



**Ottawa Paramedic Service
Headquarters Parking Lot
Modifications – Stormwater
Management Brief**

2465 Don Reid Drive

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Prepared for:

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Design & Construction Buildings and
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Department

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OTTAWA PARAMEDIC SERVICE HEADQUARTERS PARKING LOT MODIFICATIONS – STORMWATER MANAGEMENT BRIEF

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Table of Contents

1.0	INTRODUCTION	1
1.1	OBJECTIVE	2
2.0	BACKGROUND	3
3.0	STORMWATER MANAGEMENT (SWM) AND SERVICING	4
3.1	SWM CRITERIA AND CONSTRAINTS	4
3.2	ANALYSIS AND RESULTS	4
4.0	SITE GRADING	7
5.0	EROSION/SEDIMENT CONTROL DURING CONSTRUCTION	8
6.0	CONCLUSION	9

LIST OF TABLES

Table 3-1: Runoff Coefficient Summary	5
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LIST OF FIGURES

Figure 1: Ottawa Paramedic Service Headquarters (OPSH) Aerial View	1
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LIST OF APPENDICES

APPENDIX A	STORMWATER MANAGEMENT	A.1
A.1	Storm Sewer Design Sheet	A.1
A.2	Modified Rational Method Calculations	A.2
A.3	Revised Storage Volumes over Catch Basins	A.3
A.4	Original Stormwater Management Report (NCE, 2004)	A.4
A.5	Original Site Servicing Drawings (NCE, 2004)	A.5
APPENDIX B	OTTAWA PARAMEDIC SERVICE HEADQUARTERS PARKING LOT MODIFICATIONS – FUNCTIONAL DESIGN REPORT (STANTEC, 2019)	B.6
APPENDIX C	DRAWINGS	C.7



1.0 INTRODUCTION

The Ottawa Paramedic Service Headquarters, located at 2465 Don Reid Drive, is seeking to expand its existing parking lot and improve existing infrastructure to allow for increased staffing and improved operations. In 2004, NCE prepared a stormwater management report for the facility, which is owned and operated by the City of Ottawa. This report is included in **Appendix A**.

Stantec Consulting Ltd. has been retained by the City to prepare the detailed design of the parking lot expansion and associated infrastructure. This Stormwater Management (SWM) Brief seeks to evaluate the effect of the proposed changes on the existing stormwater infrastructure. The proposed parking lot expansion was guided by the *Ottawa Paramedic Service Headquarters Parking Lot Modifications – Functional Design Report* prepared by Stantec Consulting Ltd., dated September 19, 2019, as well as consultation with the City. This report is included in **Appendix B**.

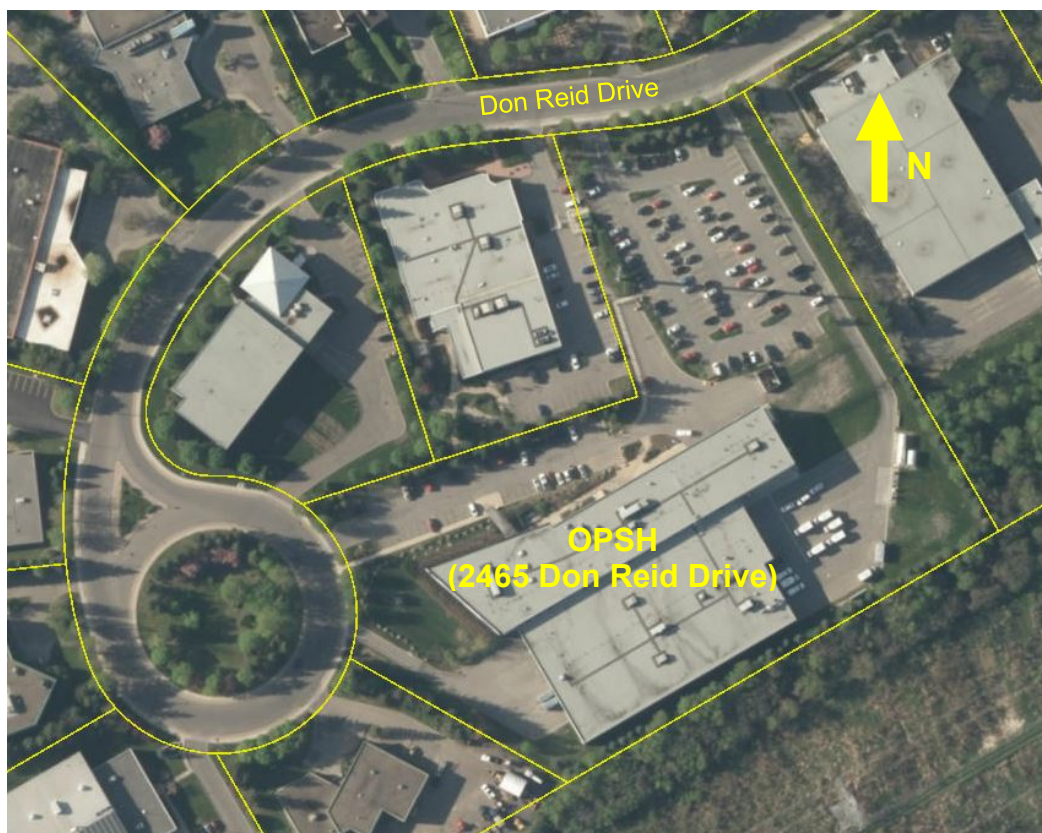


Figure 1: Ottawa Paramedic Service Headquarters (OPSH) Aerial View



OTTAWA PARAMEDIC SERVICE HEADQUARTERS PARKING LOT MODIFICATIONS – STORMWATER MANAGEMENT BRIEF

The location of the site is shown in **Figure 1**. The facility is within a light industrial zone, bound by Don Reid Drive to the north and west, existing industrial buildings to the west, north and east, and a hydro easement to the south. The site encompasses 2.74 hectares of land, with the two-storey Paramedic Service Headquarters occupying a footprint of 6947 m².

1.1 OBJECTIVE

The objective of this brief is to evaluate the effect of the proposed parking lot expansion on the stormwater management on the site. Specifically, the report seeks to:

- summarize all existing stormwater management criteria for the site;
- ensure that the proposed site grading and servicing are consistent with the stormwater management criteria;
- analyze the existing system to ensure there is sufficient capacity to accommodate the proposed changes; and
- determine if additional infrastructure is required to service the site.



2.0 BACKGROUND

The following background study was referenced in determining the applicable stormwater management criteria for the site:

- *Ottawa Paramedic Service Headquarters – Stormwater Management Report*, NCE, September 7, 2004.

The following functional design report for the parking lot expansion was referenced in the creation of this stormwater management brief:

- i. *Ottawa Paramedic Service Headquarters Parking Lot Modifications – Functional Design Report*, Stantec Consulting Ltd., September 19, 2019.

The following design guideline was used for all stormwater works:

- ii. *City of Ottawa Sewer Design Guidelines, 2nd Ed.*, City of Ottawa, October 2012, and all subsequent technical bulletins.



3.0 STORMWATER MANAGEMENT (SWM) AND SERVICING

The site's stormwater flows outlet to the northeast corner of the site via an existing 525 mm dia. concrete storm sewer to the 1200 mm dia. storm sewer on Don Reid Drive. A small portion of the existing site on the south and east end is graded such that runoff is directed to the hydro easement to the southwest.

3.1 SWM CRITERIA AND CONSTRAINTS

Through the review of existing reports, the following SWM criteria and constraints for the site were determined. The source of each criterion or constraint is given in parentheses.

- 1) The downstream storm sewer on Don Reid Drive can accept flows from the site equivalent to the runoff generated in a 5-year event using an overall site runoff coefficient of 0.70 (NCE, 2004).
- 2) Major system flows (i.e. flows in storm events with a return period greater than 5 years) are permitted to discharge uncontrolled to Don Reid Drive (NCE, 2004).
- 3) Stormwater management for the site is provided for via a cash-in-lieu program, instead of on-site controls. Therefore, no on-site quality control measures are required for this site (NCE, 2004). Stormwater from the site is ultimately directed to the existing City of Ottawa SWM facility at 2821 Hunt Club Road.
- 4) The maximum release rate from the roof of the Headquarters building is 16.4 L/s based on a 20 gpm (1.26 L/s) maximum release rate per drain (NCE, 2004), and a total of 13 roof drains identified in satellite images of the building roof (Bing Maps).

3.2 ANALYSIS AND RESULTS

A storm drainage plan reflecting site conditions with the parking lot modifications has been created for the site (**Drawing SD-1 in Appendix C**). Runoff coefficients (C values) have been assigned to each subcatchment area using a weighted average. Soft surfaces such as grass and other vegetated areas have been assigned a runoff coefficient of 0.20 while hard surfaces such as asphalt and concrete have been assigned runoff coefficients of 0.90. Using the weighted runoff coefficients for each subcatchment area, the total weighted C value for the site was found to be 0.70. A detailed breakdown is provided in **Table 3-1**.



Table 3-1: Runoff Coefficient Summary

Area ID	Area (ha)	C	(Area)*(C)
CB-2	0.13	0.47	0.061
CB-3	0.15	0.58	0.087
CB-4	0.35	0.58	0.203
CB-5	0.30	0.66	0.198
CB-6	0.19	0.53	0.101
CB-7	0.19	0.53	0.101
CB-8	0.11	0.83	0.091
CB-9	0.20	0.79	0.158
CB-10	0.18	0.72	0.130
CB-11	0.13	0.65	0.085
CB-12	0.11	0.77	0.085
ROOF	0.69	0.90	0.621

Weighted C: 0.70

As was noted in the Stormwater Management Report prepared by NCE, the site is allowed to discharge the equivalent of the 5-year event with an overall C coefficient of 0.70. The site's overall runoff coefficient after the parking lot modifications falls within this limit, satisfying the downstream capacity constraint. Furthermore, it should be noted that the roof is controlled via roof drains, and so the inclusion of the roof (which is all hard surface) in the calculation of the site's overall C coefficient is conservative.

The storm sewer network has been evaluated using a storm sewer design spreadsheet which relies on the rational method. The outlet pipe for the site is able to carry the 5-year event with the parking lot modifications. Minor surcharging may occur in the 250 mm dia. storm pipe from CB 5 to CBMH 6. However, as this pipe is outside of the area of the proposed works and no issues regarding its functionality have been identified by the Owner, no modifications for this run are proposed. There is also minor surcharging anticipated in the penultimate site outlet (the 525 mm dia. storm sewer between CBMH 2 and CBMH 1) during the 5-year storm event. This surcharging is not expected to cause any issues as the site is graded to accommodate flows in exceedance of the 5-year event within ponding areas (NCE, 2004). The potential surcharging in this pipe during the 5-year event should occur over a very short period of time during the 5-year event, with minimal impact on the ponding in the area. Based on the storm sewer design sheet, in the 5-year event, the site releases 330.3 L/s, which is below the 333 L/s capacity identified in NCE's SWM Report for the outlet pipe on site.

The site has been graded to provide surface storage at each of the catch basins for larger storm events up to the 100-year storm event. As is detailed in **Section 4.0**, an emergency overland flow route is provided to direct flows to the hydro easement to the south of the site.

The parking spaces to be added on the south side of the existing parking lot require an additional catch basin (CB-12 on **Drawing SD-1**) due to grading limitations on site. The 200 mm dia. CB lead is proposed to be connected to the existing 450 mm dia. storm sewer between CBMH 9 and CBMH 2 via a direct connection. The proposed CB lead will cross an existing sanitary sewer. As indicated on **Drawing SD-1**, sufficient clearance will be provided to the existing sanitary sewer and watermain at the crossing location.



OTTAWA PARAMEDIC SERVICE HEADQUARTERS PARKING LOT MODIFICATIONS – STORMWATER MANAGEMENT BRIEF

A modified rational method (MRM) spreadsheet, included in **Appendix A.2**, was created to determine the storage requirements in the 5-year and 100-year events and to demonstrate that the site has sufficient storage. First, the available surface storage volumes were updated to include the storage volume above proposed CB-12. The storage volumes above the existing catch basins were taken from the original SWM report (NCE, 2004). The total available surface storage volumes, including proposed CB-12, are included in **Appendix A.3**.

There will be no ponding in the 5-year event. Ponding extents around CB-12 in the 100-year storm event are shown on **Drawing SSGP-1** in **Appendix C**.

In the 100-year event, 267.0 m³ of storage are required. Based on the total available storage, including the volume over proposed CB-12, this storage would be provided at a ponding elevation of 85.79 m, which is 24 cm above the top of grate of the majority of the catch basins and catch basin maintenance holes throughout the site (top of grate at 85.55 m).

The results from the MRM calculations indicate a slightly higher storage requirement and ponding depth than the original SWM report, but the maximum ponding depth of 24 cm calculated for the 100-year event still falls well below the maximum allowable depth of 30 cm (corresponding to the spillover elevation of 85.85 m). Therefore, the site adequately stores the 100-year storm event with the proposed modifications to the parking lot.



4.0 SITE GRADING

The modifications to the existing parking areas have been graded to provide adequate fall to the nearest catch basins and to minimize changes to existing grades on site. In the case of the additional parking spaces on the southwest corner of the building and the additional motorcycle spaces on the western portion of the main parking lot, the proposed grading maintains the existing drainage areas. For the addition of the parking spaces on the south side of the main parking lot, existing grades are matched at the tie-in points with fall provided to proposed CB 1. The subcatchment area was modified to reflect the revised grading around the proposed catch basin.

The top of grate of the proposed catch basin (CB-12) is set at an elevation of 85.55 m, which matches the top of grate elevations of the majority of the existing catch basins throughout the site. This selected elevation allows up to 0.30 m of ponding up to a spillover elevation of 85.85 m, in accordance with the original SWM report (NCE, 2004). When the water stored within the site exceeds an elevation of 85.85 m, an emergency overland flow route is used to direct the excess water to the hydro easement to the south of the site. The emergency overland flow route is not altered as part of the proposed parking lot expansion works. As is discussed in **Section 3.2**, the parking lot around CB-12 is graded so as to provide sufficient storage to contain the 100-year storm event.



5.0 EROSION/SEDIMENT 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.

Proposed erosion and sediment control measures for the site are shown on **Drawing SSGP-1**, included in **Appendix C**. A detailed sediment and erosion control plan is to be prepared by the Contractor and submitted to the Contract Administrator prior to construction.



6.0 CONCLUSION

The proposed modifications to the existing parking lot respect the intent of the original stormwater management report for the site and will require only minor infrastructure modifications to be accommodated. As analysis of the stormwater management on site demonstrates, the site's overall runoff coefficient is 0.70 which is within the allowable limit set out in the stormwater management report for the site, and the existing sewers have capacity to accommodate the proposed catch basin and additional hard surface area. The site provides sufficient above-surface storage to store the 100-year storm event and provides an emergency overland flow route to the hydro easement south of the site. The proposed works will not be in conflict with existing infrastructure.

Detailed design drawings showing the proposed parking lot expansion, stormwater infrastructure, and site grading have been included in **Appendix C**.

