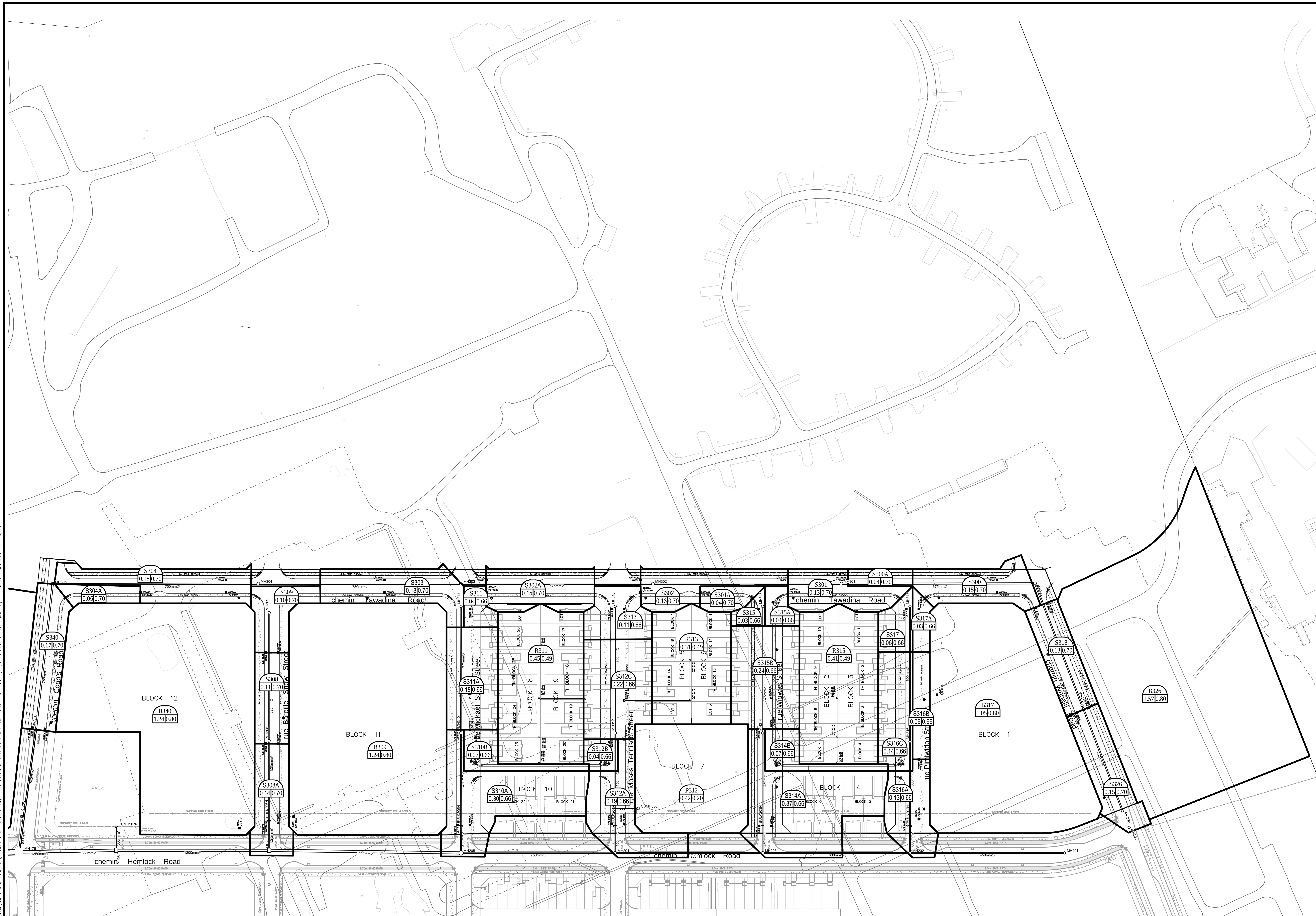
Definitions:
Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (Ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 732.951 / (TC+6.199)^0.810] 2 YEAR
[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR
[i = 1735.688 / (TC+6.014)^0.820] 100 YEAR

Notes:
1. Mannings coefficient (n) = 0.013

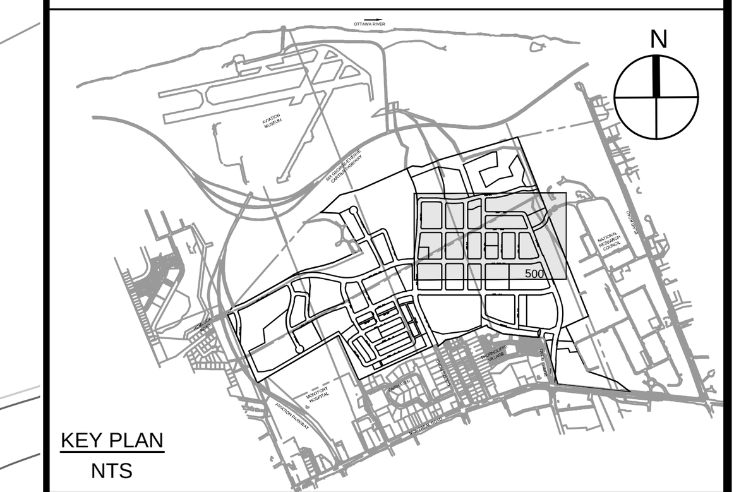
Designed: KH
Checked: JIM
Dwg. Reference: 118863-500

No.	Revision	Date
1	Submission No. 1 for City Review	2018-12-20
2	Submission No. 2 for City Review	2019-03-15
3	MECP Submission	2019-04-17

File Reference: 118863.5.7.1
Date: 2019-04-17
Sheet No: 1 of 1



SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS



KEY PLAN
NTS

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4			
3	MECP SUBMISSION	J.I.M.	2019:04:17
2	SUBMISSION NO. 2 FOR CITY REVIEW	J.I.M.	2019:03:15
1	SUBMISSION NO. 1 FOR CITY REVIEW	J.I.M.	2018:12:20

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SOCIÉTÉ IMMOBILIÈRE DU CANADA
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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 2B

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
2019/04/17
PROVINCE OF ONTARIO

N

Drawing Title

STORM DRAINAGE AREA PLAN

Scale
1:1000

Design	Date
K.H./S.T.	DECEMBER 2018
Drawn	Checked
M.M.	J.I.M.
Project No.	Drawing No.
118863	500

D07-16-15-0003

#17063

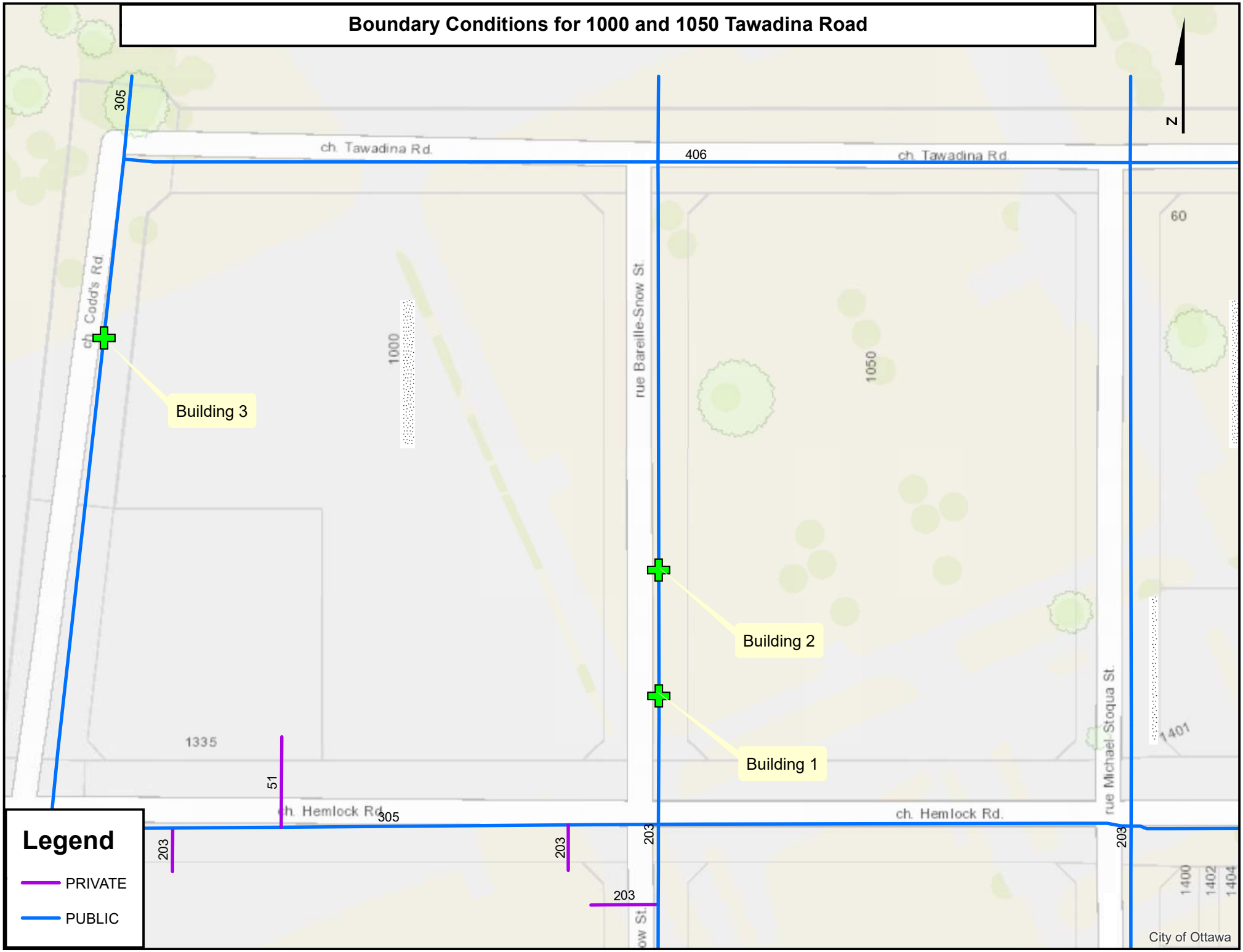
APPENDIX

APPENDIX

B

- WATERMAIN BOUNDARY CONDITIONS FROM CITY OF OTTAWA
- EMAILS FROM CITY OF OTTAWA
- FIRE UNDERWRITERS SURVEY – FIRE FLOW CALCULATION
- WATER DEMAND CALCULATION

Boundary Conditions for 1000 and 1050 Tawadina Road



Yang, Winston

From: Wessel, Shawn <shawn.wessel@ottawa.ca>
Sent: June 28, 2022 10:54 AM
To: Yang, Winston
Subject: RE: 1000 and 1050 Tawadina Road - Boundary Condition requests
Attachments: 1000 and 1050 Tawadina Road June 2022.pdf

Good morning, Winston.

Please find requested information attached and below:

The following are boundary conditions, HGL, for hydraulic analysis for three buildings at 1000 – 1050 Tawadina Road (zone MONT), assumed to be connected to the 406 mm watermain on Codd's Road, and the 203 mm on Bareille-Snow Street (see attached PDF for location).

	Building 1 Bareille-Snow	Building 2 Bareille Snow	Building 3 Codd's
Min HGL (m)	143.0	143.0	143.0
Max HGL (m)	143.0	143.0	143.0
Max Day + FF (117 L/s)	141.1	N/A	N/A
Max Day + FF (67 L/s)	N/A	142.1	142.8

These are for current conditions and 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.

If you require additional information or clarification, please do not hesitate to contact me anytime.

Thank you

Regards,

Shawn Wessel, A.Sc.T.,rcji
Project Manager - Infrastructure Approvals
Gestionnaire de projet – Approbation des demandes d'infrastructures

Development Review Central Branch | Direction de l'examen des projets d'aménagement, Centrale
Planning, Real Estate and Economic Development Department | Direction générale de la planification des biens immobiliers et du développement économique
City of Ottawa | Ville d'Ottawa
110 Laurier Ave. W. | 110, avenue Laurier Ouest, Ottawa ON K1P 1J1
(613) 580 2424 Ext. | Poste 33017
Int. Mail Code | Code de Courrier Interne 01-14
shawn.wessel@ottawa.ca

*****Please also note that, while my work hours may be affected by the current situation and am working from home, I still have access to email, video conferencing and telephone. Feel free to schedule video conferences and/or telephone calls, as necessary.*****

From: Yang, Winston <Winston.Yang@wsp.com>
Sent: June 23, 2022 1:22 PM
To: Wessel, Shawn <shawn.wessel@ottawa.ca>; Hamlin, Allison <Allison.Hamlin@ottawa.ca>
Subject: RE: 1000 and 1050 Tawadina Road - Boundary Condition requests

Hi Shawn,

The required RFF have been revised as per the FUS 2020 method.

Bldg 1 – 117 L/s
Bldg 2 – 67 L/s
Bldg 3 – 67 L/s

See attached pdfs for detail calculations.

Yours truly,

Ding Bang (Winston) Yang, P.Eng.
Project Engineer
Municipal Engineering - Ottawa

T+ 1 613-690-0538
M+ 1 647-628-8108

WSP Canada Inc.
2611 Queensview Drive, Suite 300
Ottawa, Ontario,
K2B 8K2 Canada

wsp.com

From: Wessel, Shawn <shawn.wessel@ottawa.ca>
Sent: June 22, 2022 8:08 PM
To: Yang, Winston <Winston.Yang@wsp.com>; Hamlin, Allison <Allison.Hamlin@ottawa.ca>
Subject: RE: 1000 and 1050 Tawadina Road - Boundary Condition requests

Good evening, Winston

Upon further review, we have noted that you are not using the 2020 FUS method.

Please revise and send to me asap.

If you require additional information or clarification, please do not hesitate to contact me anytime.

Thank you

Regards,

Shawn Wessel, A.Sc.T.,rcji
Project Manager - Infrastructure Approvals
Gestionnaire de projet – Approbation des demandes d'infrastructures

Development Review Central Branch | Direction de l'examen des projets d'aménagement, Centrale
Planning, Real Estate and Economic Development Department | Direction générale de la planification des biens immobiliers et du développement économique
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Int. Mail Code | Code de Courrier Interne 01-14
shawn.wessel@ottawa.ca

Please consider the environment before printing this email

*****Please also note that, while my work hours may be affected by the current situation and am working from home, I still have access to email, video conferencing and telephone. Feel free to schedule video conferences and/or telephone calls, as necessary.*****

From: Yang, Winston <Winston.Yang@wsp.com>
Sent: June 13, 2022 1:47 PM
To: Wessel, Shawn <shawn.wessel@ottawa.ca>; Hamlin, Allison <Allison.Hamlin@ottawa.ca>
Subject: 1000 and 1050 Tawadina Road - Boundary Condition requests

Hi Shawn,

We are working on the SPA for the 1000 – 1050 Tawadina Road. The proposed development consists three sites, each site will have a 9 storey apartment building.
Building 1 is bounded by Barielle Snow St to the west, Michael/Stoqua Street to the east, Hemlock Road to the south and future residential development to the north.
Building 2 is bounded by Barielle Snow St to the east, Hemlock Road to the south, future residential development to the north and future park land to the west.
Building 3 is bounded by Codd's Road to the west, Tawadina Road to the north, future residential development to the east and future parking land to the south.

Building 1 and 2, each building will be serviced by a dual 200mm dia. water services from the existing 200mm W/M along Barielle Snow Street. Building 3 will be serviced by a dual 200mm dia. water servides from the existing 400mm dia. W/M along Codd's Road.
Please see attached servicing plan for services location to all 3 buildings for your reference.

The domestic water demands were calculated using the City of Ottawa's Water Design Guidelines and fire demands were calculated using FUS 1999.

The results are summarized as follow.

Proposed Buildings	Average Daily Demand (L/s)	Maximum Daily Demand (L/s)	Maximum Hourly Demand (L/s)	Fire Demand (L/s)
Building 1				
Apartment Units	1.26	3.15	6.93	250
Commercial	0.01	0.02	0.04	
Total	1.27	3.17	6.94	250
Building 2				
Apartment Units	0.76	1.91	4.20	150
Commercial	0.01	0.01	0.02	
Total	0.77	1.92	4.22	150
Building 3				
Apartment Units	0.79	1.97	4.33	150
Commercial	0	0	0	
Total	0.79	1.97	4.33	150

Please also see attached pdfs for the detail calculation for FUS and water demands for your reference.

Please provide boundary condition at the connection points of Barielle Snow Street and Codd's Road in the vicinity of the property.

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

Yours truly,

Ding Bang (Winston) Yang, P.Eng.
Project Engineer
Municipal Engineering - Ottawa

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M+ 1 647-628-8108

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Ottawa, Ontario,
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Fire Flow Design Sheet (FUS)
1000 - 1500 Tawadina Street
City of Ottawa
WSP Project No. 221-04473-00
Date: 23-Jun-22

Proposed 9-Storey Building 1
Fire Flow Requirements Based on Fire Underwriters Survey (FUS) 2020

1. An estimate of the Fire Flow required for a given fire area may be estimated by: $F = 220\ C\ \sqrt{A}$

F = required fire flow in litres per minute
C = coefficient related to the type of construction
- 1.5 for **Type V** Wood Frame Construction
- 0.8 for **Type IV-A** Mass Timber Construction
- 0.9 for **Type IV-B** Mass Timber Construction
- 1.0 for **Type IV-C** Mass Timber Construction
- 1.5 for **Type IV-D** Mass Timber Construction
- 1.0 for **Type III** Ordinary Construction
- 0.8 for **Type II** Noncombustible Construction
- 0.6 for **Type I** Fire resistive Construction

A =2-b) The single largest Floor Area plus 25% of each of the two immediately adjoining floors

A = 3338 m^2
C = 0.8
F = 10167.7 L/min

rounded off to 10,000 L/min (min value of 2000 L/min)

2. The value obtained in 1. may be reduced by as much as 25% for occupancies having a low contents fire hazard.

Non-combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

Reduction due to low occupancy hazard -15% x 10,000 = 8,500 L/min

3. The value obtained in 2. may be reduced by as much as 50% for buildings equipped with automatic sprinkler protection.

Adequate Sprinkler confirms to NFPA13	-30%
Water supply common for sprinklers & fire hoses	-10%
Fully supervised system	-10%
No Automatic Sprinkler System	0%

Reduction due to Sprinkler System -40% x 8,500 = -3,400 L/min

4. The value obtained in 2. is increased for structures exposed within 45 metres by the fire area under consideration.

Separation	Charge
0 to 3 m	25%
3.1 to 10 m	20%
10.1 to 20 m	15%
20.1 to 30 m	10%
30.1 to 45 m	0%

Side 1	45	0%	north side
Side 2	30	10%	east side
Side 3	35	5%	south side
Side 4	31	5%	west side
		20%	(Total shall not exceed 75%)

Increase due to separation 20% x 8,500 = 1,700 L/min

5. The flow requirement is the value obtained in 2., minus the reduction in 3., plus the addition in 4.

The fire flow requirement is 7,000 L/min (Rounded to nearest 1000 L/min)
or **117 L/sec**
or 1,849 gpm (us)
or 1,540 gpm (uk)

Based on method described in:
"Water Supply for Public Fire Protection - A Guide to Recommended Practice", 2020
by Fire Underwriters Survey

Fire Flow Design Sheet (FUS)
1000 - 1500 Tawadina Street
City of Ottawa
WSP Project No. 221-04473-00
Date: 23-Jun-22

Proposed 9-Storey Building 2
Fire Flow Requirements Based on Fire Underwriters Survey (FUS) 2020

1. An estimate of the Fire Flow required for a given fire area may be estimated by: $F = 220\ C\ \sqrt{A}$

F = required fire flow in litres per minute
C = coefficient related to the type of construction
- 1.5 for **Type V** Wood Frame Construction
- 0.8 for **Type IV-A** Mass Timber Construction
- 0.9 for **Type IV-B** Mass Timber Construction
- 1.0 for **Type IV-C** Mass Timber Construction
- 1.5 for **Type IV-D** Mass Timber Construction
- 1.0 for **Type III** Ordinary Construction
- 0.8 for **Type II** Noncombustible Construction
- 0.6 for **Type I** Fire resistive Construction

A =2-b) The single largest Floor Area plus 25% of each of the two immediately adjoining floors

A = 2150 m^2
C = 0.8
F = 8159.8 L/min

rounded off to 8,000 L/min (min value of 2000 L/min)

2. The value obtained in 1. may be reduced by as much as 25% for occupancies having a low contents fire hazard.

Non-combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

Reduction due to low occupancy hazard -15% x 8,000 = 6,800 L/min

3. The value obtained in 2. may be reduced by as much as 50% for buildings equipped with automatic sprinkler protection.

Adequate Sprinkler confirms to NFPA13	-30%
Water supply common for sprinklers & fire hoses	-10%
Fully supervised system	-10%
No Automatic Sprinkler System	0%

Reduction due to Sprinkler System -40% x 6,800 = -2,720 L/min

4. The value obtained in 2. is increased for structures exposed within 45 metres by the fire area under consideration.

Separation	Charge
0 to 3 m	25%
3.1 to 10 m	20%
10.1 to 20 m	15%
20.1 to 30 m	10%
30.1 to 45 m	0%

Side 1	125	0%	north side
Side 2	31	0%	east side
Side 3	35	0%	south side
Side 4	90	0%	west side
		0%	(Total shall not exceed 75%)

Increase due to separation 0% x 6,800 = 0 L/min

5. The flow requirement is the value obtained in 2., minus the reduction in 3., plus the addition in 4.

The fire flow requirement is 4,000 L/min (Rounded to nearest 1000 L/min)
or **67 L/sec**
or 1,057 gpm (us)
or 880 gpm (uk)

Based on method described in:
"Water Supply for Public Fire Protection - A Guide to Recommended Practice", 2020
by Fire Underwriters Survey

Fire Flow Design Sheet (FUS)
1000 - 1500 Tawadina Street
City of Ottawa
WSP Project No. 221-04473-00
Date: 23-Jun-22

Proposed 9-Storey Building 3
Fire Flow Requirements Based on Fire Underwriters Survey (FUS) 2020

1. An estimate of the Fire Flow required for a given fire area may be estimated by: $F = 220\ C\ \sqrt{A}$

F = required fire flow in litres per minute
C = coefficient related to the type of construction
- 1.5 for **Type V** Wood Frame Construction
- 0.8 for **Type IV-A** Mass Timber Construction
- 0.9 for **Type IV-B** Mass Timber Construction
- 1.0 for **Type IV-C** Mass Timber Construction
- 1.5 for **Type IV-D** Mass Timber Construction
- 1.0 for **Type III** Ordinary Construction
- 0.8 for **Type II** Noncombustible Construction
- 0.6 for **Type I** Fire resistive Construction

A =2-b) The single largest Floor Area plus 25% of each of the two immediately adjoining floors

A = 2112 m^2
C = 0.8
F = 8088.3 L/min

rounded off to 8,000 L/min (min value of 2000 L/min)

2. The value obtained in 1. may be reduced by as much as 25% for occupancies having a low contents fire hazard.

Non-combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

Reduction due to low occupancy hazard -15% x 8,000 = 6,800 L/min

3. The value obtained in 2. may be reduced by as much as 50% for buildings equipped with automatic sprinkler protection.

Adequate Sprinkler confirms to NFPA13	-30%
Water supply common for sprinklers & fire hoses	-10%
Fully supervised system	-10%
No Automatic Sprinkler System	0%

Reduction due to Sprinkler System -40% x 6,800 = -2,720 L/min

4. The value obtained in 2. is increased for structures exposed within 45 metres by the fire area under consideration.

Separation	Charge
0 to 3 m	25%
3.1 to 10 m	20%
10.1 to 20 m	15%
20.1 to 30 m	10%
30.1 to 45 m	0%

Side 1	45	0%	north side
Side 2	100	0%	east side
Side 3	95	0%	south side
Side 4	40	0%	west side
		0%	(Total shall not exceed 75%)

Increase due to separation 0% x 6,800 = 0 L/min

5. The flow requirement is the value obtained in 2., minus the reduction in 3., plus the addition in 4.

The fire flow requirement is	4,000	L/min (Rounded to nearest 1000 L/min)
or	**67**	**L/sec**
or	1,057	gpm (us)
or	880	gpm (uk)

Based on method described in:
"Water Supply for Public Fire Protection - A Guide to Recommended Practice", 2020
by Fire Underwriters Survey

Water Demand Calculation Sheet

Project:	**1000 - 1050 Tawadina Street**	**Date:**	**2022-06-13**
Location:	**City of Ottawa**	**Design:**	**WY**
WSP Project No.	**221-04473-00**	**Page:**	**1 of 1**

Proposed Buildings	Residential				Non-Residentail			Average Daily			Maximum Daily			Maximum Hourly			Fire
	Units			Pop.	Industrial	Institutional	Commercial	Demand (l/s)			Demand (l/s)			Demand (l/s)			Demand
	SF	APT	ST		(ha)	(ha)	(ha)	Res.	Non-Res.	Total	Res.	Non-Res.	Total	Res.	Non-Res.	Total	(l/s)
Proposed 9-Storey Building 1																	
Units		216		389				1.26		1.26	3.15		3.15	6.93		6.93	117
Commercial							0.05		0.01	0.01		0.02	0.02		0.04	0.04	117
Total				389			0.05			1.27			3.17			6.97	117
Proposed 9-Storey Building 2																	
Units		131		236				0.76		0.76	1.91		1.91	4.20		4.20	67
Commercial							0.02		0.01	0.01		0.01	0.01		0.02	0.02	67
Total				236			0.02			0.77			1.92			4.22	67
Proposed 9-Storey Building 3																	
Units		135		243				0.79		0.79	1.97		1.97	4.33		4.33	67
Commercial							0.00		0.00	0.00		0.00	0.00		0.00	0.00	67
Total				243			0.00			0.79			1.97			4.33	67

Population Densities

Single Family	3.4	person/unit
Semi-Detached	2.7	person/unit
Duplex	2.3	person/unit
Townhome (Row)	2.7	person/unit
Bachelor Apartment	1.4	person/unit
1 Bedroom Apartment	1.4	person/unit
2 Bedroom Apartment	2.1	person/unit
3 Bedroom Apartment	3.1	person/unit
4 Bedroom Apartment	4.1	person/unit
Avg. Apartment	1.8	person/unit

Average Daily Demand

Residentail	280	l/cap/day
Industrial	35000	l/ha/day
Institutional	28000	l/ha/day
Commercial	28000	l/ha/day

Maximum Daily Demand

Residential	2.5	x avg. day
Industrial	1.5	x avg. day
Institutional	1.5	x avg. day
Commercial	1.5	x avg. day

Maximum Hourly Demand

Residential	2.2	x max. day
Industrial	1.8	x max. day
Institutional	1.8	x max. day
Commercial	1.8	x max. day

APPENDIX

APPENDIX

C

- SANITARY SEWER DESIGN SHEET

SANITARY SEWER DESIGN SHEET

1000 - 1050 Tawadina Street
Residential Development
Project: 221-04473-00
Date: August, 2022

LOCATION				RESIDENTIAL AREA AND POPULATION												INDUSTRIAL				COMMERCIAL		INSTITUTIONAL		I+C+I	INFILTRATION			TOTAL	PIPE					
LOCATION	FROM M.H.	TO M.H.	SANITARY DRAINAGE AREA ID	INDV AREA (ha)	ACCU AREA (ha)	NUMBER OF UNITS						POPULATION		PEAK FACT.	PEAK FLOW (l/s)	GROSS AREA (ha)	DEVEL. AREA (ha)	ACCU. AREA (ha)	PEAK FACTOR	INDIV AREA (ha)	ACCU. AREA (ha)	INDIV AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	INDIV AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	LENGTH (m)	DIA. (mm)	SLOPE (%)	CAP. (FULL) (l/s)	VEL. (FULL) (m/s)	AVAIL. CAP. (%)
						SINGLES	SEMIS	TOWNS	1-BED APT.	2-BED APT.	3-BED APT.	INDIV POP.	ACCU POP.																					
BUILDING 1 - BAREILLE-SNOW STREET																																	
	BLDG 1	SAMH101		0.469	0.469				216.00			389	389	3.42	4.31					0.05	0.05			0.02	0.519	0.52	0.17	**4.50**	1.70	200	1.00	32.80	1.04	**86.28%**
Bareille-Snow Street	SAMH101	*Ex. SANMH308A*			0.469								389	3.42	4.31						0.05			0.02	0.000	0.52	0.17	**4.50**	10.85	200	1.00	32.80	1.04	**86.28%**
BUILDING 2 - BAREILLE-SNOW STREET																																	
	BLDG 2	SAMH201		0.354	0.354				131.00			236	236	3.50	2.67					0.02	0.02			0.01	0.374	0.37	0.12	**2.80**	3.95	200	1.00	32.80	1.04	**91.46%**
Bareille-Snow Street	SAMH201	*EXISTING SEWER*			0.354								236	3.50	2.67						0.02			0.01	0.000	0.37	0.12	**2.80**	10.92	200	1.00	32.80	1.04	**91.46%**
IBI DESIGN BRIEF PHASE 2B																																	
EXT-1	*BULK304AN*	*Ex. SANMH304A*		7.350	7.350				905.00			1629	1629	3.12	16.49										7.350	7.35	2.43	**18.91**	*20.00*	*250*	*0.25*	29.73	0.61	**36.40%**
Future Development	*Ex. SANMH304A*	*Ex. SANMH308A*		1.475	8.825							344	1973	3.07	19.64										1.475	8.83	2.91	**22.56**	*119.13*	*250*	*0.25*	29.73	0.61	**24.14%**
	Ex. SANMH308A	*BULK206AN*		0.070	9.718							0	2598	3.00	25.22						0.07				0.070	9.79	3.23	**28.45**	*17.00*	*250*	*2.05*	85.14	1.73	**66.59%**
BUILDING 3 - CODD'S ROAD																																	
	BLDG 3	SAMH301		0.375	0.375				135.00			243	243	3.49	2.75										0.375	0.38	0.12	**2.87**	6.10	200	1.00	32.80	1.04	**91.24%**
Codd's Road	SAMH301	*EXISTING SEWER*			0.375								243	3.49	2.75										0.000	0.38	0.12	**2.87**	12.75	200	1.00	32.80	1.04	**91.24%**
IBI DESIGN BRIEF PHASE 2B																																	
EXT-1	*Ex. SANMH340A*	*Ex. SANMH231A*		0.599	0.599							119	119	3.58	1.38										0.599	0.60	0.20	**1.58**	*70.00*	*250*	*1.50*	72.83	1.48	**97.83%**
	Ex. SANMH231A	*BULK176AN*			0.974							0	362	3.43	4.03										0.000	0.97	0.32	**4.35**	*50.22*	*250*	*1.83*	80.45	1.64	**94.59%**

DESIGN PARAMETERS

RESIDENTIAL AVG. DAILY FLOW =	280	l/cap/day	COMMERCIAL PEAK FACTOR =	1.5	(WHEN AREA > 20%)	PEAK POPULATION FLOW, (l/s) =	P*q*M/86400	UNIT TYPE	PERSONS/UNIT	**DESIGNED:**	**NO.**	**REVISION**	**DATE**
COMMERCIAL AVG. DAILY FLOW =	28,000	l/ha/day		1.0	(WHEN AREA < 20%)	PEAK EXTRANEOUS FLOW, (l/s) =	I*Ac	SINGLES	3.4	Ding Bang Yang, P.Eng.	1.	City Submission No.1	2022-08-15
	0.324	l/ha/s				RESIDENTIAL PEAKING FACTOR, M =	1+(14/(4+P^0.5))*K	SEMI-DETACHED	2.7	**CHECKED:**			
INSTITUTIONAL AVG. DAILY FLOW =	28,000	l/ha/day	INSTITUTIONAL PEAK FACTOR =	1.5	(WHEN AREA > 20%)	Ac = CUMULATIVE AREA (ha)		TOWNHOMES	2.7	Ding Bang Yang, P.Eng.			
	0.324	l/ha/s		1.0	(WHEN AREA < 20%)	P = POPULATION (THOUSANDS)		SINGLE APT. UNIT	1.8	**PROJECT:**			
LIGHT INDUSTRIAL FLOW =	35,000	l/ha/day						2-BED APT. UNIT	2.1	1000 - 1050 Tawadina Street			
	0.405	l/ha/s	RESIDENTIAL CORRECTION FACTOR, K =	0.80		SEWER CAPACITY, Qcap (l/s) =	1/N S^(1/2) R^(2/3) Ac	3-BED APT. UNIT	3.1	Residential Development			
HEAVY INDUSTRIAL FLOW =	55,000	l/ha/day	MANNING N =	0.013		(MANNING'S EQUATION)				**LOCATION:**			
	0.637	l/ha/s	PEAK EXTRANEOUS FLOW, I (l/s/ha) =	0.33						Ottawa, Ontario			
										PAGE NO:	**FILE & DWG. REFERENCE:**		
										1 of 1	C06, C07, C08		

APPENDIX

APPENDIX

D

- STORM SEWER DESIGN SHEET
- POST-DEVELOPMENT STORM DRAINAGE AREA PLAN SK1
- SWM FOR BUILDING 1, 2 AND 3
- GRADING PLAN C03, C04 AND C05
- SERVICING PLAN C06, C07 AND C08

STORM SEWER DESIGN SHEET

1000 - 1050 Tawadina Road
Residential Development
Project: 211-04473-00
Date: August, 2022

LOCATION				AREA (Ha)						RATIONAL DESIGN FLOW													PROPSOED SEWER DATA								
STREET	AREA ID	FROM	TO	C= 0.25	C= 0.35	C= 0.50	C= 0.70	C= 0.80	C= 0.90	IND 2.78AC	CUM 2.78 AC	INLET (min)	TOTAL (min)	i (2) (mm/hr)	i (5) (mm/hr)	i (100) (mm/hr)	BLDG FLOW (L/s)	2yr PEAK FLOW (L/s)	5yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	ICD FIXED FLOW (L/s)	DESIGN FLOW (L/s)	MODIFIED DESIGN FLOW (L/s)	MATERIAL PIPE	SIZE (mm)	SLOPE (%)	LENGTH (m)	CAPACITY (l/s)	VELOCITY (m/s)	TIME IN PIPE	AVAIL CAP (2yr) (L/s)	AVAIL CAP (2yr) (%)
To Bareille-Snow Street from Building 1																														
Bareille-Snow Street	S101A	CB101	STMH106	0.005					0.033	0.086	0.086	10.00	10.44	76.81	104.19	178.56		6.61				6.61		PVC DR-35	200.0	1.00	27.70	32.83	1.04	0.44	26.22	79.87%
		STMH106	CBMH105							0.000	0.086	10.44	10.65	75.15	101.91	174.61		6.47				6.47		PVC DR-35	250.0	0.50	10.90	42.09	0.86	0.21	35.63	84.64%
	S101B	CBMH105	CBMH104	0.009					0.041	0.109	0.195	10.65	11.15	74.38	100.86	172.79		14.50				14.50		PVC DR-35	250.0	0.50	25.70	42.09	0.86	0.50	27.60	65.56%
	S101C	CBMH104	STMH103	0.090					0.061	0.215	0.410	11.15	11.42	72.64	98.47	168.65		29.79				29.79		PVC DR-35	300.0	0.50	15.20	68.45	0.97	0.26	38.66	56.48%
		STMH103	STMH101							0.000	0.410	11.42	11.72	71.76	97.26	166.57		29.43				29.43		PVC DR-35	300.0	0.50	17.40	68.45	0.97	0.30	39.02	57.01%
	S-BLDG1, S102	BLDG	STMH101	0.028					0.253	0.652	0.652	10.00	10.02	76.81	104.19	178.56		50.11				50.11		PVC DR-35	300.0	1.00	1.70	96.80	1.37	0.02	46.69	48.23%
		STMH101	STMH107							0.000	1.063	11.72	11.87	70.79	95.93	164.26		75.22				75.22		PVC DR-35	300.0	1.00	12.30	96.80	1.37	0.15	21.58	22.30%
To Bareille-Snow Street from Building 2																														
Bareille-Snow Street	S201A	CB201	STMH204	0.013					0.003	0.017	0.017	10.00	10.28	76.81	104.19	178.56		1.27				1.27		PVC DR-35	200.0	1.00	17.70	32.83	1.04	0.28	31.56	96.13%
		STMH204	CBMH203							0.000	0.017	10.28	10.50	75.74	102.72	176.02		1.25				1.25		PVC DR-35	250.0	0.50	11.05	42.09	0.86	0.21	40.84	97.02%
	S201B	CBMH203	STMH202	0.011					0.071	0.185	0.202	10.50	10.82	74.95	101.64	174.13		15.13				15.13		PVC DR-35	250.0	0.50	16.45	42.09	0.86	0.32	26.97	64.06%
		STMH202	STMH201							0.000	0.202	10.82	10.94	73.80	100.06	171.41		14.90				14.90		PVC DR-35	250.0	0.50	6.25	42.09	0.86	0.12	27.20	64.61%
	S-BLDG2, S202	BLDG	STMH201	0.050					0.179	0.483	0.483	10.00	10.05	76.81	104.19	178.56		37.07				37.07		PVC DR-35	300.0	1.00	3.95	96.80	1.37	0.05	59.73	61.71%
		STMH201	STMH205							0.000	0.684	10.94	11.05	73.38	99.48	170.41		50.22				50.22		PVC DR-35	300.0	1.00	9.40	96.80	1.37	0.11	46.58	48.12%
To Bareille-Snow Street from Future Development																														
Bareille-Snow Street	Future Block 11							0.721		1.604	1.604	12.00	12.00	69.89	94.70	162.13		112.07				112.07										
Bareille-Snow Street	Future Block 12							0.492		1.094	1.094	12.00	12.00	69.89	94.70	162.13		76.48				76.48										
From IBI Phase 2B Design Brief																														
Bareille-Snow Street	*S309, S08, S308A*	*EX. MH309*	*EX. BULK206N*				0.350			0.681	5.126	12.00	12.33	69.89	94.70	162.13		358.26				358.26		PVC DR-35	*525.0*	*1.43*	*46.47*	514.80	2.38	0.33	156.54	30.41%
To Codd's Road from Building 3																														
Codd's Road	S301	CB302	STMH301	0.037					0.025	0.088	0.088	10.00	10.07	76.81	104.19	178.56		6.78				6.78		PVC DR-35	200.0	1.00	4.50	32.83	1.04	0.07	26.05	79.35%
Codd's Road	S302	CB301	STMH301	0.017					0.013	0.044	0.044	10.00	10.27	76.81	104.19	178.56		3.41				3.41		PVC DR-35	200.0	1.00	16.90	32.83	1.04	0.27	29.43	89.63%
	S-BLDG3, S303	BLDG	STMH301	0.038					0.244	0.637	0.637	10.00	10.09	76.81	104.19	178.56		48.92				48.92		PVC DR-35	300.0	1.00	7.60	96.80	1.37	0.09	47.88	49.47%
		STMH301	*EX. SEWER*							0.000	0.770	10.27	10.42	75.78	102.79	176.13		58.32				58.32		PVC DR-35	300.0	1.00	12.50	96.80	1.37	0.15	38.48	39.75%
From IBI Phase 2B Design Brief																														
Codd's Road	*S304, S304A, S340, B340A*	*EX. MH305*	*EX. MH231*				0.400	0.780		2.513	3.283	10.42	10.92	75.22	102.01	174.79		246.92				246.92		PVC DR-35	*750.0*	*1.30*	*85.55*	1270.61	2.87	0.50	1023.69	80.57%

Definition:
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 = 732.951/(TC+6.199)^0.810 — 2 Year
i = 1174.184/(TC+6.014)^0.816 — 5 Year
i = 1735.688/(TC+6.014)^0.820 — 100 Year

Notes:
1. Mannings coefficient (n) = 0.013

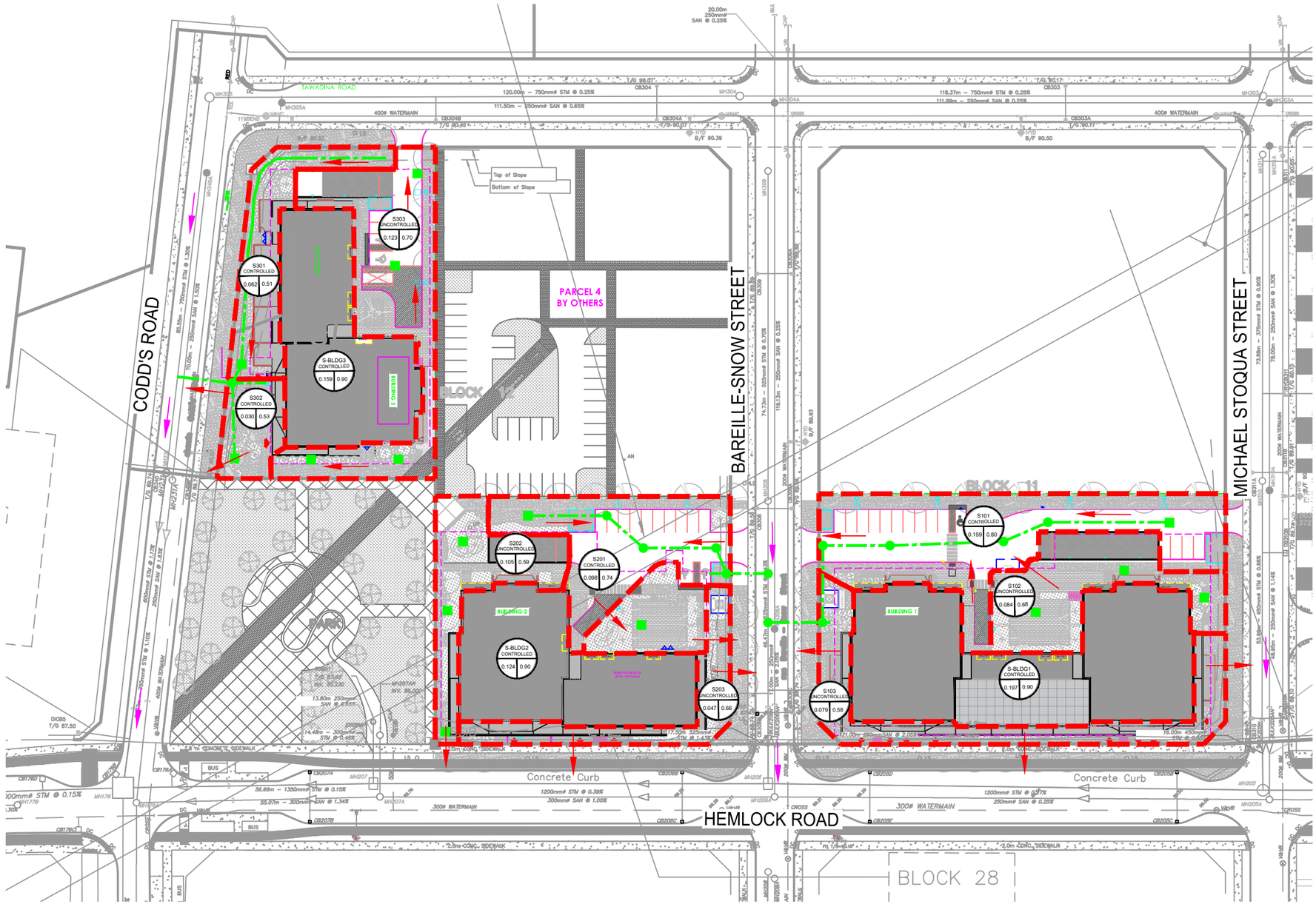
Time-of-Concentration in the Swale
FAA Equation: t (min) = 3.258 [(1.1 - C) L^0.5 / S^.33]
Where: Longest Watercourse Length, L (m). S (%)
Runoff Coef.C = Impervious

No.	L (m)	S %	Tc (min)
			#DIV/0!

Designed: D.B.Y.
Checked: D.B.Y.
Dwg. Reference: Storm Drainage Area Plan

No.	Revision	Date
1.	City Submission No. 1	2022-08-15

File Reference: 221-04473-00
Date: 2022-08-15
Sheet No: 1 of 1



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1000 - 1050 TAWADINA STREET

RESIDENTIAL DEVELOPMENT
STORM DRAINAGE PLAN

SCALE:	DATE:	SKETCH No.
1:1000	AUGUST 15, 2022	SKETCH 1

1000 - 1050 Tawadina Street
Residential Development
Project: 221-04473-00
Date: August, 2022

Table 1 - Stormwater Management Summary for Building 1

Drainage Area I.D.	Downstream Segment	Sub Area (ha)	Avg. Composite 'C' 5 yr	Avg. Composite 'C' 100 yr	Outlet Location	5 Year Uncontrolled/ Controlled Release (L/s)	5 year Storage Required (m^3)	100 Year Uncontrolled/ Controlled Release (L/s)	100 year Storage Required (m^3)	Total Storage Provided (m^3)
Total Allowable Release Rate (IBI GROUP, 2019)								**154.90**		
CONTROLLED										
S101	CBMH104	0.159	0.80	0.89	Bareille-Snow Street	51.27	0.00	52.67	10.55	13.09
S-BLDG1	STMH101	0.197	0.90	0.99	Bareille-Snow Street	22.68	17.21	22.68	50.83	73.58
UNCONTROLLED										
S102	STMH101	0.084	0.68	0.76	Bareille-Snow Street	16.50		31.70		
S103	ROW	0.079	0.580	0.66	City ROW	13.30		25.90		
			Maximum Release Rate (WSP, 2022)					**132.95**		
Total		0.519				103.75	17.21	132.95	61.37	86.67

1000 - 1050 Tawadina Street
Residential Development
Project: 221-04473-00
Date: August, 2022

Table 1a - Allowable Release Rate (Pre-Development, IBI Group 2019)

DDSWMM Parameters (IBI Group, Phase 2B 2019)

Drainage Area ID	Area (HA)	Block	MH	D/S Segment	IMP Ratio	ICD Restriction (l/s)
B309	1.24	Block 11	MH206	S308A	0.86	370

DDSWMM Parameters (IBI Group, Phase 1B 2017)

Drainage Area ID	Area (HA)	Block	MH	D/S Segment	IMP Ratio	5 Year Captured Flow (l/s)	100 Year Captured Flow (l/s)
EX205B	0.63	Block 11	S205	S205C	0.86	127	128

A= 0.519 ha
Base on IBI Phase 2B Ratio
Q = A x % of Phase 2B (B309) = 0.519 ha x (370/1.24) = 154.9 l/s

Equations:
Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the intensity of rainfall, City of Ottawa IDF
Rainfall Intensity = $998.071/(T+6.053)^{\wedge -0.814}$ T= time in minutes
A is the total drainage area

1000 - 1050 Tawadina Street
Residential Development
Project: 221-04473-00
Date: August, 2022

TABLE 1b - Storage Required for Building 1 (CBMH104)

Maximum Allowable Release for Building 1:
154.90 l/s

Post Dev run-off Coefficient "C"

			2 & 5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" x 1.25	$C_{100\ avg}$
Total	Asphalt	0.135	0.90	**0.80**	0.99	**0.89**
0.159	Playground	0.000	0.40		0.94	
	Grass	0.024	0.25		0.31	

*Areas are approximate based on Architectural site plan and Storm Draiange Area Plan

Runoff Coefficient Equation
$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{tot}$
$*C = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{tot}$

*Runoff coefficients increased by 25% up to a maximum value of 0.99 for the 100-Year event

QUANTITY STORAGE REQUIREMENTS - 5 Year

0.159 = Area(ha)
0.80 = C
154.9 l/s = max allowable release rate

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Runoff (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd m^3	Storage Avail m^3
	10	**104.19**	**36.84**	**51.27**	**-14.43**	**-8.66**	**13.09**
	20	70.25	24.84	51.27	-26.43	-31.72	13.09
	30	53.93	19.07	51.27	-32.20	-57.97	13.09
5 YEAR	40	44.18	15.62	51.27	-35.65	-85.56	13.09
	50	37.65	13.31	51.27	-37.96	-113.88	13.09
	60	32.94	11.65	51.27	-39.62	-142.65	13.09

Orifice #1 Sizing
CBMH104

Event	Flow (L/s)	Head (m)	ORIFICE AREA(m^2)	SQUARE (1-side mm)	CIRC (mmØ)
5 Year	51.27	2.91	0.011	106	120
100 Year	52.67	3.07	0.011	106	120

Orifice Control Sizing
Q = 0.6 x A x (2gh)1/2
Where:
Q is the release rate in m^3/s
A is the orifice area in m^2
g is the acceleration due to gravity, $9.81 m/s^2$
h is the head of water above the orifice centre in m
d is the diameter of the orifice in m

QUANTITY STORAGE REQUIREMENTS - 100 Year

0.159 = Area(ha)
0.89 = *C
154.9 l/s = max allowable release rate

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Runoff (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd m^3	Storage Avail m^3
	10	**178.56**	**70.24**	**52.67**	**17.58**	**10.55**	**13.09**
	20	119.95	47.19	52.67	-5.48	-6.57	13.09
100 YEAR	30	91.87	36.14	52.67	-16.52	-29.74	13.09
	40	75.15	29.56	52.67	-23.10	-55.45	13.09
	50	63.95	25.16	52.67	-27.51	-82.52	13.09
	60	55.89	21.99	52.67	-30.68	-110.43	13.09
	70	49.79	19.59	52.67	-33.08	-138.93	13.09

Orifice Invert =	86.320	m
Ponding Elevation @ 100 year=	89.450	m
Ponding Elevation @ 5 year=	89.290	m

Note: Orifice #1 is located on the downstream invert of CBMH104

Equations:

Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the intensity of rainfall, City of Ottawa IDF
A is the total drainage area

1000 - 1050 Tawadina Street
Residential Development
Project: 221-04473-00
Date: August, 2022

TABLE 1c - Storage Required for Building 1 Deck Drains

Post Dev run-off Coefficient "C"

			2 & 5 Year Event		100 Year Event	
Area	**Surface**	**Ha**	**"C"**	**C_{avg}**	**"C"+25%**	***C_{avg}**
Total	Asphalt	0.056	0.90	**0.68**	0.99	**0.76**
0.084	Roof	0.000	0.90		0.99	
	Grass	0.028	0.25		0.31	

Runoff Coefficient Equation

$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{tot}$

$*C = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{tot}$

*Runoff coefficients increased by 25% up to a maximum value of 0.99 for the 100-Year event

Post Dev Free Flow

5 Year Event

Pre Dev.	**C**	**Intensity**	**Area**
5 Year	0.68	104.19	0.084
2.78CIA=	16.55		
16.50	L/S		

**Use a 10 minute time of concentration for 5 year

100 Year Event

Pre Dev.	**C**	**Intensity**	**Area**
100 Year	0.76	178.56	0.084
2.78CIA=	31.69		
31.70	L/S		

**Use a 10 minute time of concentration for 100 year

Equations:

Flow Equation

Q = 2.78 x C x I x A

Where:

C is the runoff coefficient

I is the intensity of rainfall, City of Ottawa IDF

A is the total drainage area

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TABLE 1d - Uncontrolled Flow to ROW Building 1

Post Dev run-off Coefficient "C"

			2 & 5 Year Event		100 Year Event	
Area	**Surface**	**Ha**	**"C"**	**C_{avg}**	**"C"+25%**	***C_{avg}**
Total	Asphalt	0.040	0.90	**0.58**	0.99	**0.66**
0.079	Roof	0.000	0.90		0.99	
	Grass	0.039	0.25		0.31	

Runoff Coefficient Equation
$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{tot}$
$*C = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{tot}$

*Runoff coefficients increased by 25% up to a maximum value of 0.99 for the 100-Year event

Post Dev Free Flow
5 Year Event

Pre Dev.	**C**	**Intensity**	**Area**
5 Year	0.58	104.19	0.079
2.78CIA=	13.27		
13.30	L/S		

**Use a 10 minute time of concentration for 5 year

100 Year Event

Pre Dev.	**C**	**Intensity**	**Area**
100 Year	0.66	178.56	0.079
2.78CIA=	25.88		
25.90	L/S		

**Use a 10 minute time of concentration for 100 year

Equations:

Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the intensity of rainfall, City of Ottawa IDF
A is the total drainage area

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TABLE 1e - Proposed Roof Drains Building 1

Allowable Release Rate

Total Roof Area =	0.197	Ha
Total Roof Ponding Area =	1471.500	m^2
Ponding Depth =	0.07 ~ 0.15	m
The flow rate through each Roof Drain will be =	5 ~ 25.0	gpm
	0.32 ~ 1.58	L/s
Number of Roof Drains =	19.00	
Total flow rate =	22.68	

TABLE 1. Adjustable Accutrol Flow Rate Settings

Weir Opening Exposed	1"	2"	3"	4"	5"	6"
	Flow Rate (gallons per minute)					
Fully Exposed	5	10	15	20	25	30
3/4	5	10	13.75	17.5	21.25	25
1/2	5	10	12.5	15	17.5	20
1/4	5	10	11.25	12.5	13.75	15
Closed	5	5	5	5	5	5

Post Dev run-off Coefficient "C"

			2 & 5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" x 1.25	$C_{100\ avg}$
Total	Asphalt		0.90	**0.90**	0.99	**0.99**
0.197	Roof	0.197	0.90		0.99	
	Grass		0.25		0.31	

*Areas are approximate based on Architectural site plan

Runoff Coefficient Equation
$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{tot}$
$*C = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{tot}$

*Runoff coefficients increased by 25% up to a maximum value of 0.99 for the 100-Year event

QUANTITY STORAGE REQUIREMENTS - 5 Year

0.197 = Area(ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd (m^3)	Storage Available* (m^3)
	10	**104.19**	**51.36**	**22.68**	**28.68**	**17.21**	**73.58**
	20	70.25	34.63	22.68	11.95	14.34	73.58
5 YEAR	30	53.93	26.58	22.68	3.90	7.02	73.58
	40	44.18	21.78	22.68	-0.90	-2.16	73.58
	50	37.65	18.56	22.68	-4.12	-12.36	73.58

QUANTITY STORAGE REQUIREMENTS - 100 Year

0.197 = Area(ha)
0.99 = *C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd (m^3)	Storage Available (m^3)
	10	178.56	96.81	22.68	74.13	44.48	73.58
	20	**119.95**	**65.04**	**22.68**	**42.36**	**50.83**	**73.58**
100 YEAR	30	91.87	49.81	22.68	27.13	48.83	73.58
	40	75.15	40.74	22.68	18.06	43.35	73.58
	50	63.95	34.67	22.68	11.99	35.98	73.58
	60	55.89	30.31	22.68	7.63	27.45	73.58
	70	49.79	27.00	22.68	4.32	18.12	73.58

*Storage available is calculated using roof ponding area mulitplied by the maximum ponding depth, and divided by 3 for a conical pond.
**Refer to roof drains area and storage volume table on DWG C13 for details

Equations:

Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the intensity of rainfall, City of Ottawa IDF
A is the total drainage area

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Table 2 - Stormwater Management Summary for Building 2

Drainage Area I.D.	Downstream Segment	Sub Area (ha)	Avg. Composite 'C' 5 yr	Avg. Composite 'C' 100 yr	Outlet Location	5 Year Uncontrolled/ Controlled Release (L/s)	5 year Storage Required (m^3)	100 Year Uncontrolled/ Controlled Release (L/s)	100 year Storage Required (m^3)	Total Storage Provided (m^3)
Total Allowable Release Rate (IBI GROUP, 2019)								**110.39**		
CONTROLLED										
S201	CBMH203	0.098	0.74	0.82	Bareille-Snow Street	26.38	0.00	27.45	7.47	16.50
S-BLDG2	STMH201	0.124	0.90	0.99	Bareille-Snow Street	11.40	12.56	11.40	35.44	46.35
UNCONTROLLED										
S202	STMH201	0.105	0.59	0.67	Bareille-Snow Street	17.90		34.90		
S203	ROW	0.047	0.660	0.74	City ROW	9.00		17.30		
			Maximum Release Rate (WSP, 2022)					**91.05**		
Total		0.374				64.68	12.56	91.05	42.91	62.85

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Table 2a - Allowable Release Rate (Pre-Development, IBI Group 2019)

DDSWMM Parameters (IBI Group, Phase 2B 2019)

Drainage Area ID	Area (HA)	Block	MH	D/S Segment	IMP Ratio	ICD Restriction (l/s)
B340	1.24	Block 12	MH308	S308A	0.86	366

DDSWMM Parameters (IBI Group, Phase 1B 2017)

Drainage Area ID	Area (HA)	Block	MH	D/S Segment	IMP Ratio	5 Year Captured Flow (l/s)	100 Year Captured Flow (l/s)
EX206B	0.46	Block 12	S206	S207	0.86	93	95

A= 0.374 ha
Base on IBI Phase 2B Ratio
Q = A x % of Phase 2B (B309) = 0.374 ha x (366/1.24) = 110.39 l/s

Equations:
Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the intensity of rainfall, City of Ottawa IDF
Rainfall Intensity = $998.071/(T+6.053)^{\wedge -0.814}$ T= time in minutes
A is the total drainage area

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TABLE 2b - Storage Required for Building 2 (CBMH203)

Maximum Allowable Release for Building 2: pl
110.39 l/s

Post Dev run-off Coefficient "C"

			2 & 5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" x 1.25	$C_{100\ avg}$
Total	Asphalt	0.074	0.90	**0.74**	0.99	**0.82**
0.098	Playground	0.000	0.40		0.94	
	Grass	0.024	0.25		0.31	

*Areas are approximate based on Architectural site plan and Storm Draiange Area Plan

Runoff Coefficient Equation
$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{tot}$
$*C = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{tot}$

*Runoff coefficients increased by 25% up to a maximum value of 0.99 for the 100-Year event

QUANTITY STORAGE REQUIREMENTS - 5 Year

0.098 = Area(ha)
0.74 = C
110.4 l/s = max allowable release rate

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Runoff (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd m^3	Storage Avail m^3
	10	**104.19**	**21.01**	**26.38**	**-5.38**	**-3.23**	**16.50**
	20	70.25	14.16	26.38	-12.22	-14.66	16.50
	30	53.93	10.87	26.38	-15.51	-27.92	16.50
5 YEAR	40	44.18	8.91	26.38	-17.48	-41.94	16.50
	50	37.65	7.59	26.38	-18.79	-56.38	16.50
	60	32.94	6.64	26.38	-19.74	-71.07	16.50

Orifice #2 Sizing
CBMH203

Event	Flow (L/s)	Head (m)	ORIFICE AREA(m^2)	SQUARE (1-side mm)	CIRC (mmØ)
5 Year	26.38	2.44	0.006	80	90
100 Year	27.45	2.64	0.006	80	90

Orifice Control Sizing
Q = 0.6 x A x (2gh)1/2
Where:
Q is the release rate in m^3/s
A is the orifice area in m^2
g is the acceleration due to gravity, $9.81 m/s^2$
h is the head of water above the orifice centre in m
d is the diameter of the orifice in m

QUANTITY STORAGE REQUIREMENTS - 100 Year

0.098 = Area(ha)
0.82 = *C
110.4 l/s = max allowable release rate

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Runoff (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd m^3	Storage Avail m^3
	10	**178.56**	**39.89**	**27.45**	**12.45**	**7.47**	**16.50**
	20	119.95	26.80	27.45	-0.65	-0.78	16.50
100 YEAR	30	91.87	20.52	27.45	-6.92	-12.46	16.50
	40	75.15	16.79	27.45	-10.66	-25.58	16.50
	50	63.95	14.29	27.45	-13.16	-39.47	16.50
	60	55.89	12.49	27.45	-14.96	-53.85	16.50
	70	49.79	11.12	27.45	-16.32	-68.55	16.50

Orifice Invert =	86.470	m
Ponding Elevation @ 100 year=	89.150	m
Ponding Elevation @ 5 year=	88.950	m

Note: Orifice #1 is located on the downstream invert of CBMH203

Equations:

Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the intensity of rainfall, City of Ottawa IDF
A is the total drainage area

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TABLE 2c - Storage Required for Building 2 Deck Drains

Post Dev run-off Coefficient "C"

			2 & 5 Year Event		100 Year Event	
Area	**Surface**	**Ha**	**"C"**	**C_{avg}**	**"C"+25%**	***C_{avg}**
Total	Asphalt	0.055	0.90	**0.59**	0.99	**0.67**
0.105	Roof	0.000	0.90		0.99	
	Grass	0.050	0.25		0.31	

Runoff Coefficient Equation
$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{tot}$
$*C = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{tot}$

*Runoff coefficients increased by 25% up to a maximum value of 0.99 for the 100-Year event

Post Dev Free Flow
5 Year Event

Pre Dev.	**C**	**Intensity**	**Area**
5 Year	0.59	104.19	0.105
2.78CIA=	17.94		
17.90	L/S		

**Use a 10 minute time of concentration for 5 year

100 Year Event

Pre Dev.	**C**	**Intensity**	**Area**
100 Year	0.67	178.56	0.105
2.78CIA=	34.92		
34.90	L/S		

**Use a 10 minute time of concentration for 100 year

Equations:

Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the intensity of rainfall, City of Ottawa IDF
A is the total drainage area

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TABLE 2d - Uncontrolled Flow to ROW Building 2

Post Dev run-off Coefficient "C"

			2 & 5 Year Event		100 Year Event	
Area	**Surface**	**Ha**	**"C"**	**C_{avg}**	**"C"+25%**	***C_{avg}**
Total	Asphalt	0.030	0.90	**0.66**	0.99	**0.74**
0.047	Roof	0.000	0.90		0.99	
	Grass	0.017	0.25		0.31	

Runoff Coefficient Equation
$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{tot}$
$*C = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{tot}$

*Runoff coefficients increased by 25% up to a maximum value of 0.99 for the 100-Year event

Post Dev Free Flow
5 Year Event

Pre Dev.	**C**	**Intensity**	**Area**
5 Year	0.66	104.19	0.047
2.78CIA=	8.99		
9.00	L/S		

**Use a 10 minute time of concentration for 5 year

100 Year Event

Pre Dev.	**C**	**Intensity**	**Area**
100 Year	0.74	178.56	0.047
2.78CIA=	17.26		
17.30	L/S		

**Use a 10 minute time of concentration for 100 year

Equations:

Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the intensity of rainfall, City of Ottawa IDF
A is the total drainage area

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TABLE 2e - Proposed Roof Drains Building 2

Allowable Release Rate

Total Roof Area =	0.124	Ha
Total Roof Ponding Area =	927.000	m²
Ponding Depth =	0.07 ~ 0.15	m
The flow rate through each Roof Drain will be =	5 ~ 25.0	gpm
	0.32 ~ 1.58	L/s
Number of Roof Drains =	19.00	
Total flow rate =	11.40	

TABLE 1. Adjustable Accutrol Flow Rate Settings

Weir Opening Exposed	1"	2"	3"	4"	5"	6"
	Flow Rate (gallons per minute)					
Fully Exposed	5	10	15	20	25	30
3/4	5	10	13.75	17.5	21.25	25
1/2	5	10	12.5	15	17.5	20
1/4	5	10	11.25	12.5	13.75	15
Closed	5	5	5	5	5	5

Post Dev run-off Coefficient "C"

			2 & 5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" x 1.25	$C_{100\ avg}$
Total	Asphalt		0.90	**0.90**	0.99	**0.99**
0.124	Roof	0.124	0.90		0.99	
	Grass		0.25		0.31	

*Areas are approximate based on Architectural site plan

Runoff Coefficient Equation
$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{tot}$
$*C = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{tot}$

*Runoff coefficients increased by 25% up to a maximum value of 0.99 for the 100-Year event

QUANTITY STORAGE REQUIREMENTS - 5 Year

0.124 = Area(ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd (m^3)	Storage Available* (m^3)
	10	**104.19**	**32.33**	**11.40**	**20.93**	**12.56**	**46.35**
	20	70.25	21.80	11.40	10.40	12.47	46.35
5 YEAR	30	53.93	16.73	11.40	5.33	9.60	46.35
	40	44.18	13.71	11.40	2.31	5.54	46.35
	50	37.65	11.68	11.40	0.28	0.85	46.35

QUANTITY STORAGE REQUIREMENTS - 100 Year

0.124 = Area(ha)
0.99 = *C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd (m^3)	Storage Available (m^3)
	10	178.56	60.94	11.40	49.54	29.72	46.35
	20	**119.95**	**40.94**	**11.40**	**29.54**	**35.44**	**46.35**
100 YEAR	30	91.87	31.35	11.40	19.95	35.91	46.35
	40	75.15	25.65	11.40	14.25	34.19	46.35
	50	63.95	21.83	11.40	10.43	31.28	46.35
	60	55.89	19.08	11.40	7.68	27.63	46.35
	70	49.79	16.99	11.40	5.59	23.49	46.35

*Storage available is calculated using roof ponding area mulitplied by the maximum ponding depth, and divided by 3 for a conical pond.
**Refer to roof drains area and storage volume table on DWG C13 for details

Equations:

Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the intensity of rainfall, City of Ottawa IDF
A is the total drainage area

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Table 3 - Stormwater Management Summary for Building 3

Drainage Area I.D.	Downstream Segment	Sub Area (ha)	Avg. Composite 'C' 5 yr	Avg. Composite 'C' 100 yr	Outlet Location	5 Year Uncontrolled/ Controlled Release (L/s)	5 year Storage Required (m^3)	100 Year Uncontrolled/ Controlled Release (L/s)	100 year Storage Required (m^3)	Total Storage Provided (m^3)
Total Allowable Release Rate (IBI GROUP, 2019)								**110.39**		
CONTROLLED										
S301	CB302	0.062	0.51	0.59	Codd's Road	28.52	0.00	29.70	0.00	10.00
S302	CB301	0.030	0.53	0.61	Codd's Road	13.65	0.00	13.96	0.00	5.00
S-BLDG3	STMH301	0.159	0.90	0.99	Codd's Road	11.40	18.03	11.40	49.31	59.63
UNCONTROLLED										
S303	STMH101	0.123	0.70	0.78	Codd's Road	24.90		47.60		
			Maximum Release Rate (WSP, 2022)					**102.65**		
Total		0.374				78.48	18.03	102.65	49.31	74.63

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Table 3a - Allowable Release Rate (Pre-Development, IBI Group 2019)

DDSWMM Parameters (IBI Group, Phase 2B 2019)

Drainage Area ID	Area (HA)	Block	MH	D/S Segment	IMP Ratio	ICD Restriction (l/s)
B340	1.24	Block 12	MH308	S308A	0.86	366

DDSWMM Parameters (IBI Group, Phase 1B 2017)

Drainage Area ID	Area (HA)	Block	MH	D/S Segment	IMP Ratio	5 Year Captured Flow (l/s)	100 Year Captured Flow (l/s)
LOT230B	0.34	Block 12	S231	S231	0.86	174	174

A= 0.374 ha
Base on IBI Phase 2B Ratio
Q = A x % of Phase 2B (B309) = 0.374 ha x (366/1.24) = 110.39 l/s

Equations:
Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the intensity of rainfall, City of Ottawa IDF
Rainfall Intensity = $998.071/(T+6.053)^{\wedge -0.814}$ T= time in minutes
A is the total drainage area

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TABLE 3b - Storage Required for Building 3 (CB302)

Maximum Allowable Release for Building 3:
110.39 l/s

Post Dev run-off Coefficient "C"

			2 & 5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" x 1.25	$C_{100\ avg}$
Total	Asphalt	0.025	0.90	**0.51**	0.99	**0.59**
0.062	Playground	0.000	0.40		0.94	
	Grass	0.037	0.25		0.31	

*Areas are approximate based on Architectural site plan and Storm Draiange Area Plan

Runoff Coefficient Equation
$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{tot}$
$*C = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{tot}$

*Runoff coefficients increased by 25% up to a maximum value of 0.99 for the 100-Year event

QUANTITY STORAGE REQUIREMENTS - 5 Year

0.062 = Area(ha)
0.51 = C
110.4 l/s = max allowable release rate

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Runoff (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd m^3	Storage Avail m^3
	10	**104.19**	**9.16**	**28.52**	**-19.37**	**-11.62**	**10.00**
	20	70.25	6.18	28.52	-22.35	-26.82	10.00
	30	53.93	4.74	28.52	-23.78	-42.81	10.00
5 YEAR	40	44.18	3.88	28.52	-24.64	-59.14	10.00
	50	37.65	3.31	28.52	-25.21	-75.64	10.00
	60	32.94	2.90	28.52	-25.63	-92.26	10.00

Orifice #3 Sizing
CB302

Event	Flow (L/s)	Head (m)	ORIFICE AREA(m^2)	SQUARE (1-side mm)	CIRC (mmØ)
5 Year	28.52	3.58	0.006	75	85
100 Year	29.70	3.88	0.006	75	85

Orifice Control Sizing
Q = 0.6 x A x (2gh)1/2
Where:
Q is the release rate in m^3/s
A is the orifice area in m^2
g is the acceleration due to gravity, $9.81 m/s^2$
h is the head of water above the orifice centre in m
d is the diameter of the orifice in m

QUANTITY STORAGE REQUIREMENTS - 100 Year

0.062 = Area(ha)
0.59 = *C
110.4 l/s = max allowable release rate

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Runoff (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd m^3	Storage Avail m^3
	10	**178.56**	**18.16**	**29.70**	**-11.54**	**-6.92**	**10.00**
	20	119.95	12.20	29.70	-17.50	-21.00	10.00
100 YEAR	30	91.87	9.34	29.70	-20.35	-36.64	10.00
	40	75.15	7.64	29.70	-22.05	-52.93	10.00
	50	63.95	6.50	29.70	-23.19	-69.58	10.00
	60	55.89	5.68	29.70	-24.01	-86.44	10.00
	70	49.79	5.06	29.70	-24.63	-103.46	10.00

Orifice Invert =	86.380	m
Ponding Elevation @ 100 year=	90.300	m
Ponding Elevation @ 5 year=	90.000	m

Note: Orifice #1 is located on the downstream invert of CB302

Equations:

Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the intensity of rainfall, City of Ottawa IDF
A is the total drainage area

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TABLE 3c - Storage Required for Building 3 (CB301)

Maximum Allowable Release for Building 2: pl
110.39 l/s

Post Dev run-off Coefficient "C"

			2 & 5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" x 1.25	$C_{100\ avg}$
Total	Asphalt	0.013	0.90	**0.53**	0.99	**0.61**
0.030	Playground	0.000	0.40		0.94	
	Grass	0.017	0.25		0.31	

*Areas are approximate based on Architectural site plan and Storm Draiange Area Plan

Runoff Coefficient Equation
$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{tot}$
$*C = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{tot}$

*Runoff coefficients increased by 25% up to a maximum value of 0.99 for the 100-Year event

QUANTITY STORAGE REQUIREMENTS - 5 Year

0.030 = Area(ha)
0.53 = C
110.4 l/s = max allowable release rate

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Runoff (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd m^3	Storage Avail m^3
	10	**104.19**	**4.61**	**13.65**	**-9.05**	**-5.43**	**5.00**
	20	70.25	3.11	13.65	-10.55	-12.65	5.00
	30	53.93	2.38	13.65	-11.27	-20.28	5.00
5 YEAR	40	44.18	1.95	13.65	-11.70	-28.07	5.00
	50	37.65	1.66	13.65	-11.99	-35.96	5.00
	60	32.94	1.46	13.65	-12.19	-43.90	5.00

Orifice #4 Sizing
CB301

Event	Flow (L/s)	Head (m)	ORIFICE AREA(m^2)	SQUARE (1-side mm)	CIRC (mmØ)
5 Year	13.65	3.30	0.003	53	60
100 Year	13.96	3.45	0.003	53	60

Orifice Control Sizing
Q = 0.6 x A x (2gh)1/2
Where:
Q is the release rate in m^3/s
A is the orifice area in m^2
g is the acceleration due to gravity, $9.81 m/s^2$
h is the head of water above the orifice centre in m
d is the diameter of the orifice in m

QUANTITY STORAGE REQUIREMENTS - 100 Year

0.030 = Area(ha)
0.61 = *C
110.4 l/s = max allowable release rate

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Runoff (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd m^3	Storage Avail m^3
	10	**178.56**	**9.08**	**13.96**	**-4.87**	**-2.92**	**5.00**
	20	119.95	6.10	13.96	-7.85	-9.43	5.00
100 YEAR	30	91.87	4.67	13.96	-9.28	-16.71	5.00
	40	75.15	3.82	13.96	-10.13	-24.32	5.00
	50	63.95	3.25	13.96	-10.70	-32.11	5.00
	60	55.89	2.84	13.96	-11.11	-40.01	5.00
	70	49.79	2.53	13.96	-11.42	-47.98	5.00

Orifice Invert =	86.500	m
Ponding Elevation @ 100 year=	89.980	m
Ponding Elevation @ 5 year=	89.830	m

Note: Orifice #1 is located on the downstream invert of CB301

Equations:

Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the intensity of rainfall, City of Ottawa IDF
A is the total drainage area

1000 - 1050 Tawadina Street
Residential Development
Project: 221-04473-00
Date: August, 2022

TABLE 3d - Storage Required for Building 3 Deck Drains

Post Dev run-off Coefficient "C"

			2 & 5 Year Event		100 Year Event	
Area	**Surface**	**Ha**	**"C"**	**C_{avg}**	**"C"+25%**	***C_{avg}**
Total	Asphalt	0.085	0.90	**0.70**	0.99	**0.78**
0.123	Roof	0.000	0.90		0.99	
	Grass	0.038	0.25		0.31	

Runoff Coefficient Equation

$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{tot}$

$*C = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{tot}$

*Runoff coefficients increased by 25% up to a maximum value of 0.99 for the 100-Year event

Post Dev Free Flow

5 Year Event

Pre Dev.	**C**	**Intensity**	**Area**
5 Year	0.70	104.19	0.123
2.78CIA=	24.94		
24.90	L/S		

**Use a 10 minute time of concentration for 5 year

100 Year Event

Pre Dev.	**C**	**Intensity**	**Area**
100 Year	0.78	178.56	0.123
2.78CIA=	47.62		
47.60	L/S		

**Use a 10 minute time of concentration for 100 year

Equations:

Flow Equation

Q = 2.78 x C x I x A

Where:

C is the runoff coefficient

I is the intensity of rainfall, City of Ottawa IDF

A is the total drainage area

1000 - 1050 Tawadina Street
Residential Development
Project: 221-04473-00
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TABLE 3e - Proposed Roof Drains Building 3

Allowable Release Rate

Total Roof Area =	0.159	Ha
Total Roof Ponding Area =	1192.500	m^2
Ponding Depth =	0.07 ~ 0.15	m
The flow rate through each Roof Drain will be =	5 ~ 25.0	gpm
	0.32 ~ 1.58	L/s
Number of Roof Drains =	19.00	
Total flow rate =	11.40	

TABLE 1. Adjustable Accutrol Flow Rate Settings

Weir Opening Exposed	1"	2"	3"	4"	5"	6"
	Flow Rate (gallons per minute)					
Fully Exposed	5	10	15	20	25	30
3/4	5	10	13.75	17.5	21.25	25
1/2	5	10	12.5	15	17.5	20
1/4	5	10	11.25	12.5	13.75	15
Closed	5	5	5	5	5	5

Post Dev run-off Coefficient "C"

			2 & 5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" x 1.25	$C_{100\ avg}$
Total	Asphalt		0.90	**0.90**	0.99	**0.99**
0.159	Roof	0.159	0.90		0.99	
	Grass		0.25		0.31	

*Areas are approximate based on Architectural site plan

Runoff Coefficient Equation
$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{tot}$
$*C = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{tot}$

*Runoff coefficients increased by 25% up to a maximum value of 0.99 for the 100-Year event

QUANTITY STORAGE REQUIREMENTS - 5 Year

0.159 = Area(ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd (m^3)	Storage Available* (m^3)
	10	104.19	41.45	11.40	30.05	18.03	59.63
	20	**70.25**	**27.95**	**11.40**	**16.55**	**19.86**	**59.63**
5 YEAR	30	53.93	21.45	11.40	10.05	18.10	59.63
	40	44.18	17.58	11.40	6.18	14.83	59.63
	50	37.65	14.98	11.40	3.58	10.74	59.63

QUANTITY STORAGE REQUIREMENTS - 100 Year

0.159 = Area(ha)
0.99 = *C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd (m^3)	Storage Available (m^3)
	10	178.56	78.14	11.40	66.74	40.04	59.63
	20	119.95	52.49	11.40	41.09	49.31	59.63
100 YEAR	**30**	**91.87**	**40.20**	**11.40**	**28.80**	**51.84**	**59.63**
	40	75.15	32.88	11.40	21.48	51.56	59.63
	50	63.95	27.99	11.40	16.59	49.76	59.63
	60	55.89	24.46	11.40	13.06	47.01	59.63
	70	49.79	21.79	11.40	10.39	43.63	59.63

*Storage available is calculated using roof ponding area mulitplied by the maximum ponding depth, and divided by 3 for a conical pond.
**Refer to roof drains area and storage volume table on DWG C13 for details

Equations:

Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the intensity of rainfall, City of Ottawa IDF
A is the total drainage area

RUE BAREILLE/ SNOW STREET

RUE MICHAEL/ STOQUA STREET

HEMLOCK ROAD

BUILDING 1

PROPOSED BUILDING 1
FFE=89.77 (GROUND)

PROPOSED BUILDING 1
FFE=89.48 (GROUND
COMMERCIAL)

UNDERGROUND
PARKING LIMIT

DROP OFF

BALCONY

Concrete Curb

2.0m CONC. SIDEWALK

1200mmø STM @ 0.27%

250mmø SAN @ 0.25%

300ø WATERMAIN

BLOCK 28

CONNECT TO EXISTING WATERMAIN FORCES)

SCALE: 1:200

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APARTMENTS BUILDINGS
1000/1050 TAWADINA
ROAD, OTTAWA, ON

KEY PLAN:

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PROPOSED BUILDING 2
FFE=89.47 (GROUND)

SIXTH FLOOR ROOF
(F.F.E. 109.945m)

BUILDING 1

RUE BAREILLE/ SNOW STREET

HEMLOCK ROAD

UNDERGROUND PARKING LIMIT

Concrete Curb

2.0m CONC. SIDEWALK

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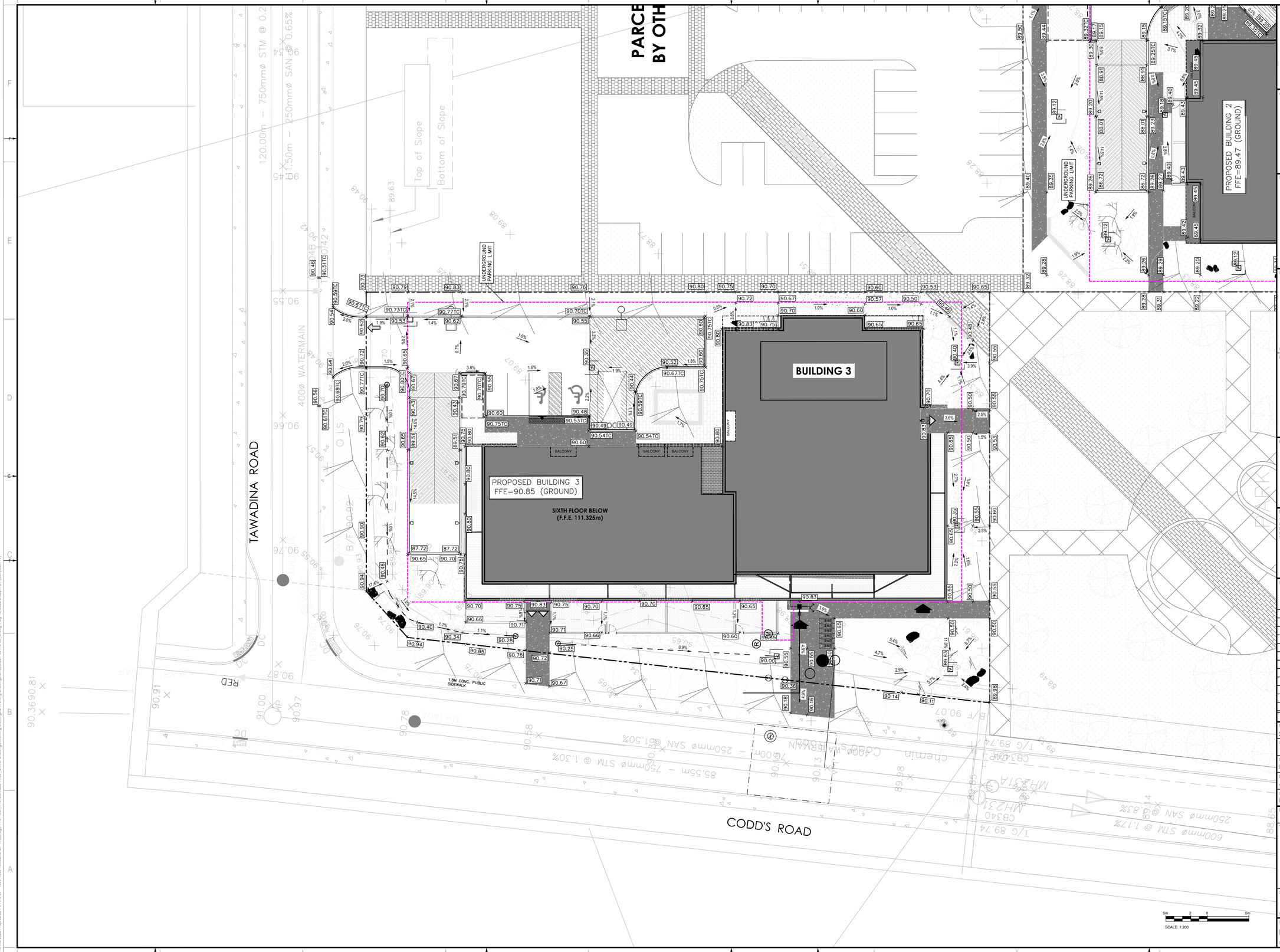

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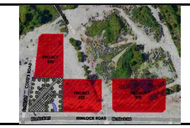

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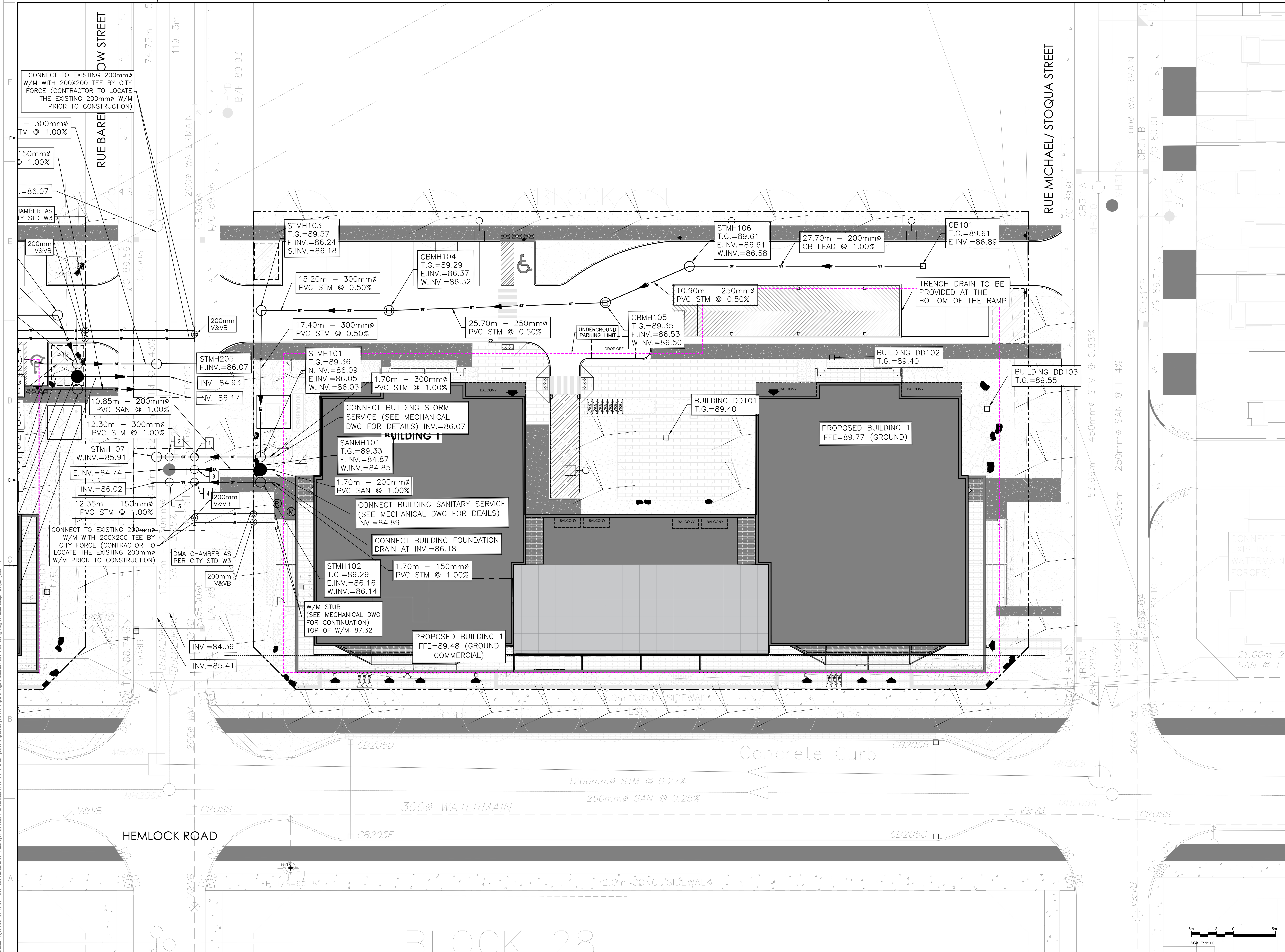

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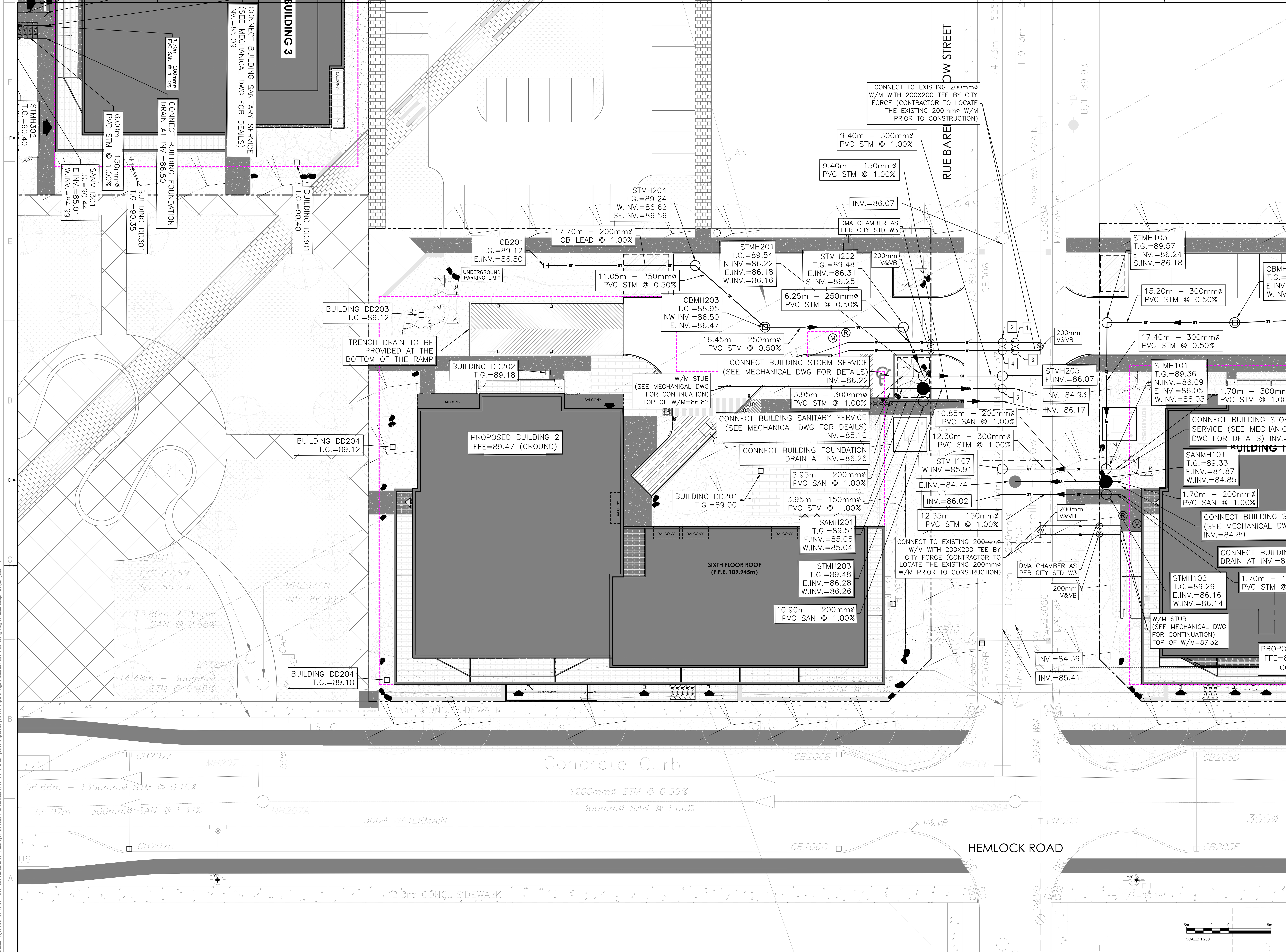

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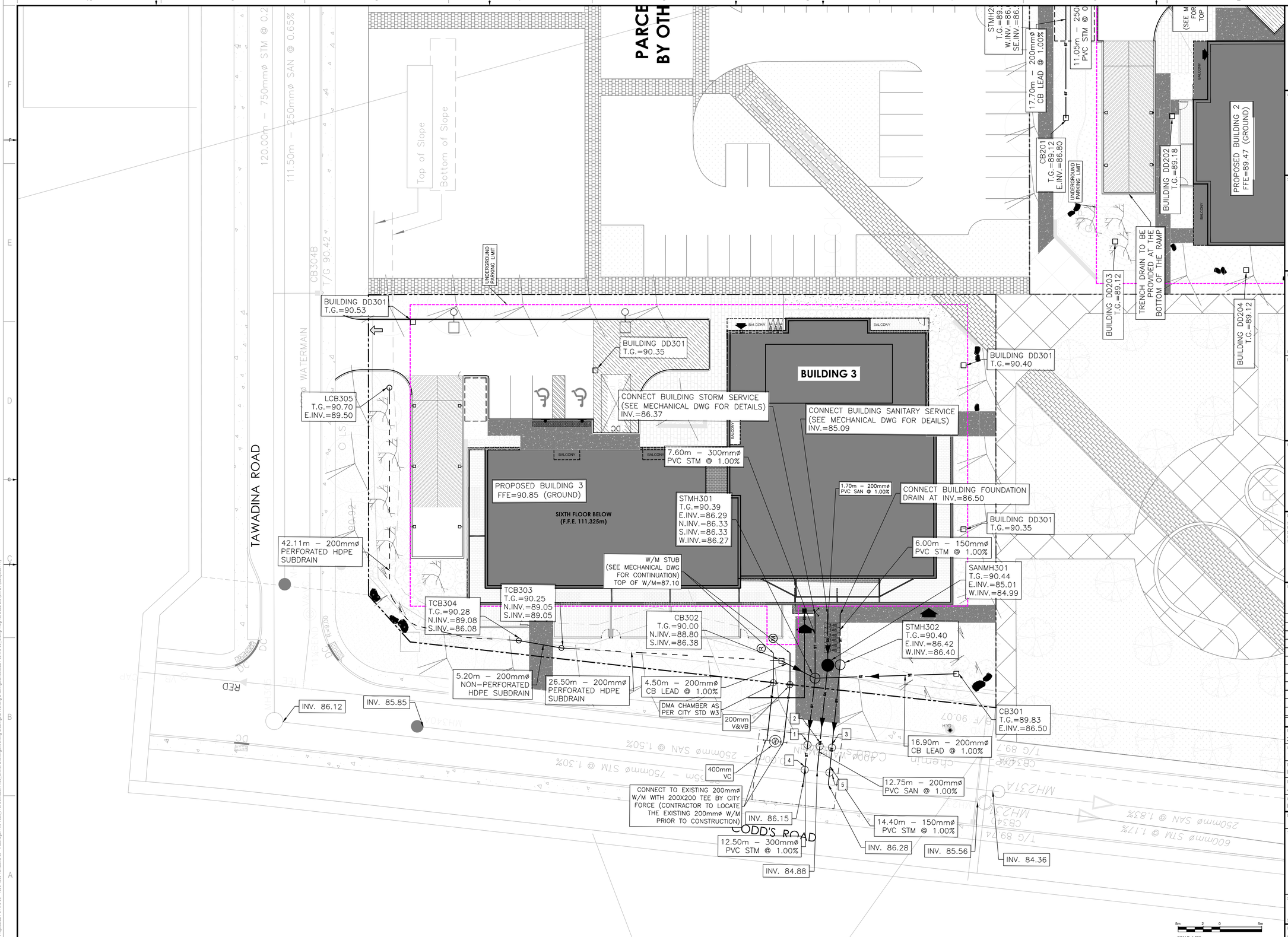

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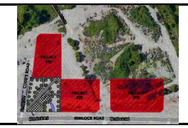

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APPENDIX

APPENDIX

E

- EROSION AND SEDIMENTATION CONTROL PLAN C09, C10 AND C11

INSTALL MUD MAT AT CONSTRUCTION ACCESS REFER TO DETAIL

PROPOSED SILT FENCE AS PER OPSD 219.110

FILTER CLOTH PLACED UNDER ALL PROPOSED AND EXISTING AND CBMH COVER

RUE BAREILLE/ SNOW STREET

RUE MICHAEL/ STOQUA STREET

HEMLOCK ROAD

BUILDING 1

PROPOSED BUILDING 1
FFE=89.77 (GROUND)

PROPOSED BUILDING 1
FFE=89.48 (GROUND COMMERCIAL)

UNDERGROUND PARKING LIMIT

DROP OFF

BALCONY

CONNECT TO EXISTING WATERMAIN FORCES)

Concrete Curb

2.0m CONC. SIDEWALK

BLOCK 28

SCALE: 1:200

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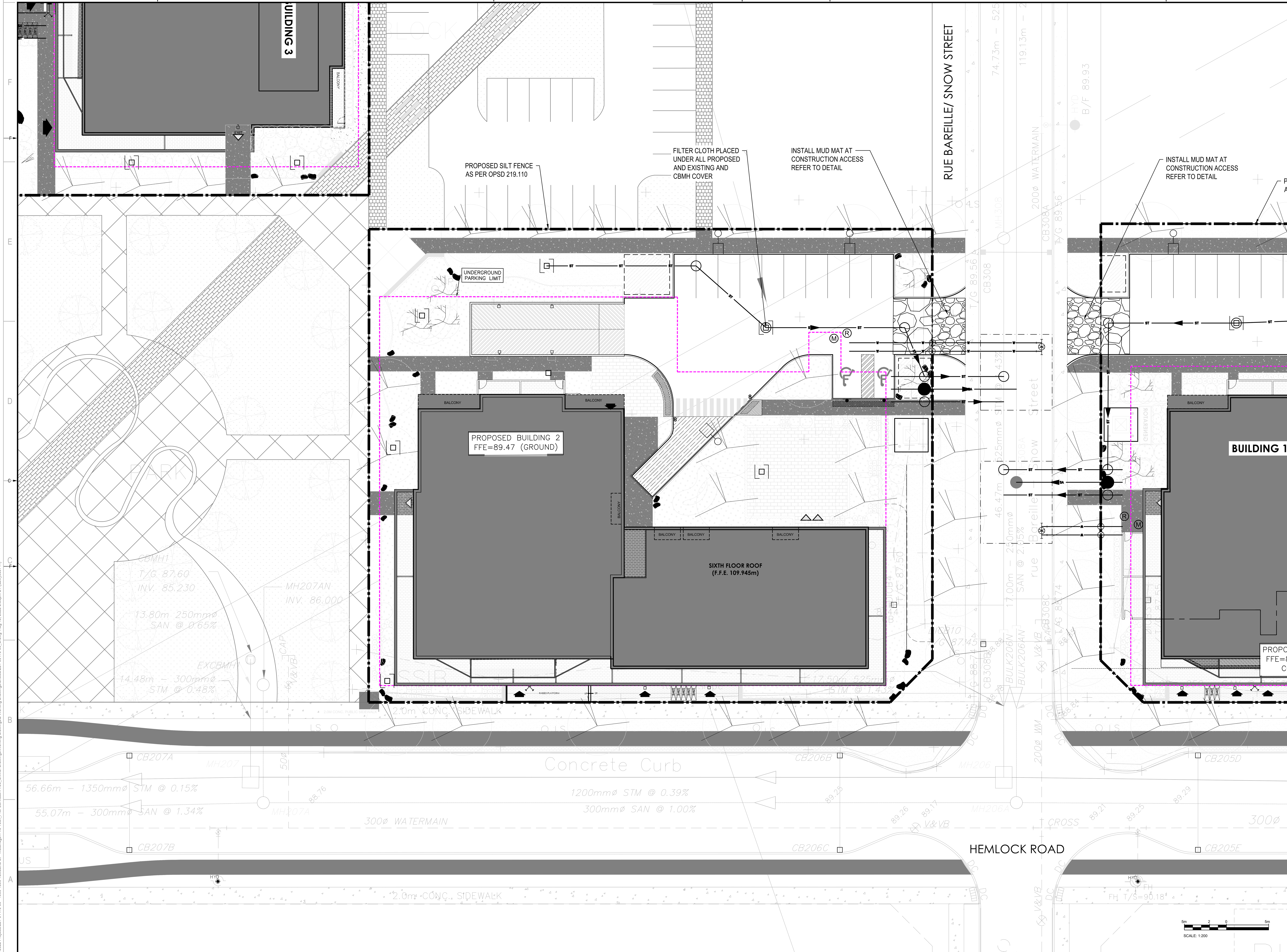

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SEAL:

LICENSED PROFESSIONAL ENGINEER
D. B. YANG
100230568
2022-08-15
PROVINCE OF ONTARIO

NORTH

CLIENT:

BAYVIEW HOSPITALITY GROUP

CLIENT REF. #:

PROJECT:

WATERIDGE
APARTMENTS BUILDINGS
1000/1050 TAWADINA
ROAD, OTTAWA, ON

KEY PLAN:

DISCLAIMER:

COPYRIGHT:

ISSUED FOR - REVISION:

IS	RE	DATE	DESCRIPTION
2		2022-08-15	ISSUED FOR SPA
1		2022-05-24	ISSUED FOR CLC REVIEW

PROJECT NO: 221-04473-00

DATE: AUGUST 15, 2022

ORIGINAL SCALE: 1:200

IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.

25mm

DESIGNED BY: DY

DRAWN BY: JT

CHECKED BY: DY

DISCIPLINE: CIVIL

TITLE:

EROSION AND SEDIMENTATION CONTROL PLAN - BUILDING 2

SHEET NUMBER: C10

SHEET #: OF

ISSUE: ISSUED FOR SPA

REV #: 0

DATE OF: 2022-08-15

D07-XX-XX-XXXX

#XXXXX

INSTALL MUD MAT AT CONSTRUCTION ACCESS REFER TO DETAIL

FILTER CLOTH PLACED UNDER ALL PROPOSED AND EXISTING AND CBMH COVER

PROPOSED SILT FENCE AS PER OPSD 219.110

PROPOSED SILT FENCE AS PER OPSD 219.110

UNDERGROUND PARKING LIMIT

UNDERGROUND PARKING LIMIT

PROPOSED BUILDING 2
FFE=89.47 (GROUND)

BALCONY

BALCONY

PARCEL BY OTH

Top of Slope

Bottom of Slope

120.00m – 750mmø STM @ 0.2

111.50m – 250mmø SAN @ 0.65%

CB304B

T/G 90.42

400ø WATERMAIN

TAWADINA ROAD

BUILDING 3

BALCONY

BALCONY

BALCONY

BALCONY

BALCONY

BALCONY

BALCONY

BALCONY

PROPOSED BUILDING 3
FFE=90.85 (GROUND)

SIXTH FLOOR BELOW
(F.F.E. 111.325m)

1.8M CONC. PUBLIC SIDEWALK

CODD'S ROAD

SCALE: 1:200

wsp

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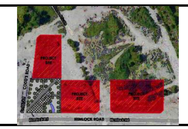
1000/1050 TAWADINA
ROAD, OTTAWA, ON

KEY PLAN:



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PROJECT NO: 221-04473-00

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ORIGINAL SCALE: 1:200

DESIGNED BY: DY

DRAWN BY: JT

CHECKED BY: DY

IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.

25mm

DISCIPLINE: CIVIL

TITLE:

EROSION AND SEDIMENTATION CONTROL PLAN - BUILDING 3

SHEET NUMBER: C11

SHEET #: OF:

ISSUE: ISSUED FOR SPA

REV #: 0

DATE OF: 2022-08-15

D07-XX-XX-XXXX

#XXXXX

APPENDIX

APPENDIX

F

- SUBMISSION CHECK LIST

4.1 General Content

☒ Executive Summary (for larger reports only).

Comments: Refer to Servicing Report Section 1.1

☒ Date and revision number of the report.

Comments: *Refer to front page of the Report*

☒ Location map and plan showing municipal address, boundary, and layout of proposed development.

Comments: *Refer to Figure 1.1 Site Location for Location Map and Plan*

☒ Plan showing the site and location of all existing services.

Comments: *Refer to drawing C06 to C08*

☒ Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.

Comments: *Refer to Architectural Site Plan*

☒ Summary of Pre-consultation Meetings with City and other approval agencies.

Comments: Refer to Appendix A for Pre-Consultation Meeting Notes

☒ 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.

Comments: *N/A*

☒ Statement of objectives and servicing criteria.

Comments: Refer to Servicing Report Section 1.7

☒ Identification of existing and proposed infrastructure available in the immediate area.

Comments: *Refer to drawing C06 to C08*

☒ 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).

Comments: *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.

Comments: *Refer to drawing C03 to C05*

☒ 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.

Comments: *N/A*

☒ Proposed phasing of the development, if applicable.

Comments: *N/A*

☒ Reference to geotechnical studies and recommendations concerning servicing.

Comments: *N/A*

☒ 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

Comments: *Refer to drawing C03 to C08*

4.2 Development Servicing Report: Water

☒ Confirm consistency with Master Servicing Study, if available

Comments: *Refer to Servicing Report Section 2.1*

☒ Availability of public infrastructure to service proposed development

Comments: Refer to Servicing Report Section 2.1

☒ Identification of system constraints

Comments: N/A

☒ Identify boundary conditions

Comments: *Refer to Servicing Report Section 2.2*

☒ Confirmation of adequate domestic supply and pressure

Comments: *Refer to Servicing Report Section 2.3*

☒ 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.

Comments: *Refer to Servicing Report Section 2.4*

☒ 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.

Comments: *Refer to Servicing Report Section 2.5*

☒ Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design

Comments: *Refer to Servicing Report Section 2.6*

☒ Address reliability requirements such as appropriate location of shut-off valves

Comments: *Refer to Servicing Report Section 2.7*

☒ Check on the necessity of a pressure zone boundary modification.

Comments: *Refer to Servicing Report Section 2.8*

☒ 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

Comments: *Refer to Servicing Report Section 2.9*

☒ 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.

Comments: *Refer to Servicing Report Section 2.10*

☒ 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.

Comments: *Refer to Servicing Report Section 2.11*

☒ Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.

Comments: *Refer to Servicing Report Section 2.12*

☒ Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

Comments: *Refer to Servicing Report Section 2.13*

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).

Comments: *Refer to Servicing Report Section 3.1*

☒ Confirm consistency with Master Servicing Study and/or justifications for deviations.

Comments: *Refer to Servicing Report Section 3.2*

☒ 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.

Comments: *Refer to Servicing Report Section 3.3*

☒ Description of existing sanitary sewer available for discharge of wastewater from proposed development.

Comments: *Refer to Servicing Report Section 3.4*

☒ 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)

Comments: *Refer to Servicing Report Section 3.5*

☒ Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.

Comments: Refer to Servicing Report Section 3.9 and 3.11

☒ Special considerations such as contamination, corrosive environment etc.

Comments: *Refer to Servicing Report Section 3.8*

4.4 Development Servicing Report: Stormwater

☒ Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)

Comments: *Refer to Servicing Report Section 4.1*

☒ Analysis of available capacity in existing public infrastructure.

Comments: *Refer to Servicing Report Section 4.2*

☒ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.

Comments: *Refer to drawing C06 to C08*

☒ 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.

Comments: *Refer to Servicing Report Section 4.4*

☒ Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.

Comments: Refer to Servicing Report Section 4.5

☒ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.

Comments: *Refer to Servicing Report Section 4.6-4.10*

☒ Set-back from private sewage disposal systems.

Comments: *N/A*

☒ Watercourse and hazard lands setbacks.

Comments: N/A

☒ Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.

Comments: N/A

☒ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.

Comments: *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).

Comments: *Refer to Servicing Report Section 4.6-4.10 and Appendix D*

☒ Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.

Comments: Refer to Servicing Report Section 4.11

☒ 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.

Comments: *Refer to Servicing Report Section 4.12*

☒ Any proposed diversion of drainage catchment areas from one outlet to another.

Comments: Refer to Servicing Report Section 4.13

☒ Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.

Comments: Refer to Section 4.6-4.10, Appendix D and drawing C06 and C08

☒ 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.

Comments: Refer to Section 4.6-4.10 and Appendix D

☒ Identification of potential impacts to receiving watercourses

Comments: Refer to Section 4.15

☒ Identification of municipal drains and related approval requirements.

Comments: Refer to Section 4.16

☒ Descriptions of how the conveyance and storage capacity will be achieved for the development.

Comments: *Refer to Section 4.17*

☒ 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.

Comments: Refer to drawings C03 and C05

☒ Inclusion of hydraulic analysis including hydraulic grade line elevations.

Comments: Refer to Section 4.18

☒ Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.

Comments: *Refer to Section 5.0 and drawings C09 and C11*

☒ 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.

Comments: *N/A*

☒ Identification of fill constraints related to floodplain and geotechnical investigation.

Comments: *N/A*

4.5 Approval and Permit Requirements: Checklist

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

☐ 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 Act. 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.

Comments: Not applicable.

☐ Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.

Comments: Not applicable.

☐ Changes to Municipal Drains.

Comments: *Not applicable.*

☐ Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)

Comments: *Not applicable.*

4.6 Conclusion Checklist

☒ Clearly stated conclusions and recommendations

Comments:

☐ 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.

Comments: *Further comments to be added following site plan application review.*

☒ All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario

Comments: