



**Servicing and Stormwater
Management Report: The
Landing on Main (1364-1370
Stittsville Main Street)**

Stantec Project No. 160401727

March 25, 2022

Prepared for:

Bayview Stittsville Inc.
108 Chestnut Street
Toronto Ontario, M5G 1R3

Prepared by:

Stantec Consulting Ltd.
300-1331 Clyde Avenue
Ottawa ON K2C 3G4




Revision	Description	Author		Quality Check		Independent Review	
0	1 st Submission SPA	PM	2022-03-21	NC	2022-03-25	KK	2022-03-25



SERVICING AND STORMWATER MANAGEMENT REPORT: THE LANDING ON MAIN (1364-1370 STITTSVILLE MAIN STREET)

This document entitled **Servicing and Stormwater Management Report: The Landing on Main (1364-1370 Stittsville Main Street)** was prepared by Stantec Consulting Ltd. ("Stantec") for the account of Bayview Hospitality Group (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by 
Peter Mott, EIT.

Reviewed by _____
Neal Cody, P.Eng.

Approved by 
Kris Kilborn, Project Manager



Table of Contents

1.0	INTRODUCTION.....	1.1
1.1	OBJECTIVE	1.2
2.0	REFERENCES.....	2.1
3.0	POTABLE WATER SERVICING.....	3.1
3.1	BACKGROUND.....	3.1
3.2	WATER DEMANDS.....	3.1
3.2.1	Domestic Water Demands	3.1
3.2.2	Fire Flow Demands	3.2
3.2.3	Boundary Conditions.....	3.2
4.0	WASTEWATER SERVICING.....	4.1
4.1	BACKGROUND.....	4.1
4.2	DESIGN CRITERIA.....	4.1
4.3	PROPOSED SERVICING.....	4.1
5.0	STORMWATER MANAGEMENT.....	5.1
5.1	OBJECTIVES	5.1
5.2	SWM CRITERIA AND CONSTRAINTS	5.1
5.3	STORMWATER MANAGEMENT DESIGN.....	5.2
5.3.1	Allowable Release Rate	5.2
5.3.2	Site Storage Requirements	5.3
5.3.3	Results.....	5.5
6.0	SITE GRADING AND DRAINAGE.....	6.1
7.0	UTILITIES	7.1
8.0	APPROVALS	8.1
9.0	EROSION CONTROL DURING CONSTRUCTION.....	9.1
10.0	GEOTECHNICAL INVESTIGATION	10.1
11.0	CONCLUSIONS.....	11.1
11.1	WATER SERVICING.....	11.1
11.2	WASTEWATER SERVICING	11.1
11.3	STORMWATER SERVICING AND MANAGEMENT	11.1
11.4	GEOTECHNICAL CONSIDERATIONS	11.1
11.5	GRADING	11.1
11.6	UTILITIES	11.2



LIST OF TABLES

Table 3.1: Estimated Water Demands.....3.1
Table 5.1: Target Release Rate5.3
Table 5.2: Roof Control Area.....5.3
Table 5.3: 5-Year and 100-Year Surface Storage Requirements5.4
Table 5.4: Subsurface Storage.....5.5
Table 5.5: 5-Year and 100-Year Peak Uncontrolled (Non-Tributary) Release Rates5.5
Table 5.6: Summary of Total 5 and 100-Year Event Release Rates.....5.5
Table 10.1: Recommended Pavement Structure – Parking Areas.....10.1
Table 10.2: Recommended Pavement Structure – Heavy Truck Access Lane10.2

LIST OF FIGURES

Figure 1 : Key Plan1.1

LIST OF APPENDICES

APPENDIX A POTABLE WATER SERVICINGA.1
A.1 Water Demand CalculationsA.1
A.2 Fire Flow Requirements per OFM 1999/ OBC GuidelinesA.2
A.3 Boundary ConditionsA.3

APPENDIX B PROPOSED SITE PLANB.1

APPENDIX C WASTEWATER SERVICING.....C.1
C.1 Preconsultation with City of OttawaC.1
C.2 Sanitary Sewer Calculation SheetC.2

APPENDIX D STORMWATER SERVICING AND MANAGEMENTD.1
D.1 Modified Rational Method Calculations.....D.1
D.2 Correspondence with City on Stormwater CriteriaD.2
D.3 Storm Design SheetD.3

APPENDIX E EXTERNAL REPORTS.....E.1
E.1 Geotechnical Investigation BY Houle Chevrier Engineering (May 2015).....E.1

APPENDIX F DRAWINGSF.1



SERVICING AND STORMWATER MANAGEMENT REPORT: THE LANDING ON MAIN (1364-1370 STITTSVILLE MAIN STREET)

Introduction

1.0 INTRODUCTION

Stantec Consulting Ltd. has been commissioned by Bayview Stittsville Inc. to prepare the following servicing and stormwater management (SWM) report in support of a site plan control application for the development of a new four (4) storey Mixed Use building, surrounding site works, and parking areas located within the properties known municipally as 1364, 1368, and 1370 Stittsville Main Street. The properties are located along Stittsville Main Street in the City of Ottawa and have been unoccupied by residential dwellings since approximately 2016.

The subject property is approximately 0.51 ha in area containing no existing structures and consisting primarily of grassed areas and trees. The architect (Mataj Architects Inc.) has prepared a proposed site plan to support the site plan control application (see **Appendix B**). The site plan proposes 71 units, a total of 87 surface parking spaces, and commercial space on the ground level. The new building will be serviced via the existing municipal water and wastewater service on Stittsville Main Street.



Figure 1 : Key Plan



SERVICING AND STORMWATER MANAGEMENT REPORT: THE LANDING ON MAIN (1364-1370 STITTSVILLE MAIN STREET)

Introduction

1.1 OBJECTIVE

This servicing and stormwater management report has been prepared to demonstrate that the existing municipal infrastructure servicing the project site is sufficient to meet the servicing requirements of the development while adopting the most suitable stormwater management approach that complies with the City of Ottawa guidelines and applicable environmental laws required for the site plan control application.

Criteria and constraints provided by the City of Ottawa in previous consultations as well as existing site conditions have been used as a basis for the design and the preparation of this report. Specific elements and potential development constraints to be addressed are as follows:

- **Potable Water Servicing**

- Estimate water demands for the proposed redevelopment which will be serviced by an existing 406 mm diameter ductile iron watermain fronting the site along Stittsville Main Street.
- Watermain servicing for the development is to provide average day, maximum day and peak hour demands (i.e., non-emergency conditions) at pressures within the acceptable range of 50 to 80 psi (345 to 552 kPa).
- Under fire flow (emergency) conditions with maximum day demands, the water distribution system is to maintain a minimum pressure greater than 20 psi (140 kPa).

- **Wastewater Servicing**

- Estimate wastewater flows contributed by the development and demonstrate that the new building can be adequately serviced by the existing 300 mm diameter PVC sanitary sewer on Stittsville Main Street.

- **Stormwater Management and Servicing**

- Determine the stormwater management storage requirements to meet the allowable release rate.
- To establish that the predevelopment impervious ratio for the site is not being increased and therefore existing stormwater management is not impacted by the development.
- Post-development 100-year peak flows controlled to the pre-development 5-year release rate with a runoff coefficient of $C=0.35$ and concentration time of 10 mins.

- Prepare a grading plan in accordance with the proposed site plan and existing grades.

Drawing SSP-1 in Appendix F shows the general arrangement and details of the proposed services on the site.



SERVICING AND STORMWATER MANAGEMENT REPORT: THE LANDING ON MAIN (1364-1370 STITTSVILLE MAIN STREET)

References

2.0 REFERENCES

Documents referenced in preparation of this Servicing and stormwater management report for 1364-1370 Stittsville Main Street include:

- Geotechnical Investigation – Proposed Seniors’ Residence – 1364, 1368, and 1370 Stittsville Main Street, Ottawa, ON, Houle Chevrier Engineering, May 25, 2015.
- City of Ottawa Sewer Design Guidelines, 2nd Edition, City of Ottawa, October 2012.
- City of Ottawa Design Guidelines – Water Distribution, 1st Edition, Infrastructure Services Department, City of Ottawa, July 2010.
- Technical Bulletin ISDTB-2014-02 Revision to Ottawa Design Guidelines – Water, City of Ottawa, May 2014.
- Technical Bulletin PIEDTB-2016-01 Revisions to Ottawa Design Guidelines – Sewer, City of Ottawa, September 2016.
- Technical Bulletin ISTB-2018-01 Revision to Ottawa Design Guidelines – Sewer, City of Ottawa, March 2018.
- Technical Bulletin ISTB-2018-02 Revision to Ottawa Design Guidelines – Water Distribution, City of Ottawa, March 2018.
- Technical Bulletin ISTB-2021-03 Revision to Ottawa Design Guidelines – Water Distribution, City of Ottawa, August 2021.



Potable Water Servicing

3.0 POTABLE WATER SERVICING

3.1 BACKGROUND

The subject site is located within the City of Ottawa's 3W pressure zone. The site will be serviced by an existing connection to the 406 mm diameter DI watermain fronting the site on Stittsville Main Street. There are also existing hydrants within proximity of the subject site including a hydrant adjacent to the site fronting Holy Spirit Catholic School, and on the southwest corner of the Beverly Street-Stittsville Main Street intersection. It is anticipated that potable water demand and emergency fire flow requirements for the site will be met by the existing infrastructure.

3.2 WATER DEMANDS

3.2.1 Domestic Water Demands

Water demands were calculated using the City of Ottawa Water Distribution Guidelines (2010) to determine the typical operating pressures to be expected at the building (see detailed calculations in **Appendix A.1**). A demand rate of 280 L/cap/day was applied for the population of the proposed site per technical bulletin ISTB 2021-03. The average daily (AVDY) residential demand was estimated with population densities as per City of Ottawa Guidelines; density of 1.4 persons per one-bedroom apartment and 2.1 persons per two-bedroom apartment.

A demand of 28,000 L/ha/day was applied to the 458 m² communal amenity space. Maximum day (MXDY) demands were determined by multiplying the AVDY demands by a factor of 2.5 for residential areas and by a factor of 1.5 for amenity areas. Peak hourly (PKHR) demands were determined by multiplying the MXDY demands by a factor of 2.2 for residential areas and by a factor of 1.8 for amenity areas. The estimated demands are summarized in **Table 3.1** below.

Table 3.1: Estimated Water Demands

Demand Type	Population	Area (m ²)	AVDY (L/s)	MXDY (L/s)	PKHR (L/s)
Residential	132	-	0.43	1.07	2.35
Amenity Space	-	458	0.01	0.02	0.04
Total Site:	132	-	0.44	1.09	2.39

Based on these results, it is expected that only one private water service connection to the building will be required which will adequately provide potable water supply to the development.



SERVICING AND STORMWATER MANAGEMENT REPORT: THE LANDING ON MAIN (1364-1370 STITTSVILLE MAIN STREET)

Potable Water Servicing

3.2.2 Fire Flow Demands

Fire flow requirements were estimated using the Office of the Fire Marshal (OFM) Guideline (1999) which provides guidance in evaluating fire protection water supply in additions to existing buildings in line with part 3 of the Ontario Building Code (OBC). Office of the Fire Marshal (OFM) methodology is based on the building construction type, building classification according to OBC, water supply coefficient, total building volume, property line exposure distances, and availability of a fire safety plan.

$$Q = KVS_{tot}$$

Q = Volume of water required (L)

V = Total building volume (m³)

K = Water supply coefficient from Table 1

S_{tot} = Total of spatial coefficient values from property line exposures on all sides as obtained from the formula

$$S_{tot} = 1.0 + [S_{side1} + S_{side2} + S_{side3} + S_{side4}]$$

As provided by the architect, it was assumed that the building is sprinklered and of Group C occupancy constructed with combustible materials without fire resistance ratings. The proposed connection is shown in **Drawing SSP-1** in **Appendix F**. The OBC/OFM calculations for the building are included in **Appendix A.2**. The initial boundary conditions request to the City was based on a fire flow demand of 9,000 L/min (150 L/s), the highest demand specified under OBC requirements.

Alternatively, as requested by City of Ottawa staff, fire flow requirements were also estimated using Fire Underwriters Survey (FUS) and determined to be approximately 24,000 L/min (400.0 L/s). The FUS estimate is based on a building of wood frame construction. Additionally, it is anticipated that the building will be sprinklered, with final sprinkler design to conform to the NFPA 13 standards. Detailed fire flow calculations per the FUS methodology are provided in **Appendix A.2**. Further consultation with the City of Ottawa will be required to determine a reasonable fire flow requirement for the proposed development given the large discrepancies between methodologies and the differences of interpretation in the guidelines. Correspondence with the City has been provided in **Appendix A.2**.

3.2.3 Boundary Conditions

As of the writing of this report, the boundary conditions have not yet been provided by the City of Ottawa and therefore the hydraulic boundary conditions for the site have not been used to determine the residual watermain pressures on Stittsville Main Street.

Based on consultation with the City of Ottawa, there is disagreement in the use of the FUS methodology for the proposed site as there will be no private water main being proposed on site and only a single service connection is required to service the building. As explicitly stated in Appendix H of the issued Technical Bulletin ISTB- 2018-02, "*The Fire Underwriters Survey (FUS) in Water supply for public fire protection (1999) – The FUS method- is the method most commonly used in Canada to calculate fire flows for the purpose of water main sizing. The City of Ottawa currently mandates the use of the FUS method to determine fire flow requirements for water main sizing.*"



SERVICING AND STORMWATER MANAGEMENT REPORT: THE LANDING ON MAIN (1364-1370 STITTSVILLE MAIN STREET)

Potable Water Servicing

It is Stantec's opinion that the FUS methodology should be used only to evaluate fire flows for water main sizing, with the ultimate objective of right-sizing water mains. Therefore, the OFM/OBC methodology should govern the design for the proposed development. Additionally, the building is expected to contain a sprinklered system and shall conform to NFPA 13 standards. Referencing Table 11.2.2.1 and Table 11.2.3.1.1 of NFPA 13, an occupancy classification of light hazard results in a required water supply of approximately 3,217.6 L/min from the sprinklered system in addition to the 9,000 L/min fire flow requirement determined through OFM/OBC methodology. The Fire flow requirement should therefore be in the 13,000 L/min range opposed to the 24,000 L/min requirement imposed via the FUS method. It is expected that further discussion will be had with the City to rectify this outstanding issue.



Wastewater Servicing

4.0 WASTEWATER SERVICING

4.1 BACKGROUND

An existing 300 mm diameter PVC sanitary sewer fronts the site on Stittsville Main Street. This sanitary sewer collects wastewater from the existing buildings along Stittsville Main Street. The new development will be serviced via a new 200 mm dia. sanitary service internal to the property before reaching the ultimate 300 mm PVC sanitary outlet with a connection at the existing sanitary manhole fronting the site (Ex. SAN MH290). **Drawing SSP-1 in Appendix F** shows the proposed wastewater service connection for the site.

4.2 DESIGN CRITERIA

As outlined in the City of Ottawa Sewer Design Guidelines and the MECP's Design Guidelines for Sewage Works, the following criteria were used to calculate estimated wastewater flow rates and to size the sanitary sewers:

- Minimum Velocity – 0.6 m/s (0.8 m/s for upstream sections)
- Maximum Velocity – 3.0 m/s
- Manning roughness coefficient for all smooth wall pipes – 0.013
- Minimum size – 200mm dia. for residential areas
- Average Wastewater Generation – 280L/cap/day
- Maximum Peak Factor – 4.0 (Harmon's)
- Extraneous Flow Allowance – 0.33 l/s/ha (conservative value)
- Manhole Spacing – 120 m
- Minimum Cover – 2.5m

4.3 PROPOSED SERVICING

The proposed site will be serviced by gravity sewers which will direct the wastewater flows (approx. 1.7 L/s with allowance for infiltration) to the proposed 300 mm diameter sanitary sewer on Stittsville Main Street. The proposed drainage pattern is detailed on **Drawing SSP-1**. A sanitary sewer design sheet for the proposed service lateral is included in **Appendix C.2**. A backwater valve is to be installed on the proposed sanitary service within the site to prevent any surcharge from the downstream sanitary sewer from impacting the proposed property.



5.0 STORMWATER MANAGEMENT

5.1 OBJECTIVES

The goal of this stormwater servicing and stormwater management (SWM) plan is to determine the measures necessary to control the quantity and quality of stormwater released from the proposed development, to meet the criteria established during the consultation process with City of Ottawa and Mississippi Valley Conservation Authority (MVCA), and to provide sufficient details required for approval and construction.

5.2 SWM CRITERIA AND CONSTRAINTS

Criteria were established by combining current design practices outlined by the City of Ottawa Design Guidelines (2012), and through consultation with City of Ottawa staff. The following summarizes the criteria, with the source of each criterion indicated in brackets:

General

- Use of the dual drainage principle (City of Ottawa).
- Wherever feasible and practical, site-level measures should be used to reduce and control the volume and rate of runoff (City of Ottawa)
- Assess impact of 100-year event outlined in the City of Ottawa Sewer Design Guidelines on major & minor drainage system (City of Ottawa)

Storm Sewer & Inlet Controls

- Size storm sewers to convey 5-year storm event under free-flow conditions using City of Ottawa I-D-F parameters (City of Ottawa).
- Proposed site to discharge to the existing 600mm diameter storm sewer within the Stittsville Main Street at the northern boundary of the subject site (City of Ottawa).
- All stormwater runoff from the site up to and including the 100-year storm event to be stored on site and released into the minor system at a maximum discharge equivalent to the 5-year storm predevelopment release rate to Stittsville Main Street at a maximum runoff coefficient of 0.5.
- 100-year Storm HGL to be a minimum of 0.30 m below building foundation footing (City of Ottawa).

Surface Storage & Overland Flow

- Building openings to be a minimum of 0.30m above the 100-year water level (City of Ottawa)
- Maximum depth of flow under either static or dynamic conditions shall be less than 0.30m (City of Ottawa)
- Provide adequate emergency overflow conveyance off-site (City of Ottawa)



SERVICING AND STORMWATER MANAGEMENT REPORT: THE LANDING ON MAIN (1364-1370 STITTSVILLE MAIN STREET)

Stormwater Management

Other criteria considered in the SWM design are described in Section 5 of the Ottawa Sewer Design Guidelines (October 2012) including all subsequent technical bulletins.

5.3 STORMWATER MANAGEMENT DESIGN

The intent of the stormwater management plan presented herein is to mitigate any negative impact that the proposed development will have on the existing storm sewer infrastructure, while providing adequate capacity to service the proposed buildings, parking and access areas. The proposed stormwater management plan is designed to detain runoff on site and within subsurface storage to ensure that peak flows after construction will not exceed the allowable site release rate detailed below.

The Modified Rational Method was employed to assess the rate and volume of runoff generated during post-development conditions. The site was subdivided into subcatchments (subareas) tributary to stormwater controls as defined by the location of inlet control devices. A summary of subcatchment areas and runoff coefficients is provided in **Appendix C** and **Drawing SD-1** indicates the stormwater management subcatchments.

5.3.1 Allowable Release Rate

Based on consultation with City of Ottawa staff, post-development allowable peak flows, up to the 100-year event, are to be controlled to the pre-development 5-year peak flow levels. Excess stormwater is to be restricted on-site using control measures. A runoff coefficient of 0.35 was used for the site based on the impervious areas that existed on the properties prior to the demolition of the on-site dwellings. Additionally, a time of concentration for the development area was calculated using Kirpich's equation and was found to be less than the minimum time of concentration of 10 minutes. Therefore, a time of concentration of 10 minutes was used as per the City's requirements provided during pre-consultation.

The development target release rate for the site area has been determined using the rational method based on the criteria above. Peak flow rates have been calculated using the rational method as follows:

$$Q = 2.78 (C)(I)(A)$$

Where:

Q = peak flow rate, L/s

C = site runoff coefficient

I = rainfall intensity, mm/hr (per City of Ottawa IDF curves)

A = drainage area, ha

$$5\text{-year Intensity (mm/hr)} = \frac{998.071}{(10 + 6.053)^{0.814}} = 104.19 \text{ mm/hr}$$

$$Q = 2.78(0.35)(104.19\text{mm/hr})(0.51 \text{ ha}) = 51.7 \text{ L/s}$$

Therefore, the post-development peak flows up to the 100-year storm event must be controlled to **51.7 L/s**.



SERVICING AND STORMWATER MANAGEMENT REPORT: THE LANDING ON MAIN (1364-1370 STITTSVILLE MAIN STREET)

Stormwater Management

Table 5.1: Target Release Rate

Design Storm	Target Flow Rate (L/s)
5-Year Event (Pre-development Conditions)	51.7

5.3.2 Site Storage Requirements

To meet the restrictive stormwater release criteria for the proposed development, rooftop storage will be used to promote stormwater detention on building roof tops and reduce the peak outflow from the site. Additionally, a stormwater cistern is proposed in conjunction with ICDs within selected upstream catchbasins to control flows and promote surface ponding for the applicable storm events (5-year to 100-year events). The proposed ICD schedule, ponding areas, and underground storage tank details are specified in **Drawing SD-1**. Stormwater management calculations are provided in **Appendix D.1**.

5.3.2.1 Rooftop Storage

It is proposed to control stormwater on the building rooftops by installing restricted flow roof drains. The MRM analysis assumes that both roofs will be equipped with standard Watts Model R1100 Accuflow Roof Drains.

Watts Drainage “Accutrol” roof drain weir data has been used to calculate a practical roof release rate and detention storage volume for the rooftops. It should be noted that the “Accutrol” weir has been used as an example only, and that other products may be specified for use, provided that the total roof drain release rate is restricted to match the maximum rate of release indicated in **Table 5.2**, and that sufficient roof storage is provided to meet (or exceed) the resulting volume of detained stormwater. Proposed drain release rates have been calculated based on the Accutrol weir setting at 50% open for R101A and 25% open for R101B. Storage volume and controlled release rate are summarized in **Table 5.2**:

Table 5.2: Roof Control Area

Area ID	Design Storm	Depth (mm)	Discharge (L/s)	Volume Stored (m ³)
R101A¹	5-Year	112	7.18	33.23
	100-Year	149	8.80	74.95
R101B²	5-Year	99	0.79	1.16
	100-Year	135	0.90	2.98

1. Number of assumed roof notches on roof area R101A is 7.
2. Number of assumed roof notches on roof area R101B is 1.

The total roof area of the proposed building is approx. 2,000 m² with 80% (1,600 m²) of the roof area assumed to be available for storage, the roof area imperviousness ratio of 0.99 was used to calculate the runoff coefficient for the roof area as C = 0.90. The two roof areas will be equipped with a total of eight (8) roof notches operated at 50% open for R101A and 25% open for R101B, which have been designed to optimize the maximum allowable ponding depth of 0.15m as per the Ontario Building Code. In the 100-year



SERVICING AND STORMWATER MANAGEMENT REPORT: THE LANDING ON MAIN (1364-1370 STITTSVILLE MAIN STREET)

Stormwater Management

storm event, the drawdown time for R101A and R101B was calculated to be 2.8 hour and 1 hour, respectively, as shown in MRM Spreadsheet in **Appendix D.1**.

5.3.2.2 Surface Storage

Surface storage over catchbasins will be utilized during storm events to help adequately control flows and achieve the target allowable release rate for the proposed development. It is proposed that inlet control devices (ICDs) be installed within specified catchbasins to promote ponding in designated areas. Ponding areas and the ICD schedule are specified in **Drawing SD-1** and **Table 5.3** outlines the surface storage potential within specified subcatchments. This design has ensured that no surface ponding will occur during the 2-year storm event.

Table 5.3: 5-Year and 100-Year Surface Storage Requirements

CB ID	Design Storm	Controlled Release (L/s)	Volume Available (m ³)	Volume Stored (m ³)
CB 102B	5-Year	16.69	13.0	0
	100-Year	13.15	13.0	12.96
CB 102D	5-Year	19.31	1.80	0
	100-Year	19.31	1.80	0.33
CB 103A	5-Year	6.98	9.50	1.10
	100-Year	5.48	9.50	8.63
CB 103B	5-Year	8.36	16.10	1.10
	100-Year	6.21	16.10	8.55

The total available volume for surface storage within the site is approximately 42 m³. In the 5-year storm event, 2.20 m³ of water will be stored above the catchbasins on the surface within the parking area, and in the 100-year storm event 30 m³ of restricted flow will be stored above the catchbasins. Additionally, an ICD has been implemented in CB 102C in order to protect the stormwater system in the 100-year event from adjacent property flows.

5.3.2.3 Subsurface Storage

An underground stormwater tank is proposed to store run-off from within the site area via a series of catchbasins, which will control and direct flows to the underground storage tank. An estimated storage volume of 60 m³ is proposed to attenuate peak flows from these areas for release at a controlled flow rate from the tank of 13.32 L/s and 19.17 L/s in the 5-Year and 100-Year events, respectively. The proposed stormwater tank would be sufficient to meet the desired target release rate for the site. The subsurface stormwater storage tank invert elevation was set higher than the obvert of the storm sewer on Stittsville Main Street in order to avoid backwater effects on the outlet orifice and backfilling of the storage; the tanks were also set above the measured groundwater levels to avoid reduction in storage capacity due to groundwater infiltration.



SERVICING AND STORMWATER MANAGEMENT REPORT: THE LANDING ON MAIN (1364-1370 STITTSVILLE MAIN STREET)

Stormwater Management

Controlled release rates and storage volumes required are summarized in **Table 5.4**.

Table 5.4: Subsurface Storage

Storm Return Period	Area ID	Design Head (m)	Discharge (L/s)	Orifice Type	V _{required} (m ³)
5-year	L103A, L103B, L103C, L102A, L102B, L102C, L102D	0.55	13.32	95 mm Orifice ICD	28.08
100-year		1.14	19.17		56.23

5.3.2.4 Uncontrolled Release

Due to grading restrictions, two subcatchment areas have been designed to sheet flow uncontrolled as determined by the site grading design and the natural topography. The UNC-1 catchment area discharges off-site uncontrolled to the adjacent Stittsville Main Street ROW and the UNC-2 catchment area will discharge off-site uncontrolled to the adjacent south-east property. Peak discharges from uncontrolled areas have been considered in the overall SWM plan and the target release rate has been satisfied by overcontrolling the discharge rates throughout the rest of the site.

Table 5.5 summarizes the estimated uncontrolled storm release rates during the 5 -year and 100-year storm events.

Table 5.5: 5-Year and 100-Year Peak Uncontrolled (Non-Tributary) Release Rates

Area ID	Area (ha)	5-Year Event Discharge (L/s)	100-Year Event Discharge (L/s)
UNC-1	0.05	8.40	17.99
UNC-2	0.01	0.90	1.24

5.3.3 Results

Table 5.6 demonstrates that the proposed stormwater management plan provides adequate attenuation storage to the target 5-year storm peak discharge rate.

Table 5.6: Summary of Total 5 and 100-Year Event Release Rates

Summary To Outlet	5-Year Peak Discharge (L/s)	100-Year Peak Discharge (L/s)
Uncontrolled (UNC-1 and UNC-2)	9	19
Roof (R101A and R101B)	8	10
Controlled – Subsurface Storage	13	19
Total	30	48
Target	52	52



Site Grading and Drainage

6.0 SITE GRADING AND DRAINAGE

The proposed development site measures approximately 0.51 ha in area and in the present consists of grassed area with some trees. The site slopes from southwest to northeast, with grades at property corners varying by approximately 1.6 m across the site. Overland flow is generally being directed to the adjacent Stittsville Main Street ROW. A detailed grading plan (see **Drawing GP-1**) has been provided to satisfy any stormwater management requirements and provide for minimum cover requirements for storm and sanitary sewers where possible. Existing grades at the rear of the property have been maintained. Site grading has been established to provide emergency overland flow routes required for stormwater management in accordance with City of Ottawa requirements.

The subject site maintains emergency overland flow routes for flows deriving from storm events in excess of the maximum design event to the existing Stittsville Main Street ROW as depicted in **Drawing GP-1**. The site grading plan maintains the general drainage pattern of the existing condition site and matches all perimeter grades.



SERVICING AND STORMWATER MANAGEMENT REPORT: THE LANDING ON MAIN (1364-1370 STITTSVILLE MAIN STREET)

Utilities

7.0 UTILITIES

As the subject site lies within a developed residential community, Hydro, Bell, Gas and Cable servicing for the proposed development should be readily available. It is anticipated that existing infrastructure will be sufficient to provide a means of distribution for the proposed site. Exact size, location and routing of utilities, along with determination of any off-site works required for redevelopment, will be finalized after design circulation.



SERVICING AND STORMWATER MANAGEMENT REPORT: THE LANDING ON MAIN (1364-1370 STITTSVILLE MAIN STREET)

Approvals

8.0 APPROVALS

It is not expected that Environmental Compliance Approvals (ECAs) under the Ontario Water Resources Act will be required by the Ontario Ministry of Environment Conservation and Parks (MECP), as the proposed sewers will be approved under the building code act and the entirety of the site is maintained under one ownership.

The Mississippi Valley Conservation Authority (MVCA) will need to be consulted in order to obtain municipal approval for site development. A Requirement for a MECP Permit to Take Water (PTTW) may be required and can be confirmed by the geotechnical consultant at the time of application



SERVICING AND STORMWATER MANAGEMENT REPORT: THE LANDING ON MAIN (1364-1370 STITTSVILLE MAIN STREET)

Erosion Control During Construction

9.0 EROSION CONTROL DURING CONSTRUCTION

In order to protect downstream water quality and prevent sediment build up in catch basins and storm sewers, erosion and sediment control measures must be implemented during construction. The following recommendations will be included in the contract documents and communicated to the Contractor.

1. Implement best management practices to provide appropriate protection of the existing and proposed drainage system and the receiving water course(s).
2. Limit the extent of the exposed soils at any given time.
3. Re-vegetate exposed areas as soon as possible.
4. Minimize the area to be cleared and grubbed.
5. Protect exposed slopes with geotextiles, geogrid, or synthetic mulches.
6. Provide sediment traps and basins during dewatering works.
7. Install sediment traps (such as SiltSack® by Terrafix) between catch basins and frames.
8. Schedule the construction works at times which avoid flooding due to seasonal rains.

The Contractor will also be required to complete inspections and guarantee the proper performance of their erosion and sediment control measures at least after every rainfall. The inspections are to include:

- Verification that water is not flowing under silt barriers.
- Cleaning and changing the sediment traps placed on catch basins.

Refer to **Drawing ECDS-1** for the proposed location of silt fences, straw bales, and other erosion control measures.



SERVICING AND STORMWATER MANAGEMENT REPORT: THE LANDING ON MAIN (1364-1370 STITTSVILLE MAIN STREET)

Geotechnical Investigation

10.0 GEOTECHNICAL INVESTIGATION

Houle Chevrier Engineering was commissioned to conduct a geotechnical investigation for a proposed 4-storey residential building to be located at 1364-1370 Stittsville Main Street in the City of Ottawa. The objective of the geotechnical investigation was determining the subsoil and groundwater conditions at this site by means of borehole analysis as well as to provide geotechnical recommendations pertaining to design of the proposed development including construction considerations which may impact the design. A geotechnical investigation was completed for the subject site by Houle Chevrier Engineering on May 25, 2015. The report summarizes the existing soil conditions within the subject area and provides construction recommendations. For details which are not summarized below, please see the original geotechnical report included in **Appendix E**.

Subsurface soil conditions within the subject site were determined from five (5) boreholes which were completed in May 2015. The boreholes were advanced to depths ranging from about 2.4 to 6 metres below the ground surface and all boreholes were terminated on practical refusal on or within inferred bedrock. Well screens were installed in two (2) of the boreholes (15-3B and 15-4) to measure groundwater levels. Topsoil fill material was encountered from the surface in three (3) of the boreholes and ranged in thickness from about 0.05 to 0.08 m. In general, the fill material consisted of topsoil fill material and crushed stone, then by brown, grey-brown, and dark grey-brown silty sand, silty sand and gravel, and sand ranging in thickness from about 0.5 to 2.3 meters. Inferred bedrock was encountered at between 2.4m to 6 m, however it should be noted that the auger refusal can occur on cobbles/boulders and may not necessarily represent bedrock.

Groundwater levels were found to range from 2.6 m to 3.9 m below the ground surface and are subject to seasonal fluctuations. The underground storage for the stormwater management component of the design was set at 2.0m below finished grade to be above the measure groundwater levels. If seasonal fluctuations in groundwater levels reached the level of the underground storage, the local groundwater table would be drawn down by the sewer outlet. The groundwater levels may also reflect the surface water level conditions in Poole Creek. No grade-raise restrictions for the proposed building foundation have been recommended for the subject site and a MOECC Permit to Take Water is not expected to be required.

The minimum pavement structure considered acceptable for the parking areas are provided in **Table 10.1** below.

Table 10.1: Recommended Pavement Structure – Parking Areas

Thickness (mm)	Material Description
50	Superpave 12.5 (Traffic Level A or B)
150	OPSS Granular A base
300	OPSS Granular B Type II Subbase

For areas to be used by heavy truck traffic (i.e. access roads, loading bays, and truck parking areas) the acceptable pavement structures are provided in **Table 10.2**.



SERVICING AND STORMWATER MANAGEMENT REPORT: THE LANDING ON MAIN (1364-1370 STITTSVILLE MAIN STREET)

Geotechnical Investigation

Table 10.2: Recommended Pavement Structure – Heavy Truck Access Lane

Thickness (mm)	Material Description
90	Hot Mix Asphaltic Concrete (40 mm Superpave 12.5 Traffic Level B over 50 mm Superpave 19.0 (Traffic Level B))
150	OPSS Granular A base
400	OPSS Granular B Type II Subbase



11.0 CONCLUSIONS

11.1 WATER SERVICING

It is expected that the existing 406 mm diameter water distribution network within Stittsville Main Street can sufficiently support the proposed development's domestic demands. Upon receipt of the boundary conditions for existing distribution system, the calculated domestic demands and the OBC fire flow demand of 9,000 L/min for the subject site can be met. The existing watermain on Stittsville Main Street has sufficient capacity to sustain the required domestic and emergency fire flow demands, however, further consultation with the City of Ottawa will be required to confirm a suitable fire flow requirement for the development.

11.2 WASTEWATER SERVICING

An existing 300 mm diameter PVC sanitary sewer fronts the site on Stittsville Main Street. The proposed development will be serviced through the internal plumbing of the building which will outlet to a new single 200 mm diameter sanitary lateral complete with backwater valve, proposed to serve the entire site, with a sanitary connection to the existing sanitary MH fronting the site (SAN MH 290).

11.3 STORMWATER SERVICING AND MANAGEMENT

The stormwater management plan provided can effectively control on-site runoff and meet the target allowable release rate. Roof storage, surface storage, and underground storage will be utilized to provide additional detention benefits by controlling the expected post development 100-year storm run-off from the proposed development area to the 5-year predevelopment runoff release rate. The ultimate storm outlet will be the 600 mm diameter stormwater network along Stittsville Main Street.

11.4 GEOTECHNICAL CONSIDERATIONS

A geotechnical investigation was conducted by Houle Chevrier Engineering to determine the subsurface properties of the site, including groundwater elevations. The proposed underground stormwater storage tanks are set higher than the measured groundwater depths. A set of recommendations are provided in this report as geotechnical guidance for the design and construction.

11.5 GRADING

The proposed development site measures approximately 0.51 ha in area and consists of grassed area and trees. The site grading and drainage will be maintained as much as possible and will not be adversely impacted by the proposed development.



11.6 UTILITIES

The site is within a residential neighbourhood and currently serviced by existing utilities providing natural gas and fibre optics telecommunication services. The site is expected to be serviced through connections to these existing services.

