STORMWATER MANAGEMENT REPORT

LIB KANATA
KANATA AVENUE AND MARITIME WAY

CITY OF OTTAWA, ONTARIO

733, chemin Jean-Adam
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ÉQUIPE LAURENCE INC.
File: 60.04.01
September 2021

PROJECT: LIB KANATA
Stormwater Management Report

FILE: 60.04.01

PREPARED BY:

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ISSUE: September 24, 2021

TABLE OF CONTENTS

1.0 INTRODUCTION

This project consists of the residential development of Parcels 2, 3 and 5 located at the intersection of Kanata Avenue and Maritime Way, in the suburb of Kanata. Équipe Laurence Inc. was mandated to carry out the design of the drinking water, storm and sanitary sewer systems that serve the proposed building as well as the stormwater management report. The civil engineering plans depicting the general features of the site, such as the parking areas, sewer structures and landscaping is attached to this report in Appendix A.

As part of the stormwater management system, the flow of water will be controlled on-site and discharged through a 200 mm diameter service connection. This pipe will be connected to the existing 1625 mm diameter storm sewer on Maritime way as shown on the attached plans.

In this report, the design and calculations of the stormwater management system will be discussed. The design was completed in accordance with the following design guidelines and regulations:

- *Ottawa Sewer Design Guidelines* (2012)
- *Technical memo* written by Justin Armstrong, Project Manager from the Planning, Infrastructure and Economic Development Department. File No. PC2021-0079
- *Stormwater Management Report Kanata Town Centre*, Volumes 1 & 2, prepared by J.L. Richards, (January 1999)

2.0 DESIGN INTENT AND PARAMETERS

According to a complementary land survey completed by *Annis, O'Sullivan, Vollebekk Ltd.* on April 13, 2021, attached in Appendix B, the subject site is primarily occupied by forested areas. In addition, the elevation difference measured between the back of the lot and the property line along the road right-of-way varies between approximately 2 and 5 m.

For the design of the stormwater management system, the calculations were done to ensure that the post-development flows are equivalent to or lesser than the pre-development overland flow. Hence, the stormwater flows for the developed site as well as the storage requirements will be explored in the following sections.

2.1 Calculation of Pre-development Flows

The pre-development overland flow was determined using the criteria outlined in the *Ottawa Sewer Design Guidelines (2012)* as well as the following site information:

- The proposed site area of 1.572 hectares.
- The Rational Method for the calculation of flow as indicated in Section 5.4.4.1 of the design guideline.
- The IDF curves and equations as indicated in Section 5.4.2 of the design guideline.
- The runoff coefficients as shown in Table 5.7 of the design guideline.

The time of concentration for the pre-developed site is of 10 minutes and the runoff coefficients used are shown in the table below.

Table 1: Forested Area Runoff Coefficients for Various Storm Events

Storm Event	Runoff Coefficient For Forested Areas
5-yr	0.20
100-yr	0.25

Using these values, the pre-development overland flow is of 109.2 L/s and 234.0 L/s for the 5-yr and 100-yr storm, respectively. The detailed calculations are attached in Appendix C.

2.2 Design Criteria for Post-Development Flows

According to the *Technical Memo*, the allowable release rate to the minor system for the proposed site will be equivalent to the pre-development flow for the 5-year storm event. As mentioned in the previous section, the predevelopment flow for the 5-year storm is of 109.2 L/s. Moreover, it is mentioned that flows in excess of the 5-yr storm allowable release rate, up to and including the 100-yr storm event, must be retained on site. Hence, these storm events must be considered for the post-development flow calculations.

In addition, to account for the effects of climate change, a 20% increase will be added to the rainfall intensities for both the 5-yr and 100-yr storm events, as per the *Ottawa Sewer Design Guideline*.

3.0 CATCH BASIN SUB-AREAS

The catch basins sub-areas are used to collect the stormwater from its associated area. The areas of impervious and pervious surfaces are determined for each catch basin. The catch basin sub-areas are depicted on drawing C-204 in Appendix A.

The runoff coefficients used for the post-development flow calculations for the 5-year storm event are shown in the table below. The 100-year runoff coefficients are determined by increasing the following coefficients by 25%, as per the *Ottawa Sewer Design Guideline*.

Table 2: Runoff Coefficients for Various Land Uses

Land Use	Runoff Coefficient
Forested area	0.20
Grass area	0.25
Paved and roof areas	0.90

Using this information, the average runoff coefficients corresponding to both storm events are calculated. The results are shown in Table 3 and the detailed calculations are presented in Appendix C.

Table 3: Average Runoff Coefficients for the Various Catch Basin Sub-Areas

Catch Basin Sub-Area	Total Area (m²)	5-year Runoff Coefficient	100-year Runoff Coefficient
CB-01	2712	0.475	0.528
CB-02	1845	0.501	0.553
CB-03	733	0.610	0.663
CB-04	802	0.829	0.881
CB-05	2013	0.550	0.603
CBMH-05	718	0.406	0.461
Building	4319	0.900	0.950

4.0 POST-DEVELOPMENT FLOWS

4.1 Uncontrolled Flows

For the proposed stormwater management system, there is an uncontrolled flow at the front of the building – i.e. on the surfaces parallel to the streets – as well as on the west side of the property. The total uncontrolled surface is of 2581 m², and the calculated time of concentration is of 10 minutes. Therefore, the uncontrolled flows for the 5-year and 100-year storm events are 42.9 L/s and 82.1 L/s, respectively.

To ensure that the proposed stormwater management system is sufficiently capable of managing the 100-year storm event and abides by the Ottawa Sewer Design Guideline, the uncontrolled flow for the 100-year storm will be subtracted from the allowable release rate of 109.2 L/s, as calculated in Section 2.1.1, for the calculations of the controlled flows as well as the storage requirements. Therefore, the allowable release rate is of 27.1 L/s.

4.2 Controlled Flows and Storage Requirements

The controlled flows for the developed site as well as the required storage were calculated using the Rational Method. The detailed calculations are found in Appendix C.

Table 4: Storage Requirements for an Allowable Release Rate of 27.1 L/s, using the City of Ottawa IDF Curves

Storm Event	Time of Conc. (min)	Intensity (mm/hr)	Peak Flow (L/s)	Max Volume (m³)	Outgoing Volume (m³)	Required Storage Volume (m³)
5-yr	60.00	39.53	94.6	340.40	87.82	252.59
100-yr	110.00	42.24	109.0	719.58	161.00	558.58

Therefore, to retain the 100-yr storm event as mentioned in Section 2.1.2, the required storage volume on site is of 614.4 m³. The volume of 558.6 m³ is increased by 10% as a factor of safety.

The required storage will be retained partly on the roof of the proposed building as well as in the storm sewer structures and pipes. The remaining volume will be stored in an underground concrete tank. The proposed stormwater storage distribution is shown in Table 5.

Table 5: Proposed Stormwater Storage

Description	Parameters	Values	Units
Proposed storage volume on roof, underground concrete tank and sewer structures	5-year required storage[1]	278	m³
	100-year required storage[1]	614	m³
	Maximum accumulation on roof	150	mm
	Volume retained on roof	173	m³
	Volume retained in underground concrete tank	431.7	m³
	Volume retained in sewer structures and pipes	10.0	m³
	Total storage volume available	614	m³

1 - The required storage volume is increased by 10%.

5.0 STORMWATER QUALITY

As mentioned in the *Technical Memo*, the controlled flows from the site are tributary to the Kanata Town Centre Stormwater Management Facility, which is anticipated to provide the quality control for the site runoff. All other flows, such as the roof runoff and uncontrolled flows require no treatment considering no vehicular traffic is anticipated in these areas.

6.0 EROSION AND SEDIMENT CONTROL

Prior to, during and after construction, the following erosion and sediment control measures should be implemented to avoid the sediment transfer to existing streams and storm sewer systems. These measures are listed on the drawing C-202 in Appendix A.

Pre-Construction

- Installation of a silt fence (geotextile)
- Installation of filter cloths over all existing manholes

Construction

- Minimize the extent of disturbed areas
- Protect disturbed areas of runoff
- Provide cover if disturbed areas will not ne reinstated within a reasonable period of time

After Construction

- Provide permanent cover to disturbed areas (i.e. topsoil and seed)
- Remove all temporary erosion and sediment control items once disturbed areas have been reinstated

All control measures are to be inspected once installed as well as during construction.

APPENDIX A

Civil Engineering Plans

emd batimo
CONSTRUCTION PROMOTEUR ET GESTIONNAIRE IMMOBILIER

PROJECT:

LIB KANATA
KANATA AVENUE AND MARITIME WAY
CITY OF OTTAWA, ONTARIO

PROJECT NO: **600401**

DATE: **2021-09-24**

ÉQUIPE LAURENCE INGÉNIERIE CIVILE

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LIB KANATA - KANATA AVENUE AND MARITIME WAY
PROJET 600401 - PLANS ÉMIS FOR SITE PLAN APPLICATION REVISION 1, LE 2021-09-24

TECHNICAL AND GENERAL SPECIFICATIONS

1.0 GENERAL SPECIFICATIONS

All work shall conform with Ontario building code, latest edition as well as local regulation and bylaws.

Contractor to verify all dimensions and report any discrepancies to the engineer immediately to get design confirmation before proceeding with construction.

Refer to Ontario Provincial Standards for Roads and Public Works - Volume 3 for details.

Refer to the City of Otawa for regulations and standards.

Ontario provincial standars for roads and public works must also be respected.

Work to be performed in accordance with the Occupational Health and Safety Act and Regulations for Construction Projects.

All materials shall meet all current applicable standards set by the American Water Works Association ("AWWA"), Canadian Standards Association ("CSA"), the American National Standards Institute ("ANSI") safety criteria standards, American Society for Testing and Materials (ASTM), NSF/14, NSF/60 and NSF/61.

The Contractor will get approval for all materials selection from the Civil Engineer prior to delivery to the site.

BUILDING OWNER: EMD BATIMO

CONSULTING CIVIL ENGINEER: ÉQUIPE LAURENCE

2.0 GENERAL INFORMATIONS

2.1 UNDERGROUND SERVICES

The plans show certain underground installations for the sole purpose to highlight the existence of cables, pipelines and underground structures. In the sectors where work must be performed, the contractor is responsible to verify himself with the competent authorities the existence and actual location of all cables, pipelines and existing underground structures that may affect the works.

Before beginning excavations, the contractor must thus contact the Ontario One Call (www.on1call.com) , the municipal authorities and all other stake holders in order to identify on the field all existing underground structures whether they are shown on the plans or not.

He is responsible for damages to cables, pipelines and underground structures. No cost variation resulting from underground structures not shown or poorly located on the plans can be claimed against the building owner. Following the review of the plans and specifications, the contractor must notify the engineer of any error, omission or discrepancy noted by him before starting work.

2.2 EXISTING WATERMAIN AND SEWER CONDUITS

The location of the watermain and sewer pipes is approximate. The contractor must verify and validate the position and depth of the pipes by the means of meticulous excavations. Should discrepancies be observed, they must be provided to the engineer without delay in order that the required modifications are made to the construction plans. The contractor will have to coordinate with the city,the connecting works to the existing networks (watermain and sewers). No service interruption shall take place without the building owner's authorization or the relevant authorities.

2.3 PROTECTION AGAINST EROSION

As per ''Erosion and sediment control guideline for urbain construction''
In all areas of the building site where there is a risk of erosion, the ground must be stabilized.
Runoff water must be intercepted and routed to stabilized areas and this, throughout the construction period. The contractor must use the recognized methods to prevent the transport of sediments.

- Sediment barrier
- Sedimentation pond
- Filtering berm and sediment trap
- Straw bale filter

Any intervention on the building site which may cause the transfer of sediments must be simultaneously accompanied by sediment capture measures.

2.4 DRAINING OF THE EXCAVATIONS

The contractor shall take all necessary precautions to prevent the penetration of surface waters and to evacuate surface, underground or sewer waters. Waste waters must be directed towards a combined sewer or a sanitary sewer and the surface and underground waters towards a storm sewer, a combined sewer or a ditch. In all cases, the diversion site must be submitted for approval.
The contractor must assume all required pumping and cleaning costs.

2.5 PAVEMENT PROTECTION

At all times, the movement of machinery and metal tracked vehicles is prohibited on paved surfaces unless plywood sheets with a 20mm normal thickness or rubber with a 12.5mm thickness are used in order to avoid damaging pavement. All repairs or complete replacements of pavement is the contractor's responsibility, who will have to pay all the costs.

2.6 CLEANING OF SITE

At the end of the construction works and as often as requested by the project superintendent, the contractor must clean and eliminate all construction generated debris and restore all construction affected areas. The cleaning of the construction site is included in the global market unit prices.

3.0 SITE GRADING

Surface topsoil layer stripping required.

Low-lying areas may be filled by utilising soil cut from higher ares and by importing suitable fill materials.

The approved subgrade may be raised to design subgrade level with approved compactable on-site soil, providing it is placed in maximum 300 mm thick lifts and each lift is compacted to at least 95% of the material's SPMDD. As an alternative to subexcavation, a woven geotextile separator, such as Terratrack 24-15, Amoco 2002, Mirafi 500XL or equivalent, may be placed over spongy areas prior to placing the Granular 'B' sub-base layer.

4.0 CONCRETE WORKS

All weather exposed concrete shall have 5 to 8% air entrainment or as otherwise specified in Tables 2 and 4 of CSA A23.1.

Concrete sidewalk as per OPSD 310.010. Foundation consist of 150 mm minimum of granular 'A' material. Sidewalk concrete thickness shall be 200 mm.

Concrete barrier curb as per OPSD 600.110. Foundation consist of 150 mm minimum ofgranular 'A' material.

PROJECT LOCATION
NO SCALE

CIVIL ENGINEERING LEGEND

- EXISTING BUILDING
- PROPOSED BUILDING
- BOTTOM OF EMBANKMENT
- TOP OF EMBANKMENT
- DITCH CENTER
- DITCH TO BE REMOVED
- DITCH CENTER WITH ROCK FILL PROTECTION
- EXISTING FENCE
- FENCE TO BE REMOVED
- PROPOSED FENCE
- ISOLATED WETLAND
- EXISTING TREE
- WOODED AREA
- GUARDRAIL
- STONE RETAINING WALL
- EXISTING FIRE HYDRANT
- PROPOSED FIRE HYDRANT
- EXISTING WATER SERVICE VALUE
- PROPOSED WATER SERVICE VALUE
- EXISTING WATER PIPE
- EXISTING WATER PIPE TO BE REMOVED
- PROPOSED WATER PIPE
- EXISTING DRINKING WATER SERVICE CONNECTION
- PROPOSED DRINKING WATER SERVICE CONNECTION
- EXISTING SANITARY SEWER AND MANHOLE
- PROPOSED SANITARY SEWER AND MANHOLE
- SANITARY SEWER AND MANHOLE TO BE REMOVED
- EXISTING STORM SEWER PIPE AND MANHOLE
- PROPOSED STORM SEWER PIPE AND MANHOLE
- STORM SEWER AND MANHOLE TO BE REMOVED
- CULVERT
- EXISTING CATCH BASIN OR MANHOLE-CATCH BASIN
- PROPOSED CATCH BASIN OR MANHOLE-CATCH BASIN
- RPE-01 EXISTING STORM SEWER MANHOLE
- RP-01 PROPOSED STORM SEWER MANHOLE
- RSE-01 EXISTING SANITARY SEWER MANHOLE
- RS-01 PROPOSED SANITARY SEWER MANHOLE
- LIGHTNING UNIT
- OVERHEAD WIRING AND GUY WIRE
- EXISTING GAS PIPELINE
- BELL CANADA UNDERGROUND CABLE
- UNDERGROUND ELECTRICAL WIRE
- PROPOSED ASPHALT SURFACE
- PROPOSED CONCRETE SIDEWALK/SLAB
- PAVER SIDEWALK
- PROPOSED GRASS SURFACE
- GRANULAR SURFACE
- PROPOSED STONES SURFACE
- PROPOSED GRANITE STONES
- EXISTING ASPHALT SURFACE TO BE REMOVED
- EXISTING SURFACE TO BE REMOVED
- 26.300 PROPOSED ELEVATION
- B: 26.450 PROPOSED ELEVATION OF CONCRETE CURB
- D: 26.450 PROPOSED ELEVATION OF CONCRETE SLAB
- G: 26.650 PROPOSED TOP ELEVATION OF GRASS
- T: 26.450 PROPOSED TOP ELEVATION OF SIDEWALK
- TW: 26.450 PROPOSED TOP ELEVATION OF RETAINING WALL
- BW: 26.450 PROPOSED BOTTOM ELEVATION OF RETAINING WALL
- .25.30 EXISTING ELEVATION OF SURFACE
- -3.00% GRADING SLOPES
- NORTH

LIST OF PLANS

THIS DOCUMENT MUST NOT BE USED FOR CONSTRUCTION

REV	DESCRIPTION	BY	DATE
B	FOR SITE PLAN APPLICATION REVISION 1	A.L.	2021-09-24
A	FOR SITE PLAN APPLICATION	A.L.	2021-09-17

CLIENT: emd batimo CONSTRUCTION PROMOTEUR ET GESTIONNAIRE IMMOBILIER

PROJECT:
LIB KANATA
KANATA AVENUE AND MARITIME WAY
CITY OF OTTAWA, ONTARIO

ÉQUIPE LAURENCE INGÉNIERIE CIVILE
733, chemin Jean-Adam, Piedmont (Québec) J0R 1R3
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PROFESSIONAL ENGINEER A.LATOUR 100222266 PROVINCE OF ONTARIO
2021-09-26

TITLE:
TECHNICAL AND GENERAL SPECIFICATIONS, LEGEND AND NOTES LOCATION

SCALE: NO SCALE

B. BRAY, ing. / L.MENARD, CPI	C-200.dwg
DESIGN	DRAWING
F. LANDRY	2021-09-14
DRAWN	DATE
A. LATOUR, ing.	600401 C-201
APPROVED	PROJECT NO PLAN NO

EROSION AND SEDIMENT CONTROL

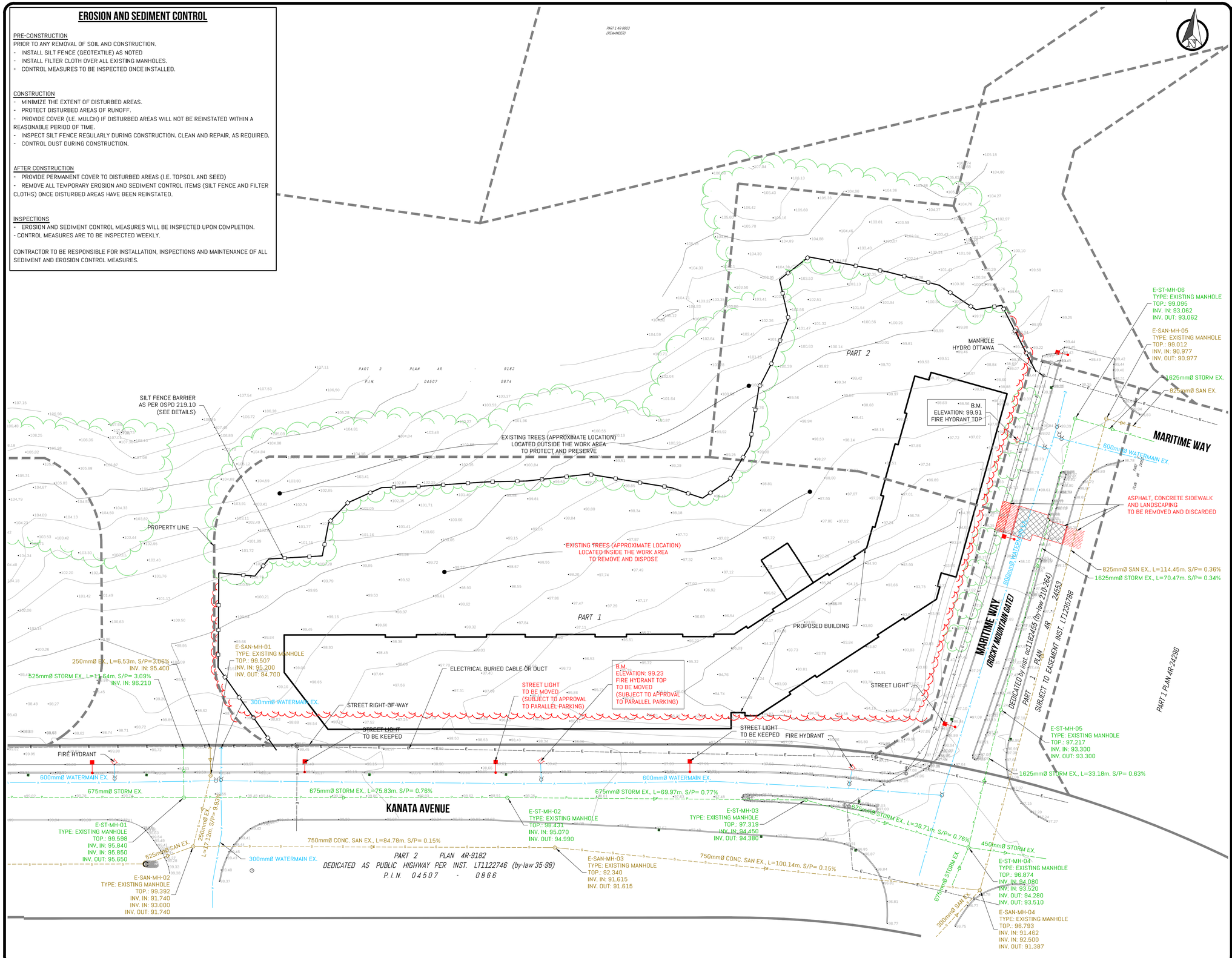
PRE-CONSTRUCTION
PRIOR TO ANY REMOVAL OF SOIL AND CONSTRUCTION.
- INSTALL SILT FENCE (GEOTEXTILE) AS NOTED
- INSTALL FILTER CLOTH OVER ALL EXISTING MANHOLES.
- CONTROL MEASURES TO BE INSPECTED ONCE INSTALLED.

CONSTRUCTION
- MINIMIZE THE EXTENT OF DISTURBED AREAS.
- PROTECT DISTURBED AREAS OF RUNOFF.
- PROVIDE COVER (I.E. MULCH) IF DISTURBED AREAS WILL NOT BE REINSTATED WITHIN A REASONABLE PERIOD OF TIME.
- INSPECT SILT FENCE REGULARLY DURING CONSTRUCTION. CLEAN AND REPAIR, AS REQUIRED.
- CONTROL DUST DURING CONSTRUCTION.

AFTER CONSTRUCTION
- PROVIDE PERMANENT COVER TO DISTURBED AREAS (I.E. TOPSOIL AND SEED)
- REMOVE ALL TEMPORARY EROSION AND SEDIMENT CONTROL ITEMS (SILT FENCE AND FILTER CLOTHS) ONCE DISTURBED AREAS HAVE BEEN REINSTATED.

INSPECTIONS
- EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSPECTED UPON COMPLETION.
- CONTROL MEASURES ARE TO BE INSPECTED WEEKLY.

CONTRACTOR TO BE RESPONSIBLE FOR INSTALLATION, INSPECTIONS AND MAINTENANCE OF ALL SEDIMENT AND EROSION CONTROL MEASURES.



NOTE:

THE EXISTING AND PROPOSED SUBDIVISION WILL HAVE TO BE VALIDATED BY THE SURVEYOR-GEOMETER ON FILE.

SURVEY AND LOTS INFORMATION PROVIDED BY
FARLEY, SMITH & DENIS SURVEYING LTD.
DATE: SEPTEMBER 13 2021
FILE NO.: 139-21
PLANIMETRIC REFERENCE SYSTEM: MTM NAD 83 ZONE 9
ALTIMETRIC REFERENCE SYSTEM: CGVD28 HT2.0

SITE PLAN PREPARED BY
ROSSMANN
ARCHITECTURE
DATE: SEPTEMBER 21 2021
PROJECT: 21019

EXISTING POWER DUCT BANK, WATERMAIN, STORM SEWER AND SANITARY SEWER FROM OTTAWA COORDINATING COMMITTEE CENTRAL REGISTRY AND CITY OF KANATA DEPARTMENT OF ENGINEERING

THE CONTRACTOR MUST NOTIFY ÉQUIPE LAURENCE, THE CONSULTANT, IF HE NOTICES ANY DISCREPANCIES BETWEEN THE INFORMATION PRESENTED ON THE PLANS AND THE MEASUREMENTS TAKEN ON SITE SO THAT ADJUSTMENTS CAN BE MADE.
WHEN APPLICABLE, HE MUST ALSO VERIFY THE ELEVATIONS OF EXISTING SEWERS BEFORE STARTING CONSTRUCTION AND MUST PROVIDE THE INFORMATION TO THE CONSULTANT.

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REV	DESCRIPTION	BY	DATE
B	FOR SITE PLAN APPLICATION REVISION 1	A.L.	2021-09-24
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CLIENT:
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LICENCE PROFESSIONAL ENGINEER
ALATOUR
100222289
PROVINCE OF ONTARIO
2021-09-26

TITLE:
PLAN VIEW
EXISTING ITEMS, DEMOLITION AND EROSION AND SEDIMENT CONTROL PLAN

SCALE: Horizontal 1:400 (0, 4, 8, 20 m)

B. BRAY, ing. / L.MENARD, CPI		C-202.dwg	
DESIGN		DRAWING	
F. LANDRY		2021-09-14	
DRAWN		DATE	
A. LATOUR, ing.		600401	C-202
APPROVED		PROJECT NO	PLAN NO

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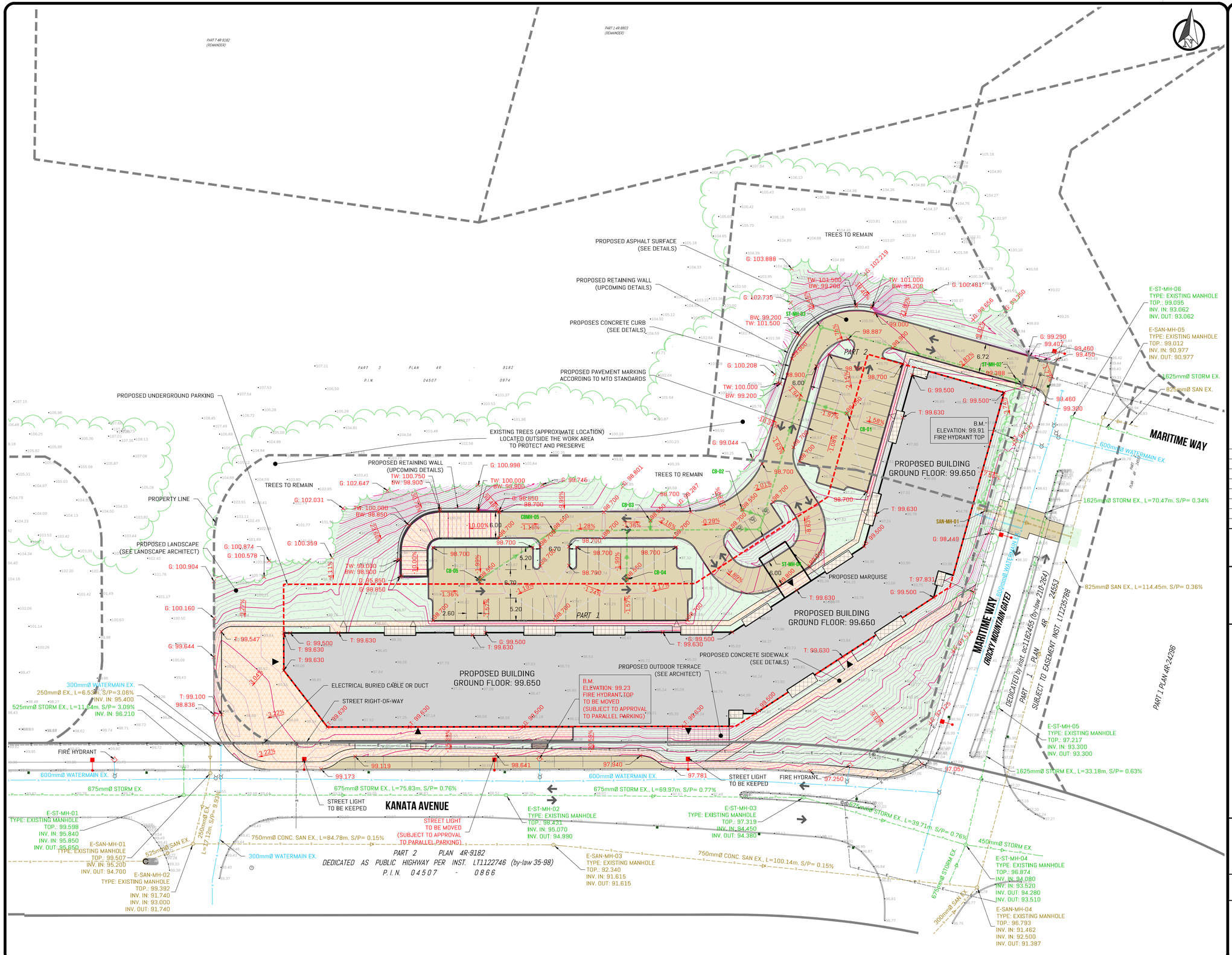

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ROSSMANN
ARCHITECTURE
DATE: SEPTEMBER 21 2021
PROJECT: 21019

EXISTING POWER DUCT BANK, WATERMAIN, STORM SEWER AND SANITARY SEWER FROM OTTAWA COORDINATING COMMITTEE CENTRAL REGISTRY AND CITY OF KANATA DEPARTMENT OF ENGINEERING

UNLESS OTHERWISE STATED, ALL PROPOSED ELEVATIONS SHOWN ON PLAN REPRESENT THE ELEVATION OF THE PAVEMENT SURFACE /PROJECTED TERRAIN.
ADD 0.15m TO SEE THE ELEVATION OF THE SIDEWALK OR ADJACENT

THE CONTRACTOR MUST NOTIFY ÉQUIPE LAURENCE, THE CONSULTANT, IF HE NOTICES ANY DISCREPANCIES BETWEEN THE INFORMATION PRESENTED ON THE PLANS AND THE MEASUREMENTS TAKEN ON SITE SO THAT ADJUSTMENTS CAN BE MADE.
WHEN APPLICABLE, HE MUST ALSO VERIFY THE ELEVATIONS OF EXISTING SEWERS BEFORE STARTING CONSTRUCTION AND MUST PROVIDE THE INFORMATION TO THE CONSULTANT.

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KANATA AVENUE AND MARITIME WAY
CITY OF OTTAWA, ONTARIO

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ORDRE DES INGÉNIEURS DU QUÉBEC PROFESSIONAL ENGINEER ALATOUR 100222589 PROVINCE OF ONTARIO
2021-09-26

TITLE:
SITE GRADING PLAN

SCALE: Horizontal 1:400 (0, 4, 8, 20 m)

B. BRAY, ing. / L.MENARD, CPI	C-203.dwg
DESIGN	DRAWING
F. LANDRY	2021-09-14
DRAWN	DATE
A. LATOUR, ing.	600401
APPROVED	PROJECT NO
	C-203
	PLAN NO

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STRUCTURE TABLE - STORM SEWER

NAME	DETAILS	ELEVATIONS / INVERTS	LOCATION
ST-MH-01	1200mmØ FLOWRATE REGULATOR	TOP.: 99.128 SUMP : 95.500 (N) 300mmØ PVC DR-35 INV. IN: 95.950 (W) 200mmØ PVC DR-35 INV. IN: 97.900 (E) 200mmØ PVC DR-35 INV. OUT: 95.950	X: 351429.4063 Y: 5019405.2426
ST-MH-02	915mmØ	TOP.: 99.375 SUMP : 95.800 (W) 300mmØ PVC DR-35 INV. IN: 96.150 (S) 300mmØ PVC DR-35 INV. OUT: 96.100	X: 351434.4303 Y: 5019434.7538
ST-MH-03	915mmØ	TOP.: 98.987 SUMP : 96.050 (S) 300mmØ PVC DR-35 INV. IN: 96.400 (E) 300mmØ PVC DR-35 INV. OUT: 96.350	X: 351387.3506 Y: 5019442.4216
ST-MH-04	915mmØ	TOP.: 98.671 SUMP : 96.300 (W) 300mmØ PVC DR-35 INV. IN: 96.650 (N) 300mmØ PVC DR-35 INV. OUT: 96.600	X: 351377.8340 Y: 5019393.6379

STRUCTURE TABLE - STORM SEWER

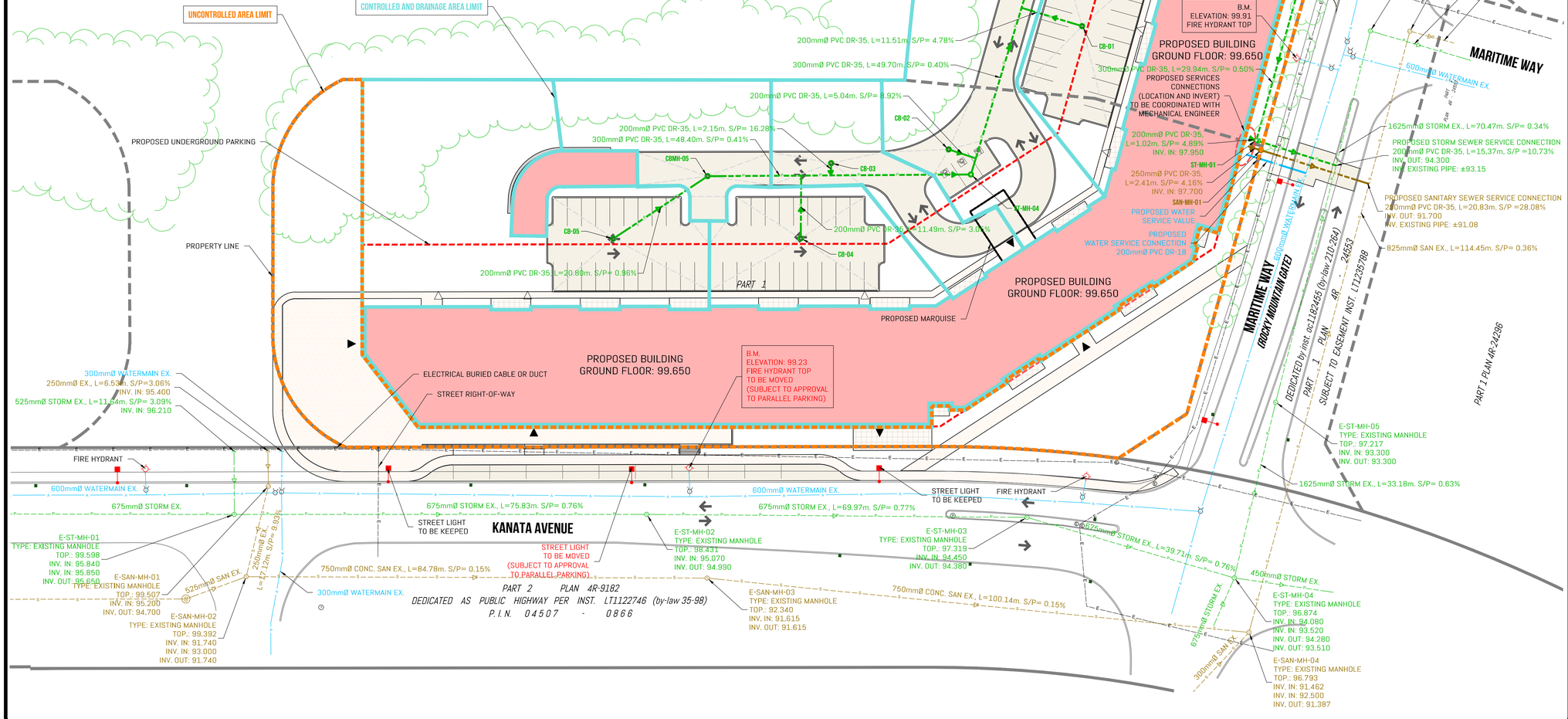
NAME	DETAILS	ELEVATIONS / INVERTS	LOCATION
CB-01	610mmØ AREA: 2712m² 5 YEAR RUNOFF COEFFICIENT: 0.475	TOP.: 98.550 SUMP : 96.750 (W) 200mmØ PVC DR-35 INV. OUT: 97.050	X: 351395.3939 Y: 5019422.8621
CB-02	610mmØ AREA: 1845m² 5 YEAR RUNOFF COEFFICIENT: 0.501	TOP.: 98.550 SUMP : 96.750 (E) 200mmØ PVC DR-35 INV. OUT: 97.050	X: 351373.3058 Y: 5019397.7993
CB-03	610mmØ AREA: 733m² 5 YEAR RUNOFF COEFFICIENT: 0.610	TOP.: 98.550 SUMP : 96.750 (S) 200mmØ PVC DR-35 INV. OUT: 97.050	X: 351352.0644 Y: 5019393.0648
CB-04	610mmØ AREA: 802m² 5 YEAR RUNOFF COEFFICIENT: 0.829	TOP.: 98.550 SUMP : 96.750 (N) 200mmØ PVC DR-35 INV. OUT: 97.050	X: 351347.9190 Y: 5019378.7321
CB-05	610mmØ AREA: 2013m² 5 YEAR RUNOFF COEFFICIENT: 0.550	TOP.: 98.550 SUMP : 96.750 (NE) 200mmØ PVC DR-35 INV. OUT: 97.050	X: 351313.6348 Y: 5019375.1633
CBMH-05	915mmØ AREA: 718m² 5 YEAR RUNOFF COEFFICIENT: 0.406	TOP.: 98.550 SUMP : 96.550 (SW) 200mmØ PVC DR-35 INV. IN: 96.850 (E) 300mmØ PVC DR-35 INV. OUT: 96.850	X: 351329.7175 Y: 5019388.3605

STRUCTURE TABLE - SANITARY SEWER

NAME	DETAILS	ELEVATIONS / INVERTS	LOCATION
SAN-MH-01	915mmØ	TOP.: 98.902 SUMP : 97.550 (W) 250mmØ PVC DR-35 INV. IN: 97.600 (E) 250mmØ PVC DR-35 INV. OUT: 97.550	X: 351430.4255 Y: 5019403.5535

STORMWATER MANAGEMENT NOTES:

REFER TO "STORMWATER MANAGEMENT REPORT" PREPARED BY ÉQUIPE LAURENCE INC.



NOTE:

THE EXISTING AND PROPOSED SUBDIVISION WILL HAVE TO BE VALIDATED BY THE SURVEYOR-GEOMETER ON FILE.

SURVEY AND LOTS INFORMATION PROVIDED BY
FARLEY, SMITH & DENIS SURVEYING LTD.
DATE: SEPTEMBER 13 2021
FILE NO.: 139-21
PLANIMETRIC REFERENCE SYSTEM: MTM NAD 83 ZONE 9
ALTIMETRIC REFERENCE SYSTEM: CGVD28 HT2.0

SITE PLAN PREPARED BY
ROSSMANN
ARCHITECTURE
DATE: SEPTEMBER 21 2021
PROJECT: 21019

EXISTING POWER DUCT BANK, WATERMAIN,
STORM SEWER AND SANITARY SEWER
FROM OTTAWA COORDINATING COMMITTEE
CENTRAL REGISTRY AND CITY OF KANATA
DEPARTMENT OF ENGINEERING

THE CONTRACTOR MUST NOTIFY ÉQUIPE LAURENCE, THE CONSULTANT, IF HE NOTICES ANY DISCREPANCIES BETWEEN THE INFORMATION PRESENTED ON THE PLANS AND THE MEASUREMENTS TAKEN ON SITE SO THAT ADJUSTMENTS CAN BE MADE,
WHEN APPLICABLE, HE MUST ALSO VERIFY THE ELEVATIONS OF EXISTING SEWERS BEFORE STARTING CONSTRUCTION AND MUST PROVIDE THE INFORMATION TO THE CONSULTANT.

THIS DOCUMENT MUST NOT BE USED FOR CONSTRUCTION

REV	DESCRIPTION	BY	DATE
B	FOR SITE PLAN APPLICATION REVISION 1	A.L.	2021-09-24
A	FOR SITE PLAN APPLICATION	A.L.	2021-09-17

CLIENT:
emd batimo
CONSTRUCTION PROMOTEUR ET GESTIONNAIRE IMMOBILIER

PROJECT:
LIB KANATA
KANATA AVENUE AND MARITIME WAY
CITY OF OTTAWA, ONTARIO

ÉQUIPE LAURENCE INGÉNIERIE CIVILE
733, chemin Jean-Adam, Piedmont (Québec) J0R 1R3
T 450 227 1857
info@equipelaurence.ca | equipelaurence.ca

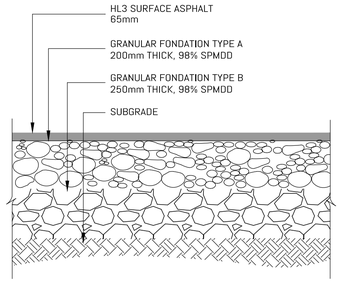
LATOUR PROFESSIONAL ENGINEER
A. LATOUR 100222290
PROVINCE OF ONTARIO
2021-09-26

TITLE:
SITE SERVICING PLAN
AND DRAINAGE AREA

SCALE: Horizontal 1:400 (0, 4, 8, 20 m)

B. BRAY, ing. / L.MENARD, CPI	DESIGN	C-204.dwg	DRAWING
F. LANDRY	DRAWN	2021-09-14	DATE
A. LATOUR, ing.	APPROVED	600401	PROJECT NO
		C-204	PLAN NO

f:\eq\ projets\600401\5_Plans\C-204.dwg, 2021-09-23 15:40:34, flandry



PARKING AND ACCESS FOUNDATION ASPHALT SURFACE

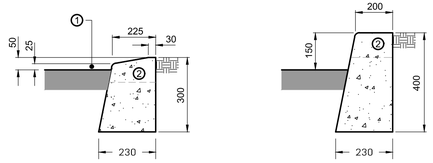
(TO BE VERIFIED BY GEOTECHNICAL ENGINEER)

① THE HEIGHT ABOVE THE PAVEMENT LEVEL IS 5mm FOR UNIVERSAL ACCESS AND FOR AJOINING BIKE PATH

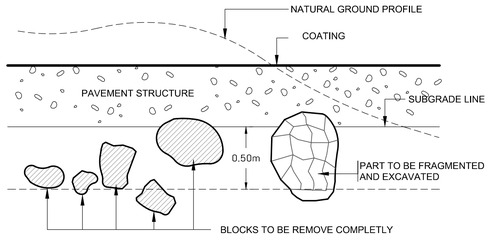
② TO CONTROL CRACKING, THE CURB IS CUT TO A DEPTH OF 100mm AT 6.0 m APART

NOTES:

- THE TRANSITION LENGTH BETWEEN A RAISED (OR LOWER) AND LEVELED CURB IS 1000mm;
- THE GRANULAR MATERIAL USED IN THE FOUNDATION (MINIMUM. THICKNESS : 150 mm) MUST BE GRANULAR FOUNDATION TYPE A
- THE FILL BEHIND THE CURB WILL BE DONE USING SIMILAR TO THE SURROUNDING SOIL;
- EDGES MUST BE ROUND TO A RADIUS OF 20mm;
- IN THE PRESENCE OF FIXED STRUCTURES SUCH AS A FIRE HYDRANT, THE SEPARATION JOINTS MUST BE DONE TO THE FULL THICKNESS OF THE CURB;
- DIMENSIONS ARE IN MILLIMETERS.
- CONCRETE CEMENT: TYPE VI OR VII
- COMPRESSION TESTS AT 7 DAYS AND 28 DAYS WILL BE PERFORMED BY A CERTIFIED LABORATORY.



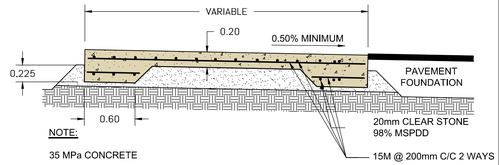
CONCRETE CURB



NOTES:

- ALL BLOCKS OVER 250mm DIAMETER PRESENT IN THE FIRST 500 mm UNDER INFRASTRUCTURE LINE MUST BE REMOVED, FRAGMENTED AND EXCAVATED TO 500 mm DEPT;
- AFTER REMOVING BLOCS, THE EXCAVATIONS HAVE TO BE RAISED TO DESIGN SUBGRADE LEVELS WITH APPROVED COMPACTABLE ON SITE SOIL.
- LIFTS OF 300mm THICK, COMPACTED AT 95% MSPDD
- AS AN ALTERNATIVE TO SUBEXCAVATION, A WOVEN GEOTEXTILE SEPARATOR, SUCH AS TERRATRACK 24-15, AMOCO 2002, MIRAFI 500XL OR EQUIVALENT, MAY BE PLACED OVER SPONGY AREAS PRIOR TO PLACING THE GRANULAR "B" SUB-BASE LAYER.

SUBGRADE PREPARATION DETAIL



NOTE:

35 MPa CONCRETE

STATISTICAL STRENGTH TEST ANALYSIS TO CONFIRM THE STRENGTH LEVEL INCLUDING THE EXPECTED 7/28-DAY STRENGTH RATIO (AS PER CSA A23.1 CLAUSE 4.4.6.7)

REINFORCED CONCRETE SLAB

THIS DOCUMENT MUST NOT BE USED FOR CONSTRUCTION

REV	DESCRIPTION	BY	DATE
B	FOR SITE PLAN APPLICATION REVISION 1	A.L.	2021-09-24
A	FOR SITE PLAN APPLICATION	A.L.	2021-09-17

CLIENT: emd batimo CONSTRUCTION PROMOTEUR ET GESTIONNAIRE IMMOBILIER

PROJECT:
LIB KANATA
KANATA AVENUE AND MARITIME WAY
CITY OF OTTAWA, ONTARIO

ÉQUIPE LAURENCE INGÉNIERIE CIVILE
733, chemin Jean-Adam, Piedmont (Québec) J0R 1R3
T 450 227 1857
info@equipelaurence.ca | equipelaurence.ca

LICENCED PROFESSIONAL ENGINEER A.LATOUR 100222299 PROVINCE OF ONTARIO
2021-09-26

TITLE:
STANDARD SECTIONS AND DETAILS

SCALE: NO SCALE

B. BRAY, ing. / L.MENARD, CPI	C-205.dwg	
DESIGN	DRAWING	
F. LANDRY	2021-09-14	
DRAWN	DATE	
A. LATOUR, ing.	600401	C-205
APPROVED	PROJECT NO	PLAN NO

① FILL BEHIND SIDEWALKS TO BE MADE WITH MATERIAL SIMILAR TO ADJACENT MATERIAL.

② THE CONCRETE THICKNESS MUST BE 150mm.

③ A COMPRESSIBLE BOARD WILL BE INSTALLED ON COMPLETE DEPTH OF CONCRETE FROM BACK OF SIDEWALK TO 25mm FROM FRONT SIDEWALK. A SAWCUT WILL BE DONE AT THE HELL IN LINE WITH THE COMPRESSIBLE BOARD.

④ THE FOUNDATION WILL BE GRANULAR FONDATION TYPE A

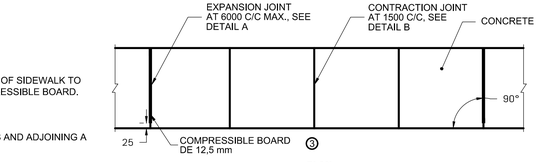
⑤ THE HEIGHT ABOVE PAVEMENT WILL BE 25mm FOR DRIVEWAYS, 5mm FOR A UNIVERSAL ACCESS AND ADJOINING A BIKE PATH.

THE CURB WILL BE CUT A 100mm DEEP AT EVERY 6.00m LENGTH.

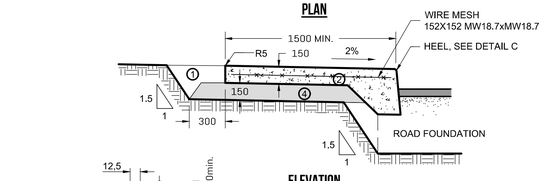
NOTES:

- SEPARATION JOINTS ARE REQUIRED BETWEEN SIDEWALK AND FIXED OBJECT SUCH AS A FIXE HYDRANT, A POLE OR MANHOLE;
- FOUNDATION AND SUBFOUNDATION MATERIAL WILL BE USED UNTIL TOP EMBANKMENT IS REACHED;
- MESUREMENTS ARE IN MILLIMETERS;
- CONCRETE CEMENT:
  - POURED IN PLACE: TYPE IV OR V;
  - MMOULDED ON SITE: TYPE VI ORVII.
- COMPRESSION TESTS AT 7 DAYS AND 28 DAYS WILL BE PERFORMED BY A CERTIFIED LABORATORY.

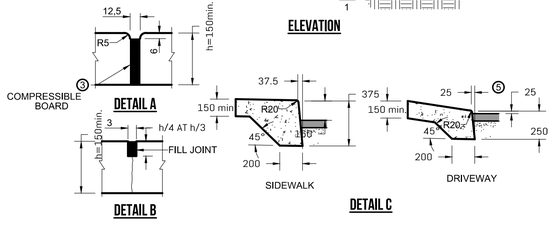
LIMITED MOBILITY PERSON LAYOUT, VIEW DRAWING BOARD OPSD 219.110



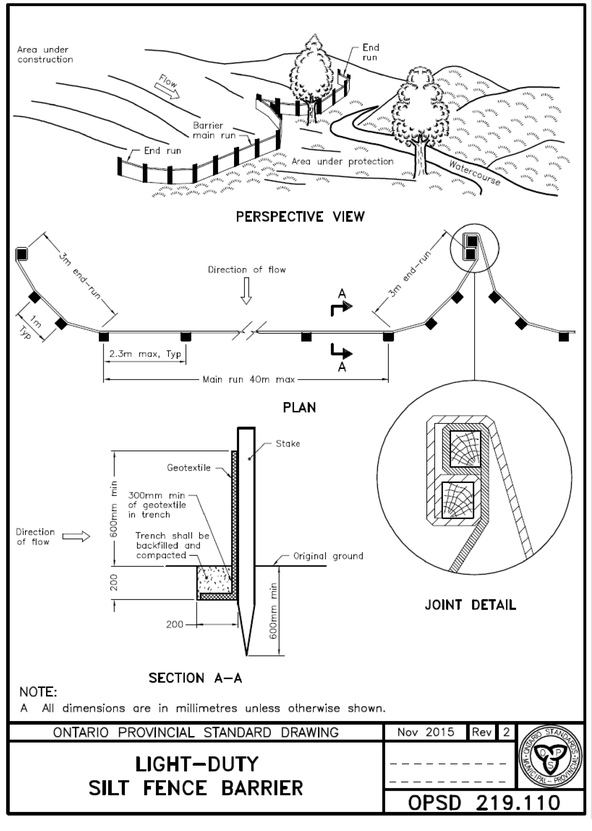
PLAN



ELEVATION



MONOLITHIC SIDEWALK AND CURB



NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING | Nov 2015 | Rev 2

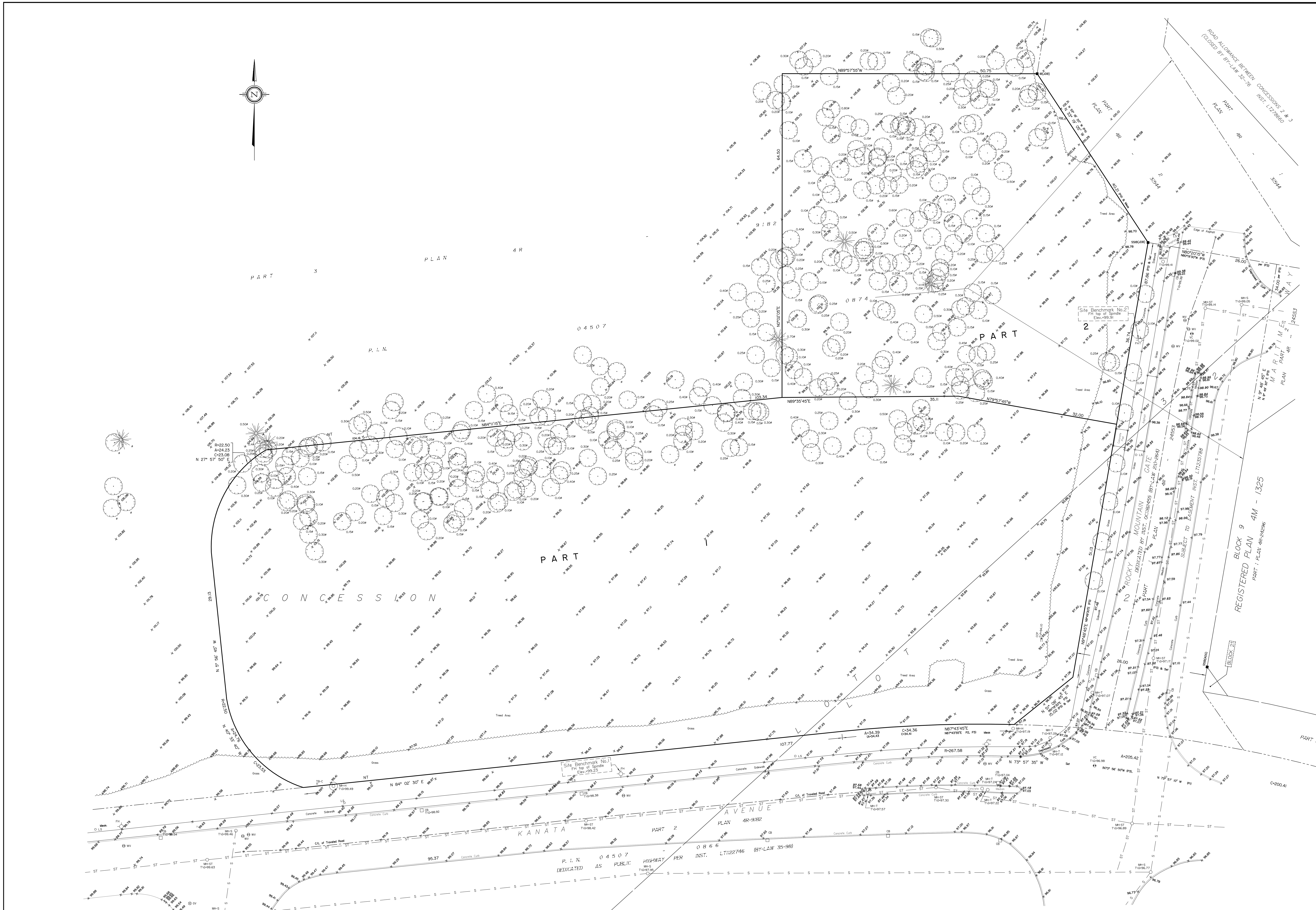
LIGHT–DUTY SILT FENCE BARRIER

OPSD 219.110

APPENDIX B

Land Survey by

Annis, O'Sullivan, Vollebekk Ltd. on April 13, 2021



TOPOGRAPHICAL PLAN OF SURVEY OF

PART OF LOTS 2 AND 3 CONCESSION 2

GEOGRAPHIC TOWNSHIP OF MARCH

CITY OF OTTAWA

Prepared by Annis, O'Sullivan, Vollebekk Ltd.

Surveyor's Certificate

I CERTIFY THAT :

1. This survey and plan are correct and in accordance with the Surveys Act and the Surveyors Act and the regulations made under them.
2. The survey was completed on the 13th day of April, 2021.

__________ Date

__________ T. Hartwick, Ontario Land Surveyor

Scale 1 : 250

10 7.5 5.0 2.5 0 5 10 Metres

Metric

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

Notes & Legend

Symbol		Denotes
⊐— ⊣	"	Survey Monument Planted
—■— I	"	Survey Monument Found
SIB	"	Standard Iron Bar
SSIB	"	Short Standard Iron Bar
IB	"	Iron Bar
RP	"	Rock Post
NT	"	Non Tangential
(WIT)	"	Witness
Meas.	"	Measured
(AOG)	"	Annis, O'Sullivan, Vollebekk Ltd.
(P1)	"	Plan 4R-9182
(P2)	"	Plan 4R-16146
(P3)	"	Plan
(P4)	"	Plan 4R-31544
◯	"	Deciduous Tree
✳	"	Coniferous Tree
FH	"	Fire Hydrant
WV	"	Water Valve
MH-ST	"	Maintenance Hole (Storm Sewer)
MH-S	"	Maintenance Hole (Sanitary)
MH-B	"	Maintenance Hole (Bell Telephone)
MH-T	"	Maintenance Hole (Traffic)
MH-H	"	Maintenance Hole (Hydro)
TB-C	"	Cable Terminal Box
VC	"	Valve Chamber (Watermain)
— ST —	"	Underground Storm Sewer
— S —	"	Underground Sanitary Sewer
CB	"	Catch Basin
S	"	Sign
UP	"	Utility Pole
AN	"	Anchor
LS	"	Light Standard
Ø	"	Diameter
65.00 +	"	Location of Elevations
65.00 +	"	Top of Concrete Curb Elevation
C/L	"	Centreline
———	"	Property Line
CCP	"	Concrete Pipe
T/P	"	Top of Pipe

Bearings hereon are grid bearings referred to the northerly limit of Kanata Avenue having a bearing of N84°03'15"E and are referenced to Specified Control Points 01919680037 and 01919791051, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

ELEVATION NOTES

1. Elevations shown are geodetic and are referred to the CGVD28 geodetic datum.
2. It is the responsibility of the user of this information to verify that the job benchmark has not been altered or disturbed and that it's relative elevation and description agrees with the information shown on this drawing.

UTILITY NOTES

1. This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation.
2. Only visible surface utilities were located.
3. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
V-13593

THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR In accordance with Regulation 1026, Section 29 (3).

Ontario Land Surveyors
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

Job No. 21429-21 6301 Campeau Dr_Lt23_C2_Topo_D3_client | ns

APPENDIX C

Detailed Calculations of

Stormwater Flows and Storage Requirements

PRE-DEVELOPMENT FLOW

Parameters	Values	Units
Forested area	15723	m²
5-year runoff coefficient	0.200	-
100-year runoff coefficient	0.250	-
Time of concentration	10	min
Pre-development 5-year flow	109.2	ℓ/s
Pre-development 100-year flow	234.0	ℓ/s

* The 100-year runoff coefficients are determined by increasing the 5-year runoff coefficients by 25% as per the city of Ottawa sewer design guidelines.

PROPOSED UNCONTROLLED FLOW

Parameters	Values	Units
Impervious surfaces	936	m²
Grass surfaces	1266	m²
Forested surfaces	379	m²
Total area	2581	m²
5-year Runoff coefficient	0.478	-
100-year Runoff coefficient	0.598	-
Time of concentration	10	min
Uncontrolled 5-year flow	42.9	ℓ/s
Uncontrolled 100-year flow	82.1	ℓ/s

* The 100-year runoff coefficients are determined by increasing the 5-year runoff coefficients by 25% as per the city of Ottawa sewer design guidelines.

PROPOSED CATCHMENT AREAS

Drainage area	Total area (m²)	Impervious surfaces		Grass surfaces		Forested area		5-year runoff coefficient	100-year runoff coefficient
		Area (m²)	Runoff coefficient	Area (m²)	Runoff coefficient	Area (m²)	Runoff coefficient		
CB-01	2712	1026	0.900	555	0.250	1131	0.200	0.475	0.528
CB-02	1845	770	0.900	320	0.250	755	0.200	0.501	0.553
CB-03	733	420	0.900	137	0.250	176	0.200	0.610	0.663
CB-04	802	715	0.900	87	0.250	0	0.200	0.829	0.881
CB-05	2013	969	0.900	525	0.250	519	0.200	0.550	0.603
CBMH-05	718	193	0.900	260	0.250	265	0.200	0.406	0.461
Building	4319	4319	0.900	0	0.250	0	0.200	0.900	0.950

* The 100-year runoff coefficients are determined by increasing the 5-year runoff coefficients by 25% as per the city of Ottawa sewer design guidelines.

PROPOSED CONTROLLED FLOW

Parameters	Values	Units
5-year pre-development flow	109.2	ℓ/s
100-year uncontrolled flow	82.1	ℓ/s
Allowable release rate / Controlled flow	27.1	ℓ/s
5-year storage requirements	252.6	m³
100-year storage requirements	558.6	m³

5-YEAR EVENT STORAGE REQUIREMENTS - CITY OF OTTAWA IDF CURVES, CONTROLLED FLOW OF 27.1 L/S

Time of concentration (min)	Intensity (mm/hr)	Peak Flow (m^3/s)	Max volume (m^3)	Outgoing volume (m^3)	Required storage volume (m^3)
5.00	169.41	0.41	121.57	7.32	114.25
10.00	125.03	0.30	179.44	14.64	164.80
15.00	100.27	0.24	215.85	21.95	193.89
20.00	84.30	0.20	241.97	29.27	212.70
25.00	73.08	0.17	262.18	36.59	225.59
30.00	64.71	0.15	278.62	43.91	234.71
35.00	58.22	0.14	292.44	51.23	241.22
40.00	53.02	0.13	304.37	58.55	245.83
45.00	48.75	0.12	314.86	65.86	249.00
50.00	45.18	0.11	324.22	73.18	251.04
55.00	42.15	0.10	332.68	80.50	252.19
60.00	**39.53**	**0.09**	**340.40**	**87.82**	**252.59**
65.00	37.25	0.09	347.51	95.07	252.43
70.00	35.25	0.08	354.08	101.84	252.24
75.00	33.47	0.08	360.21	108.56	251.65
80.00	31.87	0.08	365.95	115.23	250.73
85.00	30.44	0.07	371.36	121.85	249.50
90.00	29.15	0.07	376.46	128.44	248.02
95.00	27.97	0.07	381.29	134.98	246.31
100.00	26.89	0.06	385.89	141.48	244.41
105.00	25.90	0.06	390.27	147.94	242.33
110.00	24.99	0.06	394.46	154.37	240.09
115.00	24.14	0.06	398.47	160.75	237.71
120.00	23.36	0.06	402.32	167.10	235.22
125.00	22.63	0.05	406.02	173.40	232.61
130.00	21.95	0.05	409.58	179.67	229.91
135.00	21.32	0.05	413.02	185.89	227.14
140.00	20.72	0.05	416.34	192.06	224.29
145.00	20.16	0.05	419.56	198.18	221.38
150.00	19.63	0.05	422.67	204.25	218.42
155.00	19.14	0.05	425.69	210.27	215.42
160.00	18.67	0.04	428.62	216.23	212.39
165.00	18.22	0.04	431.47	222.14	209.33
170.00	17.80	0.04	434.24	228.00	206.25
175.00	17.40	0.04	436.94	233.79	203.14

Time of concentration (min)	Intensity (mm/hr)	Peak Flow (m^3/s)	Max volume (m^3)	Outgoing volume (m^3)	Required storage volume (m^3)
180.00	17.02	0.04	439.57	239.54	200.03
185.00	16.65	0.04	442.13	245.24	196.89
190.00	16.31	0.04	444.63	250.90	193.73
195.00	15.98	0.04	447.07	256.52	190.55
200.00	15.66	0.04	449.46	262.12	187.33
205.00	15.36	0.04	451.79	267.72	184.07
210.00	15.07	0.04	454.07	273.32	180.75
215.00	14.79	0.04	456.30	279.72	176.59
220.00	14.52	0.03	458.49	286.22	172.27
225.00	14.27	0.03	460.64	292.73	167.91
230.00	14.02	0.03	462.74	299.23	163.51
235.00	13.78	0.03	464.80	305.74	159.06
240.00	13.55	0.03	466.82	312.24	154.58
245.00	13.33	0.03	468.81	318.75	150.06
250.00	13.12	0.03	470.76	325.25	145.50
255.00	12.92	0.03	472.67	331.76	140.92
260.00	12.72	0.03	474.55	338.26	136.29
265.00	12.53	0.03	476.40	346.04	130.37
270.00	12.34	0.03	478.22	355.21	123.02
275.00	12.16	0.03	480.02	365.20	114.81
280.00	11.99	0.03	481.78	376.14	105.64
285.00	11.82	0.03	483.51	388.17	95.34
290.00	11.66	0.03	485.22	401.44	83.78
295.00	11.50	0.03	486.90	416.13	70.77
300.00	11.35	0.03	488.56	432.42	56.14
305.00	11.20	0.03	490.19	446.41	43.79
310.00	11.05	0.03	491.81	453.72	38.08
315.00	10.91	0.03	493.39	461.04	32.35
320.00	10.78	0.03	494.96	468.36	26.60
325.00	10.65	0.03	496.50	475.68	20.82
330.00	10.52	0.03	498.03	483.00	15.03
335.00	10.39	0.02	499.53	490.32	9.22
340.00	10.27	0.02	501.02	497.63	3.38
345.00	10.15	0.02	502.48	504.95	-2.47
350.00	10.03	0.02	503.93	512.27	-8.34
355.00	9.92	0.02	505.36	519.59	-14.23
360.00	9.81	0.02	506.77	526.91	-20.13

*The rain intensity is increased by 20% as per the city of Ottawa sewer design guidelines to account for climate change effects
*The IDF curves were taken from the city of Ottawa sewer design guidelines.

100-YEAR EVENT STORAGE REQUIREMENTS - CITY OF OTTAWA IDF CURVES, CONTROLLED FLOW OF 27.1 L/S

Time of concentration (min)	Intensity (mm/hr)	Peak Flow (m^3/s)	Max volume (m^3)	Outgoing volume (m^3)	Required storage volume (m^3)
5.00	291.24	0.75	225.51	7.32	218.19
10.00	214.27	0.55	331.81	14.64	317.18
15.00	171.47	0.44	398.31	21.95	376.35
20.00	143.94	0.37	445.81	29.27	416.53
25.00	124.62	0.32	482.45	36.59	445.85
30.00	110.24	0.28	512.15	43.91	468.24
35.00	99.09	0.26	537.09	51.23	485.87
40.00	90.17	0.23	558.57	58.55	500.02
45.00	82.86	0.21	577.42	65.86	511.56
50.00	76.74	0.20	594.23	73.18	521.05
55.00	71.55	0.18	609.39	80.50	528.89
60.00	67.07	0.17	623.21	87.82	535.39
65.00	63.18	0.16	635.91	95.14	540.78
70.00	59.75	0.15	647.67	102.45	545.21
75.00	56.71	0.15	658.61	109.77	548.84
80.00	53.99	0.14	668.85	117.09	551.76
85.00	51.54	0.13	678.48	124.41	554.07
90.00	49.33	0.13	687.57	131.73	555.84
95.00	47.32	0.12	696.17	139.04	557.13
100.00	45.48	0.12	704.35	146.36	557.99
105.00	43.80	0.11	712.14	153.68	558.46
110.00	**42.24**	**0.11**	**719.58**	**161.00**	**558.58**
115.00	40.81	0.11	726.71	168.32	558.39
120.00	39.47	0.10	733.54	175.64	557.90
125.00	38.23	0.10	740.11	182.95	557.15
130.00	37.08	0.10	746.43	190.27	556.16
135.00	36.00	0.09	752.53	197.59	554.94
140.00	34.98	0.09	758.42	204.91	553.51
145.00	34.03	0.09	764.12	211.80	552.32
150.00	33.13	0.09	769.63	218.54	551.10
155.00	32.29	0.08	774.98	225.25	549.73
160.00	31.49	0.08	780.17	231.94	548.22
165.00	30.73	0.08	785.21	238.61	546.60
170.00	30.01	0.08	790.11	245.26	544.85
175.00	29.33	0.08	794.88	251.88	543.00

Time of concentration (min)	Intensity (mm/hr)	Peak Flow (m^3/s)	Max volume (m^3)	Outgoing volume (m^3)	Required storage volume (m^3)
180.00	28.68	0.07	799.52	258.48	541.04
185.00	28.07	0.07	804.05	265.07	538.98
190.00	27.48	0.07	808.47	271.63	536.84
195.00	26.92	0.07	812.78	278.17	534.61
200.00	26.38	0.07	817.00	284.70	532.30
205.00	25.87	0.07	821.12	291.20	529.91
210.00	25.37	0.07	825.14	297.69	527.46
215.00	24.90	0.06	829.09	304.16	524.93
220.00	24.45	0.06	832.95	310.61	522.34
225.00	24.01	0.06	836.73	317.04	519.69
230.00	23.60	0.06	840.44	323.45	516.99
235.00	23.19	0.06	844.07	329.84	514.23
240.00	22.81	0.06	847.64	336.22	511.42
245.00	22.43	0.06	851.14	342.58	508.56
250.00	22.07	0.06	854.57	348.91	505.66
255.00	21.73	0.06	857.95	355.23	502.72
260.00	21.39	0.06	861.27	361.53	499.73
265.00	21.07	0.05	864.53	367.81	496.71
270.00	20.75	0.05	867.73	374.07	493.66
275.00	20.45	0.05	870.89	380.31	490.58
280.00	20.16	0.05	873.99	386.52	487.46
285.00	19.87	0.05	877.04	392.72	484.32
290.00	19.60	0.05	880.05	398.89	481.16
295.00	19.33	0.05	883.01	405.04	477.97
300.00	19.07	0.05	885.93	411.17	474.76
305.00	18.82	0.05	888.80	417.27	471.54
310.00	18.57	0.05	891.64	423.35	468.29
315.00	18.34	0.05	894.43	429.40	465.03
320.00	18.11	0.05	897.18	435.42	461.76
325.00	17.88	0.05	899.90	441.42	458.48
330.00	17.66	0.05	902.58	447.40	455.18
335.00	17.45	0.05	905.23	453.34	451.88
340.00	17.24	0.04	907.84	459.26	448.57
345.00	17.04	0.04	910.41	465.16	445.26
350.00	16.84	0.04	912.96	471.02	441.93
355.00	16.65	0.04	915.47	476.86	438.61
360.00	16.47	0.04	917.95	482.67	435.28

*The rain intensity is increased by 20% as per the city of Ottawa sewer design guidelines to account for climate change effects

*The IDF curves were taken from the city of Ottawa sewer design guidelines.

PROPOSED STORMWATER STORAGE

Description	Parameters	Values	Units
Proposed storage volume on roof, underground concrete tank and sewer structures	5-year required storage[1]	278	m^3
	100-year required storage[1]	614	m^3
	Maximum accumulation on roof	150	mm
	Volume retained on roof	173	m^3
	Volume retained in underground concrete tank	431.7	m^3
	Volume retained in sewer structures and pipes	10.0	m^3
	Total storage volume available	614	m^3

1 - The required storage volume is increased by 10%.