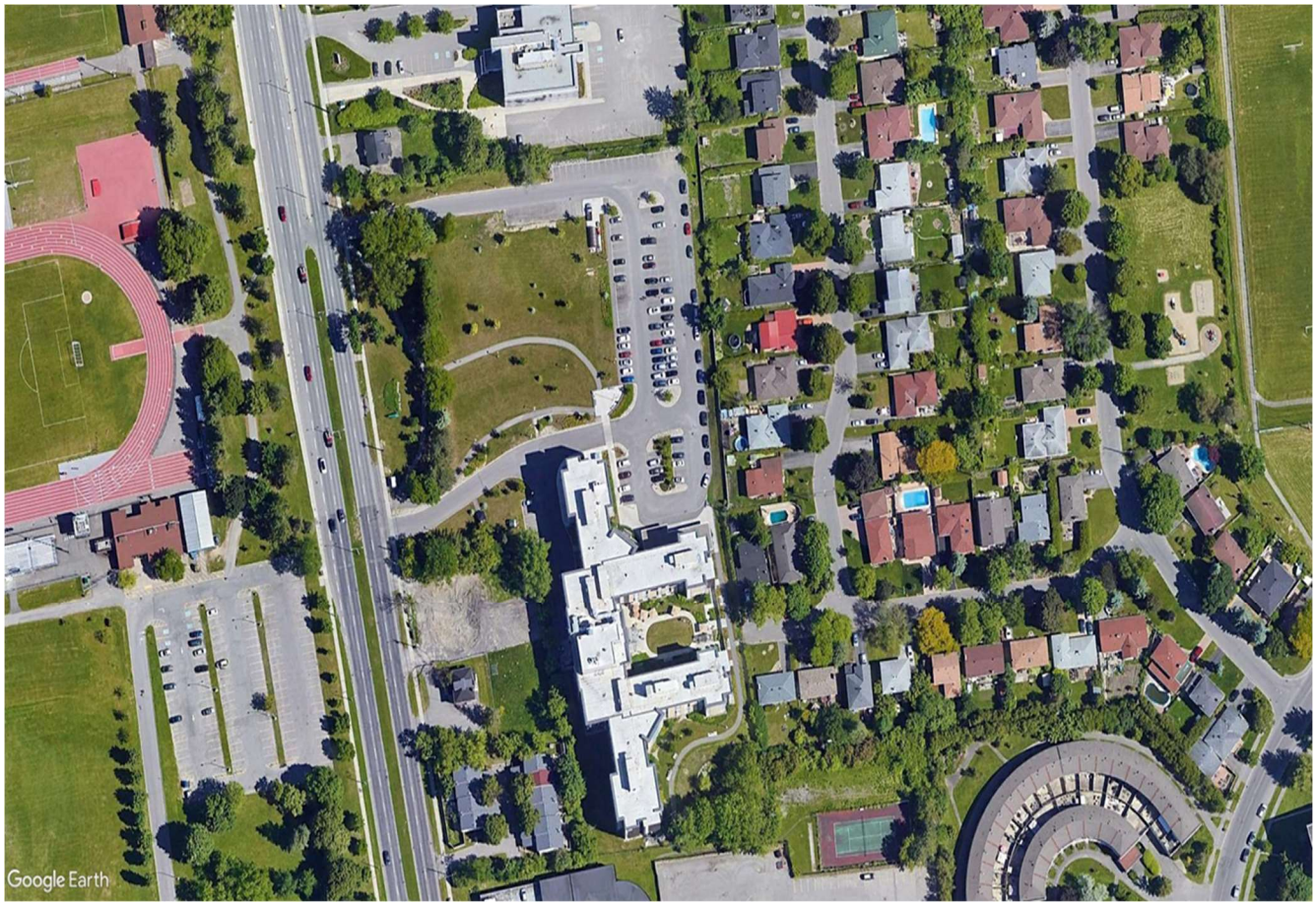
Edwards J. Cuhaci and Associates Architects Inc.

St. Patrick's Home Ottawa - New Construction

Stormwater Management Report

July 26, 2024 Restricted



St. Patrick's Home Ottawa - New Construction

Stormwater Management Report

Edwards J. Cuhaci and Associates Architects Inc.
Restricted

Project No.: 221-08396-00
Date: July 26, 2024

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July 26, 2024

Restricted

Edwards J. Cuhaci and Associates Architects Inc.
171 Slater Street, Suite 100,
Ottawa, ON K1P 5H7

Attention: David Bull

Dear Sir/Madam:

Subject: St. Patrick's Home Ottawa - New Construction Stormwater Management Report

We are pleased to submit one electronic copy of the FINAL Stormwater Management Report for the St. Patrick's Home Ottawa - New Construction. This report documents the stormwater management strategies for the new development.

We trust the submission of this documents meets your requirements. Should you have any comments we look forward to your response.

Sincerely,

Bryan Orendorff
Manager, Water Resources

WSP ref.: 221-08396-00

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Revision History

FIRST ISSUE

August 31, 2023	Issued for Site Plan Approval	
Prepared by	Reviewed by	Approved by
Marina St. Marseille Designer, Land Development and Municipal Engineering	Michael Flowers Engineer, Land Development and Municipal Engineering	Michael Flowers Engineer, Land Development and Municipal Engineering

REVISION 1

January 19, 2024	Issued for Site Plan Control Review	
Prepared by	Reviewed by	Approved by
Marina St. Marseille Designer, Land Development and Municipal Engineering	Michael Flowers Engineer, Land Development and Municipal Engineering	Michael Flowers Engineer, Land Development and Municipal Engineering

REVISION 2

April 26, 2024	Issued for Site Plan Control Review	
Prepared by	Reviewed by	Approved by
Marina St. Marseille Designer, Land Development and Municipal Engineering	Michael Flowers Engineer, Land Development and Municipal Engineering	Michael Flowers Engineer, Land Development and Municipal Engineering

REVISION 3

June 24, 2024	Issued for Site Plan Approval application	
Prepared by	Reviewed by	Approved by
Nupur Suthar Designer, Water Resources	Bryan Orendorff Manager, Water resources	Bryan Orendorff Manager, Water resources

REVISION 4

July 08, 2024	Issued for Final Site Plan Control	
Prepared by	Reviewed by	Approved by

Nupur Suthar Designer, Water Resources	Bryan Orendorff Manager, Water resources	Bryan Orendorff Manager, Water resources
FINAL		
July 26, 2024	Re-Issued for Final Site Plan Control	
Prepared by	Reviewed by	Approved by
Nupur Suthar Designer, Water Resources	Bryan Orendorff Manager, Water resources	Bryan Orendorff Manager, Water resources

Signatures

Prepared by

Nupur Suthar

Nupur Suthar, E.I.T.
Designer, Water Resources

2024-07-26

Date

Approved[1] by (must be reviewed for technical accuracy prior to approval)

Bryan Orendorff, P.Eng.
Manager, Water Resources

Date

WSP prepared this report solely for the use of the intended recipient, Edwards J. Cuhaci and Associates Architects Inc., in accordance with the professional services agreement. The intended recipient is solely responsible for the disclosure of any information contained in this report. The content and opinions contained in the present report are based on the observations and/or information available to WSP at the time of preparation. If a third party makes use of, relies on, or makes decisions in accordance with this report, said third party is solely responsible for such use, reliance or decisions. WSP does not accept responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken by said third party based on this report. This limitations statement is considered an integral part of this report.

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[1] Approval of this document is an administrative function indicating readiness for release and does not impart legal liability on to the Approver for any technical content contained herein. Technical accuracy and fit-for-purpose of this content is obtained through the review process. The Approver shall ensure the applicable review process has occurred prior to signing the document.

Contributors

Client

Edwards J. Cuhaci and Associates Architects Inc.	David Bull

WSP

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Engineer, Land Development and Municipal Engineering	Michael Flowers
Project Manager, Water Resources	Bryan Orendorff
Overall Project Manager, Municipal	Steve Davidson

Subconsultants

n/a

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1 INTRODUCTION

1.1 Scope

WSP Canada Inc. (WSP) was retained by Edward J. Cuhaci and Associates and Architects Inc. to provide design consulting services for Stormwater Management Report for the proposed development of an apartment building at 2865 Riverside Drive in Ottawa, Ontario. This report addresses the quality and quantity of stormwater from pre-development to post-development conditions.

1.2 Site Location

The project site location is shown in **Figure 1**. It is approximately 1.65 hectares in size and is located on the east of Riverside Drive. The site is described as Part of Lots 45, 46, and Registered Plan 66 and Part of Lot 23 Junction Gore in the Geographic Township of Gloucester, City of Ottawa.

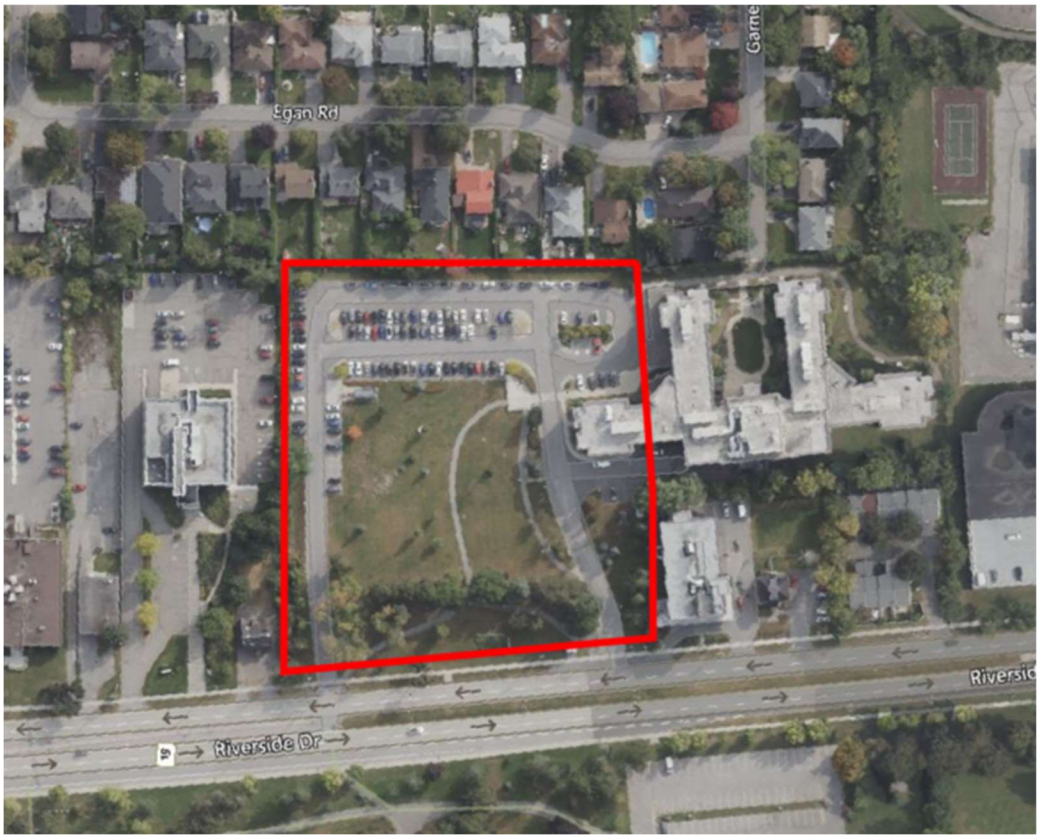

Figure 1 Site Location

The property is currently zoned ‘Neighborhood’ per the Official Plan, Schedule B3 Outer Urban Transect (November 2021). It is bound by residential properties to the east, the Canadian Labor Congress building to the north, St. Patrick’s Home Long Term Care Facility to the south, and Riverside Drive to the west. The current site contains green space and is developed with an existing surface parking lot to the east with road access from Riverside Drive. There is also an asphalt walking pathway that connects a concrete walkway from the existing St. Patrick’s Home to the concrete sidewalk along the Riverside Drive.

Refer to **Appendix A** for the Civil Drawings.

1.3 Stormwater Management Criteria

City of Ottawa Sewer Design Guidelines (October 2012) (the Guidelines) were reviewed, and the following stormwater management criteria have been adopted for the proposed site:

Quantity Control:

- Control post-development peak flows to Garner Avenue storm sewer system to pre-development levels of 76.1 L/s for all storms up to and including the 100-year storm.
- Control post-development peak flows to Riverside Drive to pre-development levels of 25 L/s for all storms up to and including the 100-year storm.

Quality Control:

- Enhanced Level 1 protection level, i.e., 80% long-term average removal of Total Suspended Solids (TSS).

2 PREDEVELOPMENT CONDITIONS

2.1 General

Pre-development conditions consists of an existing parking lot and landscaped area. An existing sidewalk accessible from Riverside Drive divides the project site in east and west areas. The site is surrounded by landscaped areas in the north and east corners and St. Patrick's Home Long Term Care Facility in the south corner.

Drainage from existing parking lot and landscaped area east of the sidewalk is captured by the catchbasins (CB) on site and conveyed to the existing 1500 mm diameter super pipe under the parking lot. Outflows from the super pipe are controlled by a 108 mm orifice plate. Uncontrolled drainage from north and east landscaped areas outlet to the Garner Avenue storm sewer system via landscape drains connected to the existing storm sewer system on site. Drainage from west of the sidewalk outlets directly on the Riverside Drive.

The general plan of services, describing most of the existing conditions on site per the latest site changes, was prepared by Novatech Engineering Consultants LTD as a part of the Stormwater Management Report (Novatech, 2011) for St. Patrick's Home and is included in **Appendix B**. Pre-development drainage area plan is included in **Appendix C**.

2.2 Allowable Flow Rates

As noted in the Novatech, 2011 report, the 100-yr allowable release rate from the combined proposed project site (north site) and existing St. Patrick's Home Long Term Care Facility (south site) is 104.6 L/s, referencing the capacity of the existing Garner Ave. storm sewer. The south site has a release rate of 28.5 L/s, as mentioned in the Novatech, 2011 report and confirmed by City of Ottawa on June 7, 2024. Existing outflows from the north site are to be controlled at 76.1 L/s.

Additionally, a small portion of the north site currently drains uncontrolled to Riverside Drive at a rate of 25 L/s which can be maintained as confirmed by the City of Ottawa on June 7, 2024. **Table 2-1** notes the allowable flow rates from the north site, south site and onto Riverside Drive.

Table 2-1 Allowable Flow Rates

Return Period	Garner Avenue storm sewer system (L/s)	St. Patrick's Home Long Term Care Facility (L/s)	Proposed North Site (L/s)	Overland to Riverside Drive (L/s)
5-yr	104.6	24.4	80.2	25
100-yr	104.6	28.5	76.1	25

3 POST DEVELOPMENT CONDITIONS

3.1 General

Drainage area delineation was conducted to determine the drainage pattern of the site under post-development conditions. The post-development drainage area plan is illustrated in **Appendix D**. Generally, existing drainage patterns have been maintained in the proposed conditions. Existing grading has been maintained for the landscaped area located west of the sidewalk. Therefore, this area will drain overland and uncontrolled to Riverside Drive. Landscaped areas in the north and east corners of the site have been maintained to outlet in the same manner as existing conditions, i.e., landscape drains to storm sewers on site and ultimately to the Garner Avenue storm sewer system.

The parking lot is proposed to have two new CBs and CB leads that collect and convey flows from the parking lot to the existing 1500 mm diameter super pipe. The super pipe attenuates and discharges flows at a controlled rate via a 50 mm diameter orifice at the existing maintenance hole (MH) 103. An Oil & Grit Separator (OGS) is proposed downstream of the control maintenance hole. The OGS will treat the outflows from super pipe to achieve 80% TSS removal before being discharged to the existing storm sewer system at Garner Avenue. Controlled outflow from the proposed building roof is considered to have no debris and will by-pass the OGS to connect to the existing storm sewer system at Garner Avenue.

3.2 Peak Flow Targets

Post-development peak flows from the proposed north site along with the uncontrolled flows from landscaped areas in the north, east and west corners of the site must be controlled down to the allowable release rates for each area. Novatech, 2011 report mentions the release rate from north and east landscaped areas to be 35.5 L/s, which has also been confirmed by the City.

Table 2-1 notes the peak flow targets from different areas of the proposed site.

3.3 PCSWMM Modelling

The modelling software utilized for the assessment was PCSWMM by Computational Hydraulics International (CHI) using PCSWMM version 5.2.4.

3.3.1 Rainfall Data

As per Ottawa Sewer Design Guidelines, a Chicago 3 hr distribution was used for this site. Rainfall intensities for the 100-yr storm with 10-minute time step have been maintained from the Guidelines. The following equation has been used to calculate rainfall intensities for the 5-yr storm with a 10-minute time step:

5-yr intensity = 998.071 / (Time in min + 6.053)$^{0.814}$

3.3.2 Subcatchments

The entire site was delineated in 18 subcatchments including north and south site. South site catchment areas have been included for completeness to ensure no loss of total drainage area from the property, but they discharge directly to outlets since they are not considered in the peak flow targets. A schematic of PCSWMM model is included in **Appendix E**. Horton method infiltration parameters have been applied to all the subcatchments as per the Guidelines as noted in **Table 3-1** below.

Table 3-1 Infiltration Parameters

Parameter	Unit	Value
Maximum Infiltration Rate	mm/hr	76.2
Minimum Infiltration Rate	mm/hr	13.2
Decay Constant	1/hr	4.14
N Imperv	-	0.013
N Perv	-	0.25
Dstore Imperv	mm	1.57
Dstore Perv	mm	4.67

The width for all the subcatchments has been maintained equal to twice the length of the street segment, as required in the Guidelines. The per cent imperviousness of each subcatchment area has been calculated by dividing the impervious area of each subcatchment by the total subcatchment area. Slope of each subcatchment area is based on the existing and proposed slopes with average slopes in impervious areas generally being equal to or less than 1 per cent.

Subcatchment area A2 consisting of the north and east landscaped areas and a portion of the south site has been divided into five subcatchment areas for modelling purposes (one for each inlet) as compared to the storm drainage area plan. Subcatchments A-3Ex and A-4Ex are part of the south site and they discharge directly to outlets since they are not considered in the peak flow targets. Subcatchment A1 represents the uncontrolled area draining overland to Riverside Drive. Subcatchment A5-Roof has

been modelled to represent the proposed building roof. **Table 3-2** represents individual subcatchment parameters used for this modelling exercise.

Table 3-2 Subcatchment Parameters

Name	Area (ha)	Runoff Coefficient 5-yr	Width (m)	Flow Length (m)	Slope (%)	Imperv. (%)
A1	0.15	0.29	55.19	27.54	0.74	13.15
A2*	0.26	0.33	-	-	-	-
A2_1	0.06	0.33	35.17	17	0.64	1
A2_2	0.02	0.33	19.50	10	0.64	1
A2_3	0.13	0.33	51.68	25	0.64	36.87
A2_4	0.04	0.33	30.79	14	0.64	1
A2_5	0.01	0.33	15.37	8	0.64	1
A-3Ex	0.27	0.23	73.89	36	0.50	25
A-4EX	0.35	0.90	84.05	42	0.50	25
A5-1	0.12	0.89	48.62	24.27	1	96.60
A5-2	0.09	0.90	44.76	21	1	100
A5-3	0.21	0.81	66.44	32	1	83.01
A5-4	0.11	0.82	45.65	23	1	86.67
A5-5	0.07	0.75	40.53	19	1	75.03
A5-6	0.09	0.90	42.86	21	1	100
A5-7	0.16	0.56	58.21	28	0.96	51.53
A5-8	0.10	0.44	45.22	23	0.96	33.65
A5-9	0.29	0.68	76.84	38	0.87	65.09
A5-B-Roof	0.14	0.90	54.23	26	1	100

*Area size of A2 is the sum of areas A2_1 to A2_5

Table 3-3 notes the peak runoff from uncontrolled subcatchments.

Table 3-3 Peak Runoff from Uncontrolled Subcatchments

Subcatchment ID	5-yr Peak Runoff (L/s)	100-yr Peak Runoff (L/s)
A1	10	10
A2_1	0	10
A2_2	0	10
A2_3	10	40
A2_4	0	10
A2_5	0	0

3.3.3 Junctions and Conduits

All the CBs and MHs have been modelled as junctions. CB leads and storm sewers have been modelled as conduits. Inverts and rim elevations of all the junctions and conduits have been maintained from the site servicing plan attached in **Appendix A** drawing sheet C5. The 1500 mm diameter super pipe has been divided into multiple segments to connect the CB leads into it. Inverts and rim elevations of these conduits have been interpolated in the model.

3.3.4 Storages

All the CBs and roof drains have been modelled to have storage to allow for surface ponding based on the proposed grading plan and roof drainage plan included in **Appendix A** drawing sheet C4 and M-311, respectively. **Table 3-4** notes the maximum ponding depth and ponding area available for parking lot structures and rooftop storage.

Table 3-4 Available Surface Storage

Area	Structure ID	Ponding depth Available (m)	Ponding Area Available (m^2)	Storage Volume Available (m^3)
A5-B Roof	-	0.15	1265	63
A5-1	EX CB 3	0.35	970	113
A5-2	EX CBMH 2	0.34	674	76
A5-3	EX CB 4	0.25	300	25
A5-4	EX CBMH 1	0.33	500	55
A5-5	CB 201	0.30	366	37
A5-6	CB 202	0.20	140	9
A5-7	EX CB 1	0.27	436	39
A5-8	LD's	-	-	-
A5-9	EX CBMH 3	0.35	830	100

Detailed PCSWMM model parameters are included in **Appendix E**.

3.4 Water Quantity Control

3.4.1 Parking Lot Storage

The minor system is designed to convey the runoff for events up to 5-yr return period. Major system runoff in excess of 5-yr and up to 100-yr must be stored on site as per the Guidelines. Parking lot storage with a ponding depth of up to 300 mm is permitted as per the Guidelines. The hydraulic grade line (HGL) analysis was completed using

PCSWMM. **Table 3-5** and **Table 3-6** provides a summary of storage used for a storm with 5-yr and 100-yr return period during HGL analysis.

Table 3-5 Structure Storage Summary for 5-yr Return Period

Structure	Maximum Utilized Storage (m^3)	Maximum Depth of Ponding (m)	Highest Ponding Elevation (m)	Structure Top of Grate Elevation (m)
EX CB 3	49	0.19	80.04	79.85
EX CBMH 2	40	0.20	80.06	79.86
EX CB 4	46	0.28	80.23	79.95
EX CBMH 1	40	0.23	80.10	79.87
CB 201	26	0.21	80.11	79.90
CB 202	0	0.03	80.13	80.10
EX CB 1	40	0.22	80.15	79.93
EX CBMH 3	2	0.04	80.64	80.60

Table 3-6 Structure Storage Summary for 100-yr Return Period

Structure	Maximum Utilized Storage (m^3)	Maximum Depth of Ponding (m)	Highest Ponding Elevation (m)	Structure Top of Grate Elevation (m)
EX CB 3	83	0.25	80.10	79.85
EX CBMH 2	68	0.26	80.12	79.86
EX CB 4	55	0.30	80.25	79.95
EX CBMH 1	70	0.30	80.17	79.87
CB 201	47	0.28	80.18	79.90
CB 202	1	0.04	80.14	80.10
EX CB 1	66	0.29	80.22	79.93
EX CBMH 3	5	0.06	80.66	80.60

3.4.2 Rooftop Storage

Proposed building will be equipped with 8 roof drains to store and convey runoff to the storm sewer system. Eight roof drains have been modelled, each with a maximum release rate of 1.5 L/s, as a single storage node for modelling purposes. This is selected based on a maximum of 150 mm of ponding depth and available manufacturer database. Watts RD 300 (half exposed) roof drains with adjustable flow control weirs is selected and included in **Appendix F**. A 200 mm diameter orifice is provided to simulate

the controlled release of outflow to the proposed storm sewer system. **Table 3-7** provides a summary of rooftop storage utilized for the proposed site.

Table 3-7 Rooftop Storage Summary

Return Period	Utilized Rooftop Storage Volume (m^3)	Maximum Depth of Ponding (m)	Toral Outflow from Roof (L/s)
5-yr	33	0.09	8
100-yr	56	0.12	12

3.4.3 Drainage to Riverside Drive

The landscaped area west of the sidewalk in the proposed north site drains overland to Riverside Drive. **Table 3-8** shows the peak flow targets and 5-yr and 100-yr peak flows from this area.

Table 3-8 Summary of Uncontrolled Flows

Area	Peak Flow Targets (L/s)		Post-development Peak Flows (L/s)	
	5-yr	100-yr	5-yr	100-yr
A1 - West landscaped area	25	25	5	10

3.4.4 Drainage to Garner Avenue

In order to meet the additional storage requirements for the proposed development on site, roof storage was added to the site. Additionally, surface storage capacity was enhanced, and the outlet control device size was reduced to promote greater storage in the combined surface and sub-surface stormwater storage system.

Table 3-9 shows a comparison of allowable peak flows and outflows from the proposed north site to the storm sewer on Garner Ave.

Table 3-9 Comparison of Peak Flow Targets and Outflows to Garner Avenue

North Site	Peak Flow Targets (L/s)	Post-development Peak Flows (L/s)
5-yr	80.2	24
100-yr	76.1	67

As shown in **Table 3-9**, the release rates from the site have been met.

3.4.5 Stress Test

A climate change consideration of 20 per cent increase to 100-yr rainfall values has been applied to stress test the hydraulic performance of the proposed site as mentioned in the Guidelines. A summary of results of stress test of all the structures is listed in **Table 3-10** below. As shown, the maximum storage depth is less than 0.35 m under this stress test condition.

Table 3-10 Stress Test Summary for Structures

Structure	Maximum Storage (m^3)	Maximum Depth of Ponding (m)	Highest Ponding Elevation (m)	Structure Top of Grate Elevation (m)
EX CB 3	100	0.27	80.12	79.85
EX CBMH 2	81	0.29	80.15	79.86
EX CB 4	58	0.31	80.26	79.95
EX CBMH 1	84	0.33	80.20	79.87
CB 201	57	0.31	80.21	79.9
CB 202	1	0.05	80.15	80.10
EX CB 1	71	0.30	80.23	79.93
EX CBMH 3	13	0.11	80.71	80.60

3.5 Water Quality Control

An OGS unit has been proposed downstream of the storage control maintenance hole (Ex.MH 103) to achieve Enhanced Level 1 protection level, i.e., 80% long-term average removal of Total Suspended Solids (TSS). Imbrium Systems Stormceptor EFO4 model with an estimated net annual TSS reduction of 81% is proposed to achieve this criterion. This model treats a drainage area of 1.25 ha with 74.40 per cent imperviousness which represents the proposed paved subcatchment areas A5-1 to A5-9 including the landscaped areas in subcatchment A5-8. OGS sizing report and details are included in **Appendix G**. As mentioned in **Section 3.1,** outflows from the proposed building roof is considered to be clean and will by-pass the OGS to connect to the existing storm sewer system at Garner Avenue. OGS is proposed to treat the previously untreated paved areas.

4 CONCLUSIONS

WSP was retained by Edwards J. Cuhaci and Associates Architects Inc. to provide design consulting services for the proposed apartment building at St. Patrick's Homes located in Ottawa, Ontario. A stormwater management report has been prepared in support of the proposed development. An existing superpipe and storm sewer system in conjunction with two new catchbasins will provide quantity control for this development.

Water Quantity

Runoff from the proposed development will be controlled by the rooftop and parking lot storage in addition with surcharging an existing 1500 mm diameter super pipe under the existing parking lot. A total of 624 m^3 of combined storage has been utilized. Post-development flows for 5-yr and 100-yr return periods have been controlled to below 76.1 L/s in compliance with the target release rates. Uncontrolled flow on Riverside Drive is maintained to below 25 L/s.

Water Quality

A Stormceptor EFO4 Oil and Grit Separator unit will provide 80% TSS removal efficiency.

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APPENDIX

A Civil drawings

GENERAL

1. DRAWINGS TO BE READ IN CONJUNCTION WITH ARCHITECTURAL AND LANDSCAPE DRAWINGS.
2. ALL SERVICES, MATERIALS, CONSTRUCTION METHODS AND INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE LATEST STANDARDS AND REGULATIONS OF THE: CITY OF OTTAWA STANDARD SPECIFICATIONS AND DRAWINGS, ONTARIO PROVINCIAL SPECIFICATION STANDARD SPECIFICATION (OPSS) AND ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD), UNLESS OTHERWISE SPECIFIED, TO THE SATISFACTION OF THE CITY AND THE CONSULTANT.
3. THE POSITION OF EXISTING POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND ABOVEGROUND UTILITIES, STRUCTURES AND APPURTENANCES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWING, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL SATISFY HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM DURING THE COURSE OF CONSTRUCTION. ANY RELOCATION OF EXISTING UTILITIES REQUIRED BY THE DEVELOPMENT OF SUBJECT LANDS IS TO BE UNDERTAKEN AT CONTRACTOR'S EXPENSE.
4. THE CONTRACTOR MUST NOTIFY ALL EXISTING UTILITY COMPANY OFFICIALS FIVE (5) BUSINESS DAYS PRIOR TO START OF CONSTRUCTION AND HAVE ALL EXISTING UTILITIES AND SERVICES LOCATED IN THE FIELD OR EXPOSED PRIOR TO THE START OF CONSTRUCTION, INCLUDING BUT NOT LIMITED TO HYDRO, BELL, CABLE TV, AND CONSUMERS GAS LINES.
5. ALL TRENCHING AND EXCAVATIONS TO BE IN ACCORDANCE WITH THE LATEST REVISIONS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS. ALL INFORMATION SHALL BE CONFIRMED PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. REFER TO ARCHITECTS PLANS FOR BUILDING DIMENSIONS, ELEVATIONS, LAYOUT AND REMOVALS. REFER TO LANDSCAPE PLAN FOR LANDSCAPED DETAILS AND OTHER RELEVANT INFORMATION. ALL INFORMATION SHALL BE CONFIRMED PRIOR TO COMMENCEMENT OF CONSTRUCTION.
7. TOPOGRAPHIC SURVEY COMPLETED AND PROVIDED BY FARLEY, SMITH & DENIS SURVEYING LTD. DATED JUNE 7, 2023. CONTRACTOR TO VERIFY IN THE FIELD PRIOR TO CONSTRUCTION OF ANY WORK AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
8. ALL ELEVATIONS ARE GEODETIC AND UTILIZE METRIC UNITS. VERIFY THAT JOB BENCHMARKS HAVE NOT BEEN ALTERED OR DISTURBED.
9. ALL GROUND SURFACES SHALL BE EVENLY GRADED WITHOUT PONDING AREAS AND WITHOUT LOW POINTS EXCEPT WHERE APPROVED SWALE OR DRAIN OUTLETS ARE PROVIDED.
10. ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAW CUT TO FORM A NEAT AND STRAIGHT LINE PRIOR TO PLACING NEW PAVEMENT. PAVEMENT REINSTATEMENT SHALL BE WITH STEP JOINTS OF 500mm WIDTH MINIMUM.
11. ALL DISTURBED AREAS OUTSIDE PROPOSED GRADING LIMITS TO BE RESTORED TO ORIGINAL ELEVATIONS AND CONDITIONS UNLESS OTHERWISE SPECIFIED. EXISTING PARKING LOT SHALL BE RE-ASPHALTED AT EXISTING GRADES EXCEPT AS NOTED TO EVEN OUT GRADES. ALL RESTORATION SHALL BE COMPLETED WITH THE GEOTECHNICAL REQUIREMENTS FOR BACKFILL AND COMPACTION.
12. ABUTTING PROPERTY GRADES TO BE MATCHED.
13. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE MUNICIPAL AUTHORITIES PRIOR TO COMMENCING CONSTRUCTION, INCLUDING WATER PERMIT AND ROAD CUT PERMIT.
14. MINIMIZE DISTURBANCE TO EXISTING VEGETATION DURING THE EXECUTION OF ALL WORKS.
15. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL UNLESS OTHERWISE DIRECTED FROM THE ENGINEER. EXCAVATE AND REMOVE ALL ORGANIC MATERIAL AND DEBRIS LOCATED WITHIN THE PROPOSED BUILDING, PARKING AND ROADWAY LOCATIONS.
16. AT PROPOSED UTILITY CONNECTION POINTS AND CROSSINGS (I.E. STORM SEWER, SANITARY SEWER, WATER, ETC.) THE CONTRACTOR SHALL DETERMINE THE PRECISE LOCATION AND DEPTH OF EXISTING UTILITIES AND REPORT ANY DISCREPANCIES OR CONFLICTS TO THE ENGINEER BEFORE COMMENCING WORK.
17. PRIOR TO CONSTRUCTION, A GEOTECHNICAL ENGINEER REGISTERED IN THE PROVINCE OF ONTARIO IS TO INSPECT ALL SUB-SURFACES FOR FOOTINGS, SERVICES AND PAVEMENT STRUCTURES.
18. CONTRACTOR TO OBTAIN POST-CONSTRUCTION TOPOGRAPHIC SURVEY PERFORMED BY CERTIFIED OLS OR P.ENG. CONFIRMING COMPLIANCE WITH DESIGN GRADING AND SERVICING. SURVEY IS TO INCLUDE LOCATION AND INVERTS FOR BURIED UTILITIES.
19. PROVIDE CCTV INSPECTION REPORT FOR ALL SEWERS AND CATCHBASIN LEADS 200MM DIAMETER AND LARGER. REPEAT CCTV INSPECTION FOLLOWING RECTIFICATION OF ANY DEFICIENCIES.
20. REPORT REFERENCES
    - 20.1. ST. PATRICK'S HOME 2865 RIVERSIDE DRIVE STORMWATER MANAGEMENT REPORT, PREPARED BY NOVATECH, PROJ NO.R-2010-121, OCTOBER 29,2010.
    - 20.2. GEOTECHNICAL INVESTIGATION REPORT FOR ST. PATRICK'S HOME OF OTTAWA, PREPARED BY STANTEC, PROJ NO.121624271, OCTOBER 2022.
    - 20.3. 2685 RIVERSIDE DRIVE - ADEQUACY OF PUBLIC SERVICES, PREPARED BY NOVATECH, APRIL 15, 2021.
    - 20.4. ST. PATRICK'S HOME DEVELOPMENT SERVICING REPORT, PREPARED BY WSP, APRIL 26,2024.
    - 20.5. ST. PATRICK'S HOME DEVELOPMENT SWM REPORT, PREPARED BY WSP, JUNE 21, 2024.

PARKING LOT AND WORK IN PUBLIC RIGHTS OF WAY

1. CONTRACTOR TO REINSTATE ROAD CUTS AS PER CITY OF OTTAWA DETAIL R10.
2. GEOTECHNICAL INVESTIGATION REPORT - FOR ST. PATRICK'S HOME OF OTTAWA, PREPARED BY STANTEC, PROJ NO.121624271, OCTOBER 2022
3. CONTRACTOR TO PREPARE SUBGRADE, INCLUDING PROOFROLLING, TO THE SATISFACTION OF THE GEOTECHNICAL CONSULTANT PRIOR TO THE COMMENCEMENT OF PLACEMENT OF GRANULAR B MATERIAL.
4. FILL TO BE PLACED AND COMPACTED PER THE GEOTECHNICAL REPORT REQUIREMENTS.
5. CONTRACTOR TO SUPPLY, PLACE AND COMPACT GRANULAR B MATERIAL IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE GEOTECHNICAL CONSULTANT. CONTRACTOR TO PROVIDE CONSULTANT WITH SAMPLES OF GRANULAR B MATERIAL FOR TESTING AND CERTIFICATION FROM THE GEOTECHNICAL CONSULTANT THAT THE MATERIAL MEETS THE GRADATION REQUIREMENTS SPECIFIED IN THE GEOTECHNICAL REPORT.
6. GRANULAR A MATERIAL TO BE PLACED ONLY UPON APPROVAL BY THE GEOTECHNICAL CONSULTANT OF GRANULAR B PLACEMENT.
7. CONTRACTOR TO SUPPLY, PLACE AND COMPACT GRANULAR A MATERIAL IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE GEOTECHNICAL CONSULTANT. CONTRACTOR TO PROVIDE CONSULTANT WITH SAMPLES OF GRANULAR A MATERIAL FOR TESTING AND CERTIFICATION FROM THE GEOTECHNICAL CONSULTANT THAT THE MATERIAL MEETS THE GRADATION REQUIREMENTS SPECIFIED IN THE GEOTECHNICAL REPORT.
8. ASPHALT MATERIAL TO BE PLACED ONLY UPON APPROVAL BY THE GEOTECHNICAL CONSULTANT OF GRANULAR A PLACEMENT.
9. CONTRACTOR TO SUPPLY, PLACE AND COMPACT ASPHALT MATERIAL IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE GEOTECHNICAL CONSULTANT. CONTRACTOR TO PROVIDE CONSULTANT WITH SAMPLES OF ASPHALT MATERIAL FOR TESTING AND CERTIFICATION FROM THE GEOTECHNICAL CONSULTANT THAT THE MATERIAL MEETS THE REQUIREMENTS SPECIFIED IN THE GEOTECHNICAL REPORT.
10. CONTRACTOR IS RESPONSIBLE FOR ESTABLISHING LINE AND GRADE IN ACCORDANCE WITH THE PLANS, AND FOR PROVIDING THE CONSULTANT WITH VERIFICATION PRIOR TO PLACEMENT.
11. ALL EXCESS MATERIAL TO BE HAULED OFFSITE AND DISPOSED OF AT AN APPROVED DUMP SITE. SHOULD THE CONTRACTOR DISCOVER ANY HAZARDOUS MATERIAL, CONTRACTOR IS TO NOTIFY CONSULTANT. CONSULTANT TO DETERMINE APPROPRIATE DISPOSAL METHOD/LOCATION.
12. PAVEMENT STRUCTURE (MATERIAL TYPES AND THICKNESS) TO BE AS SPECIFIED IN THE GEOTECHNICAL REPORT.

STORM SEWERS AND STRUCTURES

1. ALL STORM SEWER MATERIALS AND CONSTRUCTION METHODS SHALL CONFORM TO THE CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS. PROVIDE CCTV INSPECTION REPORTS FOR ALL NEW STORM SEWERS, SERVICES AND CB LEADS.
2. STORM SEWERS 450mm DIAMETER AND SMALLER SHALL BE PVC SDR-35, WITH RUBBER GASKET PER CSA A-257.3.
3. STORM SEWER LARGER THAN 450mm SHALL BE REINFORCED CONCRETE CLASS 100D.
4. SEWER BEDDING AS PER CITY OF OTTAWA DETAIL S6.
5. ALL STORM MANHOLES TO BE AS PER STORM STRUCTURE TABLE.
6. ANY NEW OR EXISTING STORM SEWER WITH LESS THAN 2.0m COVER REQUIRES THERMAL INSULATION AS PER CITY OF OTTAWA STANDARD W22, OR APPROVED BY THE ENGINEER.
7. ALL CATCHBASIN LEADS TO BE MINIMUM 200mm DIAMETER AT MINIMUM 1.0% SLOPE UNLESS OTHERWISE SPECIFIED.
8. STORM CATCHBASINS AS PER OPSD 705.010 AND FRAME/COVER AS PER CITY STANDARD DRAWINGS S19. STORM CBMH'S AS INDICATED IN TABLE WITH SUMP, ADJUSTMENT SECTIONS SHALL BE AS PER OPSD 704.010.
9. INSTALLATION OF FLOW CONTROL ICD'S TO BE VERIFIED BY QUALITY VERIFICATION ENGINEER RETAINED BY CONTRACTOR.
10. PROVIDE BACKWATER VALVE ON FOUNDATION DRAIN, STORM DISCHARGE, AND OVERFLOW DISCHARGE PER S14
11. ALL CATCHBASINS EXCLUDING LANDSCAPE CATCHBASINS TO HAVE 150 MMØ PERFORATED PIPE FOR 3.0M ON ALL AVAILABLE SIDES AT AN ELEVATION OF 300mm BELOW SUBGRADE LEVEL AS PER CITY OF OTTAWA STANDARD DRAWING 'R1'

SANITARY SEWER AND STRUCTURES

1. ALL SANITARY SEWER, SANITARY SEWER APPURTENANCES AND CONSTRUCTION METHODS SHALL CONFORM TO THE CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS. PROVIDE CCTV INSPECTION REPORTS FOR ALL NEW SANITARY PIPING.
2. SANITARY SEWER PIPE SIZE 150mm DIAMETER AND GREATER TO BE PVC SDR-35 (UNLESS SPECIFIED OTHERWISE) WITH RUBBER GASKET TYPE JOINTS IN CONFORMANCE WITH CSA B-182.2,3,4.
3. SEWER BEDDING AS PER CITY OF OTTAWA DETAIL S6.
4. ALL SANITARY MANHOLES 1200mm IN DIAMETER TO BE AS PER OPSD 701.01. FRAME AND COVER TO BE AS PER CITY OF OTTAWA STANDARD S25 AND S24.
5. MAINTENANCE HOLE BENCHING AND PIPE OPENING ALTERNATIVES AS PER THE OPSD 701.021
6. ANY SANITARY SEWER WITH LESS THAN 2.0m COVER REQUIRES THERMAL INSULATION AS PER CITY OF OTTAWA STANDARD W22, OR APPROVED BY THE ENGINEER.
7. PROVIDE BACKWATER VALVE FOR BUILDING SANITARY SERVICES PER S14.1

WATERMAIN

1. ALL WATERMAIN AND WATERMAIN APPURTANANCES, MATERIALS, CONSTRUCTION AND TESTING METHODS SHALL CONFORM TO THE CURRENT CITY OF OTTAWA AND MINISTRY OF ENVIRONMENT STANDARDS AND SPECIFICATIONS.
2. ALL WATERMAIN 300mm DIAMETER AND SMALLER TO BE POLY VINYL CHLORIDE (PVC) CLASS 150 DR 18 MEETING AWWA SPECIFICATION C900.
3. ALL WATERMAIN TO BE INSTALLED AT MINIMUM COVER OF 2.4m BELOW FINISHED GRADE. WHERE WATERMAINS CROSS OVER OTHER UTILITIES, A MINIMUM 0.30m CLEARANCE SHALL BE MAINTAINED; WHERE WATERMAINS CROSS UNDER OTHER UTILITIES, A MINIMUM 0.50m CLEARANCE SHALL BE MAINTAINED. WHERE THE MINIMUM SEPARATION CANNOT BE ACHIEVED, THE WATERMAIN SHALL BE INSTALLED AS PER CITY OF OTTAWA STANDARDS W25 AND W25.2. WHERE 2.4m MINIMUM DEPTH CANNOT BE ACHIEVED, THERMAL INSULATION SHALL BE PROVIDED AS PER CITY OF OTTAWA STANDARD W22. WHERE A WATERMAIN IS IN CLOSE PROXIMITY TO AN OPEN STRUCTURE, THERMAL INSULATION SHALL BE PROVIDED AS PER CITY OF OTTAWA STANDARD W23.
4. CONCRETE THRUST BLOCKS AND MECHANICAL RESTRAINTS ARE TO BE INSTALLED AT ALL TEES, BENDS, HYDRANTS, REDUCERS, ENDS OF MAINS AND CONNECTIONS 100mm AND LARGER, IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS W25.3 & W25.4.
5. CATHODIC PROTECTION REQUIRED FOR ALL IRON FITTINGS AS PER CITY OF OTTAWA STANDARD W40 & W42.
6. ALL VALVES AND VALVE BOXES AND CHAMBERS, HYDRANTS, AND HYDRANT VALVES AND ASSEMBLES SHALL BE INSTALLED AS PER CITY OF OTTAWA STANDARD
7. FIRE HYDRANT LOCATION AND INSTALLATION AS PER CITY OF OTTAWA STANDARD W18 & W19. CONTRACTOR TO PROVIDE FLOW TEST AND PAINTING OF NEW HYDRANT IN ACCORDANCE WITH CITY STANDARDS.
8. IF WATER MAIN MUST BE DEFLECTED TO MEET ALIGNMENT, ENSURE THAT THE AMOUNT OF DEFLECTION USED IS LESS THAN HALF THAT RECOMMENDED BY THE MANUFACTURER.

Recommended Pavement Structure

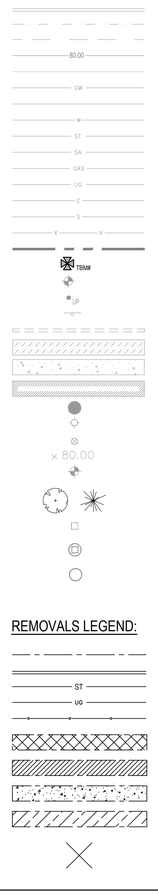
Location	Asphalt Thickness	Base Thickness OPSS Granular A (mm)	Subbase Thickness Granular B Type II (mm)
Standard Duty Parking Areas	60 mm SP12.5 mm	150	300
Heavy Duty Parking	40 mm SP12.5 mm 50 mm SP SP19.0 mm	150	400

EROSION AND SEDIMENT CONTROL

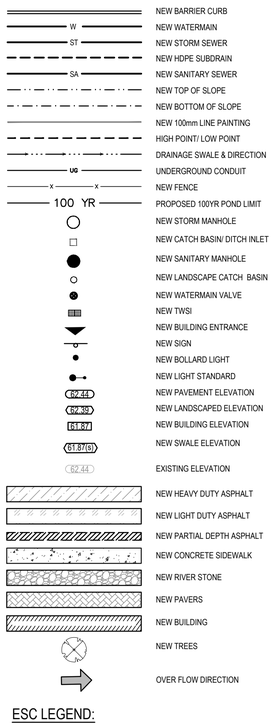
** CONTRACTOR IS RESPONSIBLE FOR ALL INSTALLATION, MONITORING, REPAIR AND REMOVAL OF ALL EROSION AND SEDIMENT CONTROL FEATURES. **

1. PRIOR TO START OF CONSTRUCTION:
   - 1.1. INSTALL SILT FENCE IN LOCATION SHOWN.
   - 1.2. INSTALL SILT SACK FILTERS IN ALL THE CATCHBASINS AND MANHOLES TO REMAIN DURING CONSTRUCTION WITHIN THE SITE.
   - 1.3. INSPECT MEASURES IMMEDIATELY AFTER INSTALLATION.
   - 1.4. INSTALL MUD MAT AT CONSTRUCTION ENTRANCES.
2. DURING CONSTRUCTION:
   - 2.1. MINIMIZE THE EXTENT OF DISTURBED AREAS AND THE DURATION OF EXPOSURE AND IMPACTS TO EXISTING GRADING.
   - 2.2. PERIMETER VEGETATION TO REMAIN IN PLACE UNTIL PERMANENT STORM WATER MANAGEMENT IS IN PLACE. OTHERWISE, IMMEDIATELY INSTALL SILT FENCE WHEN THE EXISTING SITE IS DISTURBED AT THE PERIMETER.
   - 2.3. PROTECT DISTURBED AREAS FROM OVERLAND FLOW BY PROVIDING TEMPORARY SWALES TO THE SATISFACTION OF THE FIELD ENGINEER. TIE-IN TEMPORARY SWALE TO EXISTING CB'S AS REQUIRED.
   - 2.4. PROVIDE TEMPORARY COVER SUCH AS SEEDING OR MULCHING IF DISTURBED AREA WILL NOT BE REHABILITATED WITHIN 30 DAYS.
   - 2.5. INSPECT SILT FENCES, FILTER FABRIC FILTERS AND CATCH BASIN SUMPS WEEKLY AND WITHIN 24 HOURS AFTER A STORM EVENT. CLEAN AND REPAIR WHEN NECESSARY.
   - 2.6. DOWNSTREAM STORM INFRASTRUCTURE SHALL BE PROTECTED FROM UNFILTERED RUNOFF DURING ON-SITE STORM INFRASTRUCTURE DEMOLITION.
   - 2.7. DRAWING TO BE REVIEWED AND REVISED AS REQUIRED DURING CONSTRUCTION.
   - 2.8. EROSION CONTROL FENCING TO BE ALSO INSTALLED AROUND THE BASE OF ALL STOCKPILES.
   - 2.9. DO NOT LOCATE TOPSOIL PILES AND EXCAVATION MATERIAL CLOSER THAN 2.5m FROM ANY PAVED SURFACE, OR ONE WHICH IS TO BE PAVED BEFORE THE PILE IS REMOVED. ALL TOPSOIL PILES ARE TO BE SEEDED IF THEY ARE TO REMAIN ON SITE LONG ENOUGH FOR SEEDS TO GROW (LONGER THAN 30 DAYS).
   - 2.10. CONTROL WIND-BLOWN DUST OFF SITE BY SEEDING TOPSOIL PILES AND OTHER AREAS TEMPORARILY (PROVIDE WATERING AS REQUIRED AND TO THE SATISFACTION OF THE ENGINEER).
   - 2.11. NO ALTERNATE METHODS OF EROSION PROTECTION SHALL BE PERMITTED UNLESS APPROVED BY THE FIELD ENGINEER.
   - 2.12. CITY ROADWAY AND SIDEWALK TO BE CLEANED OF ALL SEDIMENT FROM VEHICULAR TRACKING AS REQUIRED.
   - 2.13. DURING WET CONDITIONS, TIRES OF ALL VEHICLES/EQUIPMENT LEAVING THE SITE ARE TO BE SCRAPED.
   - 2.14. ANY MUD/MATERIAL TRACKED ONTO THE ROAD SHALL BE REMOVED IMMEDIATELY BY HAND OR RUBBER TIRE LOADER.
   - 2.15. TAKE ALL NECESSARY STEPS TO PREVENT BUILDING MATERIAL, CONSTRUCTION DEBRIS OR WASTE BEING SPILLED OR TRACKED ONTO ABUTTING PROPERTIES OR PUBLIC STREETS DURING CONSTRUCTION AND PROCEED IMMEDIATELY TO CLEAN UP ANY AREAS SO AFFECTED.
   - 2.16. ALL EROSION CONTROL STRUCTURE TO REMAIN IN PLACE UNTIL ALL DISTURBED GROUND SURFACES HAVE BEEN STABILIZED EITHER BY PAVING OR RESTORATION OF VEGETATIVE GROUND COVER.
   - 2.17. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.

EXISTING LEGEND:

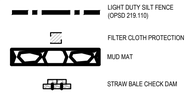


PROPOSED LEGEND:



REMOVALS LEGEND:

ESC LEGEND:



St. Patrick's Home of Ottawa Inc.

ISSUE NO.	REV. NO.	DATE YYMMDD	ISSUE
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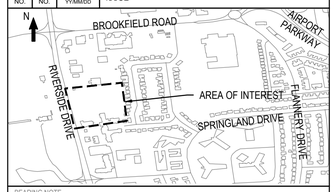

BEARING NOTE

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SITE BENCHMARK 1 N:5025855.730 E:368247.808 ELEVATION=82.24
SITE BENCHMARK 2 N:5025967.857 E:368224.569 ELEVATION=80.94

WSP CANADA INC.
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LICENSED PROFESSIONAL ENGINEER
D. B. YANG
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2024-07-08
PROVINCE OF ONTARIO

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PROJECT TITLE/TITRE DU PROJET
ST. PATRICK'S HOME
NEW SENIOR APARTMENT BUILDING

2865 RIVERSIDE DR.#226
OTTAWA, ONTARIO K1V 8N5

DRAWING TITLE/TITRE DU DESSIN

NOTES AND DETAILS

SCALE ECHELLE	AS SHOWN	PROJ. No 221-08396-00	ISSUE No 5	REV. No 0
DRAWN BY DESSINE PAR	JT	DRAWING/DESSIN C0		
CHECKED BY VERIFIE PAR	DY			
DATE	JULY 2024	ACAD FILE/FICHIER:		

D07-12-XX-XXXX

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STORM STRUCTURE	TOP OF GRATE ELEVATION	STRUCTURE INFO						OUTLET	
		INLET	INLET	OUTLET	SIZE	OPSD	COVER	DIAMETER	TYPE
CB201	79.90			78.300	600X600mm	OPSD 705.010	S19.1	250	PVC SDR-35
CB202	80.10			78.500	600X600mm	OPSD 705.010	S19.1	250	PVC SDR-35
CB203	80.93	79.700	79.590	78.980	600X600mm	OPSD 705.010	S19.1	250	PVC SDR-35
STMH201	80.38		77.390	77.390	1200mm DIA.	OPSD 701.010	S24.1	375	PVC SDR-35
STMH202	80.35	78.100	77.370	77.340	1200mm DIA.	OPSD 701.010	S24.1	375	PVC SDR-35
STMH203	80.89		78.646	78.460	1200mm DIA.	OPSD 701.010	S24.1	250	PVC SDR-35
LCB01	80.95			79.950	300mm DIA.	S31	S30	250	HDPE
LCB02	80.95			79.950	300mm DIA.	S31	S30	250	HDPE
LCB03	80.95		79.770	79.770	300mm DIA.	S31	S30	250	HDPE
DICB204	79.09			78.200	300mm DIA.	OPSD 705.010	OPSD 705.030	200	PVC SDR-35

SAN STRUCTURE TABLE								
STRUCTURE ID	TOP OF GRATE ELEVATION	INVERT				DESCRIPTION		
		INLET	INLET	INLET	OUTLET	SIZE	OPSD	COVER
SANMH310	80.55			78.783	78.753	1200mm DIA.	OPSD-701.010	S24

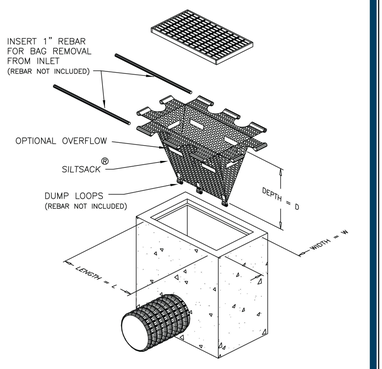
		Obvert	Invert			Obvert	Invert	
1	250mmØ PVC SAN	78.910	78.660	0.500	Clearance Above	78.160	77.810	*EX.350mmØPVC W/M*
2	250mmØ PVCSTM	79.882	79.632	1.242	Clearance Above	78.390	78.240	150mmØ PVC W/M
3	250mmØ PVC STM	78.144	77.894	0.634	Clearance Under	79.078	78.778	*EX.300mmØPVC W/M*
4	250mmØ PVC STM	78.120	77.870	0.210	Clearance Under	78.480	78.330	200mmØ PVC W/M

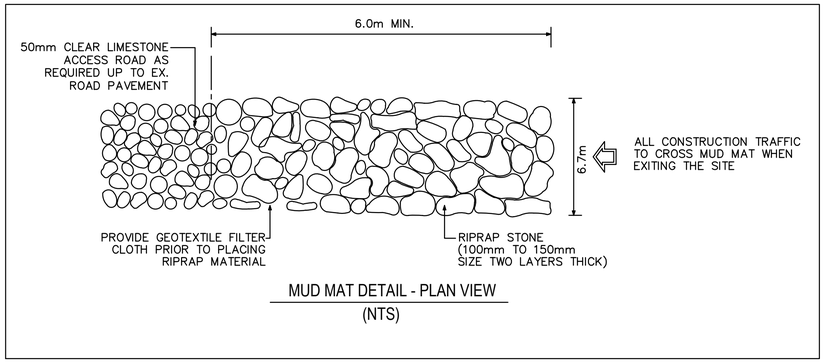
*Note: Provide Concrete Encased for corssing clearance less than 0.30m

WATERMAIN SCHEDULE				
STATION	DESCRIPTION	FINISHED GRADE	TOP OF WATERMAIN	COVER
150mm WATERMAIN SERVICE FROM BUILDING TO RIVERSIDE DRIVE				
1+000	PROPOSED 150mm CAP	81.25	78.850	2.40
1+002.40	150mm VB	81.04	78.640	2.40
1+011.35	150x150x150 mm Tee	81.04	78.640	2.40
1+033.54	11.25° Bend	81.40	79.000	2.40
1+054.35	150mm VB	80.88	78.480	2.40
1+061.85	Connect to Ex. 305mm W/M WITH 150x300mm Tee	80.64	78.240	2.40

150mm WATERMAIN EXTENSION FROM EXISTING PRIVATE MAIN				
2+011.35	150x150 mm Tee	81.04	78.640	2.40
2+012.80	150mm VB	81.04	78.640	2.40
2+025.37	11.25° Bend	81.06	78.660	2.40
2+032.09	Crossing with 250mm PVC STM	80.98	78.580	2.40
2+042.20	11.25° Bend	80.94	78.540	2.40
2+055.33	150mm VB	81.05	78.650	2.40
2+056.70	CONNECT TO Ex. 150mm W/M WITH 150x150mm Tee	81.13	78.730	2.40

Typical Siltsack® Construction - Type B





MUD MAT DETAIL - PLAN VIEW
(NTS)

St. Patrick's Home of Ottawa Inc.

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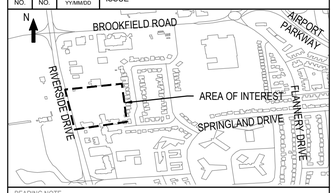

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100230568
2024-07-08
PROVINCE OF ONTARIO

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DRAWING TITLE/TITRE DU DESSIN

DETAILS

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CHECKED BY / VERIFIE PAR	DY	C1		
DATE	JULY 2024	ACAD FILE/FICHIER:		

D07-12-XX-XXXX

#XXXXX

PROTECT EXISTING UNDERGROUND UTILITIES (TYP)

ALL EXISTING RIVER ROCK TO BE REMOVED, SALVAGED AND REINSTATED (TYP)

FULL DEPTH ASPHALT REMOVAL (TYP)

CURB REMOVAL (TYP)

REMOVE EXISTING CONCRETE SIDEWALK (TYP)

REMOVE EXISTING ASPHALT SIDEWALK (TYP)

PROPOSED BUILDING EXCAVATION LIMITS

REMOVE EXISTING CB AND REPLACE WITH NEW 1200mm DIA. STMH. CONTRACTOR TO SUBMIT SHOP DWG FOR REVIEW PRIOR TO CONTRCUTION

REMOVE EXISTING CATCH BASIN

EXISTING STORM SEWER TO BE REMOVED.

REMOVE EXISTING STORM SEWER WITHIN PROPOSED BUILDING FOOTPRINT. ABANDON UNUSED PIPING IN PLACE AND FILL WITH CONCRETE. REMOVE ABANDONED PIPE BELOW FOOTINGS.

CLEAR AND GRUB EXISTING VEGETATION FOR PROPOSED PARKING AND DRAINAGE SWALE

FULL DEPTH ASPHALT REMOVAL (TYP)

EXISTING LIGHT STANDARD TO BE REMOVED (TYP)

REMOVE EXISTING TREE (TYP)

REMOVE EXISTING BARRIER CURB (TYP)

EXISTING CB WILL BE REMAINED

EXISTING U/G TO BE REMOVED (TYP)

PROTECT EXISTING TREES DURING CONSTRUCTION AS PER OPSD 220.010 (TYP)

THE CONTRACTOR SHALL PHASE CONSTRUCTION TO AVOID DISTURBANCE TO THE EXISTING DEVELOPMENT. ALL ASPHALT, CURBS, CONCRETE, ETC. EFFECTED BY CONSTRUCTION TRAFFIC/ PHASING SHALL BE REINSTATED TO THE SATISFACTION OF THE CONTRACT ADMINISTRATOR (TYP.)

BRACE EXISTING UTILITIES (UNDERGROUND & OVERHEAD) DURING CONSTRUCTION (TYP.)

REMOVE AND REINSTATE CONCRETE SIDEWALK TO MATCH EXISTING CONDITION AS PER CITY STD SC4

ROAD CUT AS PER CITY STD R10, ROAD TO BE REINSTATED TO EQUAL OR BETTER THAN ORIGINAL CONDITION

REMOVE AND REINSTATE OF CONCRETE CURB AS PER CITY STD SC1.1

RIVERSIDE DRIVE

Site Benchmark 2
Nails in Utility Pole
Elevation=80.94

Site Benchmark1
Nails in Utility Pole
Elevation=82.24

NO. 2865
5 STOREY
BRICK SIDED
BUILDING
(FOUNDATION
NOTED)

EXISTING FIVE STOREY BUILDING
FFE = 81.25
USFs = 75.73
USF = 79.25

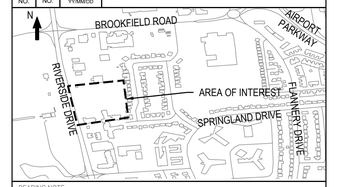
0 5m 10m 20m 30m

SCALE: 1:300

Plot Date: 08/07/2024 Plot Time: 12:41:43 PM Plot By: TAN, JEY1 | PLOT STAMP FOR EJC USE ONLY | Plotter: DWG TO PDF.PC3 | Page Setup:

St. Patrick's Home of Ottawa Inc.

ISSUE NO.	REV. NO.	DATE YY/MM/DD	ISSUE
5		24/07/08	ISSUED FOR FINAL SITE PLAN CONTROL
4		24/04/26	RESUBMISSION FOR SPC PH 3 PRE-CONSULATION
3		24/04/15	RESUBMISSION FOR SPC PH 3 PRE-CONSULATION
2		24/01/23	ISSUED FOR SITE PLAN CONTROL REVIEW
1		23/08/30	ISSUED FOR COSTING
0		22/10/07	ISSUED FOR CONCEPT DESIGN



BEARING NOTE

BEARING ARE GRID, DERIVED FROM THE CAN-NET VRS NETWORK OBSERVATIONS ON NCC HORIZONTAL CONTROL MONUMENTS 19773035 AND 1968091, CENTRAL MERIDIAN, 76°30' WEST LONGITUDE MTM ZONE 9, NAD83 (ORIGINAL)
SITE BENCHMARK 1 N:5025856.730 E:368247.808 ELEVATION=82.24
SITE BENCHMARK 2 N:5025967.857 E:368224.369 ELEVATION=80.94

WSP CANADA INC.
2611 QUEENSVIEW DRIVE, SUITE 300
OTTAWA, ONTARIO
CANADA K2B 8K2
PHONE: 613-829-2800
WWW.WSP.COM

LICENSED PROFESSIONAL ENGINEER
D. B. YANG
100230568
2024-07-08
PROVINCE OF ONTARIO

EDWARD J. CUHACI
& ASSOCIATES ARCHITECTS Inc.
171 Slater St, Suite 100, Ottawa, Ontario, K1P 5H7
Fax: (613) 236-1944 Telephone: (613) 236-7135 E-mail: info@cuhaci.com

PROJECT TITLE/TITRE DU PROJET
ST. PATRICK'S HOME
NEW SENIOR APARTMENT BUILDING

2865 RIVERSIDE DR.#226
OTTAWA, ONTARIO K1V 8N5

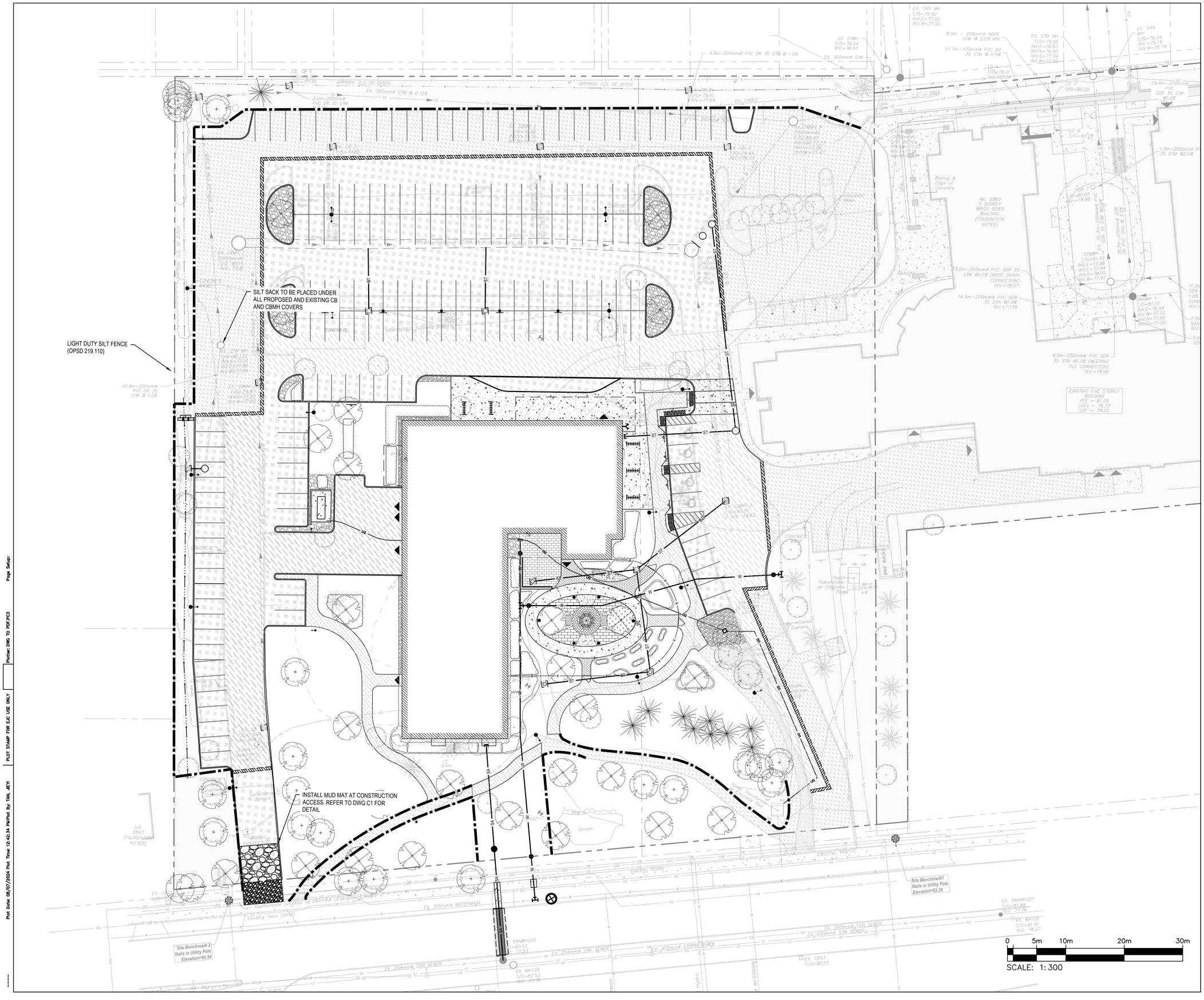
DRAWING TITLE/TITRE DU DESSIN

REMOVAL PLAN

SCALE / ECHELLE	1:300	PROJ. No	ISSUE No	REV. No
		221-08396-00	5	0
DRAWN BY / DESSINE PAR	JT	DRAWING/DESSIN		
CHECKED BY / VERIFIE PAR	DY	**C2**		
DATE	JULY 2024	ACAD FILE/FICHIER:		

D07-12-XX-XXXX

#XXXXX



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St. Patrick's Home of Ottawa Inc.

ISSUE NO.	REV. NO.	DATE YY/MM/DD	ISSUE
5		24/07/08	ISSUED FOR FINAL SITE PLAN CONTROL
4		24/04/26	RESUBMISSION FOR SPC PH 3 PRE-CONSULATION
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2		24/01/23	ISSUED FOR SITE PLAN CONTROL REVIEW
1		23/08/30	ISSUED FOR COSTING
0		22/10/07	ISSUED FOR CONCEPT DESIGN

BEARING NOTE

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SITE BENCHMARK 1 N:5025855.730 E:368247.808 ELEVATION=82.24
SITE BENCHMARK 2 N:5025967.857 E:368224.565 ELEVATION=80.94

WSP CANADA INC.
2611 QUEENSVIEW DRIVE, SUITE 300
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PHONE: 613-829-2800
WWW.WSP.COM

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171 Slater St, Suite 100, Ottawa, Ontario, K1P 5H7
Fax: (613) 236-1944 Telephone: (613) 236-7135 E-mail: info@cuhaci.com

PROJECT TITLE/TITRE DU PROJET
ST. PATRICK'S HOME
NEW SENIOR APARTMENT BUILDING

2865 RIVERSIDE DR.#226
OTTAWA, ONTARIO K1V 8N5

DRAWING TITLE/TITRE DU DESSIN

SEDIMENT AND EROSION CONTROL PLAN

SCALE / ECHELLE	1:300	PROJ. No 221-08396-00	ISSUE No 5	REV. No 0
DRAWN BY / DESSINE PAR	JT	DRAWING/DESSIN		
CHECKED BY / VERIFIE PAR	DY	**C3**		
DATE	JULY 2024	ACAD FILE/FICHIER:		

D07-12-XX-XXXX

#XXXXX

PROPOSED 7-STOREY
APARTMENT BUILDING
FFE = 81.25
USBF = 78.10

100 YR PONDING @ 80.20

100 YR PONDING @ 80.95

100 YR PONDING @ 88.20

TIE IN TO EX. GRADE

TIE INTO EXISTING DITCH AT 78.60 CONTRACTOR TO VERIFY THE EX.ELEV PRIOR TO CONSTRUCTION

PROPOSED SWALE @ 0.5% SLOPE AS PER DETAIL A/C4

NEW MOUNTABLE CURB AS PER CITY OF OTTAWA STD SC1.3

RAISED CROSSWALK AS PER CITY OF OTTAWA STANDARD DETAIL R15

REINSTATE CONCRETE SIDEWALK TO MATCH EXISTING CONDITION AS PER CITY STD SC4

ROAD CUT AS PER CITY STD R10. ROAD TO BE REINSTATED TO EQUAL OR BETTER THAN ORIGINAL CONDITION

CB201 CB202 CB203 LCB01 LCB02 LCB03 DICB204 STMH201 STMH202 STMH203 STMH204 SANMH310

(OGS) EFO4

NO. 2865 5 STOREY BRICK SIDED BUILDING (FOUNDATION NOTED)

NO. 2847 (FOUNDATION NOTED)

EXISTING FIVE STOREY BUILDING FFE = 81.25 USFa = 75.75 USF = 78.25

Site Benchmark 1 Nails in Utility Pole Elevation=82.24

Site Benchmark 2 Nails in Utility Pole Elevation=80.94

RIVERSIDE DRIVE

0 5m 10m 20m 30m

SCALE: 1:300

St. Patrick's Home of Ottawa Inc.

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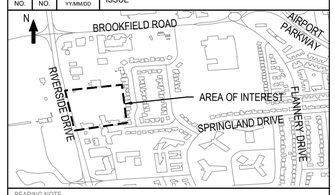
3		24/04/15	RESUBMISSION FOR SPC PH 3 PRE-CONSULATION
2		24/01/23	ISSUED FOR SITE PLAN CONTROL REVIEW
1		23/08/30	ISSUED FOR COSTING
0		22/10/07	ISSUED FOR CONCEPT DESIGN



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SITE BENCHMARK 2 N:5025967.857 E:368224.569 ELEVATION=80.94

WSP CANADA INC.
2611 QUEENSVIEW DRIVE, SUITE 300
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PROJECT TITLE/TITRE DU PROJET
ST. PATRICK'S HOME
NEW SENIOR APARTMENT BUILDING

2865 RIVERSIDE DR.#226
OTTAWA, ONTARIO K1V 8N5

DRAWING TITLE/TITRE DU DESSIN

GRADING PLAN

SCALE / ECHELLE	1:300	PROJ. No	221-08396-00
DRAWN BY / DESSINE PAR	JT	ISSUE No	5
CHECKED BY / VERIFIE PAR	DY	REV. No	0
DATE	JULY 2024	DRAWING/DESSIN	C4
		ACAD FILE/FICHIER:	D07-12-XX-XXXX

#XXXXX

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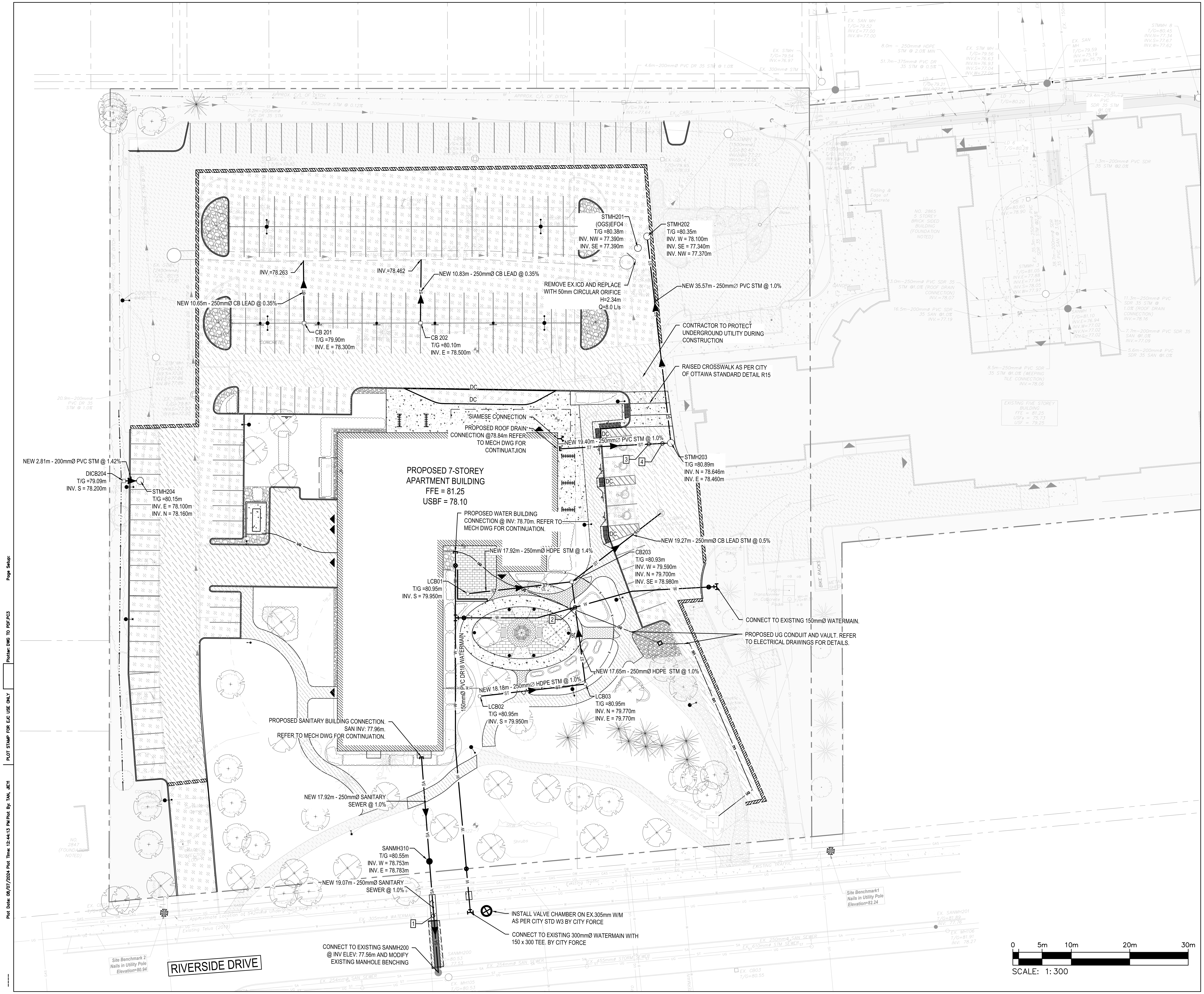

St. Patrick's Home of Ottawa Inc.

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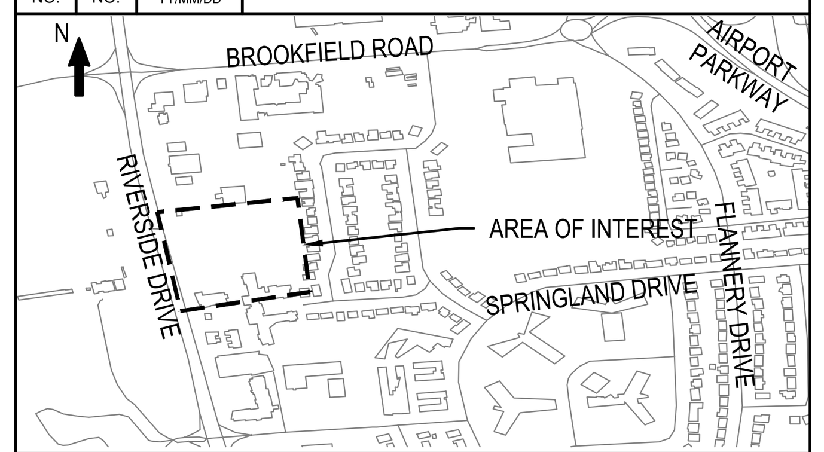

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SITE BENCHMARK 2 N:5025967.857 E:368224.569 ELEVATION=80.94

WSP CANADA INC.
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PHONE: 613-829-2800
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LICENSED PROFESSIONAL ENGINEER
D. B. YANG
100230568
2024-07-08
PROVINCE OF ONTARIO

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PROJECT TITLE/TITRE DU PROJET
ST. PATRICK'S HOME
NEW SENIOR APARTMENT BUILDING

2865 RIVERSIDE DR.#226
OTTAWA, ONTARIO K1V 8N5

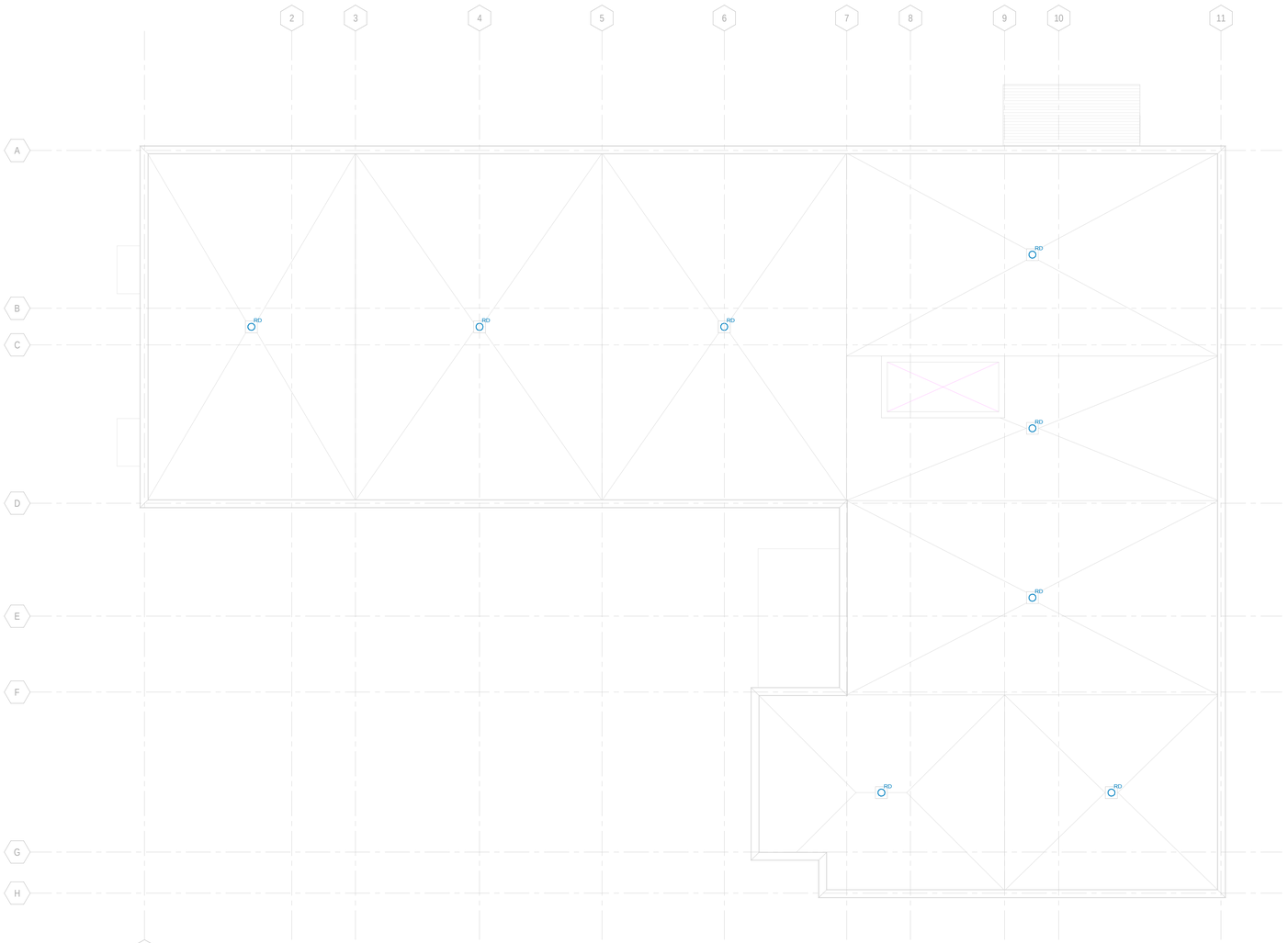
DRAWING TITLE/TITRE DU DESSIN

SERVICING PLAN

SCALE ECHELLE	1:300	PROJ. No 221-08396-00	ISSUE No 5	REV. No 0
DRAWN BY DESSINE PAR	JT	DRAWING/DESSIN		
CHECKED BY VERIFIE PAR	DY	C5		
DATE	JULY 2024	ACAD FILE/FICHIER:		

D07-12-XX-XXXX

#XXXXX



REVISIONS:

REV	DATE	DESCRIPTION	BY
1	08-09-2023	ISSUED FOR DESIGN DEVELOPMENT REVIEW	

SEAL:

ORIGINAL SCALE:
1 : 100

APPROVED BY:
Approver

CHECKED BY:
Checker

DRAWN BY:
Author

DATE:
08-09-2023

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

25mm

DISCIPLINE:

WSP Canada Inc.

PROJECT NUMBER:

CLIENT:

WSP Canada Inc.

CLIENT REF. #:

PROJECT:

St. Patrick's Home

TITLE:

ROOF - DRAINAGE

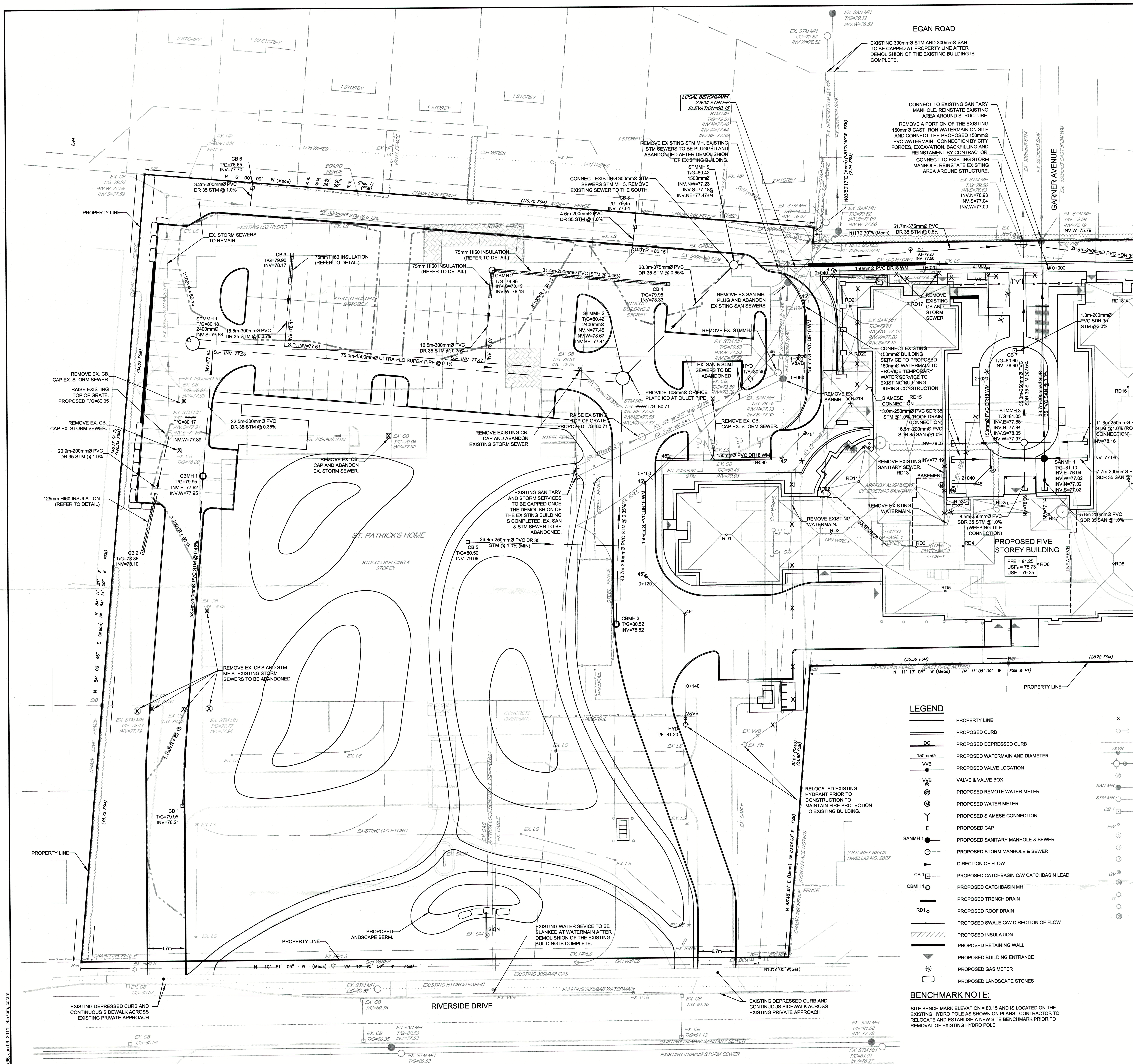
DRAWING NUMBER:
M-311

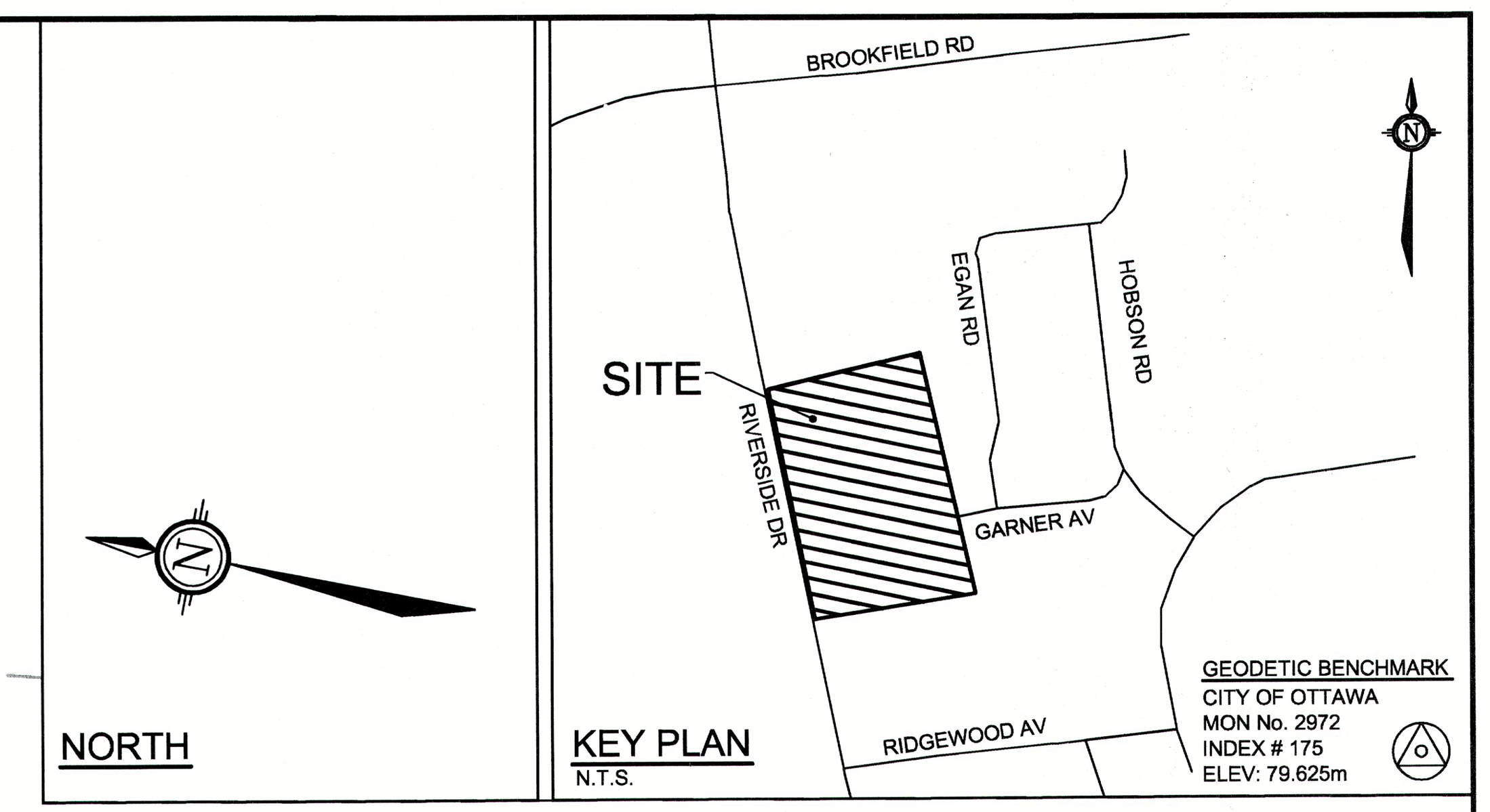
REV.:
R1

APPENDIX

B

General Plan of Services – Novatech 2011





LEGEND

PROPERTY LINE	REMOVAL
PROPOSED CURB	*EXISTING UTILITY POLE C/W GUY WIRES*
PROPOSED DEPRESSED CURB	*EXISTING OVERHEAD WIRES*
PROPOSED WATERMAIN AND DIAMETER	*EXISTING WATERMAIN C/W VALVE & VALVE BOX*
PROPOSED VALVE LOCATION	*EXISTING HYDRANT C/W VALVE & LEAD*
VALVE & VALVE BOX	*EXISTING WATER MANHOLE*
PROPOSED REMOTE WATER METER	*EXISTING SANITARY MANHOLE & SEWER*
PROPOSED WATER METER	*EXISTING STORM MANHOLE & SEWER*
PROPOSED SIAMESE CONNECTION	*EXISTING CATCHBASIN C/W CATCHBASIN LEAD*
PROPOSED CAP	*EXISTING HAND WELL*
PROPOSED SANITARY MANHOLE & SEWER	*EXISTING BELL MANHOLE*
PROPOSED STORM MANHOLE & SEWER	*EXISTING HYDRO MANHOLE*
DIRECTION OF FLOW	*EXISTING GAS MANHOLE*
PROPOSED CATCHBASIN C/W CATCHBASIN LEAD	*EXISTING GAS VALVE*
PROPOSED CATCHBASIN MH	*EXISTING GAS METER*
PROPOSED TRENCH DRAIN	*EXISTING TRAFFIC LIGHT STANDARD*
PROPOSED ROOF DRAIN	*EXISTING LIGHT STANDARD*
PROPOSED SWALE C/W DIRECTION OF FLOW	*EXISTING REMOTE WATER METER*
PROPOSED INSULATION	*EXISTING WATER METER*
PROPOSED RETAINING WALL	
PROPOSED BUILDING ENTRANCE	
PROPOSED GAS METER	
PROPOSED LANDSCAPE STONES	

BENCHMARK NOTE:

SITE BENCH MARK ELEVATION = 80.15 AND IS LOCATED ON THE EXISTING HYDRO POLE AS SHOWN ON PLANS. CONTRACTOR TO RELOCATE AND ESTABLISH A NEW SITE BENCHMARK PRIOR TO REMOVAL OF EXISTING HYDRO POLE.

REFER TO THE NOTES AND DETAIL SHEET (108167-D) FOR NOTES, TABLES, AND DETAILS.

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

M:\2008\108167\CAD\design\108167-GP.dwg, GP-28x36, Jun 09, 2011 - 3:57pm, coram

OWNER:
GREY SISTERS OF THE IMMACULATE CONCEPTION
GREY SISTERS' ADMINISTRATION CENTRE
720 MACKAY ST.
PEMBROKE, ON K8A 8J8
613-735-4111

No.	REVISION	DATE	BY
10.	REVISED AS PER CITY COMMENTS	JUN 09/11	MS
9.	ISSUED FOR PRE-TENDER REVIEW	JUN 07/11	MS
8.	REVISED PER CITY COMMENTS	MAY 13/11	MS
7.	REVISED PER CITY COMMENTS	MAY 03/11	MS
6.	ISSUED FOR BUILDING PERMIT	MAR 30/11	MS
5.	ISSUED FOR FIRE MARSHAL/MOHLTC	MAR 04/11	MS
4.	ISSUED FOR COSTING	JAN 19/11	MS
3.	ISSUED FOR SITE PLAN APPLICATION	OCT 29/10	MS
2.	ISSUED FOR REVIEW	AUG 25/10	MS
1.	ISSUED FOR REVIEW	AUG 06/10	RSC

SCALE 1:300

DESIGN	CJO
CHECKED	MS
DRAWN	JPS
CHECKED	MS
APPROVED	RSC

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER M. SAVIC 100102651 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER R.S. CEBRYK PROVINCE OF ONTARIO

NOVATECH ENGINEERING CONSULTANTS LTD.
ENGINEERS & PLANNERS
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Email: novainfo@novatech-eng.com

LOCATION
2865 RIVERSIDE DR. CITY OF OTTAWA
ST. PATRICKS HOME OTTAWA INC. REDEVELOPMENT

DRAWING NAME
GENERAL PLAN OF SERVICES

PROJECT No. 108167
REV: REV # 10
DRAWING No. 108167-GP

PLANB1.DWG - 1000mmx707mm

APPENDIX

C

Pre-Development Drainage Area Plan

ISSUE NO.	REV. NO.	DATE YY/MM/DD	ISSUE
6		24/07/26	RE-ISSUED FOR FINAL SITE PLAN CONTROL
5		24/07/08	ISSUED FOR FINAL SITE PLAN CONTROL
4		24/04/26	RESUBMISSION FOR SPC PH 3 PRE-CONSULATION
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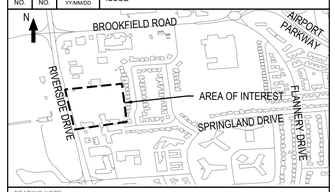

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PHONE: 613-829-2800
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LICENSED PROFESSIONAL ENGINEER
D. B. YANG
100230568
2024-07-26
PROVINCE OF ONTARIO

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& ASSOCIATES ARCHITECTS Inc.
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PROJECT TITLE/TITRE DU PROJET
ST. PATRICK'S HOME
NEW SENIOR APARTMENT BUILDING

2865 RIVERSIDE DR.#226
OTTAWA, ONTARIO K1V 8N5

DRAWING TITLE/TITRE DU DESSIN

PRE-DEVELOPMENT DRAINAGE AREA PLAN

SCALE / ECHELLE	1:400	PROJ. No 221-08396-00	ISSUE No 6	REV. No 0
DRAWN BY / DESSINE PAR	JT	DRAWING/DESSIN		
CHECKED BY / VERIFIE PAR	DY	C8		
DATE	JULY 2024	ACAD FILE/FICHIER:		

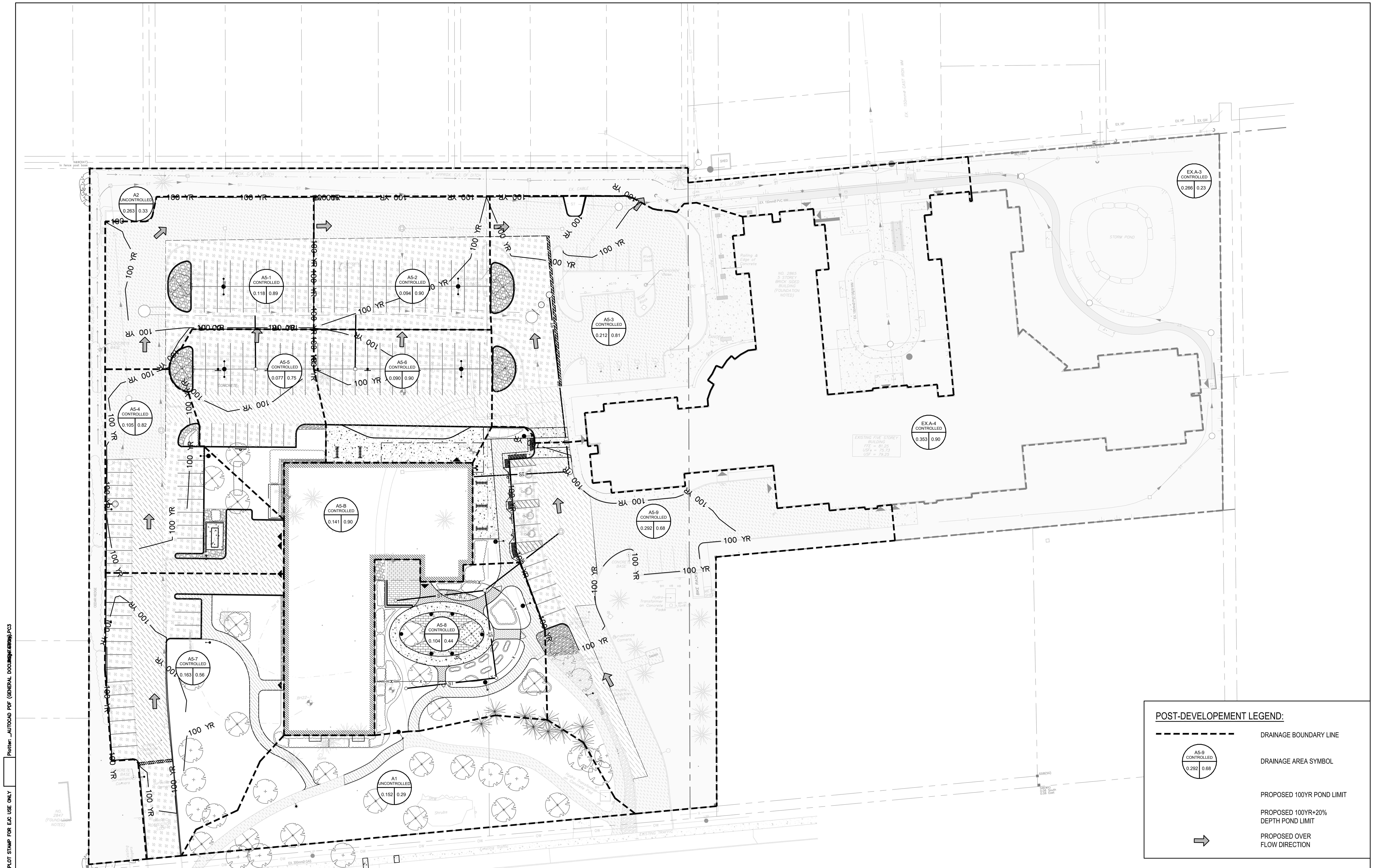
D07-12-24-0064

15844

APPENDIX

D

Post-Development Drainage Area Plan



Surface Ponding Details

ID	Area	CB. No.	T/G	Hard Surface (C=0.9)	Soft Surface (C=0.2)	Gravel (C=0.7)	C (5 Year)	C (100 Year)	100 Year Ponding Elev. (m)	100 Year Ponding Area (m²)	100 Year Storage (m³)
Uncontrolled											
A1*	0.152	N/A		0.020	0.132		0.29	0.35	N/A		
A2*	0.263	Multiple CB's		0.048	0.215		0.33	0.39	N/A		
Ex. Controlled											
Ex. A3	*0.266*	*Same as previous design*					*0.23*	*0.28*	*Same as previous design*		
Ex. A4	*0.353*						*0.90*	*1.00*			
Prop. Controlled											
A5-B	0.141	N/A		0.141			0.90	1.00	Refer to Roof Storage		
A5-1	0.118	*EX CB 3*	79.850	0.114		0.004	0.89	1.00	80.20	970.16	113.00
A5-2	0.094	*EX CBMH 2*	79.860	0.094			0.90	1.00	80.20	673.71	76.00
A5-3	0.212	*EX CB 4*	79.950	0.176	0.024	0.012	0.81	0.91	80.20	300.00	25.00
A5-4	0.105	*EX CBMH 1*	79.870	0.091	0.010	0.003	0.82	0.92	80.20	500.00	55.00
A5-5	0.077	CB201	79.900	0.057	0.015	0.004	0.75	0.84	80.20	365.84	37.00
A5-6	0.090	CB202	80.100	0.09			0.90	1.00	80.20	140.45	9.00
A5-7	0.163	*EX CB 1*	79.930	0.084	0.078	0.001	0.56	0.64	80.20	436.44	39.00
A5-8	0.104	LD's	80.950	0.035	0.068	0.000	0.44	0.51	N/A		
A5-9	0.292	*EX CBMH 3*	80.600	0.193	0.089	0.010	0.68	0.77	80.95	830.00	100

St. Patrick's Home of Ottawa Inc.

ISSUE NO.	REV. NO.	DATE YY/MM/DD	ISSUE
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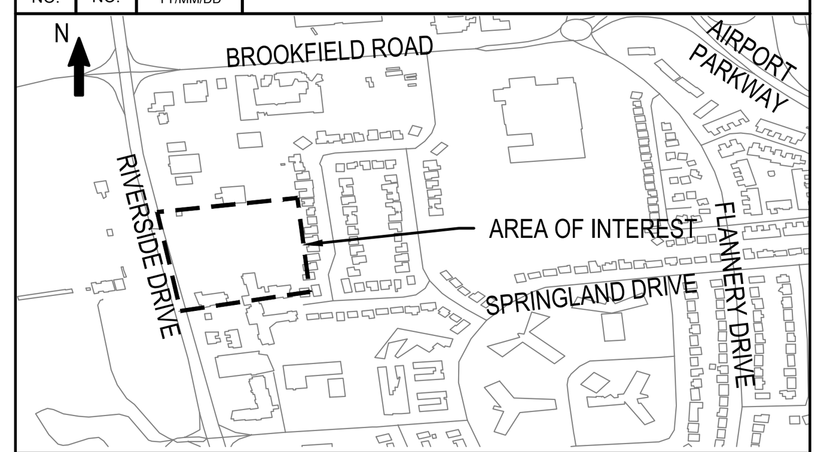
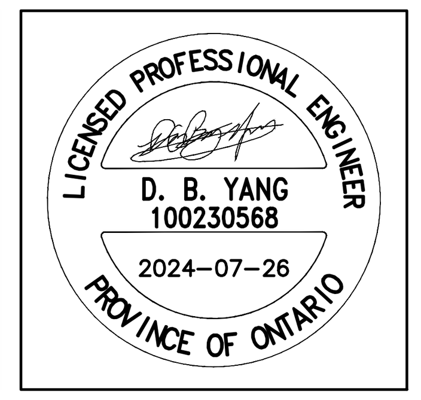
1		23/08/30	ISSUED FOR COSTING
0		22/10/07	ISSUED FOR CONCEPT DESIGN



BEARING NOTE

BEARING ARE GRID, DERIVED FROM THE CAN-NET VRS NETWORK OBSERVATIONS ON NCC HORIZONTAL CONTROL MONUMENTS 19773035 AND 1968091, CENTRAL MERIDIAN, 76°30' WEST LONGITUDE MTM ZONE 9. NAD83 (ORIGINAL)
SITE BENCHMARK 1 N:5025855.730 E:368247.808 ELEVATION=82.24
SITE BENCHMARK 2 N:5025967.857 E:368224.569 ELEVATION=80.94

WSP CANADA INC.
2611 QUEENSVIEW DRIVE, SUITE 300
OTTAWA, ONTARIO
CANADA K2B 8K2
PHONE: 613-829-2800
WWW.WSP.COM



EDWARD J. CUHACI & ASSOCIATES ARCHITECTS Inc.
171 Slater St, Suite 100, Ottawa, Ontario, K1P 5H7
Fax: (613) 236-1944 Telephone: (613) 236-7135 E-mail: info@cuhaci.com

PROJECT TITLE/TITRE DU PROJET
ST. PATRICK'S HOME
NEW SENIOR APARTMENT BUILDING

2865 RIVERSIDE DR.#226
OTTAWA, ONTARIO K1V 8N5

DRAWING TITLE/TITRE DU DESSIN

POST-DEVELOPMENT DRAINAGE AREA PLAN

SCALE / ECHELLE	1:400	PROJ. No	221-08396-00	ISSUE No	6	REV. No	0
DRAWN BY / DESSINE PAR	JT	DRAWING/DESSIN	C9				
CHECKED BY / VERIFIE PAR	DY						
DATE	JULY 2024	ACAD FILE/FICHIER:					

D07-12-24-0064

15844

APPENDIX

E PCSWMM Model

E-1 PCSWMM Model Schematics


Legend
Junctions
Outfalls
Storages
Conduits
Orifices
Subcatchments
N
50 m
19
Riverside Dr
Egan Rd
Garner Ave
ExCB
DI01
A2_1
ExCB2
ExSTMH
Ex-STMH1
A2_5
Ex-CBMH1
J17
J25
ExCB6
Ex-CB1
A5-4
A5-1
Ex-CB3
A5-7
J20
A2_2
A5-5
CB201
J1
CB202
J2
A5-B-Roof
A5-6
J6
A5-2
Ex-CBMH2
A1
A5-8
STM01
J26
A2_4
CB203
OGS-STMH201
ExMH103
ExCB8
STMMH202
ExCB4
ExCBMH3
A5-3
Ex-STMH9
A5-9
A-4EX
A2_3
EX-STMMH
A-3Ex

E-2 PCSWMM Model Parameters

Subcatchment Summary

Name	Outlet	Area (ha)	Width (m)	Flow Length (m)	Slope (%)	Imperv. (%)	N Imperv	N Perv	Dstore Imperv (mm)	Dstore Perv (mm)	Zero Imperv (%)	Subarea Routing	Percent Routed (%)	Infiltration Method	Max. Infil. Rate (mm/hr)	Min. Infil. Rate (mm/hr)	Decay Constant (1/hr)	Drying Time (days)	Suction Head (mm)	Conductivity (mm/hr)	Initial Deficit (frac.)	Curve Number
A1	OF2	0.152	55.19	27.541	0.736	13.15	0.013	0.25	1.57	4.67	100	IMPERVIOUS	100	HORTON	76.2	13.2	4.14	7	3.5	0.5	0.25	80
A2_1	SU6	0.0598	35.176	17	0.642	1	0.013	0.25	1.57	4.67	57.511	OUTLET	100	HORTON	76.2	13.2	4.14	7	3.5	0.5	0.25	80
A2_2	SU8	0.0195	19.5	10	0.642	1	0.013	0.25	1.57	4.67	57.511	OUTLET	100	HORTON	76.2	13.2	4.14	7	3.5	0.5	0.25	80
A2_3	EX-STM-MH	0.1292	51.68	25	0.642	36.87	0.013	0.25	1.57	4.67	57.511	OUTLET	100	HORTON	76.2	13.2	4.14	7	3.5	0.5	0.25	80
A2_4	SU7	0.0431	30.786	14	0.642	1	0.013	0.25	1.57	4.67	57.511	OUTLET	100	HORTON	76.2	13.2	4.14	7	3.5	0.5	0.25	80
A2_5	SU1	0.0123	15.375	8	0.642	1	0.013	0.25	1.57	4.67	57.511	OUTLET	100	HORTON	76.2	13.2	4.14	7	3.5	0.5	0.25	80
A-3Ex	OF4	0.266	73.889	36	0.5	25	0.013	0.25	1.57	4.67	25	OUTLET	100	HORTON	76.2	13.2	4.14	7	3.5	0.5	0.25	80
A-4EX	OF3	0.353	84.048	42	0.5	25	0.013	0.25	1.57	4.67	25	OUTLET	100	HORTON	76.2	13.2	4.14	7	3.5	0.5	0.25	80
A5-1	SU2	0.118	48.618	24.271	1	96.6	0.013	0.25	1.57	4.67	100	OUTLET	100	HORTON	76.2	13.2	4.14	7	3.5	0.5	0.25	80
A5-2	SU3	0.094	44.762	21	1	100	0.013	0.25	1.57	4.67	100	OUTLET	100	HORTON	76.2	13.2	4.14	7	3.5	0.5	0.25	80
A5-3	SU13_pr	0.2126	66.438	32	1	83.01	0.013	0.25	1.57	4.67	100	OUTLET	100	HORTON	76.2	13.2	4.14	7	3.5	0.5	0.25	80
A5-4	SU4	0.105	45.652	23	1	86.67	0.013	0.25	1.57	4.67	100	OUTLET	100	HORTON	76.2	13.2	4.14	7	3.5	0.5	0.25	80
A5-5	SU11_pr	0.077	40.526	19	1	75.03	0.013	0.25	1.57	4.67	100	OUTLET	100	HORTON	76.2	13.2	4.14	7	3.5	0.5	0.25	80
A5-6	SU12_pr	0.09	42.857	21	1	100	0.013	0.25	1.57	4.67	100	OUTLET	100	HORTON	76.2	13.2	4.14	7	3.5	0.5	0.25	80
A5-7	SU5	0.163	58.214	28	0.96	51.53	0.013	0.25	1.57	4.67	100	OUTLET	100	HORTON	76.2	13.2	4.14	7	3.5	0.5	0.25	80
A5-8	CB203	0.104	45.217	23	0.962	33.65	0.013	0.25	1.57	4.67	100	OUTLET	100	HORTON	76.2	13.2	4.14	7	3.5	0.5	0.25	80
A5-9	SU10	0.292	76.842	38	0.868	65.095	0.013	0.25	1.57	4.67	80.256	OUTLET	100	HORTON	76.2	13.2	4.14	7	3.5	0.5	0.25	80
A5-B-Roof	Roof-Storage	0.141	54.231	26	1	100	0.013	0.25	1.57	4.67	100	OUTLET	100	HORTON	76.2	13.2	4.14	7	3.5	0.5	0.25	80

Junctions Summary

Name	X-Coordinate	Y-Coordinate	Tag	Inflows	Treatment	Invert Elev. (m)	Rim Elev. (m)	Depth (m)
CB201	368327.366	5025955.393		NO	NO	78.3	79.9	1.6
CB202	368329.545	5025935.56		NO	NO	78.5	80.1	1.6
CB203	368287.994	5025902.769		NO	NO	78.98	80.95	1.97
DI01	368297.215	5025984.514		NO	NO	78.2	79.25	1.05
ExCB	368360.606	5025988.224		NO	NO	77.59	79.03	1.44
Ex-CB1	368254.777	5025965.161		NO	NO	78.21	79.93	1.72
ExCB2	368297.688	5025980.172		NO	NO	78.1	78.83	0.73
Ex-CB3	368354.68	5025964.487		NO	NO	78.17	79.85	1.68
ExCB4	368361.893	5025897.185		NO	NO	78.33	79.95	1.62
ExCB6	368364.259	5025973.124		NO	NO	77.7	78.83	1.13
ExCB8	368371.084	5025905.125		NO	NO	77.64	79.41	1.77
Ex-CBMH1	368313.24	5025972.593		NO	NO	77.92	79.87	1.95
Ex-CBMH2	368358.751	5025929.318		NO	NO	78.13	79.86	1.73
ExCBMH3	368302.01	5025890.95		NO	NO	78.82	80.6	1.78
ExMH103	368343.965	5025901.586		NO	NO	77.41	80.41	3
ExSTMH	368318.845	5025979.777		NO	NO	77.86	80.12	2.26
Ex-STMH1	368336.449	5025978.593		NO	NO	77.81	80.15	2.34
Ex-STMH9	368367.711	5025886.861		NO	NO	77.18	80.42	3.24
EX-STM-MH	368381.367	5025836.827		NO	NO	76.63	79.56	2.93
J1	368338.793	5025956.642		NO	NO	77.503	80.186	2.683
J17	368336.844	5025976.067		NO	NO	77.525	80.15	2.625
J2	368341.25	5025936.764		NO	NO	77.5	80.304	2.804
J20	368338.046	5025962.688		NO	NO	77.51	80.15	2.64
J25	368363.079	5025973.02		NO	NO	77.412	78.84	1.428
J26	368366.893	5025904.875		NO	NO	77.323	79.42	2.097
J6	368342.41	5025927.381		NO	NO	77.47	80.36	2.89
OGS-STMH201	368345.319	5025900.765		NO	NO	77.39	80.45	3.06
STM01	368312.386	5025909.192		NO	NO	78.23	83.23	5
STMMH202	368346.362	5025900.109		NO	NO	77.37	80.37	3
STMMH203	368315.448	5025890.59		NO	NO	77.81	80.93	3.12

Orifice Summary

Name	Inlet Node	Outlet Node	Type	Cross-Section	Height (m)	Width (m)	Inlet Elev. (m)
C13_5	ExMH103	OGS-STMH201	SIDE	CIRCULAR	0.05	0	77.41
C16	Roof-Storage	STM01	SIDE	CIRCULAR	0.2	0	88.23

Conduits Summary

Name	Inlet Node	Outlet Node	Length (m)	Roughness	Inlet Elev. (m)	Outlet Elev. (m)	Entry Loss Coeff.	Exit Loss Coeff.	Cross-Section	Geom1 (m)
C1	ExCB4	Ex-CBMH2	31.4	0.01	78.33	78.19	0	0	CIRCULAR	0.25
C1_2	STMMH203	STMMH202	35.55	0.01	77.81	77.45	0	1	CIRCULAR	0.25
C10	J17	J20	13.46	0.013	77.525	77.51	0	0	CIRCULAR	1.5
C11	Ex-CB3	J20	16.5	0.013	78.17	78.11	0.3	0.9	CIRCULAR	0.3
C12	CB202	J2	10.8	0.01	78.5	77.5	0	0	CIRCULAR	0.25
C12_1	J20	J1	6.093	0.01	77.51	77.503	0	0	CIRCULAR	1.5
C12_3	J1	J2	20.03	0.01	77.503	77.5	0	0	CIRCULAR	1.5
C12_4	J2	J6	9.455	0.01	77.5	77.47	0	0	CIRCULAR	1.5
C13	ExCBMH3	ExMH103	43.7	0.01	78.82	78.67	0.3	0.9	CIRCULAR	0.3
C13_2	STMMH202	Ex-STMH9	25.122	0.013	77.4	77.23	0.3	1	CIRCULAR	0.375
C13_6	OGS-STMH201	STMMH202	1.589	0.013	77.39	77.37	0.3	0.7	CIRCULAR	0.375
C14	Ex-STMH9	EX-STM-MH	51.7	0.013	77.18	76.93	0.3	0.9	CIRCULAR	0.375
C15	EX-STM-MH	OF1	30.194	0.013	76.63	75	0.3	0.7	CIRCULAR	0.3
C17	DI01	ExCB2	4	0.013	78.2	78.16	0.3	0.9	CIRCULAR	0.2
C18	ExCB2	ExSTMH	20.9	0.013	78.1	77.89	0.3	0.6	CIRCULAR	0.2
C19	ExSTMH	ExCB	42.607	0.013	77.86	77.59	0.3	0.9	CIRCULAR	0.3
C2	STM01	STMMH203	18.4	0.013	78.05	77.87	0.3	0.7	CIRCULAR	0.25
C20	ExCB	J25	15.404	0.013	77.59	77.412	0.3	0.6	CIRCULAR	0.3
C21	J25	J26	68.252	0.013	77.412	77.323	0.3	0	CIRCULAR	0.3
C22	J26	Ex-STMH9	18.032	0.013	77.323	77.47	0	0.9	CIRCULAR	0.3
C23	ExCB6	J25	3.2	0.013	77.7	77.412	0.3	0.9	CIRCULAR	0.2
C24	ExCB8	J26	4.6	0.013	77.64	77.323	0.3	0.9	CIRCULAR	0.2
C3	SU13_pr	ExCB4	1.536	0.01	80.2	78.33	0	0	CIRCULAR	0.25
C4	CB201	J1	10.65	0.01	78.3	77.503	0	0	CIRCULAR	0.25
C4_2	CB203	ExCBMH3	19.4	0.01	78.98	78.88	0.3	0.9	CIRCULAR	0.25
C5	J6	ExMH103	25.88	0.013	77.47	77.45	0	0.9	CIRCULAR	1.5
C6	Ex-CBMH2	J6	16.5	0.013	78.13	78.07	0.3	0.9	CIRCULAR	0.3
C7	Ex-STMH1	J17	2.57	0.013	77.81	77.525	0.3	0	CIRCULAR	1.5
C8	Ex-CB1	Ex-CBMH1	58.4	0.013	78.21	77.95	0.3	0.5	CIRCULAR	0.25
C9	Ex-CBMH1	J17	22.5	0.013	77.92	77.525	0.3	0.9	CIRCULAR	0.3
OR1	SU1	ExCB	2.035	0.01	77.61	77.59	0	0	CIRCULAR	0.25
OR10	SU10	ExCBMH3	1.542	0.01	80.95	78.82	0	0	CIRCULAR	0.25
OR11	SU11_pr	CB201	1.506	0.01	80.2	78.3	0	0	CIRCULAR	0.25
OR12	SU12_pr	CB202	1.485	0.01	80.2	78.5	0	0	CIRCULAR	0.25
OR2	SU2	Ex-CB3	1.716	0.01	80.2	78.17	0	0	CIRCULAR	0.25
OR3	SU3	Ex-CBMH2	1.703	0.01	80.2	78.13	0	0	CIRCULAR	0.25
OR4	SU4	Ex-CBMH1	1.926	0.01	80.2	77.92	0	0	CIRCULAR	0.25
OR5	SU5	Ex-CB1	3.349	0.01	80.2	78.21	0	0	CIRCULAR	0.25
OR6	SU6	DI01	2.934	0.01	78.23	78.2	0	0	CIRCULAR	0.25
OR7	SU7	ExCB8	2.004	0.01	77.66	77.64	0	0	CIRCULAR	0.25
OR8	SU8	ExCB6	1.439	0.01	77.715	77.7	0	0	CIRCULAR	0.25

Storage Summary

Name	Inflows	Treatment	Invert Elev. (m)	Rim Elev. (m)	Depth (m)	Storage Curve	Coefficient	Curve Name
Roof-Stora	NO	NO	88.23	88.38	0.15	TABULAR	1000	RoofStorage
SU1	NO	NO	79.029	84.029	5	TABULAR	1000	ExCB
SU10	NO	NO	80.6	85.6	5	TABULAR	1000	ExCBMH3
SU11_pr	NO	NO	79.9	84.9	5	TABULAR	1000	CB201/CB10
SU12_pr	NO	NO	80.1	85.1	5	TABULAR	1000	CB202/CB11
SU13_pr	NO	NO	79.95	84.95	5	TABULAR	1000	ExCB4
SU2	NO	NO	79.85	84.85	5	TABULAR	1000	ExCB3
SU3	NO	NO	79.86	84.86	5	TABULAR	1000	ExCBMH2
SU4	NO	NO	79.87	84.87	5	TABULAR	1000	ExCBMH1
SU5	NO	NO	79.93	84.93	5	TABULAR	1000	ExCB1
SU6	NO	NO	79.25	84.25	5	TABULAR	1000	DI01
SU7	NO	NO	79.41	84.41	5	TABULAR	1000	ExCB8
SU8	NO	NO	78.812	83.812	5	TABULAR	1000	ExCB6

E-3 PCSWMM Storage Summary

St. Patrick's Homes Ottawa - Storage Summary

Available Superpipe Storage

Available superpipe storage (Novatech, 2011)	*132*	*m3*

Available Surface Storage

Subcatchment	Structure	Maximum Available Storage (m3)	Maximum Available Ponding depth (m)	Maximum Available Ponding Area (m2)	Limit of Highest Ponding Elevation (m)	Structure Top of Grate Elevation (m)
A5-1	EX CB 3	113	0.35	970.16	80.2	79.85
A5-2	EX CBMH 2	76	0.34	673.71	80.2	79.86
A5-3	EX CB 4	25	0.25	300.00	80.2	79.95
A5-4	EX CBMH 1	55	0.33	500.00	80.2	79.87
A5-5	CB 10/CB201	37	0.30	365.84	80.2	79.90
A5-6	CB 11/CB202	9	0.10	140.45	80.2	80.10
A5-7	EX CB 1	39	0.27	436.44	80.2	79.93
A5-8	LD's	n/a	n/a	n/a	n/a	n/a
A5-9	EX CBMH 3	100	0.35	830.00	80.95	80.60
A2_1 (rear yard)	DI01	60	0.30	600.00	n/a	79.25
A2_2 (rear yard)	ExCB6	20	0.30	200.00	n/a	78.83
A2_3	Ex-STM-MH	n/a	n/a	n/a	n/a	79.56
A2_4 (rear yard)	ExCB8	50	0.30	500.00	n/a	79.41
A2_5 (rear yard)	ExCB	20	0.30	200.00	n/a	79.03
Total available surface storage		*605*				

Utilized Surface Storage - 100 yr

Subcatchment	Structure	Maximum Storage from PCSWMM (m^3)	Maximum Depth of Ponding (m)	Highest Ponding Elevation (m)	Structure Top of Grate Elevation (m)
A5-1	EX CB 3	83	0.25	80.10	79.85
A5-2	EX CBMH 2	68	0.26	80.12	79.86
A5-3	EX CB 4	55	0.30	80.25	79.95
A5-4	EX CBMH 1	70	0.30	80.17	79.87
A5-5	CB 10/CB201	47	0.28	80.18	79.90
A5-6	CB 11/CB202	1	0.04	80.14	80.10
A5-7	EX CB 1	66	0.29	80.22	79.93
A5-8	LD's	n/a	n/a	n/a	n/a
A5-9	EX CBMH 3	5	0.06	80.66	80.60
A2_1 (rear yard)	DI01	1	0.03	79.28	79.25
A2_2 (rear yard)	ExCB6	0	0.01	78.83	78.83
A2_3	Ex-STM-MH	n/a	n/a	n/a	n/a
A2_4 (rear yard)	ExCB8	0	0.02	79.43	79.41
A2_5 (rear yard)	ExCB	0	0.01	79.04	79.03
Total utilized surface storage - 100 yr		*396*			

Available Roof Storage

Subcatchment	Structure	Maximum Available Storage (m3)	Maximum Available Ponding depth (m)	Maximum Available Ponding Area (m2)	Structure Top of Grate Elevation (m)
A5-B Roof	n/a	63	0.15	1264.54	n/a
Total available roof storage		*63*			

Utilized Roof Storage - 100 yr

Subcatchment	Structure	Storage (m3)	Ponding depth (m)	Ponding Elevation (m)	Structure Top of Grate Elevation (m)
A5-B Roof	n/a	56	0.12	n/a	n/a
Total utilized roof storage - 100 yr		*56*			

Existing Structure Storage (Novatech, 2011)

Name	Storage (m3)
Ex STM MH1	12
Ex STM MH2	12
Ex CB3	6
Ex CBMH2	2
Ex CB4	1
Ex CBMH1	2
Ex CB1	1
Total existing surface storage	*36*

Utilized Structure Storage - 100 yr

Structure area based on 1.2 m diameter = 1.13 m2

Name	Invert Elev. (m)	Max. HGL (m)	Storage (m3)
CB201/CB10	78.30	79.90	2
CB202/CB11	78.50	80.10	2
CB203	78.98	80.95	2
DI01	78.20	78.30	0
ExCB	77.59	77.67	0
Ex-CB1	78.21	79.93	2
ExCB2	78.10	78.19	0
Ex-CB3	78.17	79.85	2
ExCB4	78.33	79.95	2
ExCB6	77.70	77.73	0
ExCB8	77.64	77.68	0
Ex-CBMH1	77.92	79.87	2
Ex-CBMH2	78.13	79.86	2
ExCBMH3	78.82	80.41	2
ExMH103/Ex STM MH2	77.41	80.18	3
ExSTMH	77.86	77.94	0
Ex-STMH1	77.81	80.15	3
Ex-STMH9	77.18	77.35	0
EX-STM-MH	76.63	76.74	0
J1	77.50	80.17	3
J17	77.53	80.16	3
J2	77.50	80.18	3
J20	77.51	80.17	3
J25	77.41	77.67	0
J26	77.32	77.65	0
J6	77.47	80.18	3
OGS-STMH201	77.39	77.51	0
STM01	78.23	78.30	0
STMMH202	77.37	77.51	0
STMMH203	77.81	77.88	0
Total Available Structure Storage			*40*

Available Storage (m3) vs Utilized Storage (m3)

Storage Type	Available Storage (m3)	Utilized Storage (m3) per PCSWMM Model
Superpipe	132	132
Inlets/Junctions	36	40
Pipes	Relatively negligible	
Roof	63	56
Surface Grading	605	396
Total	**836**	**624**

E-4 PCSWMM Model Output Files

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  EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.4)
  ------------------------------------------------------------

  WARNING 03: negative offset ignored for Link C2
  WARNING 08: elevation drop exceeds length for Conduit C3
  WARNING 03: negative offset ignored for Link OR1
  WARNING 08: elevation drop exceeds length for Conduit OR10
  WARNING 08: elevation drop exceeds length for Conduit OR11
  WARNING 08: elevation drop exceeds length for Conduit OR12
  WARNING 08: elevation drop exceeds length for Conduit OR2
  WARNING 08: elevation drop exceeds length for Conduit OR3
  WARNING 08: elevation drop exceeds length for Conduit OR4
  WARNING 03: negative offset ignored for Link OR6
  WARNING 03: negative offset ignored for Link OR7
  WARNING 03: negative offset ignored for Link OR8

  *************
  Element Count
  *************
  Number of rain gages ...... 3
  Number of subcatchments ... 18
  Number of nodes ........... 47
  Number of links ........... 43
  Number of pollutants ...... 0
  Number of land uses ....... 0


  ****************
  Raingage Summary
  ****************
                                                    Data       Recording
  Name                 Data Source                  Type       Interval
  ------------------------------------------------------------------------
  Riverside_100year    Chicago_3h_100yr_10min       INTENSITY   10 min.
  Riverside_100yr+20%  Chicago_3hr_100yr+20%_10min  INTENSITY   10 min.
  Riverside_5Year      Chicago_3h_5yr_10min         INTENSITY   10 min.


  ********************
  Subcatchment Summary
  ********************
  Name                        Area     Width   %Imperv    %Slope Rain Gage
Outlet
  ----------------------------------------------------------------------------
--------------------------
  A1                          0.15     55.19     13.15    0.7360 Riverside_100year
OF2
  A2_1                        0.06     35.18      1.00    0.6420 Riverside_100year
SU6
  A2_2                        0.02     19.50      1.00    0.6420 Riverside_100year
SU8
  A2_3                        0.13     51.68     36.87    0.6420 Riverside_100year
EX-STM-MH
  A2_4                        0.04     30.79      1.00    0.6420 Riverside_100year
SU7
  A2_5                        0.01     15.38      1.00    0.6420 Riverside_100year
SU1
```

A-3Ex	0.27	73.89	25.00	0.5000	Riverside_100year
OF4					
A-4EX	0.35	84.05	25.00	0.5000	Riverside_100year
OF3					
A5-1	0.12	48.62	96.60	1.0000	Riverside_100year
SU2					
A5-2	0.09	44.76	100.00	1.0000	Riverside_100year
SU3					
A5-3	0.21	66.44	83.01	1.0000	Riverside_100year
SU13_pr					
A5-4	0.10	45.65	86.67	1.0000	Riverside_100year
SU4					
A5-5	0.08	40.53	75.03	1.0000	Riverside_100year
SU11_pr					
A5-6	0.09	42.86	100.00	1.0000	Riverside_100year
SU12_pr					
A5-7	0.16	58.21	51.53	0.9600	Riverside_100year
SU5					
A5-8	0.10	45.22	33.65	0.9620	Riverside_100year
CB203					
A5-9	0.29	76.84	65.09	0.8680	Riverside_100year
SU10					
A5-B-Roof	0.14	54.23	100.00	1.0000	Riverside_100year
Roof-Storage					

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
CB201	JUNCTION	78.30	1.60	0.0	
CB202	JUNCTION	78.50	1.60	0.0	
CB203	JUNCTION	78.98	1.97	0.0	
DI01	JUNCTION	78.20	1.05	0.0	
ExCB	JUNCTION	77.59	1.44	0.0	
Ex-CB1	JUNCTION	78.21	1.72	0.0	
ExCB2	JUNCTION	78.10	0.73	0.0	
Ex-CB3	JUNCTION	78.17	1.68	0.0	
ExCB4	JUNCTION	78.33	1.62	0.0	
ExCB6	JUNCTION	77.70	1.13	0.0	
ExCB8	JUNCTION	77.64	1.77	0.0	
Ex-CBMH1	JUNCTION	77.92	1.95	0.0	
Ex-CBMH2	JUNCTION	78.13	1.73	0.0	
ExCBMH3	JUNCTION	78.82	1.78	0.0	
ExMH103	JUNCTION	77.41	3.00	0.0	
ExSTMH	JUNCTION	77.86	2.26	0.0	
Ex-STMH1	JUNCTION	77.81	2.34	0.0	
Ex-STMH9	JUNCTION	77.18	3.24	0.0	
EX-STM-MH	JUNCTION	76.63	2.93	0.0	
J1	JUNCTION	77.50	2.68	0.0	
J17	JUNCTION	77.53	2.62	0.0	
J2	JUNCTION	77.50	2.80	0.0	
J20	JUNCTION	77.51	2.64	0.0	
J25	JUNCTION	77.41	1.43	0.0	
J26	JUNCTION	77.32	2.10	0.0	
J6	JUNCTION	77.47	2.89	0.0	

OGS-STMH201	JUNCTION	77.39	3.06	0.0
STM01	JUNCTION	78.23	5.00	0.0
STMMH202	JUNCTION	77.37	3.00	0.0
STMMH203	JUNCTION	77.81	3.12	0.0
OF1	OUTFALL	75.00	0.30	0.0
OF2	OUTFALL	0.00	0.00	0.0
OF3	OUTFALL	0.00	0.00	0.0
OF4	OUTFALL	0.00	0.00	0.0
Roof-Storage	STORAGE	88.23	0.15	0.0
SU1	STORAGE	79.03	5.00	0.0
SU10	STORAGE	80.60	5.00	0.0
SU11_pr	STORAGE	79.90	5.00	0.0
SU12_pr	STORAGE	80.10	5.00	0.0
SU13_pr	STORAGE	79.95	5.00	0.0
SU2	STORAGE	79.85	5.00	0.0
SU3	STORAGE	79.86	5.00	0.0
SU4	STORAGE	79.87	5.00	0.0
SU5	STORAGE	79.93	5.00	0.0
SU6	STORAGE	79.25	5.00	0.0
SU7	STORAGE	79.41	5.00	0.0
SU8	STORAGE	78.81	5.00	0.0

****
Link Summary
****

Name	From Node	To Node	Type	Length	% Slope	Roughness
C1	ExCB4	Ex-CBMH2	CONDUIT	31.4	0.4459	0.0100
C1_2	STMMH203	STMMH202	CONDUIT	35.5	1.0127	0.0100
C10	J17	J20	CONDUIT	13.5	0.1114	0.0130
C11	Ex-CB3	J20	CONDUIT	16.5	0.3636	0.0130
C12	CB202	J2	CONDUIT	10.8	9.2992	0.0100
C12_1	J20	J1	CONDUIT	6.1	0.1149	0.0100
C12_3	J1	J2	CONDUIT	20.0	0.0150	0.0100
C12_4	J2	J6	CONDUIT	9.5	0.3173	0.0100
C13	ExCBMH3	ExMH103	CONDUIT	43.7	0.3433	0.0100
C13_2	STMMH202	Ex-STMH9	CONDUIT	25.1	0.6767	0.0130
C13_6	OGS-STMH201	STMMH202	CONDUIT	1.6	1.2588	0.0130
C14	Ex-STMH9	EX-STM-MH	CONDUIT	51.7	0.4836	0.0130
C15	EX-STM-MH	OF1	CONDUIT	30.2	5.4063	0.0130
C17	DI01	ExCB2	CONDUIT	4.0	1.0001	0.0130

C18	ExCB2	ExSTMH	CONDUIT	20.9	
1.0048	0.0130				
C19	ExSTMH	ExCB	CONDUIT	42.6	
0.6337	0.0130				
C2	STM01	STMMH203	CONDUIT	18.4	
1.9569	0.0130				
C20	ExCB	J25	CONDUIT	15.4	
1.1556	0.0130				
C21	J25	J26	CONDUIT	68.3	
0.1304	0.0130				
C22	J26	Ex-STMH9	CONDUIT	18.0	-
0.8152	0.0130				
C23	ExCB6	J25	CONDUIT	3.2	
9.0367	0.0130				
C24	ExCB8	J26	CONDUIT	4.6	
6.9077	0.0130				
C3	SU13_pr	ExCB4	CONDUIT	1.5	
121.7448	0.0100				
C4	CB201	J1	CONDUIT	10.7	
7.5046	0.0100				
C4_2	CB203	ExCBMH3	CONDUIT	19.4	
0.5155	0.0100				
C5	J6	ExMH103	CONDUIT	25.9	
0.0773	0.0130				
C6	Ex-CBMH2	J6	CONDUIT	16.5	
0.3636	0.0130				
C7	Ex-STMH1	J17	CONDUIT	2.6	
11.1583	0.0130				
C8	Ex-CB1	Ex-CBMH1	CONDUIT	58.4	
0.4452	0.0130				
C9	Ex-CBMH1	J17	CONDUIT	22.5	
1.7558	0.0130				
OR1	SU1	ExCB	CONDUIT	2.0	
100.0052	0.0100				
OR10	SU10	ExCBMH3	CONDUIT	1.5	
138.1323	0.0100				
OR11	SU11_pr	CB201	CONDUIT	1.5	
126.1620	0.0100				
OR12	SU12_pr	CB202	CONDUIT	1.5	
114.4781	0.0100				
OR2	SU2	Ex-CB3	CONDUIT	1.7	
118.2984	0.0100				
OR3	SU3	Ex-CBMH2	CONDUIT	1.7	
121.5502	0.0100				
OR4	SU4	Ex-CBMH1	CONDUIT	1.9	
118.3801	0.0100				
OR5	SU5	Ex-CB1	CONDUIT	3.3	
73.8777	0.0100				
OR6	SU6	DI01	CONDUIT	2.9	
38.3256	0.0100				
OR7	SU7	ExCB8	CONDUIT	2.0	
188.3495	0.0100				
OR8	SU8	ExCB6	CONDUIT	1.4	
121.7519	0.0100				
C13_5	ExMH103	OGS-STMH201	ORIFICE		
C16	Roof-Storage	STM01	ORIFICE		

****
Cross Section Summary

****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.25	0.05	0.06	0.25	1	0.05
C1_2	CIRCULAR	0.25	0.05	0.06	0.25	1	0.08
C10	CIRCULAR	1.50	1.77	0.38	1.50	1	2.36
C11	CIRCULAR	0.30	0.07	0.07	0.30	1	0.06
C12	CIRCULAR	0.25	0.05	0.06	0.25	1	0.24
C12_1	CIRCULAR	1.50	1.77	0.38	1.50	1	3.12
C12_3	CIRCULAR	1.50	1.77	0.38	1.50	1	1.12
C12_4	CIRCULAR	1.50	1.77	0.38	1.50	1	5.18
C13	CIRCULAR	0.30	0.07	0.07	0.30	1	0.07
C13_2	CIRCULAR	0.38	0.11	0.09	0.38	1	0.14
C13_6	CIRCULAR	0.38	0.11	0.09	0.38	1	0.20
C14	CIRCULAR	0.38	0.11	0.09	0.38	1	0.12
C15	CIRCULAR	0.30	0.07	0.07	0.30	1	0.22
C17	CIRCULAR	0.20	0.03	0.05	0.20	1	0.03
C18	CIRCULAR	0.20	0.03	0.05	0.20	1	0.03
C19	CIRCULAR	0.30	0.07	0.07	0.30	1	0.08
C2	CIRCULAR	0.25	0.05	0.06	0.25	1	0.08
C20	CIRCULAR	0.30	0.07	0.07	0.30	1	0.10
C21	CIRCULAR	0.30	0.07	0.07	0.30	1	0.03
C22	CIRCULAR	0.30	0.07	0.07	0.30	1	0.09
C23	CIRCULAR	0.20	0.03	0.05	0.20	1	0.10
C24	CIRCULAR	0.20	0.03	0.05	0.20	1	0.09
C3	CIRCULAR	0.25	0.05	0.06	0.25	1	0.85
C4	CIRCULAR	0.25	0.05	0.06	0.25	1	0.21
C4_2	CIRCULAR	0.25	0.05	0.06	0.25	1	0.06
C5	CIRCULAR	1.50	1.77	0.38	1.50	1	1.97
C6	CIRCULAR	0.30	0.07	0.07	0.30	1	

```
  C7               CIRCULAR            1.50     1.77     0.38     1.50        1
23.62
  C8               CIRCULAR            0.25     0.05     0.06     0.25        1
0.04
  C9               CIRCULAR            0.30     0.07     0.07     0.30        1
0.13
  OR1              CIRCULAR            0.25     0.05     0.06     0.25        1
0.77
  OR10             CIRCULAR            0.25     0.05     0.06     0.25        1
0.91
  OR11             CIRCULAR            0.25     0.05     0.06     0.25        1
0.87
  OR12             CIRCULAR            0.25     0.05     0.06     0.25        1
0.83
  OR2              CIRCULAR            0.25     0.05     0.06     0.25        1
0.84
  OR3              CIRCULAR            0.25     0.05     0.06     0.25        1
0.85
  OR4              CIRCULAR            0.25     0.05     0.06     0.25        1
0.84
  OR5              CIRCULAR            0.25     0.05     0.06     0.25        1
0.66
  OR6              CIRCULAR            0.25     0.05     0.06     0.25        1
0.48
  OR7              CIRCULAR            0.25     0.05     0.06     0.25        1
1.06
  OR8              CIRCULAR            0.25     0.05     0.06     0.25        1
0.85


  ****************
  Analysis Options
  ****************
  Flow Units ............... CMS
  Process Models:
    Rainfall/Runoff ........ YES
    RDII ................... NO
    Snowmelt ............... NO
    Groundwater ............ NO
    Flow Routing ........... YES
    Ponding Allowed ........ NO
    Water Quality .......... NO
  Infiltration Method ...... HORTON
  Flow Routing Method ...... DYNWAVE
  Surcharge Method ......... EXTRAN
  Starting Date ............ 06/11/2024 00:00:00
  Ending Date .............. 06/12/2024 00:00:00
  Antecedent Dry Days ...... 0.0
  Report Time Step ......... 00:01:00
  Wet Time Step ............ 00:05:00
  Dry Time Step ............ 00:05:00
  Routing Time Step ........ 5.00 sec
  Variable Time Step ....... YES
  Maximum Trials ........... 8
  Number of Threads ........ 8
  Head Tolerance ........... 0.001524 m
```

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.174	71.677
Evaporation Loss	0.000	0.000
Infiltration Loss	0.053	21.912
Surface Runoff	0.119	48.787
Final Storage	0.000	0.113
Continuity Error (%)	1.207	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.119	1.186
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.067	0.674
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.001
Final Stored Volume	0.054	0.535
Continuity Error (%)	-1.811	

Highest Continuity Errors

Node J17 (-21.15%)
Node Ex-CB3 (-5.57%)
Node J26 (3.26%)
Node CB201 (-2.78%)
Node J20 (-1.78%)

Time-Step Critical Elements

Link C13_6 (64.06%)
Link C3 (13.39%)
Link OR12 (8.75%)

Highest Flow Instability Indexes

Link C7 (18)
Link C12_1 (9)
Link C10 (9)
Link C12_4 (8)
Link C5 (7)

Most Frequent Nonconverging Nodes
****
Node OF1 (3.56%)
Node OF2 (3.56%)
Node OF3 (3.56%)
Node OF4 (3.56%)
Node ExCB4 (2.01%)

****
Routing Time Step Summary
****
Minimum Time Step : 0.50 sec
Average Time Step : 1.60 sec
Maximum Time Step : 5.00 sec
% of Time in Steady State : 0.00
Average Iterations per Step : 2.38
% of Steps Not Converging : 3.56
Time Step Frequencies :
5.000 - 3.155 sec : 13.02 %
3.155 - 1.991 sec : 1.04 %
1.991 - 1.256 sec : 15.32 %
1.256 - 0.792 sec : 58.50 %
0.792 - 0.500 sec : 12.12 %

****
Subcatchment Runoff Summary
****

Subcatchment	Precip mm	Runon mm	Evap mm	Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Total Peak Runoff CMS	Runoff Coeff
A1	71.68	0.00	0.00	40.94	9.43	21.79	9.43	0.01	0.01	0.132
A2_1	71.68	0.00	0.00	45.93	0.71	25.71	26.42	0.02	0.01	0.369
A2_2	71.68	0.00	0.00	44.91	0.71	27.08	27.79	0.01	0.01	0.388
A2_3	71.68	0.00	0.00	29.19	26.24	16.51	42.75	0.06	0.04	0.596
A2_4	71.68	0.00	0.00	45.51	0.71	26.24	26.96	0.01	0.01	0.376
A2_5	71.68	0.00	0.00	44.60	0.71	27.57	28.29	0.00	0.00	0.395
A-3Ex	71.68	0.00	0.00	36.10	17.67	17.97	35.64	0.09	0.06	0.497
A-4EX	71.68	0.00	0.00	36.52	17.68	17.50	35.18	0.12	0.07	0.491
A5-1	71.68	0.00	0.00	1.49	69.58	1.10	70.68	0.08	0.06	0.986

A5-2		71.68	0.00	0.00	0.00	71.99	
0.00	71.99	0.07	0.05	1.004			
A5-3		71.68	0.00	0.00	7.56	59.82	
4.94	64.76	0.14	0.10	0.904			
A5-4		71.68	0.00	0.00	5.88	62.38	
4.03	66.41	0.07	0.05	0.927			
A5-5		71.68	0.00	0.00	11.08	53.93	
7.33	61.26	0.05	0.04	0.855			
A5-6		71.68	0.00	0.00	0.00	71.99	
0.00	71.99	0.06	0.04	1.004			
A5-7		71.68	0.00	0.00	22.08	37.05	
13.12	50.17	0.08	0.06	0.700			
A5-8		71.68	0.00	0.00	30.36	24.15	
17.77	41.93	0.04	0.03	0.585			
A5-9		71.68	0.00	0.00	15.92	46.71	
9.43	56.14	0.16	0.12	0.783			
A5-B-Roof		71.68	0.00	0.00	0.00	72.06	
0.00	72.06	0.10	0.07	1.005			

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
CB201	JUNCTION	0.27	1.24	79.54	0 02:34	1.24
CB202	JUNCTION	0.19	1.04	79.54	0 02:34	1.04
CB203	JUNCTION	0.07	0.56	79.54	0 02:34	0.56
DI01	JUNCTION	0.01	0.10	78.30	0 01:11	0.10
ExCB	JUNCTION	0.01	0.08	77.67	0 01:13	0.08
Ex-CB1	JUNCTION	0.31	1.33	79.54	0 02:34	1.33
ExCB2	JUNCTION	0.01	0.09	78.19	0 01:11	0.09
Ex-CB3	JUNCTION	0.33	1.37	79.54	0 02:34	1.37
ExCB4	JUNCTION	0.26	1.21	79.54	0 02:34	1.21
ExCB6	JUNCTION	0.00	0.03	77.73	0 01:10	0.03
ExCB8	JUNCTION	0.00	0.04	77.68	0 01:10	0.04
Ex-CBMH1	JUNCTION	0.47	1.62	79.54	0 02:34	1.62
Ex-CBMH2	JUNCTION	0.36	1.41	79.54	0 02:34	1.41
ExCBMH3	JUNCTION	0.11	0.72	79.54	0 02:34	0.72
ExMH103	JUNCTION	0.85	2.13	79.54	0 02:34	2.13
ExSTMH	JUNCTION	0.01	0.08	77.94	0 01:12	0.08
Ex-STMH1	JUNCTION	0.54	1.73	79.54	0 02:34	1.73
Ex-STMH9	JUNCTION	0.06	0.16	77.34	0 01:15	0.16
EX-STM-MH	JUNCTION	0.04	0.11	76.74	0 01:13	0.11
J1	JUNCTION	0.77	2.04	79.54	0 02:34	2.04
J17	JUNCTION	0.76	2.02	79.54	0 02:34	2.02
J2	JUNCTION	0.78	2.04	79.54	0 02:34	2.04
J20	JUNCTION	0.77	2.03	79.54	0 02:34	2.03
J25	JUNCTION	0.07	0.25	77.67	0 01:13	0.25
J26	JUNCTION	0.15	0.32	77.65	0 01:13	0.32
J6	JUNCTION	0.80	2.07	79.54	0 02:34	2.07
OGS-STMH201	JUNCTION	0.06	0.11	77.50	0 01:35	0.11
STM01	JUNCTION	0.02	0.07	78.30	0 01:24	0.07
STMMH202	JUNCTION	0.08	0.13	77.50	0 01:34	0.13

STMMH203	JUNCTION	0.02	0.07	77.88	0	01:25	0.07
OF1	OUTFALL	0.30	0.30	75.30	0	00:00	0.30
OF2	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
OF3	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
OF4	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
Roof-Storage	STORAGE	0.03	0.12	88.35	0	01:24	0.12
SU1	STORAGE	0.00	0.01	79.04	0	01:10	0.01
SU10	STORAGE	0.28	0.30	80.90	1	00:00	0.30
SU11_pr	STORAGE	0.26	0.28	80.18	1	00:00	0.28
SU12_pr	STORAGE	0.10	0.14	80.24	0	01:10	0.14
SU13_pr	STORAGE	0.25	0.30	80.25	0	01:11	0.30
SU2	STORAGE	0.23	0.25	80.10	1	00:00	0.25
SU3	STORAGE	0.24	0.26	80.12	1	00:00	0.26
SU4	STORAGE	0.28	0.30	80.17	1	00:00	0.30
SU5	STORAGE	0.26	0.29	80.22	0	01:43	0.29
SU6	STORAGE	0.00	0.03	79.28	0	01:11	0.03
SU7	STORAGE	0.00	0.02	79.43	0	01:10	0.02
SU8	STORAGE	0.00	0.01	78.83	0	01:10	0.01

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
CB201	JUNCTION	0.000	0.002	0 01:23	0	0.000777	-2.701
CB202	JUNCTION	0.000	0.045	0 01:10	0	0.0614	-0.015
CB203	JUNCTION	0.034	0.034	0 01:10	0.0436	0.0438	0.075
DI01	JUNCTION	0.000	0.011	0 01:11	0	0.0158	0.005
ExCB	JUNCTION	0.000	0.014	0 01:11	0	0.0193	-0.086
Ex-CB1	JUNCTION	0.000	0.007	0 01:15	0	0.0243	-0.049
ExCB2	JUNCTION	0.000	0.011	0 01:11	0	0.0158	0.004
Ex-CB3	JUNCTION	0.000	0.004	0 01:13	0	0.00109	-5.276
ExCB4	JUNCTION	0.000	0.085	0 01:11	0	0.1	0.702
ExCB6	JUNCTION	0.000	0.005	0 01:10	0	0.00542	0.001
ExCB8	JUNCTION	0.000	0.010	0 01:10	0	0.0116	0.001
Ex-CBMH1	JUNCTION	0.000	0.014	0 01:11	0		0.

Ex-CBMH2	JUNCTION	0.000	0.085	0	01:11	0	0.0995
-0.084							
ExCBMH3	JUNCTION	0.000	0.033	0	01:10	0	0.0448
0.282							
ExMH103	JUNCTION	0.000	0.033	0	01:10	0	0.254
0.004							
ExSTMH	JUNCTION	0.000	0.011	0	01:11	0	0.0158
0.015							
Ex-STMH1	JUNCTION	0.000	0.176	0	04:00	0	0.00439
-53.491							
Ex-STMH9	JUNCTION	0.000	0.041	0	01:14	0	0.388
-0.034							
EX-STM-MH	JUNCTION	0.041	0.065	0	01:13	0.0552	0.44
0.001							
J1	JUNCTION	0.000	0.078	0	01:11	0	0.143
-1.627							
J17	JUNCTION	0.000	0.141	0	03:59	0	0.058
-17.460							
J2	JUNCTION	0.000	0.104	0	01:11	0	0.207
-0.324							
J20	JUNCTION	0.000	0.098	0	03:33	0	0.102
-1.752							
J25	JUNCTION	0.000	0.019	0	01:11	0	0.0294
1.541							
J26	JUNCTION	0.000	0.025	0	01:13	0	0.0441
3.374							
J6	JUNCTION	0.000	0.094	0	01:11	0	0.251
0.114							
OGS-STMH201	JUNCTION	0.000	0.008	0	02:34	0	0.249
0.006							
STM01	JUNCTION	0.000	0.012	0	01:24	0	0.102
0.000							
STMMH202	JUNCTION	0.000	0.019	0	01:34	0	0.35
-0.005							
STMMH203	JUNCTION	0.000	0.012	0	01:24	0	0.102
0.003							
OF1	OUTFALL	0.000	0.065	0	01:13	0	0.44
0.000							
OF2	OUTFALL	0.010	0.010	0	01:05	0.0143	0.0143
0.000							
OF3	OUTFALL	0.074	0.074	0	01:10	0.124	0.124
0.000							
OF4	OUTFALL	0.059	0.059	0	01:10	0.0948	0.0948
0.000							
Roof-Storage	STORAGE	0.070	0.070	0	01:10	0.102	0.102
0.001							
SU1	STORAGE	0.004	0.004	0	01:10	0.00348	0.00348
-0.007							
SU10	STORAGE	0.120	0.120	0	01:10	0.164	0.164
0.012							
SU11_pr	STORAGE	0.036	0.036	0	01:10	0.0472	0.0472
0.012							
SU12_pr	STORAGE	0.045	0.045	0	01:10	0.0648	0.0648
-0.001							
SU13_pr	STORAGE	0.101	0.101	0	01:10	0.138	0.138
0.003							
SU2	STORAGE	0.058	0.058	0	01:10	0.0834	0.0834
0.012							
SU3	STORAGE	0.047	0.047	0	01:10	0.0677	0.0677
0.012							

SU4	STORAGE	0.051	0.051	0	01:10	0.0697	0.0697	0.012
SU5	STORAGE	0.062	0.062	0	01:10	0.0818	0.0818	0.009
SU6	STORAGE	0.012	0.012	0	01:10	0.0158	0.0158	0.000
SU7	STORAGE	0.010	0.010	0	01:10	0.0116	0.0116	0.000
SU8	STORAGE	0.005	0.005	0	01:10	0.00542	0.00542	0.000

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
CB201	JUNCTION	4.84	0.990	0.360
CB202	JUNCTION	3.67	0.791	0.559
CB203	JUNCTION	2.06	0.310	1.410
Ex-CB1	JUNCTION	5.42	1.081	0.389
Ex-CB3	JUNCTION	5.35	1.070	0.310
ExCB4	JUNCTION	4.80	0.961	0.409
Ex-CBMH1	JUNCTION	7.29	1.321	0.329
Ex-CBMH2	JUNCTION	5.67	1.101	0.319
ExCBMH3	JUNCTION	2.22	0.410	1.060
ExMH103	JUNCTION	2.61	0.570	0.870
Ex-STMH1	JUNCTION	1.94	0.230	0.610
J1	JUNCTION	2.49	0.537	0.646
J17	JUNCTION	2.44	0.515	0.610
J2	JUNCTION	2.50	0.540	0.764
J20	JUNCTION	2.47	0.530	0.610
J26	JUNCTION	0.10	0.023	1.774
J6	JUNCTION	2.61	0.570	0.820

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

	Average Volume	Avg Pcnt	Evap Pcnt	Exfil Pcnt	Maximum Volume	Max Pcnt	Time of Max Occurrence	Maximum Outflow

Storage Unit	1000 m³	Full	Loss	Loss	1000 m³	Full	days hr:min	CMS
Roof-Storage	0.009	9.6	0.0	0.0	0.056	58.8	0 01:24	0.012
SU1	0.000	0.0	0.0	0.0	0.000	0.0	0 01:10	0.004
SU10	0.149	0.3	0.0	0.0	0.164	0.4	1 00:00	0.000
SU11_pr	0.043	0.3	0.0	0.0	0.047	0.3	1 00:00	0.000
SU12_pr	0.004	0.0	0.0	0.0	0.007	0.1	0 01:10	0.045
SU13_pr	0.037	0.2	0.0	0.0	0.055	0.4	0 01:11	0.085
SU2	0.076	0.2	0.0	0.0	0.083	0.2	1 00:00	0.000
SU3	0.061	0.2	0.0	0.0	0.068	0.3	1 00:00	0.000
SU4	0.063	0.3	0.0	0.0	0.070	0.4	1 00:00	0.000
SU5	0.056	0.3	0.0	0.0	0.066	0.3	0 01:43	0.006
SU6	0.000	0.0	0.0	0.0	0.001	0.0	0 01:11	0.011
SU7	0.000	0.0	0.0	0.0	0.000	0.0	0 01:10	0.010
SU8	0.000	0.0	0.0	0.0	0.000	0.0	0 01:10	0.005

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
OF1	87.35	0.011	0.065	0.440
OF2	24.74	0.002	0.010	0.014
OF3	27.18	0.014	0.074	0.124
OF4	26.53	0.011	0.059	0.095
System	41.45	0.039	0.200	0.674

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth

C1	CONDUIT	0.085	0	01:11	1.72	1.64	1.00
C1_2	CONDUIT	0.012	0	01:25	1.12	0.16	0.28
C10	CONDUIT	0.098	0	03:33	0.12	0.04	1.00
C11	CONDUIT	0.004	0	01:13	0.20	0.07	1.00
C12	CONDUIT	0.045	0	01:10	1.60	0.19	1.00
C12_1	CONDUIT	0.068	0	03:33	0.13	0.02	1.00
C12_3	CONDUIT	0.078	0	01:11	0.18	0.07	1.00
C12_4	CONDUIT	0.065	0	01:11	0.28	0.01	1.00
C13	CONDUIT	0.033	0	01:10	0.88	0.44	1.00
C13_2	CONDUIT	0.019	0	01:34	0.85	0.13	0.27
C13_6	CONDUIT	0.008	0	02:34	0.36	0.04	0.32
C14	CONDUIT	0.041	0	01:15	0.96	0.34	0.41
C15	CONDUIT	0.065	0	01:13	1.26	0.29	0.68
C17	CONDUIT	0.011	0	01:11	0.81	0.34	0.45
C18	CONDUIT	0.011	0	01:11	0.91	0.34	0.41
C19	CONDUIT	0.011	0	01:12	0.77	0.15	0.26
C2	CONDUIT	0.012	0	01:24	1.17	0.15	0.27
C20	CONDUIT	0.014	0	01:12	0.52	0.14	0.55
C21	CONDUIT	0.018	0	01:14	0.26	0.50	0.92
C22	CONDUIT	0.025	0	01:13	0.67	0.29	0.68
C23	CONDUIT	0.005	0	01:10	0.68	0.05	0.58
C24	CONDUIT	0.010	0	01:10	0.56	0.11	0.61
C3	CONDUIT	0.085	0	01:11	3.50	0.10	0.61
C4	CONDUIT	0.002	0	01:23	0.06	0.01	1.00
C4_2	CONDUIT	0.033	0	01:10	1.04	0.60	1.00
C5	CONDUIT	0.016	0	03:33	0.09	0.01	1.00
C6	CONDUIT	0.085	0	01:11	1.29	1.45	1.00
C7	CONDUIT	0.176	0	04:00	0.10	0.01	1.00
C8	CONDUIT	0.007	0	01:15	0.22	0.19	1.00
C9	CONDUIT	0.014	0	01:11	0.26	0.11	1.00
OR1	CONDUIT	0.004	0	01:10	0.94	0.00	0.18
OR10	CONDUIT	0.000	0	00:00	0.00	0.00	0.50
OR11	CONDUIT	0.000	0	00:00	0.00	0.00	0.50
OR12	CONDUIT	0.045	0	01:10	5.35	0.05	0.53
OR2	CONDUIT	0.000	0	00:00	0.00	0.00	0.50
OR3	CONDUIT	0.000	0	00:00	0.00	0.00	0.50
OR4	CONDUIT	0.000	0	00:00	0.00	0.00	0.50
OR5	CONDUIT	0.006	0	01:43	0.21	0.01	0.53
OR6	CONDUIT	0.011	0	01:11	1.14	0.02	0.25
OR7	CONDUIT	0.010	0	01:10	2.74	0.01	0.12
OR8	CONDUIT	0.005	0	01:10	2.37	0.01	0.09
C13_5	ORIFICE	0.008	0	02:34			1.00
C16	ORIFICE	0.012	0	01:24			0.58

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl

C1	1.00	0.05	0.00	0.00	0.32	0.00	0.00	0.64	0.05
0.00									
C1_2	1.00	0.01	0.00	0.00	0.06	0.02	0.00	0.91	0.07
0.00									
C10	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.01
0.00									
C11	1.00	0.05	0.00	0.00	0.34	0.00	0.00	0.61	0.63
0.00									
C12	1.00	0.03	0.72	0.00	0.23	0.02	0.00	0.00	0.75
0.00									
C12_1	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.41
0.00									
C12_3	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00
0.00									
C12_4	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.42
0.00									
C13	1.00	0.01	0.00	0.00	0.17	0.00	0.00	0.82	0.03
0.00									
C13_2	1.00	0.01	0.00	0.00	0.01	0.00	0.00	0.98	0.00
0.00									
C13_6	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00
0.00									
C14	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00
0.00									
C15	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.99
0.00									
C17	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00
0.00									
C18	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00
0.00									
C19	1.00	0.02	0.00	0.00	0.95	0.03	0.00	0.00	0.87
0.00									
C2	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00
0.00									
C20	1.00	0.02	0.83	0.00	0.16	0.00	0.00	0.00	0.98
0.00									
C21	1.00	0.01	0.00	0.00	0.98	0.00	0.00	0.00	0.03
0.00									
C22	1.00	0.01	0.03	0.00	0.00	0.00	0.95	0.00	0.00
0.00									
C23	1.00	0.01	0.86	0.00	0.12	0.01	0.00	0.00	0.98
0.00									
C24	1.00	0.01	0.85	0.00	0.13	0.01	0.00	0.00	0.98
0.00									
C3	1.00	0.05	0.01	0.00	0.78	0.16	0.00	0.00	0.95
0.00									
C4	1.00	0.03	0.68	0.00	0.28	0.00	0.00	0.00	0.67
0.00									
C4_2	1.00	0.01	0.00	0.00	0.12	0.00	0.00	0.87	0.02
0.00									
C5	1.00	0.02	0.01	0.00	0.56	0.00	0.00	0.41	0.00
0.00									
C6	1.00	0.05	0.00	0.00	0.35	0.00	0.00	0.60	0.02
0.00									
C7	1.00	0.04	0.52	0.00	0.44	0.00	0.00	0.00	0.51
0.00									
C8	1.00	0.05	0.00	0.00	0.39	0.00	0.00	0.56	0.09
0.00									

C9	1.00	0.04	0.01	0.00	0.75	0.21	0.00	0.00	0.13
0.00									
OR1	1.00	0.83	0.04	0.00	0.11	0.02	0.00	0.00	0.98
0.00									
OR10	1.00	0.01	0.99	0.00	0.00	0.00	0.00	0.00	0.00
0.00									
OR11	1.00	0.72	0.28	0.00	0.00	0.00	0.00	0.00	0.00
0.00									
OR12	1.00	0.03	0.00	0.00	0.94	0.03	0.00	0.00	0.97
0.00									
OR2	1.00	0.05	0.95	0.00	0.00	0.00	0.00	0.00	0.00
0.00									
OR3	1.00	0.05	0.95	0.00	0.00	0.00	0.00	0.00	0.00
0.00									
OR4	1.00	0.05	0.95	0.00	0.00	0.00	0.00	0.00	0.00
0.00									
OR5	1.00	0.05	0.01	0.00	0.84	0.10	0.00	0.00	0.94
0.00									
OR6	1.00	0.01	0.86	0.00	0.01	0.12	0.00	0.00	0.99
0.00									
OR7	1.00	0.01	0.00	0.00	0.87	0.12	0.00	0.00	0.99
0.00									
OR8	1.00	0.01	0.00	0.00	0.87	0.12	0.00	0.00	0.98
0.00									

****
Conduit Surcharge Summary
****

Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C1	4.79	4.80	5.67	0.12	0.08
C10	2.43	2.43	2.47	0.01	0.10
C11	5.35	5.35	5.78	0.01	0.01
C12	3.67	3.67	22.90	0.01	0.01
C12_1	2.47	2.47	2.49	0.01	0.26
C12_3	2.49	2.49	2.50	0.01	0.47
C12_4	2.50	2.50	2.61	0.01	0.01
C13	2.23	2.23	2.61	0.01	0.01
C15	0.01	0.01	23.83	0.01	0.01
C21	0.01	0.01	0.10	0.01	0.01
C22	0.01	0.01	0.10	0.01	0.01
C23	0.01	0.01	0.20	0.01	0.01
C24	0.01	0.01	0.67	0.01	0.01
C3	0.01	0.01	4.80	0.01	0.01
C4	4.84	4.84	22.75	0.01	0.01
C4_2	2.06	2.06	2.22	0.01	0.01
C5	2.61	2.61	2.69	0.01	0.01
C6	5.66	5.75	6.09	0.10	0.01
C7	1.94	1.94	2.43	0.01	0.01
C8	5.42	5.42	7.45	0.01	0.01
C9	7.29	7.29	10.50	0.01	0.01
OR12	0.01	0.01	3.67	0.01	0.01
OR5	0.01	0.01	5.36	0.01	0.01

```
Analysis begun on:  Mon Jun 24 16:00:08 2024
Analysis ended on:  Mon Jun 24 16:00:09 2024
Total elapsed time: 00:00:01
```

```
  EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.4)
  ------------------------------------------------------------

  WARNING 03: negative offset ignored for Link C2
  WARNING 08: elevation drop exceeds length for Conduit C3
  WARNING 03: negative offset ignored for Link OR1
  WARNING 08: elevation drop exceeds length for Conduit OR10
  WARNING 08: elevation drop exceeds length for Conduit OR11
  WARNING 08: elevation drop exceeds length for Conduit OR12
  WARNING 08: elevation drop exceeds length for Conduit OR2
  WARNING 08: elevation drop exceeds length for Conduit OR3
  WARNING 08: elevation drop exceeds length for Conduit OR4
  WARNING 03: negative offset ignored for Link OR6
  WARNING 03: negative offset ignored for Link OR7
  WARNING 03: negative offset ignored for Link OR8

  *************
  Element Count
  *************
  Number of rain gages ...... 3
  Number of subcatchments ... 18
  Number of nodes ........... 47
  Number of links ........... 43
  Number of pollutants ...... 0
  Number of land uses ....... 0


  ****************
  Raingage Summary
  ****************
                                                    Data       Recording
  Name                 Data Source                  Type       Interval
  ----------------------------------------------------------------------
  Riverside_100year    Chicago_3h_100yr_10min       INTENSITY   10 min.
  Riverside_100yr+20%  Chicago_3hr_100yr+20%_10min  INTENSITY   10 min.
  Riverside_5Year      Chicago_3h_5yr_10min         INTENSITY   10 min.


  ********************
  Subcatchment Summary
  ********************
  Name                        Area     Width   %Imperv    %Slope Rain Gage
Outlet
  ------------------------------------------------------------------------------
--------------------------
  A1                          0.15     55.19     13.15    0.7360 Riverside_5Year
OF2
  A2_1                        0.06     35.18      1.00    0.6420 Riverside_5Year
SU6
  A2_2                        0.02     19.50      1.00    0.6420 Riverside_5Year
SU8
  A2_3                        0.13     51.68     36.87    0.6420 Riverside_5Year
EX-STM-MH
  A2_4                        0.04     30.79      1.00    0.6420 Riverside_5Year
SU7
  A2_5                        0.01     15.38      1.00    0.6420 Riverside_5Year
SU1
```

A-3Ex	0.27	73.89	25.00	0.5000	Riverside_5Year
OF4					
A-4EX	0.35	84.05	25.00	0.5000	Riverside_5Year
OF3					
A5-1	0.12	48.62	96.60	1.0000	Riverside_5Year
SU2					
A5-2	0.09	44.76	100.00	1.0000	Riverside_5Year
SU3					
A5-3	0.21	66.44	83.01	1.0000	Riverside_5Year
SU13_pr					
A5-4	0.10	45.65	86.67	1.0000	Riverside_5Year
SU4					
A5-5	0.08	40.53	75.03	1.0000	Riverside_5Year
SU11_pr					
A5-6	0.09	42.86	100.00	1.0000	Riverside_5Year
SU12_pr					
A5-7	0.16	58.21	51.53	0.9600	Riverside_5Year
SU5					
A5-8	0.10	45.22	33.65	0.9620	Riverside_5Year
CB203					
A5-9	0.29	76.84	65.09	0.8680	Riverside_5Year
SU10					
A5-B-Roof	0.14	54.23	100.00	1.0000	Riverside_5Year
Roof-Storage					

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
CB201	JUNCTION	78.30	1.60	0.0	
CB202	JUNCTION	78.50	1.60	0.0	
CB203	JUNCTION	78.98	1.97	0.0	
DI01	JUNCTION	78.20	1.05	0.0	
ExCB	JUNCTION	77.59	1.44	0.0	
Ex-CB1	JUNCTION	78.21	1.72	0.0	
ExCB2	JUNCTION	78.10	0.73	0.0	
Ex-CB3	JUNCTION	78.17	1.68	0.0	
ExCB4	JUNCTION	78.33	1.62	0.0	
ExCB6	JUNCTION	77.70	1.13	0.0	
ExCB8	JUNCTION	77.64	1.77	0.0	
Ex-CBMH1	JUNCTION	77.92	1.95	0.0	
Ex-CBMH2	JUNCTION	78.13	1.73	0.0	
ExCBMH3	JUNCTION	78.82	1.78	0.0	
ExMH103	JUNCTION	77.41	3.00	0.0	
ExSTMH	JUNCTION	77.86	2.26	0.0	
Ex-STMH1	JUNCTION	77.81	2.34	0.0	
Ex-STMH9	JUNCTION	77.18	3.24	0.0	
EX-STM-MH	JUNCTION	76.63	2.93	0.0	
J1	JUNCTION	77.50	2.68	0.0	
J17	JUNCTION	77.53	2.62	0.0	
J2	JUNCTION	77.50	2.80	0.0	
J20	JUNCTION	77.51	2.64	0.0	
J25	JUNCTION	77.41	1.43	0.0	
J26	JUNCTION	77.32	2.10	0.0	
J6	JUNCTION	77.47	2.89	0.0	

OGS-STMH201	JUNCTION	77.39	3.06	0.0
STM01	JUNCTION	78.23	5.00	0.0
STMMH202	JUNCTION	77.37	3.00	0.0
STMMH203	JUNCTION	77.81	3.12	0.0
OF1	OUTFALL	75.00	0.30	0.0
OF2	OUTFALL	0.00	0.00	0.0
OF3	OUTFALL	0.00	0.00	0.0
OF4	OUTFALL	0.00	0.00	0.0
Roof-Storage	STORAGE	88.23	0.15	0.0
SU1	STORAGE	79.03	5.00	0.0
SU10	STORAGE	80.60	5.00	0.0
SU11_pr	STORAGE	79.90	5.00	0.0
SU12_pr	STORAGE	80.10	5.00	0.0
SU13_pr	STORAGE	79.95	5.00	0.0
SU2	STORAGE	79.85	5.00	0.0
SU3	STORAGE	79.86	5.00	0.0
SU4	STORAGE	79.87	5.00	0.0
SU5	STORAGE	79.93	5.00	0.0
SU6	STORAGE	79.25	5.00	0.0
SU7	STORAGE	79.41	5.00	0.0
SU8	STORAGE	78.81	5.00	0.0

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Link Summary
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Name	From Node	To Node	Type	Length	% Slope	Roughness
C1	ExCB4	Ex-CBMH2	CONDUIT	31.4	0.4459	0.0100
C1_2	STMMH203	STMMH202	CONDUIT	35.5	1.0127	0.0100
C10	J17	J20	CONDUIT	13.5	0.1114	0.0130
C11	Ex-CB3	J20	CONDUIT	16.5	0.3636	0.0130
C12	CB202	J2	CONDUIT	10.8	9.2992	0.0100
C12_1	J20	J1	CONDUIT	6.1	0.1149	0.0100
C12_3	J1	J2	CONDUIT	20.0	0.0150	0.0100
C12_4	J2	J6	CONDUIT	9.5	0.3173	0.0100
C13	ExCBMH3	ExMH103	CONDUIT	43.7	0.3433	0.0100
C13_2	STMMH202	Ex-STMH9	CONDUIT	25.1	0.6767	0.0130
C13_6	OGS-STMH201	STMMH202	CONDUIT	1.6	1.2588	0.0130
C14	Ex-STMH9	EX-STM-MH	CONDUIT	51.7	0.4836	0.0130
C15	EX-STM-MH	OF1	CONDUIT	30.2	5.4063	0.0130
C17	DI01	ExCB2	CONDUIT	4.0	1.0001	0.0130

C18	ExCB2	ExSTMH	CONDUIT	20.9	
1.0048	0.0130				
C19	ExSTMH	ExCB	CONDUIT	42.6	
0.6337	0.0130				
C2	STM01	STMMH203	CONDUIT	18.4	
1.9569	0.0130				
C20	ExCB	J25	CONDUIT	15.4	
1.1556	0.0130				
C21	J25	J26	CONDUIT	68.3	
0.1304	0.0130				
C22	J26	Ex-STMH9	CONDUIT	18.0	-
0.8152	0.0130				
C23	ExCB6	J25	CONDUIT	3.2	
9.0367	0.0130				
C24	ExCB8	J26	CONDUIT	4.6	
6.9077	0.0130				
C3	SU13_pr	ExCB4	CONDUIT	1.5	
121.7448	0.0100				
C4	CB201	J1	CONDUIT	10.7	
7.5046	0.0100				
C4_2	CB203	ExCBMH3	CONDUIT	19.4	
0.5155	0.0100				
C5	J6	ExMH103	CONDUIT	25.9	
0.0773	0.0130				
C6	Ex-CBMH2	J6	CONDUIT	16.5	
0.3636	0.0130				
C7	Ex-STMH1	J17	CONDUIT	2.6	
11.1583	0.0130				
C8	Ex-CB1	Ex-CBMH1	CONDUIT	58.4	
0.4452	0.0130				
C9	Ex-CBMH1	J17	CONDUIT	22.5	
1.7558	0.0130				
OR1	SU1	ExCB	CONDUIT	2.0	
100.0052	0.0100				
OR10	SU10	ExCBMH3	CONDUIT	1.5	
138.1323	0.0100				
OR11	SU11_pr	CB201	CONDUIT	1.5	
126.1620	0.0100				
OR12	SU12_pr	CB202	CONDUIT	1.5	
114.4781	0.0100				
OR2	SU2	Ex-CB3	CONDUIT	1.7	
118.2984	0.0100				
OR3	SU3	Ex-CBMH2	CONDUIT	1.7	
121.5502	0.0100				
OR4	SU4	Ex-CBMH1	CONDUIT	1.9	
118.3801	0.0100				
OR5	SU5	Ex-CB1	CONDUIT	3.3	
73.8777	0.0100				
OR6	SU6	DI01	CONDUIT	2.9	
38.3256	0.0100				
OR7	SU7	ExCB8	CONDUIT	2.0	
188.3495	0.0100				
OR8	SU8	ExCB6	CONDUIT	1.4	
121.7519	0.0100				
C13_5	ExMH103	OGS-STMH201	ORIFICE		
C16	Roof-Storage	STM01	ORIFICE		

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Cross Section Summary

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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.25	0.05	0.06	0.25	1	0.05
C1_2	CIRCULAR	0.25	0.05	0.06	0.25	1	0.08
C10	CIRCULAR	1.50	1.77	0.38	1.50	1	2.36
C11	CIRCULAR	0.30	0.07	0.07	0.30	1	0.06
C12	CIRCULAR	0.25	0.05	0.06	0.25	1	0.24
C12_1	CIRCULAR	1.50	1.77	0.38	1.50	1	3.12
C12_3	CIRCULAR	1.50	1.77	0.38	1.50	1	1.12
C12_4	CIRCULAR	1.50	1.77	0.38	1.50	1	5.18
C13	CIRCULAR	0.30	0.07	0.07	0.30	1	0.07
C13_2	CIRCULAR	0.38	0.11	0.09	0.38	1	0.14
C13_6	CIRCULAR	0.38	0.11	0.09	0.38	1	0.20
C14	CIRCULAR	0.38	0.11	0.09	0.38	1	0.12
C15	CIRCULAR	0.30	0.07	0.07	0.30	1	0.22
C17	CIRCULAR	0.20	0.03	0.05	0.20	1	0.03
C18	CIRCULAR	0.20	0.03	0.05	0.20	1	0.03
C19	CIRCULAR	0.30	0.07	0.07	0.30	1	0.08
C2	CIRCULAR	0.25	0.05	0.06	0.25	1	0.08
C20	CIRCULAR	0.30	0.07	0.07	0.30	1	0.10
C21	CIRCULAR	0.30	0.07	0.07	0.30	1	0.03
C22	CIRCULAR	0.30	0.07	0.07	0.30	1	0.09
C23	CIRCULAR	0.20	0.03	0.05	0.20	1	0.10
C24	CIRCULAR	0.20	0.03	0.05	0.20	1	0.09
C3	CIRCULAR	0.25	0.05	0.06	0.25	1	0.85
C4	CIRCULAR	0.25	0.05	0.06	0.25	1	0.21
C4_2	CIRCULAR	0.25	0.05	0.06	0.25	1	0.06
C5	CIRCULAR	1.50	1.77	0.38	1.50	1	1.97
C6	CIRCULAR	0.30	0.07	0.07	0.30	1	

```
  C7               CIRCULAR            1.50     1.77     0.38     1.50        1
23.62
  C8               CIRCULAR            0.25     0.05     0.06     0.25        1
0.04
  C9               CIRCULAR            0.30     0.07     0.07     0.30        1
0.13
  OR1              CIRCULAR            0.25     0.05     0.06     0.25        1
0.77
  OR10             CIRCULAR            0.25     0.05     0.06     0.25        1
0.91
  OR11             CIRCULAR            0.25     0.05     0.06     0.25        1
0.87
  OR12             CIRCULAR            0.25     0.05     0.06     0.25        1
0.83
  OR2              CIRCULAR            0.25     0.05     0.06     0.25        1
0.84
  OR3              CIRCULAR            0.25     0.05     0.06     0.25        1
0.85
  OR4              CIRCULAR            0.25     0.05     0.06     0.25        1
0.84
  OR5              CIRCULAR            0.25     0.05     0.06     0.25        1
0.66
  OR6              CIRCULAR            0.25     0.05     0.06     0.25        1
0.48
  OR7              CIRCULAR            0.25     0.05     0.06     0.25        1
1.06
  OR8              CIRCULAR            0.25     0.05     0.06     0.25        1
0.85


  ****************
  Analysis Options
  ****************
  Flow Units ............... CMS
  Process Models:
    Rainfall/Runoff ........ YES
    RDII ................... NO
    Snowmelt ............... NO
    Groundwater ............ NO
    Flow Routing ........... YES
    Ponding Allowed ........ NO
    Water Quality .......... NO
  Infiltration Method ...... HORTON
  Flow Routing Method ...... DYNWAVE
  Surcharge Method ......... EXTRAN
  Starting Date ............ 06/11/2024 00:00:00
  Ending Date .............. 06/12/2024 00:00:00
  Antecedent Dry Days ...... 0.0
  Report Time Step ......... 00:01:00
  Wet Time Step ............ 00:05:00
  Dry Time Step ............ 00:05:00
  Routing Time Step ........ 5.00 sec
  Variable Time Step ....... YES
  Maximum Trials ........... 8
  Number of Threads ........ 8
  Head Tolerance ........... 0.001524 m
```

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.103	42.540
Evaporation Loss	0.000	0.000
Infiltration Loss	0.043	17.811
Surface Runoff	0.060	24.552
Final Storage	0.000	0.113
Continuity Error (%)	0.150	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.060	0.597
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.027	0.272
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.001
Final Stored Volume	0.033	0.326
Continuity Error (%)	-0.006	

Highest Continuity Errors

Node J26 (19.30%)
Node J25 (8.12%)

Time-Step Critical Elements

Link C13_6 (41.92%)
Link OR12 (39.36%)
Link C3 (5.00%)

Highest Flow Instability Indexes

Link C12_4 (2)

Most Frequent Nonconverging Nodes

Convergence obtained at all time steps.

Routing Time Step Summary

```
  *************************
  Minimum Time Step           :     0.50 sec
  Average Time Step           :     2.02 sec
  Maximum Time Step           :     5.00 sec
  % of Time in Steady State   :     0.00
  Average Iterations per Step :     2.00
  % of Steps Not Converging   :     0.00
  Time Step Frequencies       :
      5.000 -  3.155 sec      :    29.09 %
      3.155 -  1.991 sec      :     2.26 %
      1.991 -  1.256 sec      :    19.45 %
      1.256 -  0.792 sec      :    13.78 %
      0.792 -  0.500 sec      :    35.42 %


  ***************************
  Subcatchment Runoff Summary
  ***************************

  ------------------------------------------------------------------------------------
-----------------------------------------------
                             Total      Total      Total      Total     Imperv
Perv      Total       Total     Peak  Runoff
                          Precip      Runon       Evap      Infil     Runoff
Runoff     Runoff      Runoff   Runoff   Coeff
  Subcatchment                 mm         mm         mm         mm         mm
mm         mm    10^6 ltr      CMS
  ------------------------------------------------------------------------------------
-----------------------------------------------
  A1                           42.54       0.00       0.00      33.36       5.60
3.68       5.60        0.01     0.01   0.132
  A2_1                         42.54       0.00       0.00      37.56       0.42
4.68       5.10        0.00     0.00   0.120
  A2_2                         42.54       0.00       0.00      36.77       0.42
5.55       5.97        0.00     0.00   0.140
  A2_3                         42.54       0.00       0.00      23.88      15.49
3.06      18.55        0.02     0.01   0.436
  A2_4                         42.54       0.00       0.00      37.25       0.42
5.01       5.43        0.00     0.00   0.128
  A2_5                         42.54       0.00       0.00      36.47       0.42
5.88       6.30        0.00     0.00   0.148
  A-3Ex                        42.54       0.00       0.00      29.21      10.38
2.75      13.13        0.03     0.02   0.309
  A-4EX                        42.54       0.00       0.00      29.41      10.39
2.55      12.93        0.05     0.03   0.304
  A5-1                         42.54       0.00       0.00       1.20      41.29
0.27      41.56        0.05     0.03   0.977
  A5-2                         42.54       0.00       0.00       0.00      42.73
0.00      42.73        0.04     0.03   1.005
  A5-3                         42.54       0.00       0.00       6.15      35.50
1.14      36.64        0.08     0.05   0.861
  A5-4                         42.54       0.00       0.00       4.77      37.03
0.97      38.00        0.04     0.03   0.893
  A5-5                         42.54       0.00       0.00       9.01      32.02
1.72      33.74        0.03     0.02   0.793
  A5-6                         42.54       0.00       0.00       0.00      42.73
0.00      42.73        0.04     0.02   1.005
  A5-7                         42.54       0.00       0.00      18.08      22.00
2.63      24.63        0.04     0.03   0.579
```

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  A5-8                      42.54       0.00       0.00      24.87      14.34
3.47      17.81        0.02     0.01   0.419
  A5-9                      42.54       0.00       0.00      13.03      27.64
1.88      29.52        0.09     0.05   0.694
  A5-B-Roof                 42.54       0.00       0.00       0.00      42.76
0.00      42.76        0.06     0.04   1.005
```

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Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
CB201	JUNCTION	0.00	0.00	78.30	0 00:00	0.00
CB202	JUNCTION	0.01	0.05	78.55	0 01:10	0.05
CB203	JUNCTION	0.01	0.09	79.07	0 01:10	0.09
DI01	JUNCTION	0.00	0.04	78.24	0 01:20	0.04
ExCB	JUNCTION	0.00	0.03	77.62	0 01:21	0.03
Ex-CB1	JUNCTION	0.00	0.00	78.21	0 00:00	0.00
ExCB2	JUNCTION	0.00	0.03	78.13	0 01:21	0.03
Ex-CB3	JUNCTION	0.00	0.00	78.17	0 00:00	0.00
ExCB4	JUNCTION	0.02	0.11	78.44	0 01:21	0.11
ExCB6	JUNCTION	0.00	0.01	77.71	0 01:20	0.01
ExCB8	JUNCTION	0.00	0.02	77.66	0 01:20	0.02
Ex-CBMH1	JUNCTION	0.06	0.23	78.15	0 02:12	0.23
Ex-CBMH2	JUNCTION	0.02	0.14	78.27	0 01:21	0.14
ExCBMH3	JUNCTION	0.01	0.09	78.91	0 01:10	0.09
ExMH103	JUNCTION	0.35	0.74	78.15	0 02:12	0.74
ExSTMH	JUNCTION	0.00	0.03	77.89	0 01:21	0.03
Ex-STMH1	JUNCTION	0.11	0.34	78.15	0 02:10	0.34
Ex-STMH9	JUNCTION	0.04	0.10	77.28	0 01:28	0.10
EX-STM-MH	JUNCTION	0.03	0.06	76.69	0 01:10	0.06
J1	JUNCTION	0.29	0.64	78.15	0 02:10	0.64
J17	JUNCTION	0.27	0.62	78.15	0 02:10	0.62
J2	JUNCTION	0.29	0.65	78.15	0 02:11	0.65
J20	JUNCTION	0.28	0.64	78.15	0 02:11	0.64
J25	JUNCTION	0.06	0.11	77.52	0 01:26	0.11
J26	JUNCTION	0.14	0.20	77.52	0 01:25	0.20
J6	JUNCTION	0.31	0.68	78.15	0 02:09	0.68
OGS-STMH201	JUNCTION	0.05	0.09	77.48	0 01:34	0.09
STM01	JUNCTION	0.02	0.06	78.29	0 01:28	0.06
STMMH202	JUNCTION	0.07	0.11	77.48	0 01:34	0.11
STMMH203	JUNCTION	0.02	0.06	77.87	0 01:28	0.06
OF1	OUTFALL	0.30	0.30	75.30	0 00:00	0.30
OF2	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
OF3	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
OF4	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
Roof-Storage	STORAGE	0.03	0.09	88.32	0 01:27	0.09
SU1	STORAGE	0.00	0.01	79.03	0 01:10	0.01
SU10	STORAGE	0.20	0.22	80.82	1 00:00	0.22
SU11_pr	STORAGE	0.19	0.21	80.11	1 00:00	0.21
SU12_pr	STORAGE	0.10	0.13	80.23	0 01:10	0.13
SU13_pr	STORAGE	0.24	0.28	80.23	0 01:20	0.28

SU2	STORAGE	0.17	0.19	80.04	1	00:00	0.19
SU3	STORAGE	0.19	0.20	80.06	1	00:00	0.20
SU4	STORAGE	0.21	0.23	80.10	1	00:00	0.23
SU5	STORAGE	0.21	0.22	80.15	1	00:00	0.22
SU6	STORAGE	0.00	0.01	79.26	0	01:20	0.01
SU7	STORAGE	0.00	0.01	79.42	0	01:20	0.01
SU8	STORAGE	0.00	0.01	78.82	0	01:20	0.01

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Node Inflow Summary
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Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
CB201	JUNCTION	0.000	0.000	0 00:00	0	0	0.000 ltr
CB202	JUNCTION	0.000	0.024	0 01:10	0	0.0348	-0.004
CB203	JUNCTION	0.012	0.012	0 01:10	0.0185	0.0185	-0.000
DI01	JUNCTION	0.000	0.002	0 01:20	0	0.00305	0.031
ExCB	JUNCTION	0.000	0.002	0 01:21	0	0.00382	-0.246
Ex-CB1	JUNCTION	0.000	0.000	0 00:00	0	0	0.000 ltr
ExCB2	JUNCTION	0.000	0.002	0 01:20	0	0.00305	0.027
Ex-CB3	JUNCTION	0.000	0.000	0 00:00	0	0	0.000 ltr
ExCB4	JUNCTION	0.000	0.020	0 01:20	0	0.0402	-0.007
ExCB6	JUNCTION	0.000	0.001	0 01:20	0	0.00116	0.005
ExCB8	JUNCTION	0.000	0.002	0 01:20	0	0.00234	0.006
Ex-CBMH1	JUNCTION	0.000	0.002	0 01:23	0	0.00188	0.010
Ex-CBMH2	JUNCTION	0.000	0.020	0 01:21	0	0.0402	0.163
ExCBMH3	JUNCTION	0.000	0.011	0 01:10	0	0.0185	-0.002
ExMH103	JUNCTION	0.000	0.011	0 01:10	0	0.0949	-0.015
ExSTMH	JUNCTION	0.000	0.002	0 01:21	0	0.00305	0.015
Ex-STMH1	JUNCTION	0.000	0.001	0 01:14	0	0.000537	0.006

Ex-STMH9	JUNCTION	0.000	0.016	0	01:28	0	0.159
-0.019							
EX-STM-MH	JUNCTION	0.015	0.023	0	01:10	0.024	0.183
0.000							
J1	JUNCTION	0.000	0.016	0	01:21	0	0.0432
0.045							
J17	JUNCTION	0.000	0.007	0	01:23	0	0.012
0.058							
J2	JUNCTION	0.000	0.024	0	01:10	0	0.0739
-0.028							
J20	JUNCTION	0.000	0.011	0	01:21	0	0.0261
-0.011							
J25	JUNCTION	0.000	0.003	0	01:20	0	0.00536
8.833							
J26	JUNCTION	0.000	0.004	0	01:20	0	0.0074
23.914							
J6	JUNCTION	0.000	0.020	0	01:21	0	0.0887
-0.037							
OGS-STMH201	JUNCTION	0.000	0.005	0	02:15	0	0.0938
0.010							
STM01	JUNCTION	0.000	0.008	0	01:27	0	0.0603
-0.000							
STMMH202	JUNCTION	0.000	0.013	0	01:34	0	0.154
0.026							
STMMH203	JUNCTION	0.000	0.008	0	01:28	0	0.0603
0.002							
OF1	OUTFALL	0.000	0.023	0	01:10	0	0.183
0.000							
OF2	OUTFALL	0.005	0.005	0	01:05	0.00851	0.00851
0.000							
OF3	OUTFALL	0.027	0.027	0	01:10	0.0456	0.0456
0.000							
OF4	OUTFALL	0.021	0.021	0	01:10	0.0349	0.0349
0.000							
Roof-Storage	STORAGE	0.038	0.038	0	01:10	0.0603	0.0603
-0.000							
SU1	STORAGE	0.001	0.001	0	01:10	0.000774	0.000774
-0.014							
SU10	STORAGE	0.054	0.054	0	01:10	0.0862	0.0862
0.011							
SU11_pr	STORAGE	0.017	0.017	0	01:10	0.026	0.026
0.011							
SU12_pr	STORAGE	0.024	0.024	0	01:10	0.0385	0.0385
0.001							
SU13_pr	STORAGE	0.050	0.050	0	01:10	0.0779	0.0779
0.005							
SU2	STORAGE	0.031	0.031	0	01:10	0.049	0.049
0.011							
SU3	STORAGE	0.025	0.025	0	01:10	0.0402	0.0402
0.011							
SU4	STORAGE	0.026	0.026	0	01:10	0.0399	0.0399
0.011							
SU5	STORAGE	0.025	0.025	0	01:10	0.0401	0.0401
0.011							
SU6	STORAGE	0.002	0.002	0	01:20	0.00305	0.00305
-0.003							
SU7	STORAGE	0.002	0.002	0	01:20	0.00234	0.00234
-0.005							
SU8	STORAGE	0.001	0.001	0	01:20	0.00116	0.00116
-0.002							

****
Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m³	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m³	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
Roof-Storage	0.008	8.6	0.0	0.0	0.033	34.5	0 01:27	0.008
SU1	0.000	0.0	0.0	0.0	0.000	0.0	0 01:10	0.001
SU10	0.077	0.2	0.0	0.0	0.086	0.2	1 00:00	0.000
SU11_pr	0.023	0.2	0.0	0.0	0.026	0.2	1 00:00	0.000
SU12_pr	0.004	0.0	0.0	0.0	0.006	0.1	0 01:10	0.024
SU13_pr	0.037	0.2	0.0	0.0	0.046	0.3	0 01:20	0.020
SU2	0.044	0.1	0.0	0.0	0.049	0.1	1 00:00	0.000
SU3	0.036	0.1	0.0	0.0	0.040	0.2	1 00:00	0.000
SU4	0.036	0.2	0.0	0.0	0.040	0.2	1 00:00	0.000
SU5	0.036	0.2	0.0	0.0	0.040	0.2	1 00:00	0.000
SU6	0.000	0.0	0.0	0.0	0.000	0.0	0 01:20	0.002
SU7	0.000	0.0	0.0	0.0	0.000	0.0	0 01:20	0.002
SU8	0.000	0.0	0.0	0.0	0.000	0.0	0 01:20	0.001

****

Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
OF1	71.16	0.009	0.023	0.183
OF2	37.86	0.001	0.005	0.009
OF3	40.90	0.005	0.027	0.046
OF4	40.13	0.004	0.021	0.035
System	47.51	0.018	0.076	0.272

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.020	0 01:21	0.99	0.39	0.43
C1_2	CONDUIT	0.008	0 01:28	1.00	0.11	0.23
C10	CONDUIT	0.007	0 01:23	0.14	0.00	0.42
C11	CONDUIT	0.000	0 00:00	0.00	0.00	0.06
C12	CONDUIT	0.024	0 01:10	1.74	0.10	0.61
C12_1	CONDUIT	0.011	0 01:21	0.15	0.00	0.43
C12_3	CONDUIT	0.016	0 01:21	0.20	0.01	0.43
C12_4	CONDUIT	0.014	0 01:23	0.28	0.00	0.44
C13	CONDUIT	0.011	0 01:10	0.69	0.15	0.28
C13_2	CONDUIT	0.013	0 01:34	0.77	0.09	0.21
C13_6	CONDUIT	0.005	0 02:15	0.29	0.02	0.27
C14	CONDUIT	0.016	0 01:28	0.75	0.13	0.25
C15	CONDUIT	0.023	0 01:10	0.51	0.10	0.61
C17	CONDUIT	0.002	0 01:20	0.53	0.06	0.17
C18	CONDUIT	0.002	0 01:21	0.56	0.06	0.16
C19	CONDUIT	0.002	0 01:21	0.46	0.02	0.11
C2	CONDUIT	0.008	0 01:28	1.05	0.10	0.22
C20	CONDUIT	0.002	0 01:21	0.38	0.02	0.23
C21	CONDUIT	0.003	0 01:23	0.16	0.08	0.51
C22	CONDUIT	0.004	0 01:25	0.14	0.04	0.40
C23	CONDUIT	0.001	0 01:20	0.47	0.01	0.30
C24	CONDUIT	0.002	0 01:20	0.40	0.02	0.54
C3	CONDUIT	0.020	0 01:20	2.52	0.02	0.27
C4	CONDUIT	0.000	0 00:00	0.00	0.00	0.50
C4_2	CONDUIT	0.011	0 01:10	0.82	0.21	0.33
C5	CONDUIT	0.005	0 01:56	0.09	0.00	0.46
C6	CONDUIT	0.020	0 01:21	0.74	0.35	0.41
C7	CONDUIT	0.001	0 01:14	0.01	0.00	0.32
C8	CONDUIT	0.000	0 00:00	0.00	0.00	0.39
C9	CONDUIT	0.002	0 01:23	0.05	0.02	0.88
OR1	CONDUIT	0.001	0 01:10	0.65	0.00	0.07
OR10	CONDUIT	0.000	0 00:00	0.00	0.00	0.18

OR11	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
OR12	CONDUIT	0.024	0	01:10	4.47	0.03	0.17
OR2	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
OR3	CONDUIT	0.000	0	00:00	0.00	0.00	0.28
OR4	CONDUIT	0.000	0	00:00	0.00	0.00	0.45
OR5	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
OR6	CONDUIT	0.002	0	01:20	0.79	0.00	0.10
OR7	CONDUIT	0.002	0	01:20	1.60	0.00	0.05
OR8	CONDUIT	0.001	0	01:20	1.36	0.00	0.04
C13_5	ORIFICE	0.005	0	02:15			1.00
C16	ORIFICE	0.008	0	01:27			0.44

****
Flow Classification Summary
****

	Adjusted	---------- Fraction of Time in Flow Class -------							
	/Actual		Up	Down	Sub	Sup	Up	Down	Norm Inlet
Conduit	Length	Dry	Dry	Dry	Crit	Crit	Crit	Crit	Ltd Ctrl
C1	1.00	0.05	0.00	0.00	0.00	0.00	0.00	0.95	0.00 0.00
C1_2	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00 0.00
C10	1.00	0.70	0.00	0.00	0.29	0.00	0.00	0.00	0.67 0.00
C11	1.00	0.95	0.05	0.00	0.00	0.00	0.00	0.00	0.00 0.00
C12	1.00	0.69	0.10	0.00	0.20	0.01	0.00	0.00	0.96 0.00
C12_1	1.00	0.04	0.66	0.00	0.30	0.00	0.00	0.00	0.67 0.00
C12_3	1.00	0.04	0.00	0.00	0.96	0.00	0.00	0.00	0.00 0.00
C12_4	1.00	0.04	0.65	0.00	0.31	0.00	0.00	0.00	0.67 0.00
C13	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00 0.00
C13_2	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00 0.00
C13_6	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00 0.00
C14	1.00	0.04	0.00	0.00	0.00	0.00	0.00	0.96	0.00 0.00
C15	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.99 0.00
C17	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00 0.00
C18	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00 0.00
C19	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.87 0.00

C2	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00
0.00									
C20	1.00	0.02	0.83	0.00	0.15	0.00	0.00	0.00	0.98
0.00									
C21	1.00	0.02	0.01	0.00	0.98	0.00	0.00	0.00	0.03
0.00									
C22	1.00	0.02	0.04	0.00	0.00	0.00	0.95	0.00	0.00
0.00									
C23	1.00	0.02	0.86	0.00	0.11	0.01	0.00	0.00	0.98
0.00									
C24	1.00	0.02	0.85	0.00	0.12	0.01	0.00	0.00	0.98
0.00									
C3	1.00	0.05	0.01	0.00	0.53	0.42	0.00	0.00	0.95
0.00									
C4	1.00	0.04	0.96	0.00	0.00	0.00	0.00	0.00	0.00
0.00									
C4_2	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00
0.00									
C5	1.00	0.03	0.01	0.00	0.30	0.00	0.00	0.66	0.00
0.00									
C6	1.00	0.05	0.00	0.00	0.06	0.00	0.00	0.89	0.05
0.00									
C7	1.00	0.71	0.11	0.00	0.18	0.00	0.00	0.00	0.76
0.00									
C8	1.00	0.87	0.13	0.00	0.00	0.00	0.00	0.00	0.00
0.00									
C9	1.00	0.71	0.12	0.00	0.17	0.00	0.00	0.00	0.80
0.00									
OR1	1.00	0.84	0.04	0.00	0.10	0.03	0.00	0.00	0.98
0.00									
OR10	1.00	0.01	0.99	0.00	0.00	0.00	0.00	0.00	0.00
0.00									
OR11	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00									
OR12	1.00	0.04	0.00	0.00	0.76	0.21	0.00	0.00	0.96
0.00									
OR2	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00									
OR3	1.00	0.05	0.95	0.00	0.00	0.00	0.00	0.00	0.00
0.00									
OR4	1.00	0.83	0.17	0.00	0.00	0.00	0.00	0.00	0.00
0.00									
OR5	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00									
OR6	1.00	0.01	0.86	0.00	0.06	0.07	0.00	0.00	0.99
0.00									
OR7	1.00	0.01	0.00	0.00	0.88	0.11	0.00	0.00	0.98
0.00									
OR8	1.00	0.01	0.00	0.00	0.91	0.08	0.00	0.00	0.97
0.00									

****
Conduit Surcharge Summary
****

	Hours Full			Hours Above Full	Hours Capacity

Conduit	Both Ends	Upstream	Dnstream	Normal Flow	Limited
C12	0.01	0.01	22.82	0.01	0.01
C15	0.01	0.01	23.83	0.01	0.01
C9	0.01	0.01	22.66	0.01	0.01

Analysis begun on: Mon Jun 24 16:06:14 2024
Analysis ended on: Mon Jun 24 16:06:15 2024
Total elapsed time: 00:00:01

```
  EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.4)
  ------------------------------------------------------------

  WARNING 03: negative offset ignored for Link C2
  WARNING 08: elevation drop exceeds length for Conduit C3
  WARNING 03: negative offset ignored for Link OR1
  WARNING 08: elevation drop exceeds length for Conduit OR10
  WARNING 08: elevation drop exceeds length for Conduit OR11
  WARNING 08: elevation drop exceeds length for Conduit OR12
  WARNING 08: elevation drop exceeds length for Conduit OR2
  WARNING 08: elevation drop exceeds length for Conduit OR3
  WARNING 08: elevation drop exceeds length for Conduit OR4
  WARNING 03: negative offset ignored for Link OR6
  WARNING 03: negative offset ignored for Link OR7
  WARNING 03: negative offset ignored for Link OR8

  *************
  Element Count
  *************
  Number of rain gages ...... 3
  Number of subcatchments ... 18
  Number of nodes ........... 47
  Number of links ........... 43
  Number of pollutants ...... 0
  Number of land uses ....... 0


  ****************
  Raingage Summary
  ****************
                                                    Data       Recording
  Name                 Data Source                  Type       Interval
  ------------------------------------------------------------------------
  Riverside_100year    Chicago_3h_100yr_10min       INTENSITY   10 min.
  Riverside_100yr+20%  Chicago_3hr_100yr+20%_10min  INTENSITY   10 min.
  Riverside_5Year      Chicago_3h_5yr_10min         INTENSITY   10 min.


  ********************
  Subcatchment Summary
  ********************
  Name                        Area     Width   %Imperv    %Slope Rain Gage
Outlet
  ----------------------------------------------------------------------------
--------------------------
  A1                          0.15     55.19     13.15    0.7360 Riverside_100year
OF2
  A2_1                        0.06     35.18      1.00    0.6420 Riverside_100year
SU6
  A2_2                        0.02     19.50      1.00    0.6420 Riverside_100year
SU8
  A2_3                        0.13     51.68     36.87    0.6420 Riverside_100year
EX-STM-MH
  A2_4                        0.04     30.79      1.00    0.6420 Riverside_100year
SU7
  A2_5                        0.01     15.38      1.00    0.6420 Riverside_100year
SU1
```

A-3Ex	0.27	73.89	25.00	0.5000	Riverside_100year
OF4					
A-4EX	0.35	84.05	25.00	0.5000	Riverside_100year
OF3					
A5-1	0.12	48.62	96.60	1.0000	Riverside_100year
SU2					
A5-2	0.09	44.76	100.00	1.0000	Riverside_100year
SU3					
A5-3	0.21	66.44	83.01	1.0000	Riverside_100year
SU13_pr					
A5-4	0.10	45.65	86.67	1.0000	Riverside_100year
SU4					
A5-5	0.08	40.53	75.03	1.0000	Riverside_100year
SU11_pr					
A5-6	0.09	42.86	100.00	1.0000	Riverside_100year
SU12_pr					
A5-7	0.16	58.21	51.53	0.9600	Riverside_100year
SU5					
A5-8	0.10	45.22	33.65	0.9620	Riverside_100year
CB203					
A5-9	0.29	76.84	65.09	0.8680	Riverside_100year
SU10					
A5-B-Roof	0.14	54.23	100.00	1.0000	Riverside_100year
Roof-Storage					

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
CB201	JUNCTION	78.30	1.60	0.0	
CB202	JUNCTION	78.50	1.60	0.0	
CB203	JUNCTION	78.98	1.97	0.0	
DI01	JUNCTION	78.20	1.05	0.0	
ExCB	JUNCTION	77.59	1.44	0.0	
Ex-CB1	JUNCTION	78.21	1.72	0.0	
ExCB2	JUNCTION	78.10	0.73	0.0	
Ex-CB3	JUNCTION	78.17	1.68	0.0	
ExCB4	JUNCTION	78.33	1.62	0.0	
ExCB6	JUNCTION	77.70	1.13	0.0	
ExCB8	JUNCTION	77.64	1.77	0.0	
Ex-CBMH1	JUNCTION	77.92	1.95	0.0	
Ex-CBMH2	JUNCTION	78.13	1.73	0.0	
ExCBMH3	JUNCTION	78.82	1.78	0.0	
ExMH103	JUNCTION	77.41	3.00	0.0	
ExSTMH	JUNCTION	77.86	2.26	0.0	
Ex-STMH1	JUNCTION	77.81	2.34	0.0	
Ex-STMH9	JUNCTION	77.18	3.24	0.0	
EX-STM-MH	JUNCTION	76.63	2.93	0.0	
J1	JUNCTION	77.50	2.68	0.0	
J17	JUNCTION	77.53	2.62	0.0	
J2	JUNCTION	77.50	2.80	0.0	
J20	JUNCTION	77.51	2.64	0.0	
J25	JUNCTION	77.41	1.43	0.0	
J26	JUNCTION	77.32	2.10	0.0	
J6	JUNCTION	77.47	2.89	0.0	

OGS-STMH201	JUNCTION	77.39	3.06	0.0
STM01	JUNCTION	78.23	5.00	0.0
STMMH202	JUNCTION	77.37	3.00	0.0
STMMH203	JUNCTION	77.81	3.12	0.0
OF1	OUTFALL	75.00	0.30	0.0
OF2	OUTFALL	0.00	0.00	0.0
OF3	OUTFALL	0.00	0.00	0.0
OF4	OUTFALL	0.00	0.00	0.0
Roof-Storage	STORAGE	88.23	0.15	0.0
SU1	STORAGE	79.03	5.00	0.0
SU10	STORAGE	80.60	5.00	0.0
SU11_pr	STORAGE	79.90	5.00	0.0
SU12_pr	STORAGE	80.10	5.00	0.0
SU13_pr	STORAGE	79.95	5.00	0.0
SU2	STORAGE	79.85	5.00	0.0
SU3	STORAGE	79.86	5.00	0.0
SU4	STORAGE	79.87	5.00	0.0
SU5	STORAGE	79.93	5.00	0.0
SU6	STORAGE	79.25	5.00	0.0
SU7	STORAGE	79.41	5.00	0.0
SU8	STORAGE	78.81	5.00	0.0

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Link Summary
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Name	From Node	To Node	Type	Length	% Slope	Roughness
C1	ExCB4	Ex-CBMH2	CONDUIT	31.4	0.4459	0.0100
C1_2	STMMH203	STMMH202	CONDUIT	35.5	1.0127	0.0100
C10	J17	J20	CONDUIT	13.5	0.1114	0.0130
C11	Ex-CB3	J20	CONDUIT	16.5	0.3636	0.0130
C12	CB202	J2	CONDUIT	10.8	9.2992	0.0100
C12_1	J20	J1	CONDUIT	6.1	0.1149	0.0100
C12_3	J1	J2	CONDUIT	20.0	0.0150	0.0100
C12_4	J2	J6	CONDUIT	9.5	0.3173	0.0100
C13	ExCBMH3	ExMH103	CONDUIT	43.7	0.3433	0.0100
C13_2	STMMH202	Ex-STMH9	CONDUIT	25.1	0.6767	0.0130
C13_6	OGS-STMH201	STMMH202	CONDUIT	1.6	1.2588	0.0130
C14	Ex-STMH9	EX-STM-MH	CONDUIT	51.7	0.4836	0.0130
C15	EX-STM-MH	OF1	CONDUIT	30.2	5.4063	0.0130
C17	DI01	ExCB2	CONDUIT	4.0	1.0001	0.0130

C18	ExCB2	ExSTMH	CONDUIT	20.9	
1.0048	0.0130				
C19	ExSTMH	ExCB	CONDUIT	42.6	
0.6337	0.0130				
C2	STM01	STMMH203	CONDUIT	18.4	
1.9569	0.0130				
C20	ExCB	J25	CONDUIT	15.4	
1.1556	0.0130				
C21	J25	J26	CONDUIT	68.3	
0.1304	0.0130				
C22	J26	Ex-STMH9	CONDUIT	18.0	-
0.8152	0.0130				
C23	ExCB6	J25	CONDUIT	3.2	
9.0367	0.0130				
C24	ExCB8	J26	CONDUIT	4.6	
6.9077	0.0130				
C3	SU13_pr	ExCB4	CONDUIT	1.5	
121.7448	0.0100				
C4	CB201	J1	CONDUIT	10.7	
7.5046	0.0100				
C4_2	CB203	ExCBMH3	CONDUIT	19.4	
0.5155	0.0100				
C5	J6	ExMH103	CONDUIT	25.9	
0.0773	0.0130				
C6	Ex-CBMH2	J6	CONDUIT	16.5	
0.3636	0.0130				
C7	Ex-STMH1	J17	CONDUIT	2.6	
11.1583	0.0130				
C8	Ex-CB1	Ex-CBMH1	CONDUIT	58.4	
0.4452	0.0130				
C9	Ex-CBMH1	J17	CONDUIT	22.5	
1.7558	0.0130				
OR1	SU1	ExCB	CONDUIT	2.0	
100.0052	0.0100				
OR10	SU10	ExCBMH3	CONDUIT	1.5	
138.1323	0.0100				
OR11	SU11_pr	CB201	CONDUIT	1.5	
126.1620	0.0100				
OR12	SU12_pr	CB202	CONDUIT	1.5	
114.4781	0.0100				
OR2	SU2	Ex-CB3	CONDUIT	1.7	
118.2984	0.0100				
OR3	SU3	Ex-CBMH2	CONDUIT	1.7	
121.5502	0.0100				
OR4	SU4	Ex-CBMH1	CONDUIT	1.9	
118.3801	0.0100				
OR5	SU5	Ex-CB1	CONDUIT	3.3	
73.8777	0.0100				
OR6	SU6	DI01	CONDUIT	2.9	
38.3256	0.0100				
OR7	SU7	ExCB8	CONDUIT	2.0	
188.3495	0.0100				
OR8	SU8	ExCB6	CONDUIT	1.4	
121.7519	0.0100				
C13_5	ExMH103	OGS-STMH201	ORIFICE		
C16	Roof-Storage	STM01	ORIFICE		

****
Cross Section Summary

****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.25	0.05	0.06	0.25	1	0.05
C1_2	CIRCULAR	0.25	0.05	0.06	0.25	1	0.08
C10	CIRCULAR	1.50	1.77	0.38	1.50	1	2.36
C11	CIRCULAR	0.30	0.07	0.07	0.30	1	0.06
C12	CIRCULAR	0.25	0.05	0.06	0.25	1	0.24
C12_1	CIRCULAR	1.50	1.77	0.38	1.50	1	3.12
C12_3	CIRCULAR	1.50	1.77	0.38	1.50	1	1.12
C12_4	CIRCULAR	1.50	1.77	0.38	1.50	1	5.18
C13	CIRCULAR	0.30	0.07	0.07	0.30	1	0.07
C13_2	CIRCULAR	0.38	0.11	0.09	0.38	1	0.14
C13_6	CIRCULAR	0.38	0.11	0.09	0.38	1	0.20
C14	CIRCULAR	0.38	0.11	0.09	0.38	1	0.12
C15	CIRCULAR	0.30	0.07	0.07	0.30	1	0.22
C17	CIRCULAR	0.20	0.03	0.05	0.20	1	0.03
C18	CIRCULAR	0.20	0.03	0.05	0.20	1	0.03
C19	CIRCULAR	0.30	0.07	0.07	0.30	1	0.08
C2	CIRCULAR	0.25	0.05	0.06	0.25	1	0.08
C20	CIRCULAR	0.30	0.07	0.07	0.30	1	0.10
C21	CIRCULAR	0.30	0.07	0.07	0.30	1	0.03
C22	CIRCULAR	0.30	0.07	0.07	0.30	1	0.09
C23	CIRCULAR	0.20	0.03	0.05	0.20	1	0.10
C24	CIRCULAR	0.20	0.03	0.05	0.20	1	0.09
C3	CIRCULAR	0.25	0.05	0.06	0.25	1	0.85
C4	CIRCULAR	0.25	0.05	0.06	0.25	1	0.21
C4_2	CIRCULAR	0.25	0.05	0.06	0.25	1	0.06
C5	CIRCULAR	1.50	1.77	0.38	1.50	1	1.97
C6	CIRCULAR	0.30	0.07	0.07	0.30	1	

```
  C7               CIRCULAR            1.50     1.77     0.38     1.50        1
23.62
  C8               CIRCULAR            0.25     0.05     0.06     0.25        1
0.04
  C9               CIRCULAR            0.30     0.07     0.07     0.30        1
0.13
  OR1              CIRCULAR            0.25     0.05     0.06     0.25        1
0.77
  OR10             CIRCULAR            0.25     0.05     0.06     0.25        1
0.91
  OR11             CIRCULAR            0.25     0.05     0.06     0.25        1
0.87
  OR12             CIRCULAR            0.25     0.05     0.06     0.25        1
0.83
  OR2              CIRCULAR            0.25     0.05     0.06     0.25        1
0.84
  OR3              CIRCULAR            0.25     0.05     0.06     0.25        1
0.85
  OR4              CIRCULAR            0.25     0.05     0.06     0.25        1
0.84
  OR5              CIRCULAR            0.25     0.05     0.06     0.25        1
0.66
  OR6              CIRCULAR            0.25     0.05     0.06     0.25        1
0.48
  OR7              CIRCULAR            0.25     0.05     0.06     0.25        1
1.06
  OR8              CIRCULAR            0.25     0.05     0.06     0.25        1
0.85


  ****************
  Analysis Options
  ****************
  Flow Units ............... CMS
  Process Models:
    Rainfall/Runoff ........ YES
    RDII ................... NO
    Snowmelt ............... NO
    Groundwater ............ NO
    Flow Routing ........... YES
    Ponding Allowed ........ NO
    Water Quality .......... NO
  Infiltration Method ...... HORTON
  Flow Routing Method ...... DYNWAVE
  Surcharge Method ......... EXTRAN
  Starting Date ............ 06/11/2024 00:00:00
  Ending Date .............. 06/12/2024 00:00:00
  Antecedent Dry Days ...... 0.0
  Report Time Step ......... 00:01:00
  Wet Time Step ............ 00:05:00
  Dry Time Step ............ 00:05:00
  Routing Time Step ........ 5.00 sec
  Variable Time Step ....... YES
  Maximum Trials ........... 8
  Number of Threads ........ 8
  Head Tolerance ........... 0.001524 m
```

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.174	71.677
Evaporation Loss	0.000	0.000
Infiltration Loss	0.053	21.912
Surface Runoff	0.119	48.787
Final Storage	0.000	0.113
Continuity Error (%)	1.207	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.119	1.186
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.067	0.674
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.001
Final Stored Volume	0.054	0.535
Continuity Error (%)	-1.811	

Highest Continuity Errors

Node J17 (-21.15%)
Node Ex-CB3 (-5.57%)
Node J26 (3.26%)
Node CB201 (-2.78%)
Node J20 (-1.78%)

Time-Step Critical Elements

Link C13_6 (64.06%)
Link C3 (13.39%)
Link OR12 (8.75%)

Highest Flow Instability Indexes

Link C7 (18)
Link C12_1 (9)
Link C10 (9)
Link C12_4 (8)
Link C5 (7)

Most Frequent Nonconverging Nodes
****
Node OF1 (3.56%)
Node OF2 (3.56%)
Node OF3 (3.56%)
Node OF4 (3.56%)
Node ExCB4 (2.01%)

****
Routing Time Step Summary
****
Minimum Time Step : 0.50 sec
Average Time Step : 1.60 sec
Maximum Time Step : 5.00 sec
% of Time in Steady State : 0.00
Average Iterations per Step : 2.38
% of Steps Not Converging : 3.56
Time Step Frequencies :
5.000 - 3.155 sec : 13.02 %
3.155 - 1.991 sec : 1.04 %
1.991 - 1.256 sec : 15.32 %
1.256 - 0.792 sec : 58.50 %
0.792 - 0.500 sec : 12.12 %

****
Subcatchment Runoff Summary
****

Subcatchment	Precip mm	Runon mm	Evap mm	Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Total Peak Runoff CMS	Runoff Coeff
A1	71.68	0.00	0.00	40.94	9.43	21.79	9.43	0.01	0.01	0.132
A2_1	71.68	0.00	0.00	45.93	0.71	25.71	26.42	0.02	0.01	0.369
A2_2	71.68	0.00	0.00	44.91	0.71	27.08	27.79	0.01	0.01	0.388
A2_3	71.68	0.00	0.00	29.19	26.24	16.51	42.75	0.06	0.04	0.596
A2_4	71.68	0.00	0.00	45.51	0.71	26.24	26.96	0.01	0.01	0.376
A2_5	71.68	0.00	0.00	44.60	0.71	27.57	28.29	0.00	0.00	0.395
A-3Ex	71.68	0.00	0.00	36.10	17.67	17.97	35.64	0.09	0.06	0.497
A-4EX	71.68	0.00	0.00	36.52	17.68	17.50	35.18	0.12	0.07	0.491
A5-1	71.68	0.00	0.00	1.49	69.58	1.10	70.68	0.08	0.06	0.986

A5-2		71.68	0.00	0.00	0.00	71.99	
0.00	71.99	0.07	0.05	1.004			
A5-3		71.68	0.00	0.00	7.56	59.82	
4.94	64.76	0.14	0.10	0.904			
A5-4		71.68	0.00	0.00	5.88	62.38	
4.03	66.41	0.07	0.05	0.927			
A5-5		71.68	0.00	0.00	11.08	53.93	
7.33	61.26	0.05	0.04	0.855			
A5-6		71.68	0.00	0.00	0.00	71.99	
0.00	71.99	0.06	0.04	1.004			
A5-7		71.68	0.00	0.00	22.08	37.05	
13.12	50.17	0.08	0.06	0.700			
A5-8		71.68	0.00	0.00	30.36	24.15	
17.77	41.93	0.04	0.03	0.585			
A5-9		71.68	0.00	0.00	15.92	46.71	
9.43	56.14	0.16	0.12	0.783			
A5-B-Roof		71.68	0.00	0.00	0.00	72.06	
0.00	72.06	0.10	0.07	1.005			

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
CB201	JUNCTION	0.27	1.24	79.54	0 02:34	1.24
CB202	JUNCTION	0.19	1.04	79.54	0 02:34	1.04
CB203	JUNCTION	0.07	0.56	79.54	0 02:34	0.56
DI01	JUNCTION	0.01	0.10	78.30	0 01:11	0.10
ExCB	JUNCTION	0.01	0.08	77.67	0 01:13	0.08
Ex-CB1	JUNCTION	0.31	1.33	79.54	0 02:34	1.33
ExCB2	JUNCTION	0.01	0.09	78.19	0 01:11	0.09
Ex-CB3	JUNCTION	0.33	1.37	79.54	0 02:34	1.37
ExCB4	JUNCTION	0.26	1.21	79.54	0 02:34	1.21
ExCB6	JUNCTION	0.00	0.03	77.73	0 01:10	0.03
ExCB8	JUNCTION	0.00	0.04	77.68	0 01:10	0.04
Ex-CBMH1	JUNCTION	0.47	1.62	79.54	0 02:34	1.62
Ex-CBMH2	JUNCTION	0.36	1.41	79.54	0 02:34	1.41
ExCBMH3	JUNCTION	0.11	0.72	79.54	0 02:34	0.72
ExMH103	JUNCTION	0.85	2.13	79.54	0 02:34	2.13
ExSTMH	JUNCTION	0.01	0.08	77.94	0 01:12	0.08
Ex-STMH1	JUNCTION	0.54	1.73	79.54	0 02:34	1.73
Ex-STMH9	JUNCTION	0.06	0.16	77.34	0 01:15	0.16
EX-STM-MH	JUNCTION	0.04	0.11	76.74	0 01:13	0.11
J1	JUNCTION	0.77	2.04	79.54	0 02:34	2.04
J17	JUNCTION	0.76	2.02	79.54	0 02:34	2.02
J2	JUNCTION	0.78	2.04	79.54	0 02:34	2.04
J20	JUNCTION	0.77	2.03	79.54	0 02:34	2.03
J25	JUNCTION	0.07	0.25	77.67	0 01:13	0.25
J26	JUNCTION	0.15	0.32	77.65	0 01:13	0.32
J6	JUNCTION	0.80	2.07	79.54	0 02:34	2.07
OGS-STMH201	JUNCTION	0.06	0.11	77.50	0 01:35	0.11
STM01	JUNCTION	0.02	0.07	78.30	0 01:24	0.07
STMMH202	JUNCTION	0.08	0.13	77.50	0 01:34	0.13

STMMH203	JUNCTION	0.02	0.07	77.88	0	01:25	0.07
OF1	OUTFALL	0.30	0.30	75.30	0	00:00	0.30
OF2	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
OF3	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
OF4	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
Roof-Storage	STORAGE	0.03	0.12	88.35	0	01:24	0.12
SU1	STORAGE	0.00	0.01	79.04	0	01:10	0.01
SU10	STORAGE	0.28	0.30	80.90	1	00:00	0.30
SU11_pr	STORAGE	0.26	0.28	80.18	1	00:00	0.28
SU12_pr	STORAGE	0.10	0.14	80.24	0	01:10	0.14
SU13_pr	STORAGE	0.25	0.30	80.25	0	01:11	0.30
SU2	STORAGE	0.23	0.25	80.10	1	00:00	0.25
SU3	STORAGE	0.24	0.26	80.12	1	00:00	0.26
SU4	STORAGE	0.28	0.30	80.17	1	00:00	0.30
SU5	STORAGE	0.26	0.29	80.22	0	01:43	0.29
SU6	STORAGE	0.00	0.03	79.28	0	01:11	0.03
SU7	STORAGE	0.00	0.02	79.43	0	01:10	0.02
SU8	STORAGE	0.00	0.01	78.83	0	01:10	0.01

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
CB201	JUNCTION	0.000	0.002	0 01:23	0	0.000777	-2.701
CB202	JUNCTION	0.000	0.045	0 01:10	0	0.0614	-0.015
CB203	JUNCTION	0.034	0.034	0 01:10	0.0436	0.0438	0.075
DI01	JUNCTION	0.000	0.011	0 01:11	0	0.0158	0.005
ExCB	JUNCTION	0.000	0.014	0 01:11	0	0.0193	-0.086
Ex-CB1	JUNCTION	0.000	0.007	0 01:15	0	0.0243	-0.049
ExCB2	JUNCTION	0.000	0.011	0 01:11	0	0.0158	0.004
Ex-CB3	JUNCTION	0.000	0.004	0 01:13	0	0.00109	-5.276
ExCB4	JUNCTION	0.000	0.085	0 01:11	0	0.1	0.702
ExCB6	JUNCTION	0.000	0.005	0 01:10	0	0.00542	0.001
ExCB8	JUNCTION	0.000	0.010	0 01:10	0	0.0116	0.001
Ex-CBMH1	JUNCTION	0.000	0.014	0 01:11	0		0.

Ex-CBMH2	JUNCTION	0.000	0.085	0	01:11	0	0.0995
-0.084							
ExCBMH3	JUNCTION	0.000	0.033	0	01:10	0	0.0448
0.282							
ExMH103	JUNCTION	0.000	0.033	0	01:10	0	0.254
0.004							
ExSTMH	JUNCTION	0.000	0.011	0	01:11	0	0.0158
0.015							
Ex-STMH1	JUNCTION	0.000	0.176	0	04:00	0	0.00439
-53.491							
Ex-STMH9	JUNCTION	0.000	0.041	0	01:14	0	0.388
-0.034							
EX-STM-MH	JUNCTION	0.041	0.065	0	01:13	0.0552	0.44
0.001							
J1	JUNCTION	0.000	0.078	0	01:11	0	0.143
-1.627							
J17	JUNCTION	0.000	0.141	0	03:59	0	0.058
-17.460							
J2	JUNCTION	0.000	0.104	0	01:11	0	0.207
-0.324							
J20	JUNCTION	0.000	0.098	0	03:33	0	0.102
-1.752							
J25	JUNCTION	0.000	0.019	0	01:11	0	0.0294
1.541							
J26	JUNCTION	0.000	0.025	0	01:13	0	0.0441
3.374							
J6	JUNCTION	0.000	0.094	0	01:11	0	0.251
0.114							
OGS-STMH201	JUNCTION	0.000	0.008	0	02:34	0	0.249
0.006							
STM01	JUNCTION	0.000	0.012	0	01:24	0	0.102
0.000							
STMMH202	JUNCTION	0.000	0.019	0	01:34	0	0.35
-0.005							
STMMH203	JUNCTION	0.000	0.012	0	01:24	0	0.102
0.003							
OF1	OUTFALL	0.000	0.065	0	01:13	0	0.44
0.000							
OF2	OUTFALL	0.010	0.010	0	01:05	0.0143	0.0143
0.000							
OF3	OUTFALL	0.074	0.074	0	01:10	0.124	0.124
0.000							
OF4	OUTFALL	0.059	0.059	0	01:10	0.0948	0.0948
0.000							
Roof-Storage	STORAGE	0.070	0.070	0	01:10	0.102	0.102
0.001							
SU1	STORAGE	0.004	0.004	0	01:10	0.00348	0.00348
-0.007							
SU10	STORAGE	0.120	0.120	0	01:10	0.164	0.164
0.012							
SU11_pr	STORAGE	0.036	0.036	0	01:10	0.0472	0.0472
0.012							
SU12_pr	STORAGE	0.045	0.045	0	01:10	0.0648	0.0648
-0.001							
SU13_pr	STORAGE	0.101	0.101	0	01:10	0.138	0.138
0.003							
SU2	STORAGE	0.058	0.058	0	01:10	0.0834	0.0834
0.012							
SU3	STORAGE	0.047	0.047	0	01:10	0.0677	0.0677
0.012							

SU4	STORAGE	0.051	0.051	0	01:10	0.0697	0.0697	0.012
SU5	STORAGE	0.062	0.062	0	01:10	0.0818	0.0818	0.009
SU6	STORAGE	0.012	0.012	0	01:10	0.0158	0.0158	0.000
SU7	STORAGE	0.010	0.010	0	01:10	0.0116	0.0116	0.000
SU8	STORAGE	0.005	0.005	0	01:10	0.00542	0.00542	0.000

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
CB201	JUNCTION	4.84	0.990	0.360
CB202	JUNCTION	3.67	0.791	0.559
CB203	JUNCTION	2.06	0.310	1.410
Ex-CB1	JUNCTION	5.42	1.081	0.389
Ex-CB3	JUNCTION	5.35	1.070	0.310
ExCB4	JUNCTION	4.80	0.961	0.409
Ex-CBMH1	JUNCTION	7.29	1.321	0.329
Ex-CBMH2	JUNCTION	5.67	1.101	0.319
ExCBMH3	JUNCTION	2.22	0.410	1.060
ExMH103	JUNCTION	2.61	0.570	0.870
Ex-STMH1	JUNCTION	1.94	0.230	0.610
J1	JUNCTION	2.49	0.537	0.646
J17	JUNCTION	2.44	0.515	0.610
J2	JUNCTION	2.50	0.540	0.764
J20	JUNCTION	2.47	0.530	0.610
J26	JUNCTION	0.10	0.023	1.774
J6	JUNCTION	2.61	0.570	0.820

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

	Average Volume	Avg Pcnt	Evap Pcnt	Exfil Pcnt	Maximum Volume	Max Pcnt	Time of Max Occurrence	Maximum Outflow

Storage Unit	1000 m³	Full	Loss	Loss	1000 m³	Full	days hr:min	CMS
Roof-Storage	0.009	9.6	0.0	0.0	0.056	58.8	0 01:24	0.012
SU1	0.000	0.0	0.0	0.0	0.000	0.0	0 01:10	0.004
SU10	0.149	0.3	0.0	0.0	0.164	0.4	1 00:00	0.000
SU11_pr	0.043	0.3	0.0	0.0	0.047	0.3	1 00:00	0.000
SU12_pr	0.004	0.0	0.0	0.0	0.007	0.1	0 01:10	0.045
SU13_pr	0.037	0.2	0.0	0.0	0.055	0.4	0 01:11	0.085
SU2	0.076	0.2	0.0	0.0	0.083	0.2	1 00:00	0.000
SU3	0.061	0.2	0.0	0.0	0.068	0.3	1 00:00	0.000
SU4	0.063	0.3	0.0	0.0	0.070	0.4	1 00:00	0.000
SU5	0.056	0.3	0.0	0.0	0.066	0.3	0 01:43	0.006
SU6	0.000	0.0	0.0	0.0	0.001	0.0	0 01:11	0.011
SU7	0.000	0.0	0.0	0.0	0.000	0.0	0 01:10	0.010
SU8	0.000	0.0	0.0	0.0	0.000	0.0	0 01:10	0.005

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
OF1	87.35	0.011	0.065	0.440
OF2	24.74	0.002	0.010	0.014
OF3	27.18	0.014	0.074	0.124
OF4	26.53	0.011	0.059	0.095
System	41.45	0.039	0.200	0.674

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth

C1	CONDUIT	0.085	0	01:11	1.72	1.64	1.00
C1_2	CONDUIT	0.012	0	01:25	1.12	0.16	0.28
C10	CONDUIT	0.098	0	03:33	0.12	0.04	1.00
C11	CONDUIT	0.004	0	01:13	0.20	0.07	1.00
C12	CONDUIT	0.045	0	01:10	1.60	0.19	1.00
C12_1	CONDUIT	0.068	0	03:33	0.13	0.02	1.00
C12_3	CONDUIT	0.078	0	01:11	0.18	0.07	1.00
C12_4	CONDUIT	0.065	0	01:11	0.28	0.01	1.00
C13	CONDUIT	0.033	0	01:10	0.88	0.44	1.00
C13_2	CONDUIT	0.019	0	01:34	0.85	0.13	0.27
C13_6	CONDUIT	0.008	0	02:34	0.36	0.04	0.32
C14	CONDUIT	0.041	0	01:15	0.96	0.34	0.41
C15	CONDUIT	0.065	0	01:13	1.26	0.29	0.68
C17	CONDUIT	0.011	0	01:11	0.81	0.34	0.45
C18	CONDUIT	0.011	0	01:11	0.91	0.34	0.41
C19	CONDUIT	0.011	0	01:12	0.77	0.15	0.26
C2	CONDUIT	0.012	0	01:24	1.17	0.15	0.27
C20	CONDUIT	0.014	0	01:12	0.52	0.14	0.55
C21	CONDUIT	0.018	0	01:14	0.26	0.50	0.92
C22	CONDUIT	0.025	0	01:13	0.67	0.29	0.68
C23	CONDUIT	0.005	0	01:10	0.68	0.05	0.58
C24	CONDUIT	0.010	0	01:10	0.56	0.11	0.61
C3	CONDUIT	0.085	0	01:11	3.50	0.10	0.61
C4	CONDUIT	0.002	0	01:23	0.06	0.01	1.00
C4_2	CONDUIT	0.033	0	01:10	1.04	0.60	1.00
C5	CONDUIT	0.016	0	03:33	0.09	0.01	1.00
C6	CONDUIT	0.085	0	01:11	1.29	1.45	1.00
C7	CONDUIT	0.176	0	04:00	0.10	0.01	1.00
C8	CONDUIT	0.007	0	01:15	0.22	0.19	1.00
C9	CONDUIT	0.014	0	01:11	0.26	0.11	1.00
OR1	CONDUIT	0.004	0	01:10	0.94	0.00	0.18
OR10	CONDUIT	0.000	0	00:00	0.00	0.00	0.50
OR11	CONDUIT	0.000	0	00:00	0.00	0.00	0.50
OR12	CONDUIT	0.045	0	01:10	5.35	0.05	0.53
OR2	CONDUIT	0.000	0	00:00	0.00	0.00	0.50
OR3	CONDUIT	0.000	0	00:00	0.00	0.00	0.50
OR4	CONDUIT	0.000	0	00:00	0.00	0.00	0.50
OR5	CONDUIT	0.006	0	01:43	0.21	0.01	0.53
OR6	CONDUIT	0.011	0	01:11	1.14	0.02	0.25
OR7	CONDUIT	0.010	0	01:10	2.74	0.01	0.12
OR8	CONDUIT	0.005	0	01:10	2.37	0.01	0.09
C13_5	ORIFICE	0.008	0	02:34			1.00
C16	ORIFICE	0.012	0	01:24			0.58

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl

C1	1.00	0.05	0.00	0.00	0.32	0.00	0.00	0.64	0.05
0.00									
C1_2	1.00	0.01	0.00	0.00	0.06	0.02	0.00	0.91	0.07
0.00									
C10	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.01
0.00									
C11	1.00	0.05	0.00	0.00	0.34	0.00	0.00	0.61	0.63
0.00									
C12	1.00	0.03	0.72	0.00	0.23	0.02	0.00	0.00	0.75
0.00									
C12_1	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.41
0.00									
C12_3	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00
0.00									
C12_4	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.42
0.00									
C13	1.00	0.01	0.00	0.00	0.17	0.00	0.00	0.82	0.03
0.00									
C13_2	1.00	0.01	0.00	0.00	0.01	0.00	0.00	0.98	0.00
0.00									
C13_6	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00
0.00									
C14	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00
0.00									
C15	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.99
0.00									
C17	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00
0.00									
C18	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00
0.00									
C19	1.00	0.02	0.00	0.00	0.95	0.03	0.00	0.00	0.87
0.00									
C2	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00
0.00									
C20	1.00	0.02	0.83	0.00	0.16	0.00	0.00	0.00	0.98
0.00									
C21	1.00	0.01	0.00	0.00	0.98	0.00	0.00	0.00	0.03
0.00									
C22	1.00	0.01	0.03	0.00	0.00	0.00	0.95	0.00	0.00
0.00									
C23	1.00	0.01	0.86	0.00	0.12	0.01	0.00	0.00	0.98
0.00									
C24	1.00	0.01	0.85	0.00	0.13	0.01	0.00	0.00	0.98
0.00									
C3	1.00	0.05	0.01	0.00	0.78	0.16	0.00	0.00	0.95
0.00									
C4	1.00	0.03	0.68	0.00	0.28	0.00	0.00	0.00	0.67
0.00									
C4_2	1.00	0.01	0.00	0.00	0.12	0.00	0.00	0.87	0.02
0.00									
C5	1.00	0.02	0.01	0.00	0.56	0.00	0.00	0.41	0.00
0.00									
C6	1.00	0.05	0.00	0.00	0.35	0.00	0.00	0.60	0.02
0.00									
C7	1.00	0.04	0.52	0.00	0.44	0.00	0.00	0.00	0.51
0.00									
C8	1.00	0.05	0.00	0.00	0.39	0.00	0.00	0.56	0.09
0.00									

C9	1.00	0.04	0.01	0.00	0.75	0.21	0.00	0.00	0.13
0.00									
OR1	1.00	0.83	0.04	0.00	0.11	0.02	0.00	0.00	0.98
0.00									
OR10	1.00	0.01	0.99	0.00	0.00	0.00	0.00	0.00	0.00
0.00									
OR11	1.00	0.72	0.28	0.00	0.00	0.00	0.00	0.00	0.00
0.00									
OR12	1.00	0.03	0.00	0.00	0.94	0.03	0.00	0.00	0.97
0.00									
OR2	1.00	0.05	0.95	0.00	0.00	0.00	0.00	0.00	0.00
0.00									
OR3	1.00	0.05	0.95	0.00	0.00	0.00	0.00	0.00	0.00
0.00									
OR4	1.00	0.05	0.95	0.00	0.00	0.00	0.00	0.00	0.00
0.00									
OR5	1.00	0.05	0.01	0.00	0.84	0.10	0.00	0.00	0.94
0.00									
OR6	1.00	0.01	0.86	0.00	0.01	0.12	0.00	0.00	0.99
0.00									
OR7	1.00	0.01	0.00	0.00	0.87	0.12	0.00	0.00	0.99
0.00									
OR8	1.00	0.01	0.00	0.00	0.87	0.12	0.00	0.00	0.98
0.00									

****
Conduit Surcharge Summary
****

Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C1	4.79	4.80	5.67	0.12	0.08
C10	2.43	2.43	2.47	0.01	0.10
C11	5.35	5.35	5.78	0.01	0.01
C12	3.67	3.67	22.90	0.01	0.01
C12_1	2.47	2.47	2.49	0.01	0.26
C12_3	2.49	2.49	2.50	0.01	0.47
C12_4	2.50	2.50	2.61	0.01	0.01
C13	2.23	2.23	2.61	0.01	0.01
C15	0.01	0.01	23.83	0.01	0.01
C21	0.01	0.01	0.10	0.01	0.01
C22	0.01	0.01	0.10	0.01	0.01
C23	0.01	0.01	0.20	0.01	0.01
C24	0.01	0.01	0.67	0.01	0.01
C3	0.01	0.01	4.80	0.01	0.01
C4	4.84	4.84	22.75	0.01	0.01
C4_2	2.06	2.06	2.22	0.01	0.01
C5	2.61	2.61	2.69	0.01	0.01
C6	5.66	5.75	6.09	0.10	0.01
C7	1.94	1.94	2.43	0.01	0.01
C8	5.42	5.42	7.45	0.01	0.01
C9	7.29	7.29	10.50	0.01	0.01
OR12	0.01	0.01	3.67	0.01	0.01
OR5	0.01	0.01	5.36	0.01	0.01

```
Analysis begun on:  Mon Jun 24 16:09:19 2024
Analysis ended on:  Mon Jun 24 16:09:20 2024
Total elapsed time: 00:00:01
```

APPENDIX

F

Roof Drain Specifications

Engineering Specification

Job Name _____ Contractor _____

Job Location _____ Approval _____

Engineer _____ Contractor's P.O. No. _____

Approval _____ Representative _____

Tag _____

RD-300

High Volume Roof Drain

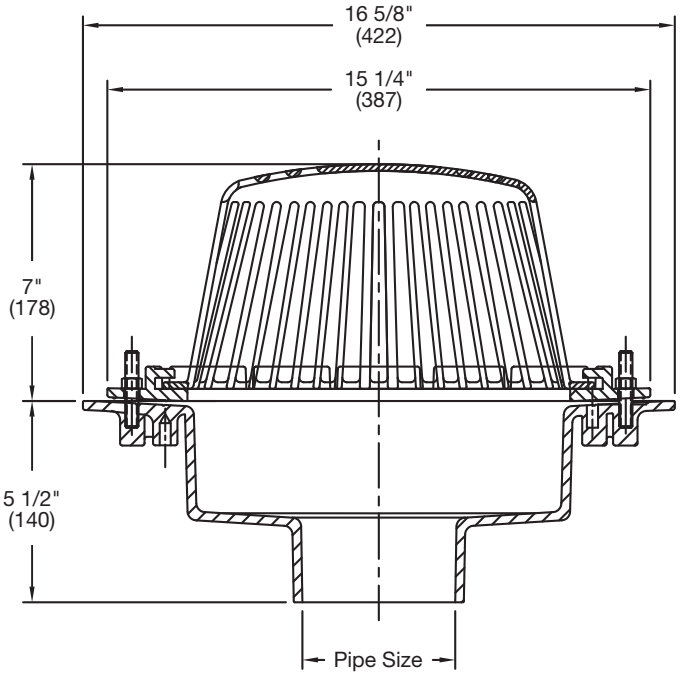
Specification

Watts RD-300 epoxy coated cast iron roof drain with flashing clamp with integral gravel stop, self-locking polyethylene dome (standard), and no hub (standard) outlet.

Pipe Sizing		
Suffix	Description	
2	2"(51) Pipe Size (NH Only)	☐
3	3"(76) Pipe Size	☐
4	4"(102) Pipe Size	☐
5	5"(127) Pipe Size (NH Only)	☐
6	6"(152) Pipe Size	☐
8	8"(203) Pipe Size	☐
10	10"(254) Pipe Size (NH Only)	☐

Outlet Type		
Suffix	Description	
NH	No Hub (MJ)	☐
P	Push On	☐
X	Inside Caulk	☐

Options		
Suffix	Description	
-13	Galvanized Body & Clamp	☐
-85	IRMA Perf. SS Extension	☐
-AC	Compression Seal Extension	☐
-AE	Threaded Extension	☐
-B	Sump Receiver	☐
-D	Underdeck Clamp	☐
-F	Deck Flange/Adj. Extension	☐
-GSS	Stainless Steel Ballast Guard	☐
-K	Ductile Iron Dome	☐
-K13	Galvanized Dome	☐
-K40	Ductile Iron Low Dome (4" High)	☐
-K80	Aluminum Dome	☐
-K81	Rough Bronze Dome	☐
-K83	SS Mesh Covered Dome	☐
-L	Vandal Proof Dome	☐
-R	2" External Water Dam	☐
-W	Adj. Internal Water Dam	☐



Deck Opening 14 1/2"(368) with Sump Receiver 18"(457)

Free Area
Sq. In.
137

NOTICE

The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

USA: T: (800) 338-2581 • F: (828) 248-3929 • Watts.com
Canada: T: (888) 208-8927 • F: (905) 481-2316 • Watts.ca
Latin America: T: (52) 55-4122-0138 • Watts.com

WATTS®	Adjustable Accutrol Weir Tag: _____	Adjustable Flow Control for Roof Drains

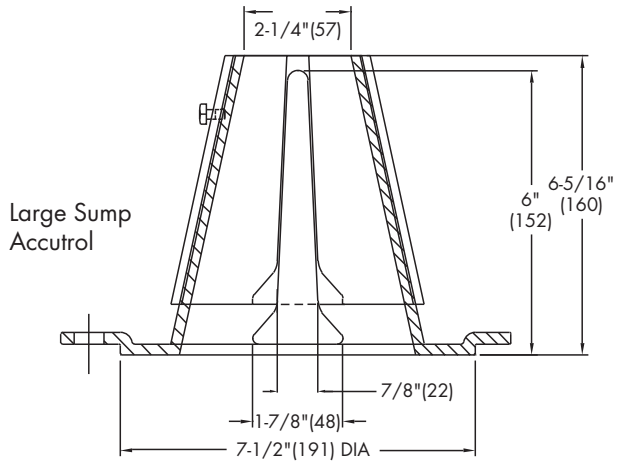
ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)

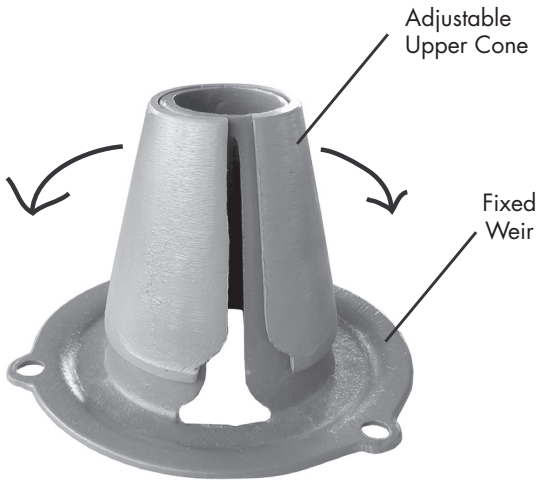
For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the flow rate for depths over 2" of head, set the slot in the adjustable upper cone according to the flow rate required. Refer to Table 1 below.
Note: Flow rates are directly proportional to the amount of weir opening that is exposed.

EXAMPLE:

For example, if the adjustable upper cone is set to cover 1/2 of the weir opening, flow rates above 2"of head will be restricted to 2-1/2 gpm per inch of head.

Therefore, at 3"of head, the flow rate through the Accutrol Weir that has 1/2 the slot exposed will be:
[5 gpm (per inch of head) x 2 inches of head] + 2-1/2 gpm (for the third inch of head) = 12-1/2 gpm.





1/2 Weir Opening Exposed Shown Above

TABLE 1. Adjustable Accutrol Flow Rate Settings

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

Job Name _____ Contractor _____

Job Location _____ Contractor's P.O. No. _____

Engineer _____ Representative _____

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Canada: Tel: (905) 332-4090 • Fax: (905) 332-7068 • Watts.ca
Latin America: Tel: (52) 81-1001-8600 • Fax: (52) 81-8000-7091 • Watts.com

WATTS®
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APPENDIX

G

OGS Sizing Report

Stormceptor®

Rinker MATERIALS™

Stormceptor® EF Sizing Report

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

06/21/2024

Province:	Ontario
City:	Ottawa
Nearest Rainfall Station:	OTTAWA CDA RCS
Climate Station Id:	6105978
Years of Rainfall Data:	20

Site Name:	St Patrick's Home

Drainage Area (ha):	1.255
% Imperviousness:	74.40

Runoff Coefficient 'c': 0.74

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	30.23
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	Yes
Upstream Orifice Control Flow Rate to Stormceptor (L/s):	8.00
Peak Conveyance (maximum) Flow Rate (L/s):	8.00
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	1029
Estimated Average Annual Sediment Volume (L/yr):	837

Project Name:	St. Patrick's Home Ottawa
Project Number:	221-08396-00
Designer Name:	Ding Bang Yang
Designer Company:	WSP Canada Inc
Designer Email:	winston.yang@wsp.com
Designer Phone:	613-690-0538
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	81
EFO6	92
EFO8	98
EFO10	100
EFO12	100

Recommended Stormceptor EFO Model: EFO4

Estimated Net Annual Sediment (TSS) Load Reduction (%): 81

Water Quality Runoff Volume Capture (%): > 90

imbrium

THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterwavs.

PARTICLE SIZE DISTRIBUTION (PSD)

►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

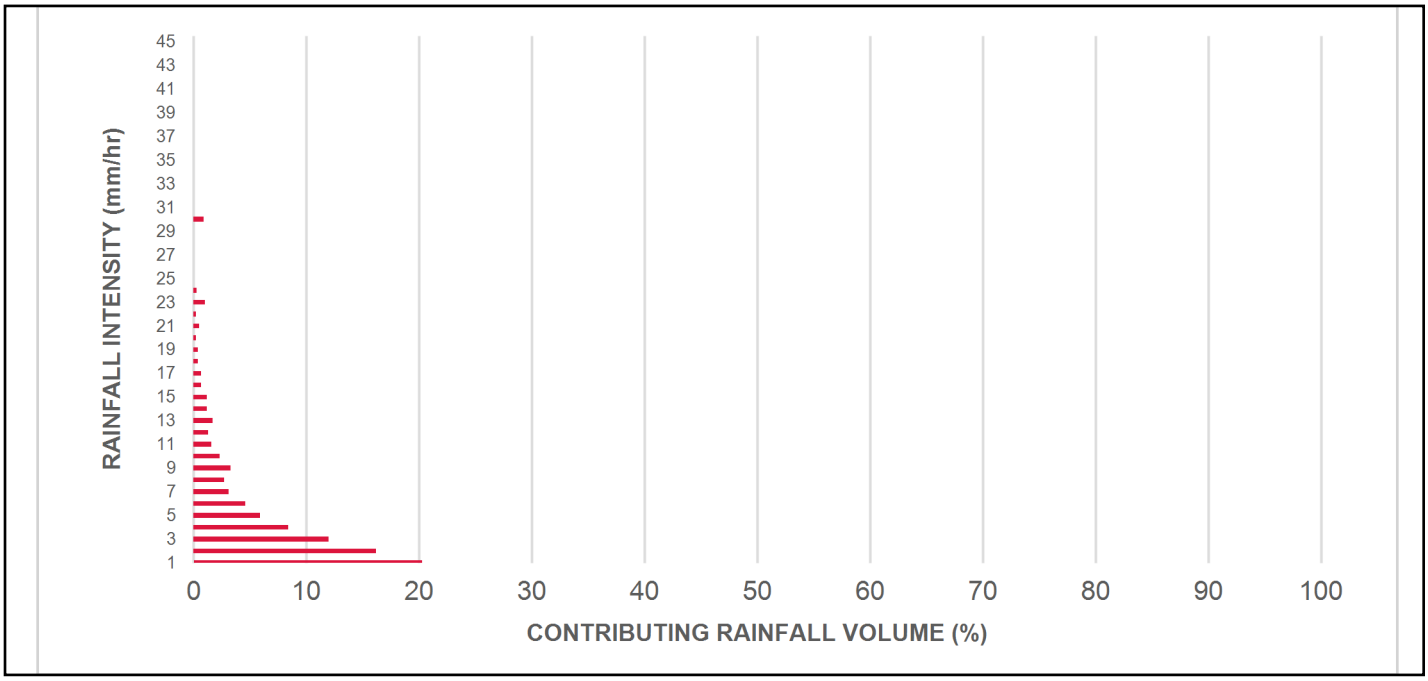
Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Upstream Flow Controlled Results

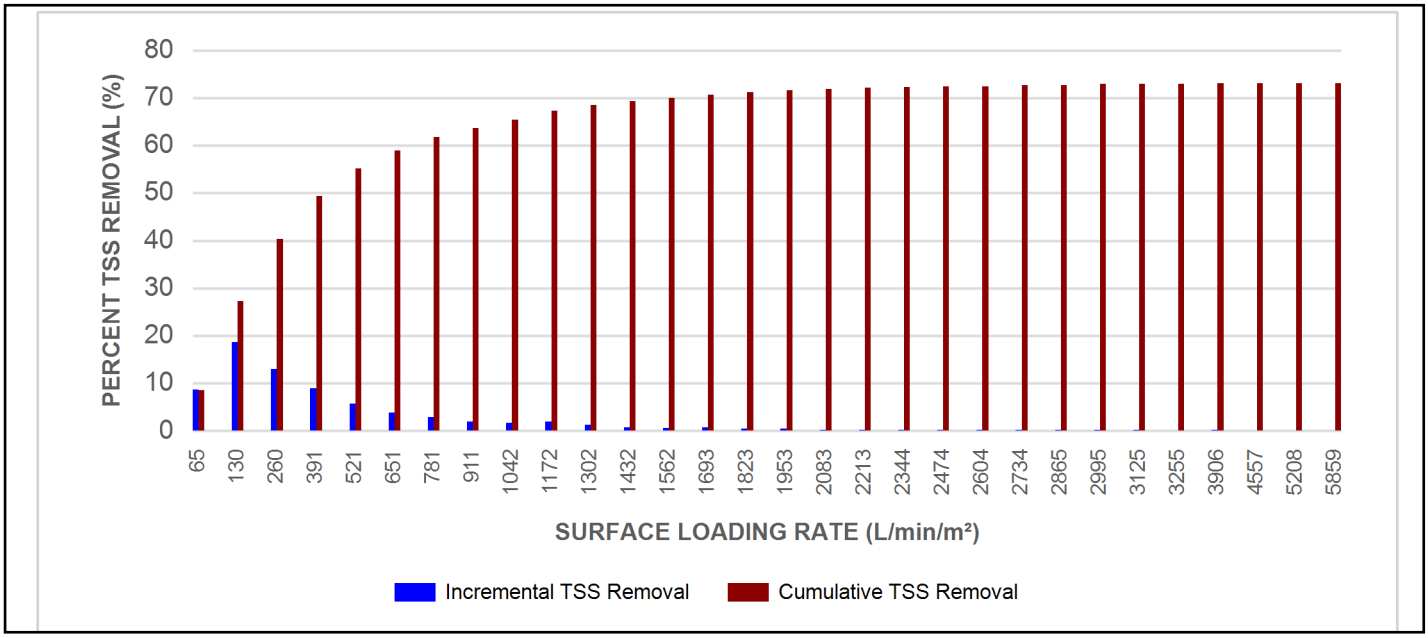
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.6	8.6	1.30	78.0	65.0	100	8.6	8.6
1.00	20.3	29.0	2.60	156.0	130.0	92	18.7	27.3
2.00	16.2	45.2	5.21	312.0	260.0	80	13.0	40.4
3.00	54.8	100.0	7.81	469.0	391.0	74	40.7	81.1
4.00	0.0	100.0	8.00	480.0	400.0	74	0.0	81.1
5.00	0.0	100.0	8.00	480.0	400.0	74	0.0	81.1
6.00	0.0	100.0	8.00	480.0	400.0	74	0.0	81.1
7.00	0.0	100.0	8.00	480.0	400.0	74	0.0	81.1
8.00	0.0	100.0	8.00	480.0	400.0	74	0.0	81.1
9.00	0.0	100.0	8.00	480.0	400.0	74	0.0	81.1
10.00	0.0	100.0	8.00	480.0	400.0	74	0.0	81.1
11.00	0.0	100.0	8.00	480.0	400.0	74	0.0	81.1
12.00	0.0	100.0	8.00	480.0	400.0	74	0.0	81.1
13.00	0.0	100.0	8.00	480.0	400.0	74	0.0	81.1
14.00	0.0	100.0	8.00	480.0	400.0	74	0.0	81.1
15.00	0.0	100.0	8.00	480.0	400.0	74	0.0	81.1
16.00	0.0	100.0	8.00	480.0	400.0	74	0.0	81.1
17.00	0.0	100.0	8.00	480.0	400.0	74	0.0	81.1
18.00	0.0	100.0	8.00	480.0	400.0	74	0.0	81.1
19.00	0.0	100.0	8.00	480.0	400.0	74	0.0	81.1
20.00	0.0	100.0	8.00	480.0	400.0	74	0.0	81.1
21.00	0.0	100.0	8.00	480.0	400.0	74	0.0	81.1
22.00	0.0	100.0	8.00	480.0	400.0	74	0.0	81.1
23.00	0.0	100.0	8.00	480.0	400.0	74	0.0	81.1
24.00	0.0	100.0	8.00	480.0	400.0	74	0.0	81.1
25.00	0.0	100.0	8.00	480.0	400.0	74	0.0	81.1
30.00	0.0	100.0	8.00	480.0	400.0	74	0.0	81.1
35.00	0.0	100.0	8.00	480.0	400.0	74	0.0	81.1
40.00	0.0	100.0	8.00	480.0	400.0	74	0.0	81.1
45.00	0.0	100.0	8.00	480.0	400.0	74	0.0	81.1
Estimated Net Annual Sediment (TSS) Load Reduction =								**81 %**

Climate Station ID: 6105978 *Years of Rainfall Data*: 20

RAINFALL DATA FROM OTTAWA CDA RCS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

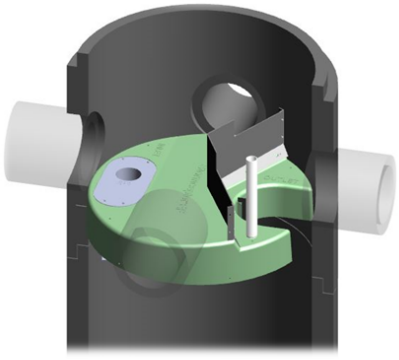
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

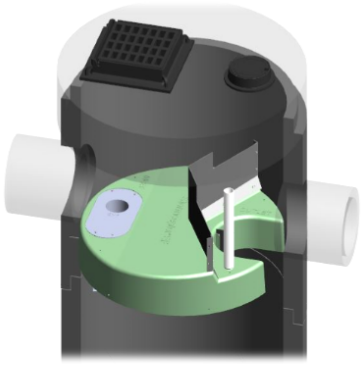
DESIGN FLEXIBILITY

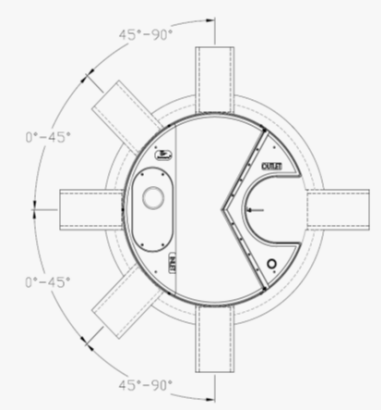
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.
0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.
45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity
** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit** S**eparators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall

remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

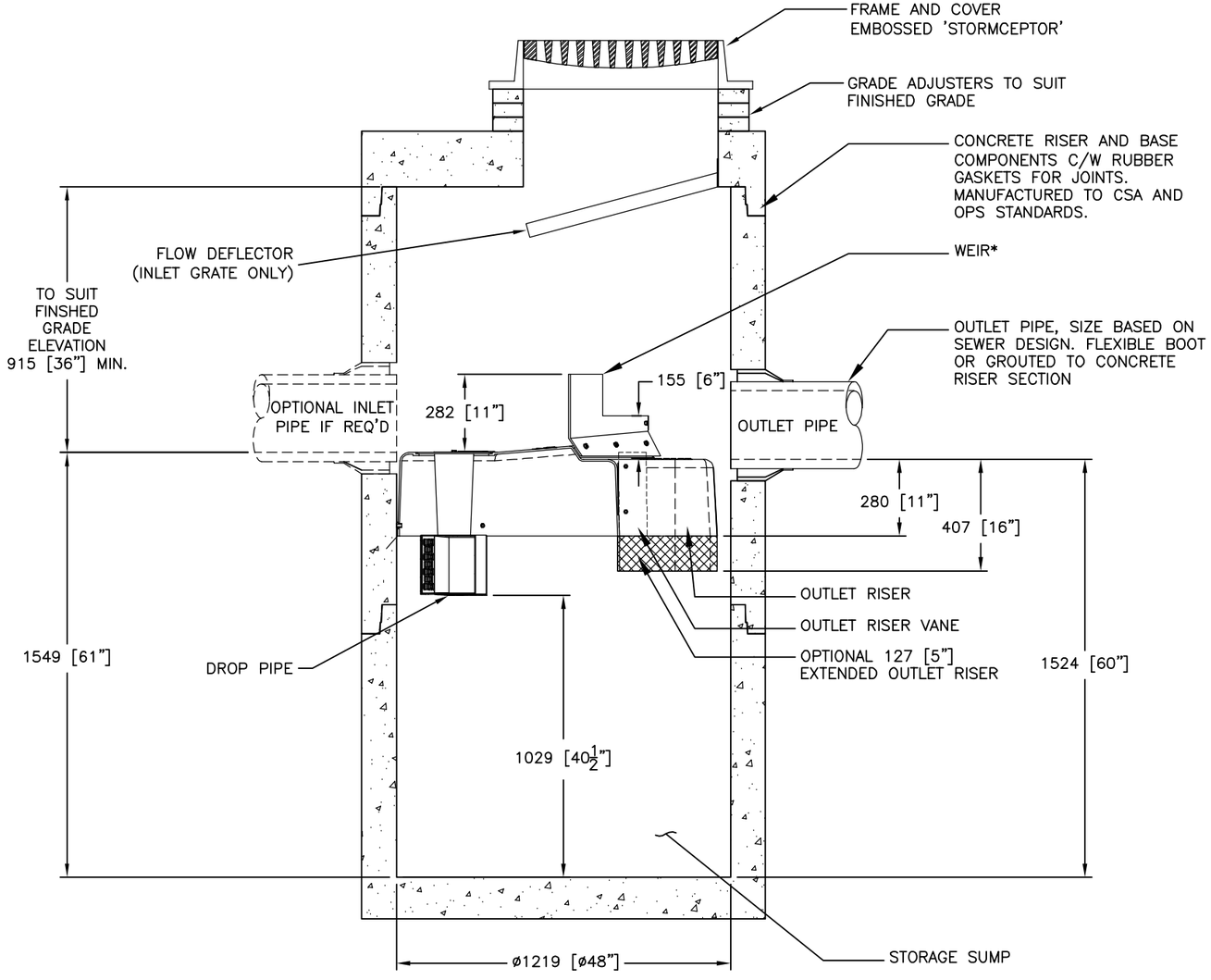
3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

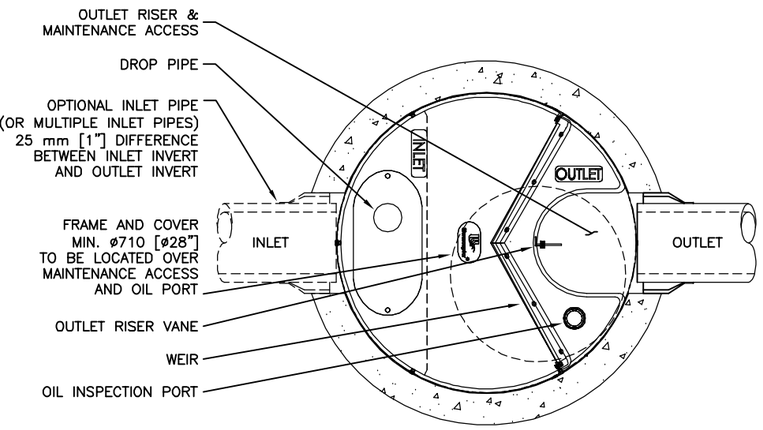
The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to

assess whether light liquids captured after a spill are effectively retained at high flow rates.

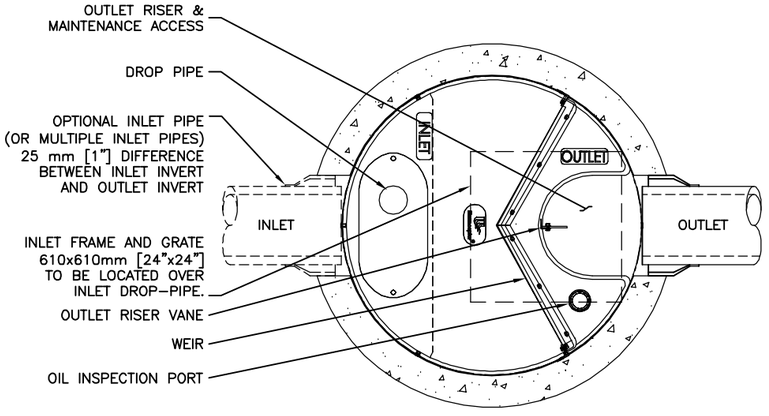
3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.



SECTION VIEW



PLAN VIEW (STANDARD)



PLAN VIEW (INLET TOP)

FOR SITE SPECIFIC DRAWINGS PLEASE CONTACT YOUR LOCAL STORMCEPTOR REPRESENTATIVE. SITE SPECIFIC DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME. SOME FIELD REVISIONS TO THE SYSTEM LOCATION OR CONNECTION PIPING MAY BE NECESSARY BASED ON AVAILABLE SPACE OR SITE CONFIGURATION REVISIONS. ELEVATIONS SHOULD BE MAINTAINED EXCEPT WHERE NOTED ON BYPASS STRUCTURE (IF REQUIRED).

GENERAL NOTES:

* MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m^2 (27.9 gpm/ft^2) FOR STORMCEPTOR EF4 AND 535 L/min/m^2 (13.1 gpm/ft^2) FOR STORMCEPTOR EFO4 (OIL CAPTURE CONFIGURATION). WEIR HEIGHT IS 150 mm (6 INCH) FOR EF04.

1. ALL DIMENSIONS INDICATED ARE IN MILLIMETERS (INCHES) UNLESS OTHERWISE SPECIFIED.
2. STORMCEPTOR STRUCTURE INLET AND OUTLET PIPE SIZE AND ORIENTATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.
3. UNLESS OTHERWISE NOTED, BYPASS INFRASTRUCTURE, SUCH AS ALL UPSTREAM DIVERSION STRUCTURES, CONNECTING STRUCTURES, OR PIPE CONDUITS CONNECTING TO COMPLETE THE STORMCEPTOR SYSTEM SHALL BE PROVIDED AND ADDRESSED SEPARATELY.
4. DRAWING FOR INFORMATION PURPOSES ONLY. REFER TO ENGINEER'S SITE/UTILITY PLAN FOR STRUCTURE ORIENTATION.
5. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT THE DEVICE FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. DEVICE ACTIVATION, BY CONTRACTOR, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE STORMCEPTOR UNIT IS CLEAN AND FREE OF DEBRIS.

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

STORMCEPTOR MODEL	EFO4
STRUCTURE ID	*
HYDROCARBON STORAGE REQ'D (L)	*
WATER QUALITY FLOW RATE (L/s)	*
PEAK FLOW RATE (L/s)	*
RETURN PERIOD OF PEAK FLOW (yrs)	*
DRAINAGE AREA (HA)	*
DRAINAGE AREA IMPERVIOUSNESS (%)	*

PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*

* PER ENGINEER OF RECORD

MARK	DATE	REVISION DESCRIPTION	BY
1	6/8/18	UPDATES	JSK
0	5/26/17	INITIAL RELEASE	JSK

Stormceptor® EF

SCALE = NTS

imbrium®
407 FAIRVIEW DRIVE, WHITBY, ON, L1N 9A9
TF 800-565-4501 CA 416-800-9000 INTL +1-416-800-9000

DATE: 10/13/2017

DESIGNED:	DRAWN:
JSK	JSK
CHECKED:	APPROVED:
BSF	SP
PROJECT No.:	SEQUENCE No.:
EFO4	*

SHEET: 1 OF 1