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# U-Haul of Ottawa 30 Frank Nighbor Place Development Servicing Study and Stormwater Management Report

**PROPOSED U-HAUL DEVELOPMENT  
30 FRANK NIGHBOR PLACE**

**DEVELOPMENT SERVICING STUDY AND  
STORMWATER MANAGEMENT REPORT**

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Novatech File No. 121326

December 5, 2022

U-HAUL Canada  
3636 Innes Road  
Ottawa, Ontario  
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**Attention: Mr. David Pollock**

**Re: Development Servicing Study and Stormwater Management Report  
Proposed U-Haul Development  
30 Frank Nighbor Place, Ottawa, ON  
Novatech File No.: 121326**

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Enclosed is a copy of the revised 'Development Servicing Study and Stormwater Management Report' for the proposed development of the 30 Frank Nighbor property in the City of Ottawa. This report addresses the approach to site servicing and stormwater management, and it is being submitted in support of a Site Plan Control application.

Please contact the undersigned, should you have any questions or require additional information.

Yours truly,

**NOVATECH**



François Thauvette, P. Eng.  
Senior Project Manager

cc: Shika Rathnasooriya (City of Ottawa)  
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## 1.0 INTRODUCTION

Novatech has been retained by U-HAUL Canada to complete the site servicing, grading, and stormwater management design for the proposed development. This report is being submitted in support of a Site Plan Control application.

### 1.1 Location and Site Description

The vacant site is located at 30 Frank Nighbor Place in the west end of the City of Ottawa. The site is located immediately south of Highway 417, west of the Camp Mart site and east of the Carp River. The Subject Site is identified on plans 4M-1012 and 4R-30745 and is located within the City of Ottawa.

**Figure 1: Aerial view of the site**



### 1.2 Pre-Consultation Information

A pre-consultation meeting was held with the City of Ottawa on January 14, 2022, at which time the client was advised of the general submission requirements. The Mississippi Valley Conservation Authority (MVCA) was also consulted regarding the proposed development. Based on a review of **O. Reg. 525/98: Approval Exemptions**, a Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA) will be required for the proposed development. Refer to **Appendix A** for a summary of the correspondence related to the proposed development.

### 1.3 Proposed Development

The intent is only to develop a portion of the larger (3.82 ha) site. The proposed U-HAUL development (2.16 ha) will consist of two (2) large buildings and two (2) smaller “mini storage” buildings along with associated surface parking and loading areas as well as the extension of the private access road off Frank Nighbor Place. An on-site stormwater management facility (i.e., a dry pond) and landscaped areas around the perimeter of the site are also included in the proposed development. The site will be serviced by the municipal sanitary sewer, storm sewer and watermain located within an existing easement south of the portion of the site to be developed.

### 1.4 Reference Material

- <sup>1</sup> The ‘Terry Fox Business Park – Stormwater Design Plan’ (Ref. No. 91005-3), prepared by Novatech Engineering Consultants Ltd., on August 9, 1994.
- <sup>2</sup> The Proposed Camp Mart Development and Private Access Road 20 & 30 Frank Nighbor Place – Development Servicing Study & Stormwater Management Report (Ref. R-2018-011) dated August 19, 2018.
- <sup>3</sup> The Geotechnical Investigation Report (Ref. No. PG6153-1 Revision 1), prepared by Paterson Group on April 28, 2022.
- <sup>4</sup> Ottawa Sewer Design Guidelines (October 2012) and subsequent Technical Bulletins.
- <sup>5</sup> Ottawa Design Guidelines – Water Distribution (2010) and subsequent Technical Bulletins.
- <sup>6</sup> MOE Stormwater Management Planning and Design Manual Guidelines (March 2003).
- <sup>7</sup> Ontario Provincial Standards

## 2.0 SITE SERVICING

The objective of the site servicing design is to provide proper sewage outlets, a suitable domestic water supply and to ensure that appropriate fire protection is provided for the proposed development. The servicing criteria, the expected sewage flows, and the water demands are to conform to the requirements of the City of Ottawa municipal design guidelines for sewer and water distribution systems. Refer to the subsequent sections of the report for further details.

The City of Ottawa Servicing Study Guidelines for Development Applications requires that a Development Servicing Study Checklist is included to confirm that each applicable item is deemed complete and ready for review by City of Ottawa Infrastructure Approvals. Enclosed in **Appendix B** of the report is a completed checklist.

### 2.1 Sanitary Sewage

The subject site is currently undeveloped, other than a portion of the private access road off Frank Nighbor Place that was constructed in 2018/2019 as described in the previous DSS&SWM Report<sup>2</sup>. Under post-development conditions, the proposed site will be serviced by a new 200mm dia. sanitary sewer connected to the municipal 450mm dia. sanitary sewer in the existing easement to the south. Design Criteria from the City of Ottawa Sewer Design Guidelines and section 8 of the Ontario Building Code (OBC) were used to calculate the theoretical sewage flows for the proposed development. The sanitary sewage calculations for the proposed development are based on the following criteria:

- Industrial sanitary sewage flow (for Warehouses)
  - 950 L/day per water closet (OBC Table 8.2.1.3.B)
  - 150 L/day per loading bay (OBC Table 8.2.1.3.B)
- Commercial sanitary sewage flow (Office Space)

- 75 L/day per employee (Ottawa Sewer Design Guidelines – Appendix 4-A)
- Light Industrial/Commercial Office Space Peaking Factor = 1.5
- Infiltration Allowance: 0.33 L/s/ha

**Table 1.0** identifies the theoretical sanitary flows for the proposed development based on the above design criteria. Provided in **Appendix C** are detailed calculations.

**Table 1.0: Theoretical Post-Development Sanitary Flows**

Type of Use	Unit Count	Average Flow (L/s)	Peaking Factor	Peak Flow (L/s) *
<b>Building A</b>				
No. Loading Docks/Washrooms	4/2	0.03	1.5	0.04
Number of Employees (Max)	6	<0.01		0.01
<b>Sub-Total A</b>	-	0.03	-	<b>0.05</b>
<b>Building B - Mini Storage</b>	-	-	-	-
<b>Building C - Mini Storage</b>	-	-	-	-
<b>Building D</b>				
No. Loading Docks/Washrooms	2/0	<0.01	1.5	0.01
Number of Employees	-	-		-
<b>Sub-Total D</b>	-	<0.01	-	<b>0.01</b>
Infiltration (ha)	2.18	0.72	-	0.72
<b>TOTAL</b>	-	<b>0.75</b>	-	<b>0.78</b>

\*Represents rounded values

As indicated in the table above, the calculated post-development average sewage flow is less than the allowable sewage flow calculated based on a rate of 28,000 L/gross ha/day, when excluding the infiltration allowance. A 200mm dia. sanitary sewer at a minimum slope of 1.0% has a full flow conveyance capacity of 34 L/s and will have enough capacity to convey the theoretical sanitary flows for the proposed development.

## 2.2 Water for Domestic Use and Fire Protection

The subject site is located within the City of Ottawa 3W watermain pressure zone. The proposed development will be serviced by a new 200mm dia. private watermain fed off the existing 300mm dia. watermain in the easement to the south. The two larger buildings will be fully sprinklered and equipped with fire department (siamese) connections located within 45m of one of the new on-site fire hydrants. The smaller 'mini storage' buildings will be non-sprinklered and protected by the on-site hydrants. The proposed water service to Building A will be 150mm dia. in size, while the service to Building D will be a 200mm dia. pipe due to the sprinkler flow requirements. The building services have been sized to provide both the required domestic water demand and fire flow. Shut-off valves will be provided on the proposed watermain at the property line as well as on the individual building services. The water meters will be within the respective mechanical rooms, while the remote meters will be located on the exterior face of the larger buildings.

To determine if the existing 300mm dia. municipal watermain has adequate capacity to accommodate the proposed development a hydraulic analysis was completed based on boundary conditions provided by the City of Ottawa.



## 2.2.1 Water Demands and Watermain Analysis

The theoretical water demands for the proposed development were based on the design criteria from the City of Ottawa Water Distribution Guidelines and section 8 of the Ontario Building Code (OBC). The Fire Underwriters Survey (FUS) method was used to calculate the fire flows based on general assumptions and information provided by the architect. The water demands are calculated based on the following criteria:

- Industrial sanitary sewage flow (for Warehouses)
  - 950 L/day per water closet (OBC Table 8.2.1.3.B)
  - 150 L/day per loading bay (OBC Table 8.2.1.3.B)
- Commercial water demands (Office Space)
  - 75 L/day per employee (Ottawa Sewer Design Guidelines – Appendix 4-A)
- Maximum Day Demand Peaking Factor = 1.5 x Avg. Day Demand (City Water Table 4.2)
- Peak Hour Demand Peaking Factor = 1.8 x Max. Day Demand (City Water Table 4.2)

**Table 2.0** identifies the theoretical domestic water demands and fire flow requirements for the development based on the above design criteria.

**Table 2.0: Theoretical Water Demand for Proposed Development**

Type of Use	Unit Count	Avg. Day Demand (L/s)	Max. Day Demand (L/s)	Peak Hour (L/s)	FUS Fire Flow (L/s)
<b>Building A</b>					
No. Loading Docks/Washrooms	4/2	0.03	0.04	0.08	<b>250</b>
Number of Employees (Max)	6	<0.01	<0.01	0.01	
<b>Sub-Total A</b>	-	<b>0.03</b>	<b>0.05</b>	<b>0.09</b>	
<b>Building B - Mini Storage</b>	-	-	-	-	<b>67</b>
<b>Building C - Mini Storage</b>	-	-	-	-	<b>67</b>
<b>Building D</b>					
No. Loading Docks/Washrooms	2/0	<0.01	<0.01	0.01	<b>167</b>
Number of Employees	-	-	-	-	
<b>Sub-Total D</b>	-	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>0.01</b>	
<b>TOTAL</b>	-	0.04	0.06	<b>0.10</b>	<b>250 (Max)</b>

\*Represents rounded values

The fire flow requirements were calculated using the Fire Underwriters Survey (FUS). Based on information provided by the architect, the fire flow requirements for the buildings are expected to be in the order of 67-250 L/s, including both sprinkler system and hose allowances in accordance with the OBC and NFPA 13. The sprinkler system will be designed by the fire protection (sprinkler) contractor as this process involves detailed hydraulic calculations based on building layout, pipe runs, head losses, fire pump requirements, etc. Booster pumps should not be required, however, pressure reducing valves will be required as system pressures will exceed 80 psi. Refer to **Appendix D** for detailed calculations and correspondence from the City of Ottawa.

As discussed with the City of Ottawa, a multi-hydrant approach to firefighting is anticipated to be required to achieve the maximum fire flow requirements on-site. A total of three (3) new private fire hydrants are being proposed on-site. Based on the City of Ottawa Technical Bulletin ISTB-2018-02, Class AA (blue bonnet) hydrants within 75m have a maximum capacity 95 L/s while hydrants between 75m and 150m have a maximum capacity 63 L/s (at a pressure of 20 PSI). The combined maximum flow from the private fire hydrants will exceed the Max Day + Fire Flow requirement of the proposed development. This multi-hydrant approach to firefighting is in accordance with the City of Ottawa Technical Bulletin ISTB-2018-02. **Table 2.1** summarizes the total theoretical combined fire flow available from the proposed private fire hydrants and compares it to the fire flow demands based on FUS calculations.

**Table 2.1: Fire Protection Summary Table**

Building ID	Fire Flow Demand (L/s)	Fire Hydrant(s) within 75m (~ 95 L/s each)	Fire Hydrant(s) within 150m (~ 63 L/s each)	Theoretical Combined Available Fire Flow (L/s)
Building A	250	3	-	285
Building B	67	3	-	285
Building C	67	3	-	285
Building D	167	2	1	253

Preliminary domestic water demands, and fire flow requirements were provided to the City of Ottawa. **Table 2.2** summarizes preliminary hydraulic analysis results based on municipal watermain boundary conditions provided by the City of Ottawa.

**Table 2.2: Hydraulic Boundary Conditions Provided by the City**

Municipal Watermain Boundary Condition	Boundary Condition	Normal Operating Pressure Range (psi)	Anticipated WM Pressure (psi)*
Minimum HGL (Peak Hour Demand)	156.6 m	40 psi (min.)	~ 87.6 psi
Maximum HGL (Max Day Demand)	160.7 m	50 - 70 psi	~ 93.5 psi
HGL Max Day + Fire Flow (250 L/s)	149.0 m	20 psi (min.)	~ 76.8 psi

\*Based on an approximate ground elevation of 95.0m on-site. Design pressure = (HGL – ground elevation) x 1.42197 PSI/m.

The following design criteria were taken from Section 4.2.2 – ‘Watermain Pressure and Demand Objectives’ of the City of Ottawa Design Guidelines for Water Distribution:

- Normal operating pressures are to range between 345 kPa (50 psi) and 483 kPa (70 psi) under Max Day demands
- Minimum system pressures are to be 276 kPa (40 psi) under Peak Hour demands
- Minimum system pressures are to be 140 kPa (20 psi) under Max Day + Fire Flow demands

The hydraulic model EPANET was used to analyzing the performance of the proposed watermain configuration for three (3) theoretical conditions:

- Peak Hour Demand
- Maximum HGL
- Maximum Day + Fire Flow Demand (250 L/s)

A schematic representation of the hydraulic network depicts the node and pipe numbers used in the model. The model is based on hydraulic boundary conditions provided by the City of Ottawa. **Tables 2.3, 2.4, and 2.5** summarize the hydraulic model results. The values indicated in **Table 2.5** demonstrate that individual fire flow conditions for all buildings (A, B, C and D) can be met. The watermain network pressures will be higher than what is indicated in **Table 2.5**, should the demand be less (i.e., in the case of only one Building being on fire). The analysis does not account for simultaneous fire demands for all buildings. Refer to **Appendix D** for City of Ottawa boundary conditions, the hydraulic modeling schematic and modeling results.

**Table 2.3: Peak Hour Demand**

Operating Condition	Minimum System Pressure	Maximum System Pressure
Peak Hour demands of 0.09 L/s at J5 (Bldg A) and 0.01 L/s at J8 (Bldg D)	Minimum system pressure of 594.5 kPa (86.2 psi) is available at Node J3 (north Hydrant)	Maximum system pressure 628.3 kPa (91.1 psi) is available at Node J13 (on-site watermain near connection to municipal main)

**Table 2.4: Maximum HGL**

Operating Condition	Minimum System Pressure	Maximum System Pressure
Max Day demands of 0.05 L/s at J5 (Bldg A) and 0.01 L/s at J8 (Bldg D)	Minimum system pressure of 634.7 kPa (92.0 psi) is available at Node J3 (north Hydrant)	Maximum system pressure 668.5 kPa (96.9 psi) is available at Node J13 (on-site watermain near connection to municipal main)

**Table 2.5: Maximum Day + Fire Flow Demand**

Operating Condition	Minimum System Pressure	Maximum System Pressure
<p><b>Max Day Demands:</b> 0.05 L/s at J5 (Bldg A) and 0.01 L/s at J8 (Bldg D)</p> <p><b>Fire Flow Demand:</b> 67 L/s at J3, 95 L/s at J9 and 95 L/s at J10 (all Private Hydrants), which exceeds the FUS Fire Flow required</p>	Minimum system pressure of 148.9 kPa (21.6 psi) is available at Node J3 (north Hydrant)	Maximum system pressure 447.4 kPa (64.9 psi) is available at Node J13 (on-site watermain near connection to municipal main)

The model indicates that the municipal watermain and private on-site watermain will provide adequate fire flow during 'Max Day + Fire Flow' conditions, however, pressure reducing valves will be required as system pressures will exceed 80 psi during both 'Peak Hour' and 'Max Day' conditions.

### 2.3 Storm Drainage and Stormwater Management

The proposed U-HAUL site will be serviced by connecting the proposed on-site storm sewer system to the existing 1050mm dia. storm sewer in the easement to the south. The approach for

the stormwater management design for the site is discussed in the subsequent sections of the report.

On-site stormwater management will include both stormwater quantity and quality control measures (i.e., an Enhanced Level of Treatment equivalent to 80% Total Suspended Solids removal) prior to releasing flows towards the Carp River. This will be achieved by a treatment train of grass swales, an on-site stormwater management facility (dry pond) and the use of an oil/grit separator. Post-development storm flows will be controlled to a maximum release rate of 50 L/s/ha as defined in the ‘Terry Fox Business Park – Stormwater Design Plan’<sup>1</sup> by means of a control pipe located within the on-site storm sewer system. The stormwater management design will meet the requirements of the City of Ottawa, the Mississippi Valley Conservation Authority (MVCA), the Ontario Ministry of Transportation (MTO) and the Ministry of the Environment, Conservation and Parks (MECP).

### 2.3.1 Storm Sewer Design

The proposed storm sewers have been sized to convey the uncontrolled 5-year storm event using the Rational Method. The design criteria used in sizing the storm sewers are summarized in **Table 2.6**. Refer to **Appendix E** for detailed storm drainage area plans and storm sewer design sheets.

**Table 2.6: Storm Sewer Design Parameters**

Parameter	Design Criteria
Storm Event	5 Year Return Period
Storm Sewer Design	Rational Method
IDF Rainfall Data	City of Ottawa Sewer Design Guidelines
Initial Time of Concentration (Tc)	10 min
Minimum Velocity	0.8 m/s
Maximum Velocity	3.0 m/s
Minimum Diameter	250 mm

### 2.3.2 Stormwater Management Criteria and Objectives

The stormwater management (SWM) criteria have been provided during pre-consultation meetings with the City of Ottawa and the MVCA. The SWM criteria and objectives are as follows:

- Maintain existing drainage patterns.
- Provide a dual drainage system (i.e., minor system and emergency overland flow route, for events exceeding the 100-year design storm).
- Maximize the use of surface storage available on site.
- Control the post-development flows from the site to the maximum allowable release rate of 50 L/s/ha for both the 5-year and 100-year design storms, as defined in the ‘Terry Fox Business Park – Stormwater Design Plan’<sup>1</sup>. This only applies to the portion of the site to be developed.
- Ensure that no surface ponding will occur on the paved surfaces (i.e., private drive aisles or parking lots) during the 2-year storm event.
- Provide on-site water quality control equivalent to a ‘Enhanced’ Level of Protection (i.e., minimum 80% TSS removal) as required by the MVCA prior to releasing flows from the site towards the Carp River. This only applies to the portion of the site to be developed, excluding the extended private access road.

- Provide guidelines to ensure that site preparation and construction is in accordance with the current Best Management Practices for Erosion and Sediment Control.

### 2.3.3 Pre-Development Conditions and Allowable Release Rate

The uncontrolled pre-development flows from the undeveloped 2.16 ha portion of the site (to be developed) were calculated using the Rational Method and are summarized below in **Table** . The allowable release rate for the 2.16 ha portion of the site to be developed, as specified in the 'Terry Fox Business Park – Stormwater Design Plan'<sup>1</sup>, was calculated to be 107.9 L/s (50 L/s/ha x 2.16 ha). The site to be developed is located within 'Drainage Basin 1' as defined on Figure 2. Refer to **Appendix E** for detailed calculations and excerpts from the 'Terry Fox Business Park– Stormwater Design Plan'<sup>1</sup>.

**Table 2.7: Summary of Pre-Development Storm Flows**

Return Period	Pre-Development Flow (L/s)	Allowable Flows (L/s)
2-Year	92.1	107.9
5-Year	125.0	
10-Year	146.5	
25-Year	190.9	
50-Year	232.4	
100-Year	267.7	

### 2.3.4 Post-Development Conditions

Stormwater runoff from the proposed buildings roofs will be directed to the surface, via rainwater downspouts. Runoff from the site to be developed will be directed towards the proposed stormwater management (SWM) dry pond via the grass drainage swales and on-site storm sewer system. Flow from the SWM dry pond will outlet to the existing 1050mm dia. storm sewer, which discharges directly to the Carp River, approximately 105m to the west. Due to the elevation difference, it will not be possible to direct stormwater runoff from the private access road into the dry pond. To mitigate the stormwater related impacts due to the increase in imperviousness of the site, stormwater runoff will be attenuated using a combination of a restrictor pipe installed within CBMH101 of the proposed on-site storm sewer system and an inlet control device (ICD) within CB 08 in the private access road. Flows will be attenuated for storms up to and including the 100-year design event. Due to the existing grades, runoff from the remainder of the undeveloped property will continue to sheet drain uncontrolled towards the Carp River.

### 2.3.5 Stormwater Management Modeling

The City of Ottawa Sewer Design Guidelines (October 2012) requires hydrologic / hydraulic modeling for all dual drainage systems. The performance of the proposed storm drainage system for the site was evaluated using the PCSWMM hydrologic / hydraulic model. The results of the analysis were used to:

- Determine the total runoff from the site.
- Size the required ICD and restrictor pipe.
- Determine the required storage volumes.

- Calculate the storm sewer hydraulic grade line and ponding elevations for the 5 and 100-year events.

The PCSWMM model schematics and model output files are provided in **Appendix E**.

### 2.3.5.1 Design Storms

The hydrologic analysis was completed using the following synthetic design storms:

- 3-hour Chicago storm distribution
- 4-hour Chicago storm distribution
- 12-hour SCS Type II storm distribution
- 24-hour SCS Type II storm distribution

The return periods analyzed include the 2,5,10,25,50 & 100-year storm events. The IDF parameters used to generate the design storms were taken from the *City of Ottawa Sewer Design Guidelines* (October 2012). It was determined after analyzing the results that the 4-hour Chicago distribution generated the highest peak flows for both the minor and major systems and was determined to be the critical storm distribution for the design of the storm drainage system. The proposed drainage system was also ‘stress tested’ using a 100-year (+20%) 4-hour Chicago design storm. This design storm has a 20% higher intensity and total volume compared to the 100-year event.

### 2.3.5.2 Model Development

#### Storm Drainage Areas

For modeling purposes, the site has been divided into sub-catchments based on the drainage areas tributary to each inlet of the proposed storm sewer system. The sub-catchment areas are shown on the Post-Development Storm Drainage Area Plan (121326-STM2).

The hydrologic modeling parameters for each sub-catchment were developed based on the Site Plan and the Post-Development Storm Drainage Area Plan specified above. Sub-catchment parameters are provided below in **Table 2.8**.

**Table 2.8: Sub-catchment Parameters**

Area ID	Catchment Area (ha)	Runoff Coefficient (C)	Percent Impervious (%)	Zero-Imperv. (%)	Equiv. Width / Flow Length (m)		Average Slope (%)
<b>Controlled Areas</b>							
A-0	0.002	0.25	7	0	5.0	4.0	2.0
A-1	0.033	0.90	100	0	25.4	13.0	2.0
A-2	0.663	0.65	64	50	37.7	176.0	1.5
A-3	0.030	0.90	100	0	27.3	11.0	2.0
A-4	0.031	0.90	100	0	23.9	13.0	2.0
A-5	0.049	0.90	100	0	37.7	13.0	2.0
A-6	0.045	0.90	100	0	34.6	13.0	2.0
A-7	0.053	0.90	100	0	37.9	14.0	2.0
A-8	0.102	0.90	99	0	42.5	24.0	2.0
A-9	0.013	0.90	100	0	8.7	15.0	5.5
A-10	0.122	0.65	64	64	34.9	35.0	1.0
A-11	0.030	0.90	100	0	33.3	9.0	1.5
A-12	0.099	0.90	100	0	58.2	17.0	2.0
A-13	0.050	0.90	100	0	31.3	16.0	2.0

Area ID	Catchment Area (ha)	Runoff Coefficient (C)	Percent Impervious (%)	Zero-Imperv. (%)	Equiv. Width / Flow Length (m)		Average Slope (%)
A-14	0.050	0.90	100	0	31.3	16.0	2.0
A-15	0.109	0.71	73	72	36.3	30.0	1.0
A-16	0.023	0.25	7	0	4.7	49.0	1.5
A-17	0.168	0.90	100	0	80.0	21.0	2.0
A-18	0.116	0.90	100	0	55.2	21.0	2.0
A-19	0.170	0.90	100	0	80.9	21.0	2.0
A-20	0.107	0.90	100	0	50.9	21.0	2.0
R-1	0.092	0.79	84	0	21.4	43.0	1.0
<b>TOTAL (Controlled)</b>	<b>2.157</b>	<b>0.79</b>	<b>84</b>	-	-		-

### Infiltration

Infiltration losses for all subcatchments were modeled using Horton's infiltration equation, which defines the infiltration capacity of soil over the duration of a precipitation event using a decay function that ranges from an initial maximum infiltration rate to a minimum rate as the storm progresses. The default values for the City of Ottawa were used for all catchments.

$$\text{Horton's Equation: } f(t) = f_c + (f_o - f_c)e^{-k(t)}$$

$$\text{Initial infiltration rate: } f_o = 76.2 \text{ mm/hr}$$

$$\text{Final infiltration rate: } f_c = 13.2 \text{ mm/hr}$$

$$\text{Decay Coefficient: } k = 4.14/\text{hr}$$

### Depression Storage

The default values for depression storage in the City of Ottawa were used for all catchments. Rooftops were assumed to provide no depression storage (zero-impervious parameter).

- Depression Storage (pervious areas): 4.67 mm
- Depression Storage (impervious areas): 1.57 mm

### Equivalent Width

'Equivalent Width' refers to the width of the sub-catchment flow path. This parameter (Table 5.1) is calculated as described in Section 5.4.5.6 of the City of Ottawa Sewer Design Guidelines. The calculated flow paths are shown on the Post-Development Storm Drainage Area Plan (121326-STM2).

### Impervious Values

Runoff coefficients for each sub-catchment area were determined based on the proposed site plan. Refer to the Post-Development Storm Drainage Area Plan (121326-STM2) for details. Percent impervious values were calculated using:

$$\% \text{imp} = (C - 0.20) / 0.70$$

### Inlet Capacities

The inlet capacities of the catchbasin and catchbasin manholes were verified for the 100-year peak flows using the Inlet Capacity at Road Sag Design Chart 4.19 from the City of Ottawa Sewer Design Guidelines. It was determined that in some instances the inlet capacity would cause minor ponding on the surface that's not generated by the HGL in the system. This happens only for the smaller drainage areas with peak flows at or below the sewer capacity. It should be noted that this ponding would be very short in duration in comparison to ponding on the surface generated

by an elevated HGL condition in the sewer. For larger drainage areas generating 100-year peak flows above the pipe capacities it was determined that the HGL in the sewer would govern the ponding depth over the inlet capacity of the grates.

### Storage Nodes

The PCSWM model for development utilizes storage nodes for each catchbasin and catchbasin manhole inlet to represent the underground and surface storage for each drainage area. Additionally, storage nodes are used instead of junctions in the model to improve stability and reduce the routing errors when running the model.

### Downstream Boundary Conditions and Hotstart Files

Due to the proximity of the municipal sewer outlet the HGL elevation in the connecting pipe is directly correlated to the Carp River water elevations. The model was run using the Carp River water elevations as outfall boundary conditions for the different storm events. The water elevations in the Carp River were taken derived from the PCSWMM 2021 Carp River model run. The elevations are provided below in **Table** .

**Table 2.9: Boundary Conditions**

Return Period	Carp River Water Elevation (m)
25mm	92.85
2-Year	93.22
5-Year	93.43
10-Year	93.64
25-Year	93.84
50-Year	93.91
100-Year	94.02

It should be noted that there is a discrepancy in the 100-year floodplain elevation between the elevation provided by the conservation authority (94.10m) and the elevation from the Carp River model run (94.02m). The floodplain limit shown on the engineering drawings is based on the 100-year elevation provided by the conservation authority.

As previously noted, the PCSMM model was run for the 2,5,10,25,50 & 100-year storm events to determine the total runoff from the site and calculate the required storage volumes. For each storm event the boundary condition elevation was updated accordingly at the outfalls. A 'hotstart' file was updated each time the boundary condition was adjusted to accurately model the system by filling up the conduits and storage nodes to the elevation of the boundary condition. By utilizing a 'hotstart' file in the model the storage volume in the system below the boundary condition elevation is not available to store runoff from the development. All storage required to restrict the storm flows to the allowable release rate will be above the boundary condition elevation.

### **2.3.5.3 Model Results**

The on-site storage and conveyance system requirements were refined using the PCSWMM model. The model was used to ensure that peak flows are controlled to the allowable release rates and ensure that the 100-year hydraulic grade line is contained on-site and that there will be no surface ponding during the 2-year storm event.



Post-development Controlled Site Flow (Drainage Area: A-1 to A-20)

The post-development flow from the site to be developed (including building roofs, paved areas, SWM dry pond and landscaped areas) will be attenuated using a restrictor pipe installed as the outlet pipe from CBMH 101. Stormwater runoff from this sub-catchment area will be temporarily stored within the grassed areas (i.e., swales and dry pond), underground storm sewer system and on the paved parking lot prior to being discharged into the municipal storm sewer system.

**Table 2.10** summarizes the post-development design flow as well as the size of the restrictor pipe, the anticipated ponding elevations, storage volumes required and storage volume provided for the 2-year, 5-year, 10-year, 25-year, 50-year and the 100-year design events.

**Table 2.10: Design Flow and Restrictor Pipe Table**

Design Event	Sub-Catchment Areas A-1 to A-20					
	Restrictor Pipe (mm)	*Design Head (m)	*Design Flow (L/s)	*Ponding Elevation (m)	**Storage Vol. Required (m <sup>3</sup> )	**Max Storage Provided (m <sup>3</sup> )
2-Year	200mm dia. control pipe	0.79 m	53.9 L/s	93.55 m	549 m <sup>3</sup>	2,285 m <sup>3</sup>
5-Year		1.10 m	60.9 L/s	93.86 m	857 m <sup>3</sup>	
10-Year		1.34 m	63.5 L/s	94.10 m	1,155 m <sup>3</sup>	
25-Year		1.59 m	66.4 L/s	94.35 m	1,498 m <sup>3</sup>	
50-Year		1.70 m	69.1 L/s	94.46 m	1,675 m <sup>3</sup>	
100-Year		1.84 m	71.0 L/s	94.60 m	1,911 m <sup>3</sup>	

\*Note: design head, ponding elevation and design flow accounted for at CBMH101 (restrictor pipe)

\*\*Note: required and provided volumes are dry pond volumes only

Refer to **Appendix E** for SWM calculations. The table above indicates that there is sufficient storage for the 2-year, 5-year, 10-year, 25-year, 50-year and 100-year design events., no stormwater will pond on the private paved surfaces (i.e., drive aisles or parking lots) during the 2-year storm event. Furthermore, the site grading design will ensure that surface ponding depths will not touch the building envelope or lowest building openings during the 100-year+20% stress test.

Controlled Flow from Private Access Road (Drainage Area: R-1)

The post-development flow from this sub-catchment area will be attenuated by installing an inlet control device (ICD) within the outlet pipe of CB 08. Stormwater runoff from this sub-catchment area will be temporarily stored on the paved roadway prior to being discharged into the municipal storm sewer. Based on preliminary calculations it is impractical to control flows from this small catchment area using a restrictor pipe, as the size of the pipe required to achieve minimal flows would be too small and would therefore be prone to clogging. As a result, an ICD was chosen to control the flow from this small sub-catchment area.

**Table 2.11** summarizes the post-development design flow as well as the type of ICD, the anticipated ponding elevations, storage volumes required and storage volume provided for the 2-year, 5-year, 10-year, 25-year, 50-year and the 100-year design events.

**Table 2.11: Design Flow and Inlet Control Device Table**

Design Event	Sub-Catchment Area R-1					
	ICD Type	Design Head (m)	Design Flow (L/s)	Ponding Elevation (m)	Storage Vol. Required (m <sup>3</sup> )	Max Storage Provided (m <sup>3</sup> )
2-Year	Tempest MHF Vortex ICD 'Custom'	0.32 m	17.1 L/s	93.47 m	0.1 m <sup>3</sup>	7.0 m <sup>3</sup>
5-Year		0.78 m	24.2 L/s	93.93 m	0.3 m <sup>3</sup>	
10-Year		1.20 m	28.9 L/s	94.35 m	0.4 m <sup>3</sup>	
25-Year		1.60 m	32.7 L/s	94.75 m	1.0 m <sup>3</sup>	
50-Year		1.65 m	32.3 L/s	94.80 m	2.9 m <sup>3</sup>	
100-Year		1.69 m	31.0 L/s	94.84 m	5.8 m <sup>3</sup>	

Refer to **Appendix E** for SWM calculations and to **Appendix F** for ICD information. As indicated in the table above, this sub-catchment area will provide sufficient storage for the 2-year, 5-year, 10-year, 25-year, 50-year and 100-year design events.

#### Summary of Post-Development Flows

**Table 2.12** compares the post-development site flows from the proposed development to the uncontrolled pre-development flows and to the maximum allowable release rate specified by the City of Ottawa, for the 2-year, 5-year, and the 100-year design events.

**Table 2.12: Stormwater Flow Comparison Table**

Design Event	Drainage Areas A-0, A-1 to A-20 and R-1						
	Pre-Dev. Conditions		Post-Development Conditions				
	Existing Site Flows (L/s)	Max Release Rate (L/s)	A-0 Direct Runoff Flow (L/s)	A-1 to A-20 Controlled Flow (L/s)	R-1 Controlled Flow (L/s)	Total Flow (L/s)	Reduction in Flow (L/s or %)*
2-Yr	92.1	107.9	0.2	53.9	17.1	71.2	20.9 or 23%
5-Yr	125.0		0.5	60.9	24.2	85.6	39.4 or 32%
10-Yr	146.5		0.6	63.5	28.9	93.0	53.5 or 37%
25-Yr	190.9		0.7	66.4	32.7	99.8	91.1 or 48%
50-Yr	232.4		0.8	69.1	32.3	102.2	130.2 or 56%
100-Yr	267.7		0.9	71.0	31.0	102.9	164.8 or 62%

\*Reduced flow compared to pre-development uncontrolled conditions.

As indicated in the table above, the 2-year, 5-year, 10-year, 25-year, 50-year and 100-year post-development flows will be less than the maximum allowable release rate for the site. Furthermore, this represents significant reductions in total site flow rates when compared to the respective pre-development conditions. Refer to **Appendix E** for detailed SWM calculations.

### Hydraulic Grade Line (HGL)

The PCSWMM model was used to estimate the hydraulic grade line (HGL) elevation of the of the storm sewer system during the 100-year storm event. **Table** provides a summary of the 100-year HGL elevation at each storm manhole within the proposed development.

**Table 2.13: Hydraulic Grade Line (HGL) Elevations**

MH ID	Invert Elevation (m)	T/G Elevation (m)	100-yr HGL Elevation (m)	Surcharge (m)	Clearance from T/G (m)	HGL in Stress Test (m)
CB01	93.25	95.00	94.62	1.62	0.38	94.70
CB02	93.30	95.00	94.69	1.64	0.31	94.84
CB03	93.35	94.25	94.78	1.68	-0.53*	94.90
CB04	93.60	94.90	94.97	1.62	-0.07	95.10
CB05	93.52	95.00	95.11	1.84	-0.11	95.21
CB06	93.60	95.10	95.25	1.90	-0.15	95.29
CB07	93.70	95.10	95.26	1.81	-0.16	95.29
CB08	93.15	94.70	94.84	1.94	-0.14	94.88
CB09	93.30	94.85	94.74	1.69	0.11	94.87
CBMH-101	92.76	94.85	94.60	2.04	0.25	94.67
CBMH-102	92.94	94.95	94.62	2.05	0.33	94.70
CBMH-103	93.00	94.95	94.66	2.04	0.29	94.77
CBMH-105	93.23	94.90	94.79	1.94	0.11	94.92
CBMH-106	92.97	95.15	94.71	2.19	0.44	94.79
CBMH-107	93.09	95.00	94.94	2.30	0.06	95.01
CBMH-108	93.21	95.05	95.00	2.17	0.05	95.09
CBMH-109	93.28	95.15	95.04	2.14	0.11	95.14
CBMH-110	93.24	95.00	95.09	2.30	-0.09	95.14
CBMH-111	93.42	95.00	95.16	2.12	-0.16	95.20
LD301	94.00	95.00	95.12	1.37	-0.12	95.22
STMH-104	93.10	95.00	94.73	2.00	0.27	94.86

Notes: Based on PCSWMM Model Results for a 4-hour Chicago Storm.

Negative clearance from T/G values indicate surface ponding.

\* Ponding exceeds 0.3m in the depressed loading dock.

### Stress Test

**Table** also provides the estimated HGL elevations for the ‘stress test’ event. The stress test event represents a 20% increase (rainfall intensity and total precipitation) in the 100-year design event. The ‘stress test’ event will not be confined within the storm sewer system. Ponding will occur within the parking lot sags and may cascade off-site. The major system overland flow will be diverted through overland pathways and spill off-site to the Carp River.

### Foundation Drains

The proposed buildings will be slab-on-grade, as such, there are no concerns with the surcharged HGL elevations. The general grade of the site will allow water to pond in the parking lot and overflow downstream before impacting the building. Refer to the Grading and Erosion Sediment Control Plans (drawing 121326-GR1 and 121326-GR2).

### **2.3.6 Stormwater Quality Control**

The subject site is located within the jurisdiction of the Mississippi Valley Conservation Authority (MVCA) and is tributary to the Carp River. Based on preliminary feedback from the MVCA, surface parking lots and drive aisles will require an ‘Enhanced’ Level of Protection (i.e., 80% TSS

removal). Landscaped areas and roof tops are considered clean for the purposes of water quality and aquatic habitat protection.

To achieve this level of quality control protection, a new oil-grit separator unit (Vortechs Model 3000) will be installed downstream of CBMH 101 on the storm sewer outlet pipe from the site. Stormwater runoff collected by the on-site storm sewer system (2.06 ha tributary area) will be directed through the proposed treatment unit. The contributing area includes the proposed paved parking lot areas, controlled building roofs and controlled loading dock areas.

As stated above, the proposed oil-grit separator has been sized to provide an 'Enhanced' Level of water quality treatment prior to discharging the stormwater into the municipal storm sewer. Echelon Environmental and Contech Stormwater Solutions Inc. have modeled and analyzed the tributary area to provide a Vortechs unit capable of meeting the TSS removal requirements. The model parameters for the TSS removal were based on historical rainfall data for Ottawa from the Ontario Climate Centre. It was determined that a Vortechs Model 3000 will exceed the target removal rate, providing a net annual 87% TSS removal. The Vortechs unit has a treatment capacity of approximately 127.4 L/s, a sediment storage capacity of 1.38 m<sup>3</sup>; an oil storage capacity of 853 L, and a holding capacity of 4.67 m<sup>3</sup> and will treat a net annual volume of approximately 95% for the tributary area. The OGS unit was sized to account for the tailwater conditions in Carp River. The weir height in the unit will provide effective treatment of stormwater up to the 2-year water elevation in the Carp River. The unit has also been designed to ensure all floatable materials will remain captured during the larger storm events. The on-site catchbasins and storm manhole structures will be equipped with sumps to promote additional settling of sediment. The treatment train of grass swales, an on-site stormwater management facility (dry pond) and the use of an oil/grit separator will provide the necessary stormwater quality treatment.

### Maintenance and Monitoring of the Storm Sewer and Stormwater Management Systems

It is recommended that the client implement a maintenance and monitoring program for both the on-site storm sewers and the stormwater management systems: The storm drainage system should be inspected routinely (at least annually); the restrictor pipe/ICD should be inspected to ensure they are free of debris; and the oil-grit separator should be inspected at regular intervals and maintained when necessary to ensure optimum performance. Refer to **Appendix G** for the Vortechs unit design parameters, sizing analysis, operation, design, performance, and maintenance summary parameters as well as the annual TSS removal efficiency data.

### **2.3.7 Carp River Watershed PCSWMM Model**

The City has developed a PCSWMM model of the Carp River subwatershed and indicated that all new development within the watershed is to be represented in this model to confirm that the cumulative impacts of development are accounted for and that the proposed stormwater management strategies will have no adverse impact on water levels in the Carp River.

To determine what effect the proposed 30 Frank Neighbor development will have on the downstream Carp River, the 30 Frank Neighbor PCSWMM model was integrated into the Carp River Watershed PCSWMM model provided by the City, following the protocol outlined in the *City of Ottawa Carp River PCSWMM Model Documentation*.

The results of the analysis indicate that the proposed development will not have an adverse effect on the downstream watercourses, as the outflows from the development are to be controlled to

an allowable release rate of 50 L/s/ha as defined in the 'Terry Fox Business Park – Stormwater Design Plan'<sup>1</sup> which is less than the existing flows into the Carp River West Tributary.

Error! Reference source not found. provides a comparison of the 100-year water levels and flows along the main Branch of the Carp River between the updated Carp River Models and the original 2021 models provided by the city.

**Table 2.14: 100-year Flows and Water Levels in Carp River**

Location on Carp River	PCSWMM Node	Original 2021		With 30 Frank Nighbor	
		Flow (m <sup>3</sup> /s)	Water Level (m)	Flow (m <sup>3</sup> /s)	Water Level (m)
Palladium Drive	CJ152	32.56	94.07	32.56	94.07
Frank Nighbor Place	CJ142	32.55	94.02	32.49	94.02
Highway 417	CJ120	32.47	93.97	32.39	93.97

The model results indicate a minimal decrease in peak flow in the Carp River at the locations immediately downstream of the proposed development. The model results indicate that there will be no change in the 100-year water levels in the Carp River.

### 3.0 SITE GRADING

The elevation of the existing site varies from approximately 94.50m up to approximately 96.50m. The existing site generally slopes from east to west towards the Carp River, which is located approximately 80m west of the furthest development limit for the subject site.

The finished floor elevation (FFE) of the proposed buildings will be set at an elevation of 95.50m, which corresponds to the FFE of the Home Depot and Camp Mart buildings to the east. The buildings and general site elevations will work well with the grades along the property lines, the views from Hwy 417 to the north, and the private access road off Frank Nighbor Place to the south. The grade on the adjacent undeveloped portion of the property to the west will remain unchanged.

Any excess fill material generated from the proposed site development is to be reviewed by the geotechnical engineer to determine suitability for use as general fill. Filling on the undeveloped portion of the property is only permitted outside the regulatory floodline as defined by the MVC. Limits of the works are to be established on-site by an OLS.

Refer to the enclosed Grading and ESC Plans (121326-GR1 and 121326-GR2).

#### 3.1 Emergency Overland Flow Route

In the case of a major rainfall event exceeding the design storms provided for, the stormwater located within the subject site will overflow towards the downstream drainage ditch and/or private roadway and ultimately flow towards the Carp River. The finished floor elevation of Buildings A, B, C and D have been set at 95.50m, which represents a minimum of 0.3m above the major system overflow points. The emergency overland flow route is shown on the enclosed Grading and ESC Plans.

#### 4.0 GEOTECHNICAL INVESTIGATIONS

Paterson Group prepared a Geotechnical Investigation Report for the proposed development. Refer to the Geotechnical Report<sup>3</sup> for subsurface conditions, grade raise restrictions, construction recommendations and geotechnical inspection requirements.

#### 5.0 EROSION AND SEDIMENT CONTROL

To mitigate erosion and to prevent sediment from entering the storm sewer system and downstream water course, temporary erosion and sediment control measures will be implemented on-site during construction in accordance with the Best Management Practices for Erosion and Sediment Control. This includes the following temporary measures:

- Filter bags will be placed under the grates of nearby catchbasins, manholes and will remain in place until vegetation has been established and construction is completed.
- Silt fencing will be placed per OPSS 577 and OPSD 219.110 where appropriate, along the surrounding construction limits.
- Mud mats will be installed at the site entrances.
- Street sweeping and cleaning will be performed, as required, to suppress dust and to provide safe and clean roadways adjacent to the construction site.
- On-site dewatering is to be directed to a sediment trap and/or gravel splash pad and discharged safely to an approved outlet as directed by the engineer.
- Any stockpiled material will be properly managed to prevent those materials from entering the sewer system and/or the downstream watercourse.

The temporary erosion and sediment control measures will be implemented prior to construction and will remain in place during all phases of construction. Regular inspection and maintenance of the erosion control measures will be undertaken.

In addition, the following measures will provide permanent erosion and sediment control on the proposed site:

- Shallow flat-bottom grass drainage swales as well as within the dry pond (SWM facility).
- A CDS type Oil/Grit Separator will be installed to provide water quality control prior to releasing stormwater from the portion of the site to be developed.

#### 6.0 CONCLUSION

This report has been prepared in support of a Site Plan Control application for the proposed U-HAUL development at 30 Frank Nighbor Place. The conclusions are as follows:

- The proposed development will be serviced by the municipal watermain, sanitary and storm sewers to the south located within an easement along the private access road off Frank Nighbor Place.
- The large buildings will be sprinklered and supplied with fire department (siamese) connections. The siamese connections will be located within 45m of a nearby on-site fire hydrant.
- The proposed design will include on-site stormwater management measures (both quantity and quality control measures) prior to releasing flows from the site.

- Post-development flow from sub-catchment area A-1 to A-20 will be controlled by a restrictor pipe installed within the on-site storm sewer system, while flows from area R-1 will be attenuated in the access road by an inlet control device (ICD).
- The total post-development flow to the municipal storm sewer (Carp River) will be approximately 71.2 L/s during the 2-year design event, 85.6 L/s during the 5-year event and 102.9 L/s during the 100-year event, all less than the maximum allowable release rate of 107.9 L/s. The post-development flows are also being significantly reduced when compared to current conditions.
- Erosion and sediment controls are to be provided both during construction and on a permanent basis. In addition to the grass swales and SWM dry pond, an oil / grit separator unit (CDS Model PMSU 20\_20\_5) will provide an 'Enhanced' Level of water quality control for the controlled flows from the site discharging into the municipal storm sewer.
- Regular inspection and maintenance of the storm sewer system, including the restrictor pipe/inlet control device and the water quality treatment unit is recommended to ensure that the storm drainage system is clean and operational.

It is recommended that the proposed site servicing and stormwater management design be approved for implementation.

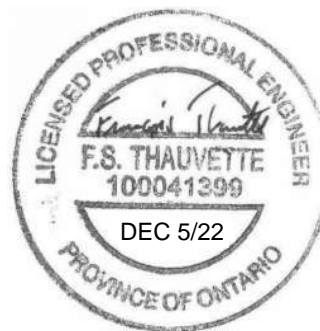
#### NOVATECH

Prepared by:



Matt Hrehoriak, P, Eng.  
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Stormwater Management

Prepared by:



François Thauvette, P. Eng.  
Senior Project Manager

**APPENDIX A**  
**Correspondence**



### **Pre-Consultation Meeting Notes**

Site Address: 30 Frank Nighbor Place

Location: Virtual - Microsoft Teams

Meeting Date: January 14, 2022

**Attendees:** Colette Gorni- Planner (File Lead), City of Ottawa  
Shika Rathnasooriya – Infrastructure Project Manager, City of Ottawa  
Sami Rehman – Environmental Planner, City of Ottawa  
Adrian Van Wyk - Planner (Urban Design), City of Ottawa  
Jeff Goettling - Planner (Parks), City of Ottawa  
Ashvinya Moorthy - Student Planner, City of Ottawa  
Erica Ogden - MVCA  
Greg Winters - Novatech  
Robert Tran - Novatech  
Francois Thauvette - Novatech  
Jake Spelic - U-Haul  
David Pollock - U-Haul  
Thomas Donnelly - U-Haul  
Tamrat Meherete - U-Haul

**Regrets:** Mike Giampa - Transportation, City of Ottawa  
Mark Richardson - Forestry, City of Ottawa

### **Comments from the Applicant**

1. The subject site is one of the last parcels in a plan of subdivision that began in 1997.
2. Surrounding uses include Highway 417 to the north, the Carp River to the west, and light industrial uses to the east and south.
3. The site is serviced by existing public services that run along Frank Nighbor Place.
4. The site is technically located within a flood plain; however, the Owner has a fill permit filed with the MVCA which allows them to address related concerns. The fill permit was renewed last year and is valid for two years.
5. The proposed development includes a 5-storey self-storage facility with an associated rental office, as well as a separate warehouse building to be used for U-Haul's operations.

### **Engineering**

1. The Servicing Study Guidelines for Development Applications are available at the following address: <https://ottawa.ca/en/planning-development-and->

[construction/developing-property/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans#servicing-study-guidelines-development-applications](#)

2. Servicing and site works shall be in accordance with the following documents:

- Ottawa Sewer Design Guidelines (October 2012)
- Ottawa Design Guidelines – Water Distribution (2010)
- Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
- City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
- City of Ottawa Environmental Noise Control Guidelines (January 2016)
- City of Ottawa Park and Pathway Development Manual (2012)
- City of Ottawa Accessibility Design Standards (2012)
- Ottawa Standard Tender Documents (latest version)
- Ontario Provincial Standards for Roads & Public Works (2013)

3. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at [InformationCentre@ottawa.ca](mailto:InformationCentre@ottawa.ca) or by phone at (613) 580-2424 x.44455).

4. Watermain Infrastructure:

- a. There is an available 305mm diameter PVC watermain located within the proposed extension of Frank Nighbor Place. A water boundary condition request is needed for the proposed water connection to the City main.
- b. As per Section 4.4.7.2 of the Ottawa Design Guidelines – Water Distribution, a DMA (District Metering Area) chamber will be required for private developments serviced by a connection 150mm or larger.
- c. Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide an email to [Shika Rathnasooriya](mailto:Shika.Rathnasooriya@ottawa.ca) with the following information:
  - i. Location of service
  - ii. Type of development and the amount of fire flow required (as per FUS, 1999 – See technical bulletin ISTB 2021-03).
  - iii. Average daily demand: \_\_\_ l/s.
  - iv. Maximum daily demand: \_\_\_ l/s.
  - v. Maximum hourly daily demand: \_\_\_ l/s.

5. Sanitary / Storm Infrastructure:

- a. There is an available 450mm diameter concrete sanitary sewer located within a private access road west of Frank Nighbor Place.
  - b. There is an available 1050mm diameter concrete storm sewer within a private access road west of Frank Nighbor Place.
  - c. A monitoring maintenance hole will be required for a private sanitary sewer outletting to a public sanitary sewer. The maintenance hole should be located in an accessible location on private property near the property line (ie. Not in a parking area).
  - d. All services (STM, SAN, WTR) should be grouped in a common trench to minimize the number of road cuts.
  - e. Sewer connections to be made above the springline of the sewermain as per:
    - i. Std Dwg S11.1 for flexible main sewers.
    - ii. Std Dwg S11 (For rigid main sewers).
    - iii. Std Dwg S11.2 (for rigid main sewers using bell end insert method).
    - iv. Connections to manholes permitted when the connection is to rigid main sewers where the lateral exceeds 50% the diameter of the sewermain. – Connect obvert to obvert with the outlet pipe unless pipes are a similar size.
6. The Stormwater Management Criteria, for the subject site, is to be based on the following:
- a. The 5-yr and 100-yr post development peak flows for the development area are to be controlled to a release rate of 50 L/s/ha based on the 'Terry Fox Business Park- Stormwater Design Plan' dated 1994. Onsite storage is to be provided for storm events up to and including the 100-yr storm.
  - b. There should be no stormwater ponding in parking areas or drive aisles during the 2-year storm event.
  - c. Quality control to be provided as specified by the MVCA.
  - d. The design of the storm sewers in the area are based on a 5-yr storm. If discharging to a storm sewer, the SWM criteria is to be based on the following for the development area:
    - i. The 5-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.

- ii. The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less.
  - iii. A calculated time of concentration (Cannot be less than 10 minutes).
  - iv. Flows to the storm sewer in excess of the 5-yr storm release rate, up to and including the 100-year storm event, must be detained on site.
7. MECP ECA Requirements:
- An MECP Environmental Compliance Approval (Private Sewage Works) will be required for the proposed development.
8. Phase 1 ESAs and Phase 2 ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.

Should you have any questions or require additional information, please contact me directly at [Thakshika.Rathnasooriya@ottawa.ca](mailto:Thakshika.Rathnasooriya@ottawa.ca).

### **MVCA**

1. The Mississippi Valley Conservation Authority (MVCA) confirms that a portion of the subject property is regulated under Ontario Regulation 153/06, *Development, Interference with Wetlands and Alterations to Shorelines and Watercourses*. Under Ontario Regulation 153/06, written permission is required from the MVCA prior to the initiation of development (which includes construction, site grading and the placement or removal of fill) within an area regulated by the Conservation Authority.
2. MVCA notes that permit W20-176 has been issued to the previous property owner to facility fill placement within the regulated area. This permit must be transferred into the new owner's name and expires on October 19, 2022. The construction of the proposed buildings within the regulated area will also require written permission from MVCA. A new permit is valid for a two year period.
3. An enhanced level of water quality protection is required, 80% TSS Removal.
4. The watercourse setbacks outlined in the Official Plan should be demonstrated on the plans submitted and ensure all buildings are located beyond the required watercourse setbacks.
5. Please note that a small portion of the subject property is zoned O1 and is subject to the holding zone provisions related to the restoration of the Carp River.

Please contact Erica Ogden, MVCA Planner, at [eogden@mvc.on.ca](mailto:eogden@mvc.on.ca) for follow-up questions.

## **Parks**

1. How does the applicant propose to meet the Parkland Dedication (By-law No. 2009-95)? Land or cash-in-lieu (CIL) of parkland and associated appraisal fee will be required as a condition of approval as per the [Parkland Dedication \(By-law No. 2009-95\) | City of Ottawa](#). If required, the value of noted lands to be appraised shall be through a Real Estate Valuation Advisor within the Planning Infrastructure & Economic Development Department. The exact amount will be identified as a condition of site plan approval.
2. For Commercial purposes, the parkland requirement is calculated as 2% of the gross land area of the site being developed.
3. The conveyance of land for purposes or the payment of money in-lieu of accepting the conveyance is not required for development, redevelopment, subdivisions or consents, where it is known, or can be demonstrated that the required parkland conveyance or money in-lieu thereof has been previously satisfied.
4. Parks Planning requests that the existing pedestrian link through the property be formalized. This link shall connect the existing Multi-Use Pathway (MUP) to the existing concrete sidewalk and asphalt roadway (currently located south of 20 Frank Nighbor Place). The proponent shall construct this link to City standards and provide a pedestrian and maintenance access easement over this area. It is anticipated that the MUP extension will terminate at the new site asphalt access roadway, include a P-Gate, TSWI's, and drop/ depressed curb(s) as required.

Please contact Jeff Goettling, Parks Planner, at [jeff.goettling@ottawa.ca](mailto:jeff.goettling@ottawa.ca) for follow-up questions.

## **Environmental Planning**

1. An EIS is triggered due to the site being adjacent to Carp River and potential species at risk habitat.
2. Please refer to the New City of Ottawa Official Plan for updated policies regarding setbacks from surface water features and natural heritage protection.
3. Incorporate the findings and recommendations of the Carp River Subwatershed study for this area into the report.
4. Consider ways to soften the landscape with locally appropriate native trees and vegetation along the Carp River.
5. Consult with the MVCA to determine if any permits or approvals are required.

Please contact Sami Rehman, Environmental Planner, at [Sami.Rehman@ottawa.ca](mailto:Sami.Rehman@ottawa.ca) for follow-up questions.

### **Urban Design**

1. An Urban Design Brief will be required, which can be combined with a Planning Rationale. Please see the attached Terms of Reference.
2. Pedestrian circulation should be considered. It may be desirable to extend the private sidewalk to Frank Nighbor Place.
3. The paving over of the lot should be avoided where possible. Please keep hard surfaces to a minimum.
4. Parking and loading areas should be located at the rear of the buildings to avoid conflicts with pedestrian movement.
5. Please ensure that the site design includes appropriate landscaped buffering.
6. Opportunities for tree planting should be explored.
7. Please carefully consider sustainability and incorporating blue-green infrastructure and on-site stormwater management techniques into the site design.

Please contact Adrian van Wyk, Urban Design Planner, at [Adrian.vanWyk@ottawa.ca](mailto:Adrian.vanWyk@ottawa.ca) for follow-up questions.

### **Transportation**

1. No TIA will be required.
2. Warehouse use does not trigger a road noise study.

Please contact Mike Giampa, Transportation Project Manager, at [Mike.Giampa@ottawa.ca](mailto:Mike.Giampa@ottawa.ca) for follow-up questions.

### **Forestry**

1. A Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City:
  - a. An approved TCR is a requirement of Site Plan approval.
  - b. The TCR may be combined with the LP provided all information is supplied.
2. Any removal of privately-owned trees 10cm or larger in diameter, or city-owned trees of any diameter requires a tree permit issued under the Tree Protection

Bylaw (Bylaw 2020 – 340); the permit will be based on an approved TCR and made available at or near plan approval.

3. The Planning Forester from Planning and Growth Management as well as foresters from Forestry Services will review the submitted TCR.
  - a. If tree removal is required, both municipal and privately-owned trees will be addressed in a single permit issued through the Planning Forester.
  - b. Compensation may be required for city owned trees – if so, it will need to be paid prior to the release of the tree permit.
4. The TCR must list all trees on site, as well as off-site trees if the CRZ extends into the developed area, by species, diameter and health condition.
5. Please identify trees by ownership – private onsite, private on adjoining site, city owned, co-owned (trees on a property line).
6. The TCR must list all trees on adjacent sites if they have a critical root zone that extends onto the development site.
7. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained.
8. All retained trees must be shown and all retained trees within the area impacted by the development process must be protected as per City guidelines available at [Tree Protection Specification](#) or by searching [Ottawa.ca](#).
  - a. The location of tree protection fencing must be shown on a plan
  - b. Show the critical root zone of the retained trees
  - c. If excavation will occur within the critical root zone, please show the limits of excavation
9. the City encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees that will contribute to the design/function of the site.
10. For more information on the process or help with tree retention options, contact Mark Richardson [mark.richardson@ottawa.ca](mailto:mark.richardson@ottawa.ca) or on [City of Ottawa](#)

Please contact Mark Richardson, Planning Forester, at [Mark.Richardson@ottawa.ca](mailto:Mark.Richardson@ottawa.ca) for follow-up questions.

## **Planning**

1. There are two zones on the site – IL6[1414] H(30)-h (Light Industrial, Subzone 6, Exception 1414, height limit of 30m, holding zone) and O1[1932]-h (Parks and Open Space Zone, Exception 1932, with a holding zone).
2. Please note that all storage on site must be concealed or enclosed as per Exception 1414.
3. Please ensure that the proposed development meets the requirements of Section 69 of the Zoning By-law – Setback from Watercourses.
4. Parking is to be provided at the rates specific for Area C in Section 101 of the Zoning By-law:
  - Warehouse: 0.8 per 100 m<sup>2</sup> for the first 5000 m<sup>2</sup> of gross floor area, and 0.4 per 100 m<sup>2</sup> above 5000 m<sup>2</sup> of gross floor area.
  - Automobile Rental Establishment: Sales/showroom area, 2 per 100 m<sup>2</sup> of gross floor area; Service area, 2 per service bay; Other areas, 1 per 100 m<sup>2</sup> of gross floor area.
5. Ensure that bicycle parking is provided at the rates identified in Table 111A of the Zoning By-law:
  - Warehouse: 1 per 2000 m<sup>2</sup> of gross floor area.
  - All other non-residential uses: 1 per 15000 m<sup>2</sup> of gross floor area.
6. Ensure that vehicle loading spaces are provided at the rates specified in Table 113A of the Zoning By-law, and that all provided loading spaces meet the requirements identified in Table 113B.
7. Please consider where and how waste will be handled on the site. If waste collection will be stored outside, ensure the requirements for waste enclosures are met under Section 110(3) of the Zoning By-law.
8. Ensure a 3m landscaped buffer is provided abutting a street (Highway 417), required as per Table 203(i)(ii).
9. Consider opportunities for tree planting and landscaping throughout the site.
10. The proposed development requires a 'Site Plan Control – Complex' application. Fees, forms and timelines can be found on the City's website [here](#).
11. A Lifting Holding By-law application will be required before development can proceed. Fees, forms and timelines can be found on the City's website [here](#). Refer to Exceptions 1414 and 1932 for the requirements associated with the



holding symbols. Both holding symbols can be lifted through the same application.

Please contact Colette Gorni, Planner, at [colette.gorni@ottawa.ca](mailto:colette.gorni@ottawa.ca) for follow-up questions.

### **City Surveyor**

1. The determination of property boundaries, minimum setbacks and other regulatory constraints are a critical component of development. An Ontario Land Surveyor (O.L.S.) needs to be consulted at the outset of a project to ensure properties are properly defined and can be used as the geospatial framework for the development.
2. Topographic details may also be required for a project and should be either carried out by the O.L.S. that has provided the Legal Survey or done in consultation with the O.L.S. to ensure that the project is integrated to the appropriate control network.

Questions regarding the above requirements can be directed to the City's Surveyor, Bill Harper, at [Bill.Harper@ottawa.ca](mailto:Bill.Harper@ottawa.ca).

### **Next Steps**

Please refer to the links to [Guide to preparing studies and plans](#) and [fees](#) for further information. Additional information is available related to [building permits](#), [development charges](#), and the [Accessibility Design Standards](#). Be aware that other fees and permits may be required, outside of the development review process. You may obtain background drawings by contacting [informationcentre@ottawa.ca](mailto:informationcentre@ottawa.ca).

These pre-consultation comments are valid for one year. If you submit a development application(s) after this time, you may be required to meet for another pre-consultation meeting and/or the submission requirements may change. You are as well encouraged to contact us for a follow-up meeting if the plan/concept will be further refined.

Please do not hesitate to contact Colette Gorni, at [colette.gorni@ottawa.ca](mailto:colette.gorni@ottawa.ca) if you have any questions.

### APPLICANT'S STUDY AND PLAN IDENTIFICATION LIST

Legend: **S** indicates that the study or plan is required with application submission.

**A** indicates that the study or plan may be required to satisfy a condition of approval/draft approval.

For information and guidance on preparing required studies and plans refer [here](#):

S/A	Number of copies	ENGINEERING		S/A	Number of copies
S	15	1. Site Servicing Plan	2. Site Servicing Study	S	3
S	15	3. Grade Control and Drainage Plan	4. Geotechnical Study / Slope Stability Study	S	3
■	2	5. Composite Utility Plan	6. Groundwater Impact Study	■	3
■	3	7. Servicing Options Report	8. Wellhead Protection Study	■	3
■	9	9. Transportation Impact Assessment (TIA)	10. Erosion and Sediment Control Plan / Brief	S	3
S	3	11. Storm water Management Report / Brief	12. Hydro geological and Terrain Analysis	■	3
■	3	13. Hydraulic Water main Analysis	14. Noise / Vibration Study	■	3
■	PDF only	15. Roadway Modification Functional Design	16. Confederation Line Proximity Study	■	3

S/A	Number of copies	PLANNING / DESIGN / SURVEY		S/A	Number of copies
■	15	17. Draft Plan of Subdivision	18. Plan Showing Layout of Parking Garage	■	2
■	5	19. Draft Plan of Condominium	20. Planning Rationale	S	3
S	15	21. Site Plan	22. Minimum Distance Separation (MDS)	■	3
■	15	23. Concept Plan Showing Proposed Land Uses and Landscaping	24. Agrology and Soil Capability Study	■	3
■	3	25. Concept Plan Showing Ultimate Use of Land	26. Cultural Heritage Impact Statement	■	3
S	15	27. Landscape Plan	28. Archaeological Resource Assessment Requirements: <b>S</b> (site plan) <b>A</b> (subdivision, condo)	S	3
S	2	29. Survey Plan	30. Shadow Analysis	■	3
S	3	31. Architectural Building Elevation Drawings (dimensioned)	32. Design Brief (may be provided as part of the Planning Rationale)	S	Available online
■	3	33. Wind Analysis		■	

S/A	Number of copies	ENVIRONMENTAL		S/A	Number of copies
S	3	34. Phase 1 Environmental Site Assessment	35. Impact Assessment of Adjacent Waste Disposal/Former Landfill Site	■	3
S	3	36. Phase 2 Environmental Site Assessment (depends on the outcome of Phase 1)	37. Assessment of Landform Features	■	3
■	3	38. Record of Site Condition	39. Mineral Resource Impact Assessment	■	3
S	3	40. Tree Conservation Report	41. Environmental Impact Statement / Impact Assessment of Endangered Species	S	3
■	3	42. Mine Hazard Study / Abandoned Pit or Quarry Study	43. Integrated Environmental Review (Draft, as part of Planning Rationale)	■	3

S/A	Number of copies	ADDITIONAL REQUIREMENTS		S/A	Number of copies
S	1	44. Applicant's Public Consultation Strategy (may be provided as part of the Planning Rationale)	45. Site Lighting Plan	■	3
A	1	46. Site Lighting Certification Letter	47.		

Meeting Date: January 14, 2022

Application Type: *Site Plan Control*

File Lead (Assigned Planner): Colette Gorni

Infrastructure Approvals Project Manager: Shika Rathnasooriya

Site Address (Municipal Address): 30 Frank Nighbor PI \*Preliminary Assessment: 1  2  3  4  5

\*One (1) indicates that considerable major revisions are required before a planning application is submitted, while five (5) suggests that proposal appears to meet the City's key land use policies and guidelines. **This assessment is purely advisory and does not consider technical aspects of the proposal or in any way guarantee application approval.**

***It is important to note that the need for additional studies and plans may result during application review. If following the submission of your application, it is determined that material that is not identified in this checklist is required to achieve complete application status, in accordance with the Planning Act and Official Plan requirements, the Planning, Real Estate and Economic Development Department will notify you of outstanding material required within the required 30 day period. Mandatory pre-application consultation will not shorten the City's standard processing timelines, or guarantee that an application will be approved. It is intended to help educate and inform the applicant about submission requirements as well as municipal processes, policies, and key issues in advance of submitting a formal development application. This list is valid for one year following the meeting date. If the application is not submitted within this timeframe the applicant must again pre-consult with the Planning, Real Estate and Economic Development Department.***

## **APPENDIX B**

### **Development Servicing Study Checklist**

## Servicing study guidelines for development applications

### 4. Development Servicing Study Checklist

The following section describes the checklist of the required content of servicing studies. It is expected that the proponent will address each one of the following items for the study to be deemed complete and ready for review by City of Ottawa Infrastructure Approvals staff.

The level of required detail in the Servicing Study will increase depending on the type of application. For example, for Official Plan amendments and re-zoning applications, the main issues will be to determine the capacity requirements for the proposed change in land use and confirm this against the existing capacity constraint, and to define the solutions, phasing of works and the financing of works to address the capacity constraint. For subdivisions and site plans, the above will be required with additional detailed information supporting the servicing within the development boundary.

#### 4.1 General Content

- Executive Summary (for larger reports only).
- Date and revision number of the report.
- Location map and plan showing municipal address, boundary, and layout of proposed development.
- Plan showing the site and location of all existing services.
- Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.
- Summary of Pre-consultation Meetings with City and other approval agencies.
- Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defensible design criteria.
- Statement of objectives and servicing criteria.
- Identification of existing and proposed infrastructure available in the immediate area.
- Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).
- Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.
- Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.
- Proposed phasing of the development, if applicable.

- Reference to geotechnical studies and recommendations concerning servicing.
  
- All preliminary and formal site plan submissions should have the following information:
  - Metric scale
  
  - North arrow (including construction North)
  
  - Key plan
  
  - Name and contact information of applicant and property owner
  
  - Property limits including bearings and dimensions
  
  - Existing and proposed structures and parking areas
  
  - Easements, road widening and rights-of-way
  
  - Adjacent street names

#### **4.2 Development Servicing Report: Water**

- Confirm consistency with Master Servicing Study, if available
- Availability of public infrastructure to service proposed development
- Identification of system constraints
- Identify boundary conditions
- Confirmation of adequate domestic supply and pressure
- Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.
- Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.
- Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design
- Address reliability requirements such as appropriate location of shut-off valves
- Check on the necessity of a pressure zone boundary modification.
- Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range

- Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.
- Description of off-site required feeder mains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.
- Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.
- Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

### **4.3 Development Servicing Report: Wastewater**

- Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).
- Confirm consistency with Master Servicing Study and/or justifications for deviations.
- Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.
- Description of existing sanitary sewer available for discharge of wastewater from proposed development.
- Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)
- Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.
- Description of proposed sewer network including sewers, pumping stations, and forcemains.
- Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).
- Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.
- Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.
- Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.
- Special considerations such as contamination, corrosive environment etc.

#### 4.4 Development Servicing Report: Stormwater Checklist

- Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)
- Analysis of available capacity in existing public infrastructure.
- A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.
- Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.
- Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.
- Description of the stormwater management concept with facility locations and descriptions with references and supporting information.
- Set-back from private sewage disposal systems.
- Watercourse and hazard lands setbacks.
- Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.
- Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.
- Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).
- Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.
- Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.
- Any proposed diversion of drainage catchment areas from one outlet to another.
- Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.
- If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100 year return period storm event.
- Identification of potential impacts to receiving watercourses
- Identification of municipal drains and related approval requirements.
- Descriptions of how the conveyance and storage capacity will be achieved for the development.
- 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.

- Inclusion of hydraulic analysis including hydraulic grade line elevations.
- Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.
- Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.
- Identification of fill constraints related to floodplain and geotechnical investigation.

#### **4.5 Approval and Permit Requirements: Checklist**

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

- Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.
- Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.
- Changes to Municipal Drains.
- Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)

#### **4.6 Conclusion Checklist**

- Clearly stated conclusions and recommendations
- Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.
- All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario



**APPENDIX C**  
**Sanitary Sewage Calculations**

**30 Frank Nighbor Place (121326)**

**Proposed Peak Sanitary Flows**

**Daily Demands from OBC Table 8.2.1.3**

Type of Use	Daily Demand Volume	
Warehouse	150	L/day/loading bay
	950	L/day/washroom

**Ottawa Sewer Design Guidelines - Industrial & Commercial Sanitary Demands and Peaking Factors**

Employee (Office Space)	75	L/day/Employee
<b>Conditions</b>	<b>Peaking Factor</b>	
Office Space/Commercial	1.5	
Light Industrial (warehouse)	1.5	

**Proposed Development Conditions**

	Bldg A	Bldg B	Bldg C	Bldg D	Total Site
No. Loading Bays	4	0	0	2	6
No. Washrooms	2	0	0	0	2
Peak Industrial Flows (L/s)	0.04	0.00	0.00	0.01	0.05
Number of Employees	6	0	0	0	6
Peak Flows (L/s)	0.01	0.00	0.00	0.00	0.01
Site Area (ha)	2.18	0.000	0.000	0.000	2.18
Extraneous Flows (0.33 L/s/ha)	0.72	0.00	0.00	0.00	0.72
Total Peak Sanitary Flows (L/s)	0.77	0.00	0.00	0.01	0.77

## **APPENDIX D**

### **Water Demands, Boundary Conditions, Schematic of the Hydraulic Model, Hydraulic Modeling Results and FUS Calculations**

**Domestic Water Demands**

**Daily Demands from OBC Table 8.2.1.3**

Establishment	Daily Demand Volume	
Industrial :	150	L/day>Loading bay
	950	L/day/washroom

**Industrial Water Demands and Peaking Factors - Ottawa Water Distribution Guidelines**

Employee (Office Space)	75	L/day/Employee
-------------------------	----	----------------

Conditions	Peaking Factor	
Maximum Day	1.5	x Avg. Day
Peak Hour	1.8	x Max Day

**Proposed Development Conditions**

	Bldg A	Bldgs B & C	Bldg D	Totals
No. Loading Bays	4	0	2	6
No. Washrooms	2	0	0	2
Number of Employees	6	0	0	6
Total Daily Volume (Liters)	2,950	0	300	3250
Avg Day Demand (L/s)	0.03	0.00	0.00	0.04
Max Day Demand (L/s)	0.05	0.00	0.01	0.06
Peak Hour Demand (L/s)	0.09	0.00	0.01	0.10

## Steve Matthews

---

**From:** Rathnasooriya, Shika <Thakshika.Rathnasooriya@ottawa.ca>  
**Sent:** Tuesday, May 17, 2022 9:49 AM  
**To:** Francois Thauvette  
**Cc:** Steve Matthews  
**Subject:** RE: 30 Frank Nighbor Place (Kanata)- Watermain Boundary Conditions Request  
**Attachments:** 30 Frank Nighbor Place\_16May2022.docx

Hi Francois,

Please find the boundary conditions attached.

Thanks,  
Shika

---

**From:** Francois Thauvette <f.thauvette@novatech-eng.com>  
**Sent:** May 16, 2022 11:05 AM  
**To:** Rathnasooriya, Shika <Thakshika.Rathnasooriya@ottawa.ca>  
**Cc:** Steve Matthews <S.Matthews@novatech-eng.com>  
**Subject:** RE: 30 Frank Nighbor Place (Kanata)- Watermain Boundary Conditions Request

**CAUTION: This email originated from an External Sender. Please do not click links or open attachments unless you recognize the source.**

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Hi Shika,

We are sending this e-mail as a follow-up on the watermain boundary conditions request sent out 3 weeks ago. Have you received any feedback from the City's water modelling group? Our client is very eager to submit for SPC this week and we require the boundary conditions to finalize our servicing design and report. Please follow-up at your end and advise when we can expect to receive the requested information.

Regards,

**François Thauvette**, P. Eng., Senior Project Manager | Land Development & Public Sector Engineering

**NOVATECH** Engineers, Planners & Landscape Architects

Please note that I am working from home. Email or MS Teams are the best ways to contact me.

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 219 | Cell: 613.276.0310 | Fax: 613.254.5867

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**From:** Rathnasooriya, Shika <[Thakshika.Rathnasooriya@ottawa.ca](mailto:Thakshika.Rathnasooriya@ottawa.ca)>  
**Sent:** Tuesday, April 26, 2022 2:50 PM  
**To:** Francois Thauvette <[f.thauvette@novatech-eng.com](mailto:f.thauvette@novatech-eng.com)>  
**Subject:** RE: 30 Frank Nighbor Place (Kanata)- Watermain Boundary Conditions Request

Hi Francois,

Your boundary conditions request is now being processed. Please note that currently the turnaround time can take up to 3 weeks.

Thank you,  
Shika

---

**From:** Francois Thauvette <[f.thauvette@novatech-eng.com](mailto:f.thauvette@novatech-eng.com)>  
**Sent:** April 22, 2022 4:17 PM  
**To:** Rathnasooriya, Shika <[Thakshika.Rathnasooriya@ottawa.ca](mailto:Thakshika.Rathnasooriya@ottawa.ca)>  
**Cc:** Steve Matthews <[S.Matthews@novatech-eng.com](mailto:S.Matthews@novatech-eng.com)>  
**Subject:** FW: 30 Frank Nighbor Place (Kanata)- Watermain Boundary Conditions Request

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Hi Thakshika,

We are sending this e-mail to request watermain boundary conditions for the proposed development of the 30 Frank Nighbor Place property in Kanata. Please see e-mail below and attachments for details.

Regards,

**François Thauvette**, P. Eng., Senior Project Manager | Land Development & Public Sector Engineering

**NOVATECH** Engineers, Planners & Landscape Architects

Please note that I am working from home. Email or MS Teams are the best ways to contact me.

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---

**From:** Steve Matthews <[S.Matthews@novatech-eng.com](mailto:S.Matthews@novatech-eng.com)>  
**Sent:** Friday, April 22, 2022 3:57 PM  
**To:** Francois Thauvette <[f.thauvette@novatech-eng.com](mailto:f.thauvette@novatech-eng.com)>  
**Subject:** 30 Frank Nighbor Place (Kanata)- Watermain Boundary Conditions Request

Hi François,

Please forward this information to the City of Ottawa as our request for municipal watermain boundary conditions in relation to the proposed commercial development at 30 Frank Nighbor (in the Kanata area). The site development will include a 5-storey commercial storage building (Bldg 'A'), a high 1-storey rack storage building (Bldg 'D') with an external loading dock and two (2) small portable storage buildings (Bldgs 'B' and 'C') off the extension of Frank Nighbor Place. Refer to the attached Site Plan for details.

Please request watermain boundary conditions from the City of Ottawa for the existing 300mm dia. PVC municipal watermain in the easement through the subject site. The architect has confirmed the construction method and that Buildings 'A' and 'D' will be sprinklered. The anticipated water demands for the proposed development (incl. Buildings A, B, C and D) are as follows:

- Average Day Demand = 0.04 L/s
- Maximum Day Demand = 0.06 L/s

- Peak Hour Demand = 0.10 L/s
- Maximum Fire Flow Demand = 250 L/s (Building A)

See the attached PDFs of the architectural Site Plan and the preliminary calculation sheets for details. A multi-hydrant approach to firefighting is anticipated to be required. There will be three (3) new private on-site fire hydrants within 75m of Buildings 'A', 'B' and 'C'. Two of those new hydrants will be within 75m of Building 'D' and one will be within 150m of Building 'D'.

Please review and let me know if you require any additional information.

Regards,  
Steve

**Stephen Matthews**, B.A.(Env), Senior Design Technologist

**NOVATECH** Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 223 | Fax: 613.254.5867

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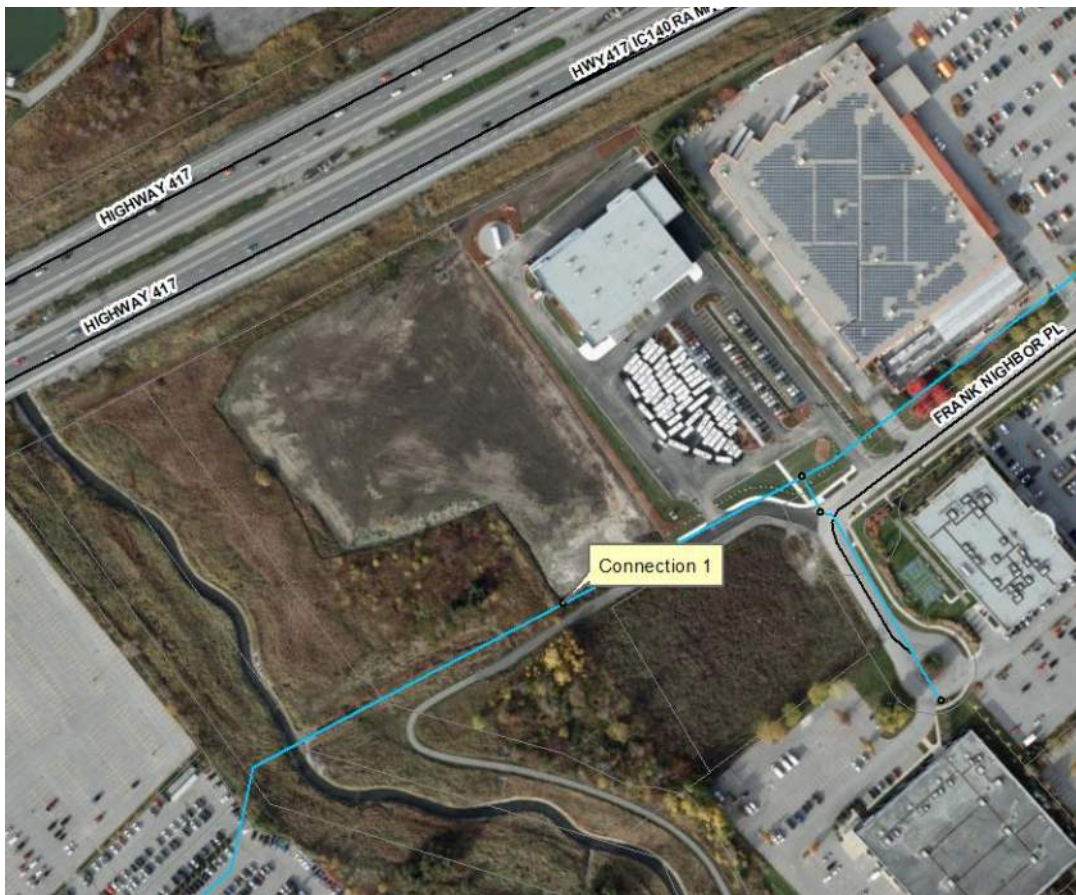
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## Boundary Conditions 30 Frank Nighbor Place

### Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	2	0.04
Maximum Daily Demand	4	0.06
Peak Hour	6	0.10
Fire Flow Demand #1	15,000	250.00

### Location



### Results

#### Connection 1 – Frank Nighbor Place

Demand Scenario	Head (m)	Pressure <sup>1</sup> (psi)
Maximum HGL	160.7	93.5
Peak Hour	156.6	87.6
Max Day plus Fire 1	149.0	76.8

Ground Elevation = 95.0 m



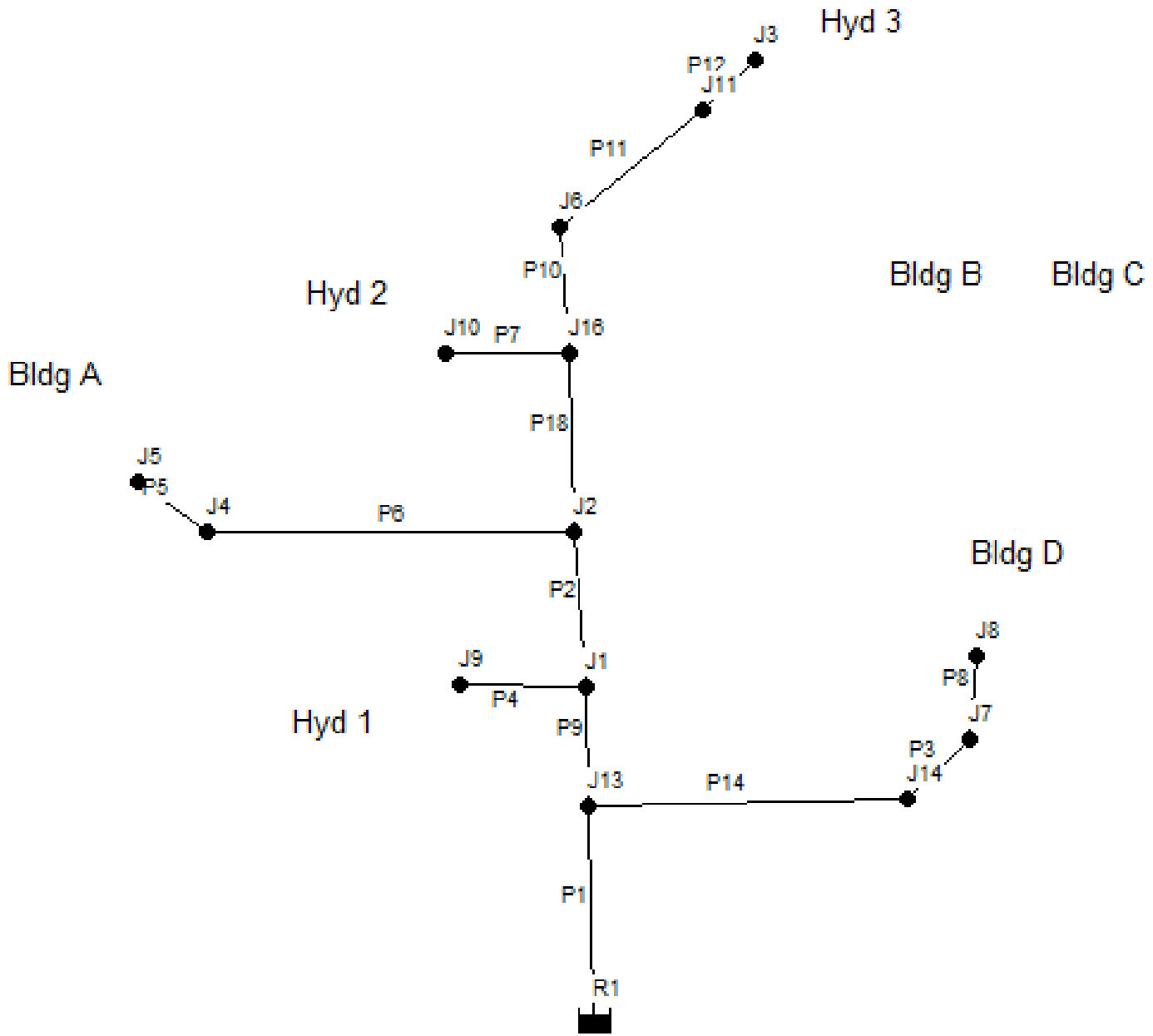
## **Notes**

1. As per the Ontario Building Code in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi.) Pressure control measures to be considered are as follows, in order of preference:
  - a. If possible, systems to be designed to residual pressures of 345 to 552 kPa (50 to 80 psi) in all occupied areas outside of the public right-of-way without special pressure control equipment.
  - b. Pressure reducing valves to be installed immediately downstream of the isolation valve in the home/ building, located downstream of the meter so it is owner maintained.

## **Disclaimer**

*The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.*

# 30 Frank Neighbor Place - U-Haul Development



### 30 Frank Nighbor (U-Haul) - Watermain Analysis

Peak Hour Demand  
Network Table - Nodes

Node ID	Elevation m	Demand L/s	Head m	Pressure m	Pressure kPa	Pressure psi
Junc J1	92.75	0	156.6	63.85	626.37	90.85
Junc J2	92.7	0	156.6	63.9	626.86	90.92
Junc J3	96	0	156.6	60.6	594.49	86.22
Junc J4	92.92	0	156.6	63.68	624.70	90.61
Junc J5 (Bldg A)	95.5	0.09	156.6	61.1	599.39	86.93
Junc J7	93.02	0	156.6	63.58	623.72	90.46
Junc J8 (Bldg D)	95.5	0.01	156.6	61.1	599.39	86.93
Junc J13	92.55	0	156.6	64.05	628.33	91.13
Junc J14	92.92	0	156.6	63.68	624.70	90.61
Junc J16	92.73	0	156.6	63.87	626.56	90.88
Junc J6	92.67	0	156.6	63.93	627.15	90.96
Junc J9	95.9	0	156.6	60.7	595.47	86.37
Junc J10	95.9	0	156.6	60.7	595.47	86.37
Junc J11	92.87	0	156.6	63.73	625.19	90.68
Resvr R1	156.6	-0.1	156.6	0	0.00	0.00

Peak Hour Demand  
Network Table - Links

Link ID	Length m	Diameter mm	Roughness	Flow L/s	Velocity m/s	Unit Headloss m/km
Pipe P2	6.2	200	110	0.09	0	0
Pipe P5	5.9	150	100	0.09	0.01	0
Pipe P8	7	200	110	0.01	0	0
Pipe P1	29.9	200	110	0.1	0	0
Pipe P9	52.6	200	110	0.09	0	0
Pipe P14	33.7	200	110	0.01	0	0
Pipe P18	27.3	200	110	0	0	0
Pipe P3	3.4	200	110	-0.01	0	0
Pipe P4	9.5	150	100	0	0	0
Pipe P6	35.1	150	100	-0.09	0.01	0
Pipe P7	8.7	150	100	0	0	0
Pipe P10	13.7	200	110	0	0	0
Pipe P11	43.6	200	110	0	0	0
Pipe P12	7	150	100	0	0	0

### 30 Frank Nighbor (U-Haul) - Watermain Analysis

Max HGL check  
Network Table - Nodes

Node ID	Elevation m	Demand L/s	Head m	Pressure m	Pressure kPa	Pressure psi
Junc J1	92.75	0	160.7	67.95	666.59	96.68
Junc J2	92.7	0	160.7	68	667.08	96.75
Junc J3	96	0	160.7	64.7	634.71	92.06
Junc J4	92.92	0	160.7	67.78	664.92	96.44
Junc J5 (Bldg A)	95.5	0.05	160.7	65.2	639.61	92.77
Junc J7	93.02	0	160.7	67.68	663.94	96.30
Junc J8 (Bldg D)	95.5	0.01	160.7	65.2	639.61	92.77
Junc J13	92.55	0	160.7	68.15	668.55	96.97
Junc J14	92.92	0	160.7	67.78	664.92	96.44
Junc J16	92.73	0	160.7	67.97	666.79	96.71
Junc J6	92.67	0	160.7	68.03	667.37	96.79
Junc J9	95.9	0	160.7	64.8	635.69	92.20
Junc J10	95.9	0	160.7	64.8	635.69	92.20
Junc J11	92.87	0	160.7	67.83	665.41	96.51
Resvr R1	160.7	-0.06	160.7	0	0.00	0.00

Max HGL check  
Network Table - Links

Link ID	Length m	Diameter mm	Roughness	Flow L/s	Velocity m/s	Unit Headloss m/km
Pipe P2	6.2	200	110	0.05	0	0
Pipe P5	5.9	150	100	0.05	0	0
Pipe P8	7	200	110	0.01	0	0
Pipe P1	29.9	200	110	0.06	0	0
Pipe P9	52.6	200	110	0.05	0	0
Pipe P14	33.7	200	110	0.01	0	0
Pipe P18	27.3	200	110	0	0	0
Pipe P3	3.4	200	110	-0.01	0	0
Pipe P4	9.5	150	100	0	0	0
Pipe P6	35.1	150	100	-0.05	0	0
Pipe P7	8.7	150	100	0	0	0
Pipe P10	13.7	200	110	0	0	0
Pipe P11	43.6	200	110	0	0	0
Pipe P12	7	150	100	0	0	0

### 30 Frank Nighbor (U-Haul) - Watermain Analysis

Max Day + Fire Flow Demand (Bldgs A, B, C or D)

Network Table - Nodes

Node ID	Elevation m	Demand L/s	Head m	Pressure m	Pressure kPa	Pressure psi
Junc J1	92.75	0	119.09	26.34	258.40	37.48
Junc J2	92.7	0	118.13	25.43	249.47	36.18
Junc J3 (Hyd)	96	67	111.18	15.18	148.92	21.60
Junc J4	92.92	0	118.13	25.21	247.31	35.87
Junc J5 (Bldg A)	95.5	0.05	118.13	22.63	222.00	32.20
Junc J7	93.02	0	138.16	45.14	442.82	64.23
Junc J8 (Bldg D)	95.5	0.01	138.16	42.66	418.49	60.70
Junc J13	92.55	0	138.16	45.61	447.43	64.89
Junc J14	92.92	0	138.16	45.24	443.80	64.37
Junc J16	92.73	0	113.92	21.19	207.87	30.15
Junc J6	92.67	0	113.51	20.84	204.44	29.65
Junc J9 (Hyd)	95.9	95	116.45	20.55	201.60	29.24
Junc J10 (Hyd)	95.9	95	111.5	15.6	153.04	22.20
Junc J11	92.87	0	112.2	19.33	189.63	27.50
Resvr R1	149	-257.06	149	0	0.00	0.00

Max Day + Fire Flow Demand

Network Table - Links

Link ID	Length m	Diameter mm	Roughness	Flow L/s	Velocity m/s	Unit Headloss m/km
Pipe P2	6.2	200	110	162.05	5.16	154.29
Pipe P5	5.9	150	100	0.05	0	0
Pipe P8	7	200	110	0.01	0	0
Pipe P1	29.9	200	110	257.06	8.18	362.61
Pipe P9	52.6	200	110	257.05	8.18	362.58
Pipe P14	33.7	200	110	0.01	0	0
Pipe P18	27.3	200	110	162	5.16	154.2
Pipe P3	3.4	200	110	-0.01	0	0
Pipe P4	9.5	150	100	-95	5.38	277.99
Pipe P6	35.1	150	100	-0.05	0	0
Pipe P7	8.7	150	100	-95	5.38	277.99
Pipe P10	13.7	200	110	67	2.13	30.06
Pipe P11	43.6	200	110	67	2.13	30.06
Pipe P12	7	150	100	67	3.79	145.61

## Steve Matthews

---

**From:** Yazan Bilbeisi <Yazan.Bilbeisi@ibigroup.com>  
**Sent:** Friday, April 22, 2022 12:05 PM  
**To:** Francois Thauvette  
**Cc:** Steve Matthews; David Pollock; Alvis Chu  
**Subject:** RE: 30 Frank Nighbor Place - Confirmation of Building Construction for FUS Calculations  
**Attachments:** Yazan Bilbeisi.vcf; 2022-04-21\_IBI-Arch\_Uhaul-Kanata\_A-4001-4002v2.pdf

Hi Francois,

Please see replies below and file attached.

Kind regards,

**Yazan Bilbeisi** RIBA, PMP, PGDip (Oxon), MArch (UCL), MSc (Cardiff), BSc, MRAIC

*Working remotely*

### IBI GROUP

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Ottawa ON K1S 5N4 Canada  
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**From:** Francois Thauvette <f.thauvette@novatech-eng.com>  
**Sent:** Thursday, April 21, 2022 10:22 AM  
**To:** Yazan Bilbeisi <Yazan.Bilbeisi@ibigroup.com>  
**Cc:** Steve Matthews <S.Matthews@novatech-eng.com>  
**Subject:** FW: 30 Frank Nighbor Place - Confirmation of Building Construction for FUS Calculations

Hi Yazan

We are completing the fire flow calculations for the proposed U-Haul development using the Fire Underwriters Survey (FUS) method per City standards and require input from your office. Please review the e-mail below and provide clarification/input, so that we may be able to finalize the calculations and request the municipal watermain boundary conditions to finalize the servicing design.

Regards,

**François Thauvette**, P. Eng., Senior Project Manager | Land Development & Public Sector Engineering

**NOVATECH** Engineers, Planners & Landscape Architects

Please note that I am working from home. Email or MS Teams are the best ways to contact me.

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---

**From:** Steve Matthews <[S.Matthews@novatech-eng.com](mailto:S.Matthews@novatech-eng.com)>

**Sent:** Thursday, April 21, 2022 10:13 AM

**To:** Francois Thauvette <[f.thauvette@novatech-eng.com](mailto:f.thauvette@novatech-eng.com)>

**Subject:** 30 Frank Nighbor Place - Confirmation of Building Construction for FUS Calculations

Hi François,

The City of Ottawa now requires that we verify building construction via e-mail correspondence with the architect (and include the verification e-mail as supporting documentation in our DSS & SWM Report).

Please confirm the following building design elements with the Architect in regards to the **type of construction**, **occupancy type** and **sprinkler protection** for our use in calculating the FUS fire flow requirements:

- Please confirm the **Building Construction Type** for both Buildings A and D (i.e., **Combustible** (wood frame); **Non-Combustible** (concrete with metal stud infill) **[Yazan Bilbeisi] Non-combustible**; or **Fire Resistive** construction).
  - If fire resistive, what will it be rated to? (i.e.: 2 hours or 3 hours) and will the openings between floors (Building A) have a 1-hour fire rating, or greater; or will the openings be fully protected?
- Please confirm that the **Occupancy Hazard** will be considered **Combustible** **[Yazan Bilbeisi] confirmed** (given the contents of the storage units are unknown but assumed to be residential type items).
- Please confirm that both Buildings A and D be designed with a **Sprinkler System** for the entire interior space. **[Yazan Bilbeisi] confirmed**
- Please confirm the height of each storey for both Buildings A and D. **[Yazan Bilbeisi] Please see attached.**

Refer to the attached FUS Guidelines for clarification on the Building Construction Type Definitions [pages 21, 22 and 23] and for the Occupancy Hazard definitions [pages 25, 26 and 27 for this section specifically].

The OBC fire flow calculations indicate that volume of water required exceeds the 270,000 L limit which triggers the City of Ottawa requirement to provide FUS fire flow calculations for this urban site.

If there are any questions or concerns please do not hesitate to call.

Regards,  
Steve

**Stephen Matthews**, B.A.(Env), Senior Design Technologist

**NOVATECH** Engineers, Planners & Landscape Architects

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# FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines



Engineers, Planners & Landscape Architects

Novatech Project #: 121326  
 Project Name: 30 Frank Nighbor Place  
 Date: 4/22/2022  
 Input By: S. Matthews  
 Reviewed By: F. Thauvette

Legend

Input by User  
 No Information or Input Required

Building Description: 5-Storey Building A  
 Non-combustible construction

Step	Input		Value Used	Total Fire Flow (L/min)		
<b>Base Fire Flow</b>						
1	<b>Construction Material</b>		<b>Multiplier</b>	0.8		
	<b>Coefficient related to type of construction</b> <b>C</b>	Wood frame			1.5	
		Ordinary construction			1	
		Non-combustible construction	Yes		0.8	
		Modified Fire resistive construction (2 hrs)			0.6	
Fire resistive construction (> 3 hrs)			0.6			
2	<b>Floor Area</b>			23,000		
	<b>A</b>	Building Footprint (m <sup>2</sup> )	3383		16,915	
		Number of Floors/Storeys	5			
		Area of structure considered (m <sup>2</sup> )				
<b>F</b>	<b>Base fire flow without reductions</b>					
<b>Reductions or Surcharges</b>						
3	<b>Occupancy hazard reduction or surcharge</b>		<b>Reduction/Surcharge</b>	23,000		
	<b>(1)</b>	Non-combustible			-25%	
		Limited combustible			-15%	
		Combustible	Yes		0%	
		Free burning			15%	
Rapid burning			25%			
4	<b>Sprinkler Reduction</b>		<b>Reduction</b>	-9,200		
	<b>(2)</b>	Adequately Designed System (NFPA 13)	Yes		-30%	
		Standard Water Supply	Yes		-10%	
		Fully Supervised System	No		-10%	
<b>Cumulative Total</b>			<b>-40%</b>			
5	<b>Exposure Surcharge (cumulative %)</b>		<b>Surcharge</b>	1,150		
	<b>(3)</b>	North Side	> 45.1m		0%	
		East Side	30.1- 45 m		5%	
		South Side	> 45.1m		0%	
		West Side	> 45.1m		0%	
<b>Cumulative Total</b>			<b>5%</b>			
<b>Results</b>						
6	<b>(1) + (2) + (3)</b>	<b>Total Required Fire Flow, rounded to nearest 1000L/min</b>		<b>L/min</b>	<b>15,000</b>	
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	<b>L/s</b>	<b>250</b>
				or	<b>USGPM</b>	<b>3,963</b>
7	<b>Storage Volume</b>	Required Duration of Fire Flow (hours)		<b>Hours</b>	<b>3</b>	
		Required Volume of Fire Flow (m <sup>3</sup> )		<b>m<sup>3</sup></b>	<b>2700</b>	



# FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines



Engineers, Planners & Landscape Architects

Novatech Project #: 121326  
 Project Name: 30 Frank Nighbor Place  
 Date: 4/22/2022  
 Input By: S.Matthews  
 Reviewed By: F.Thauvette

Legend

Input by User  
 No Information or Input Required

Building Description: 1-Storey Building B  
 Non-combustible construction

Step	Input		Value Used	Total Fire Flow (L/min)		
<b>Base Fire Flow</b>						
1	<b>Construction Material</b>		<b>Multiplier</b>	0.8		
	<b>Coefficient related to type of construction</b> <b>C</b>	Wood frame			1.5	
		Ordinary construction			1	
		Non-combustible construction	Yes		0.8	
		Modified Fire resistive construction (2 hrs)			0.6	
Fire resistive construction (> 3 hrs)			0.6			
2	<b>Floor Area</b>			3,000		
	<b>A</b>	Building Footprint (m <sup>2</sup> )	218			
		Number of Floors/Storeys	1			
		Area of structure considered (m <sup>2</sup> )			218	
<b>F</b>	<b>Base fire flow without reductions</b>		<b>F = 220 C (A)<sup>0.5</sup></b>			
<b>Reductions or Surcharges</b>						
3	<b>Occupancy hazard reduction or surcharge</b>		<b>Reduction/Surcharge</b>	3,000		
	<b>(1)</b>	Non-combustible			-25%	
		Limited combustible			-15%	
		Combustible	Yes		0%	
		Free burning			15%	
Rapid burning			25%			
4	<b>Sprinkler Reduction</b>		<b>Reduction</b>	0		
	<b>(2)</b>	Adequately Designed System (NFPA 13)			-30%	
		Standard Water Supply			-10%	
		Fully Supervised System			-10%	
<b>Cumulative Total</b>			<b>0%</b>			
5	<b>Exposure Surcharge (cumulative %)</b>		<b>Surcharge</b>	750		
	<b>(3)</b>	North Side	> 45.1m		0%	
		East Side	3.1 - 10 m		20%	
		South Side	> 45.1m		0%	
		West Side	30.1- 45 m		5%	
<b>Cumulative Total</b>			<b>25%</b>			
<b>Results</b>						
6	<b>(1) + (2) + (3)</b>	<b>Total Required Fire Flow, rounded to nearest 1000L/min</b>		<b>L/min</b>	<b>4,000</b>	
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	<b>L/s</b>	<b>67</b>
				or	<b>USGPM</b>	<b>1,057</b>
7	<b>Storage Volume</b>	Required Duration of Fire Flow (hours)		Hours	1.5	
		Required Volume of Fire Flow (m <sup>3</sup> )		m <sup>3</sup>	360	

# FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines



Engineers, Planners & Landscape Architects

Novatech Project #: 121326  
 Project Name: 30 Frank Nighbor Place  
 Date: 4/22/2022  
 Input By: S. Matthews  
 Reviewed By: F. Thauvette

Legend

Input by User  
 No Information or Input Required

Building Description: 1-Storey Building C  
 Non-combustible construction

Step	Input		Value Used	Total Fire Flow (L/min)		
<b>Base Fire Flow</b>						
1	<b>Construction Material</b>		<b>Multiplier</b>	0.8		
	<b>Coefficient related to type of construction</b> <b>C</b>	Wood frame			1.5	
		Ordinary construction			1	
		Non-combustible construction	Yes		0.8	
		Modified Fire resistive construction (2 hrs)			0.6	
Fire resistive construction (> 3 hrs)			0.6			
2	<b>Floor Area</b>			3,000		
	<b>A</b>	Building Footprint (m <sup>2</sup> )	218			
		Number of Floors/Storeys	1			
		Area of structure considered (m <sup>2</sup> )			218	
<b>F</b>	<b>Base fire flow without reductions</b>					
<b>Reductions or Surcharges</b>						
3	<b>Occupancy hazard reduction or surcharge</b>		<b>Reduction/Surcharge</b>	3,000		
	<b>(1)</b>	Non-combustible			-25%	
		Limited combustible			-15%	
		Combustible	Yes		0%	
		Free burning			15%	
Rapid burning			25%			
4	<b>Sprinkler Reduction</b>		<b>Reduction</b>	0		
	<b>(2)</b>	Adequately Designed System (NFPA 13)			-30%	
		Standard Water Supply			-10%	
		Fully Supervised System			-10%	
<b>Cumulative Total</b>			<b>0%</b>			
5	<b>Exposure Surcharge (cumulative %)</b>		<b>Surcharge</b>	1,050		
	<b>(3)</b>	North Side	> 45.1m		0%	
		East Side	10.1 - 20 m		15%	
		South Side	> 45.1m		0%	
		West Side	3.1 - 10 m		20%	
<b>Cumulative Total</b>			<b>35%</b>			
<b>Results</b>						
6	<b>(1) + (2) + (3)</b>	<b>Total Required Fire Flow, rounded to nearest 1000L/min</b>		<b>L/min</b>	<b>4,000</b>	
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	<b>L/s</b>	<b>67</b>
				or	<b>USGPM</b>	<b>1,057</b>
7	<b>Storage Volume</b>	Required Duration of Fire Flow (hours)		Hours	1.5	
		Required Volume of Fire Flow (m <sup>3</sup> )		m <sup>3</sup>	360	

# FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines



Engineers, Planners & Landscape Architects

Novatech Project #: 121326  
 Project Name: 30 Frank Nighbor Place  
 Date: 4/22/2022  
 Input By: S.Matthews  
 Reviewed By: F.Thauvette

Legend

Input by User  
 No Information or Input Required

Building Description: High 1-Storey Building D (1=3 Rack Storage per FUS guidelines)  
 Non-combustible construction

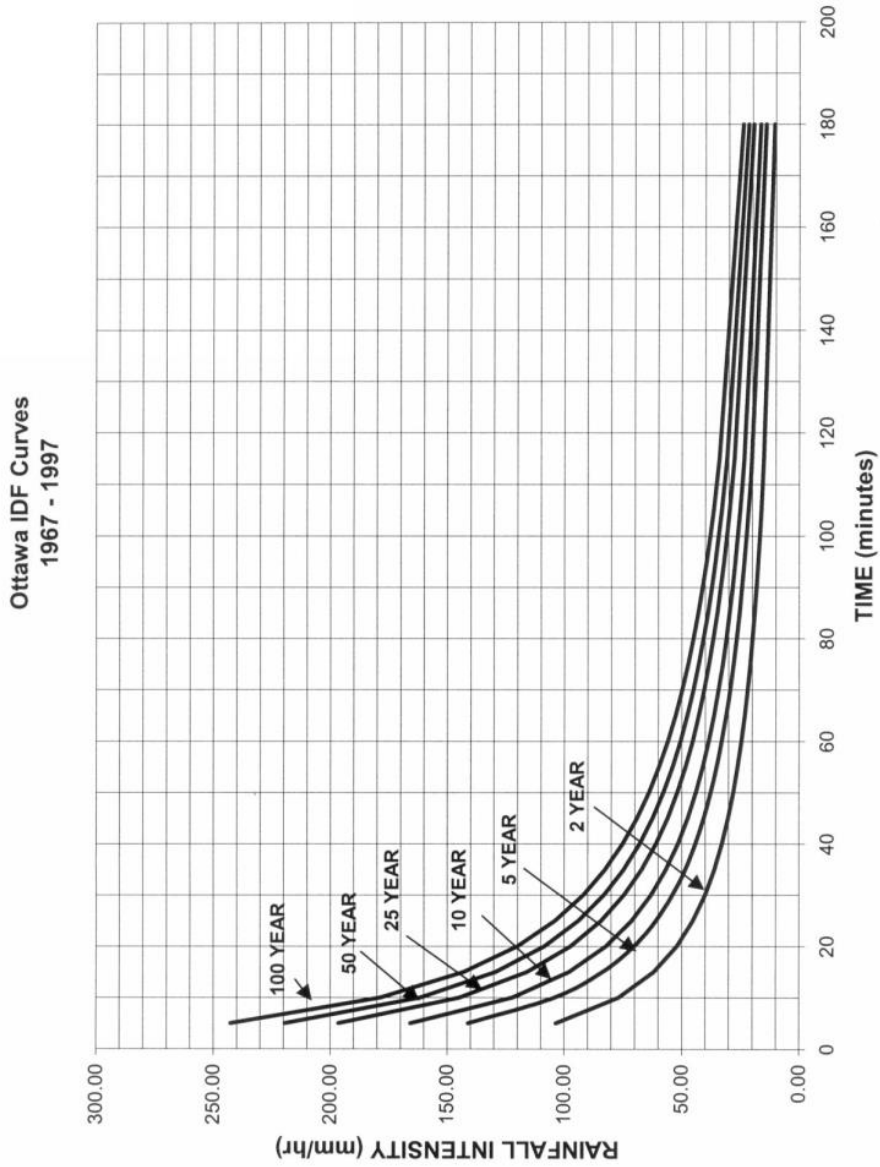
Step	Input		Value Used	Total Fire Flow (L/min)		
<b>Base Fire Flow</b>						
1	<b>Construction Material</b>		<b>Multiplier</b>	0.8		
	<b>Coefficient related to type of construction</b> <b>C</b>	Wood frame			1.5	
		Ordinary construction			1	
		Non-combustible construction	Yes		0.8	
		Modified Fire resistive construction (2 hrs)			0.6	
Fire resistive construction (> 3 hrs)			0.6			
2	<b>Floor Area</b>			12,000		
	<b>A</b>	Building Footprint (m <sup>2</sup> )	1554		4,662	
		Number of Floors/Storeys	3			
		Area of structure considered (m <sup>2</sup> )				
<b>F</b>	<b>Base fire flow without reductions</b>					
<b>Reductions or Surcharges</b>						
3	<b>Occupancy hazard reduction or surcharge</b>		<b>Reduction/Surcharge</b>	12,000		
	<b>(1)</b>	Non-combustible			-25%	
		Limited combustible			-15%	
		Combustible	Yes		0%	
		Free burning			15%	
Rapid burning			25%			
4	<b>Sprinkler Reduction</b>		<b>Reduction</b>	-4,800		
	<b>(2)</b>	Adequately Designed System (NFPA 13)	Yes		-30%	
		Standard Water Supply	Yes		-10%	
		Fully Supervised System	No		-10%	
<b>Cumulative Total</b>			<b>-40%</b>			
5	<b>Exposure Surcharge (cumulative %)</b>		<b>Surcharge</b>	2,400		
	<b>(3)</b>	North Side	> 45.1m		0%	
		East Side	10.1 - 20 m		15%	
		South Side	> 45.1m		0%	
		West Side	30.1- 45 m		5%	
<b>Cumulative Total</b>			<b>20%</b>			
<b>Results</b>						
6	<b>(1) + (2) + (3)</b>	<b>Total Required Fire Flow, rounded to nearest 1000L/min</b>		<b>L/min</b>	<b>10,000</b>	
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	<b>L/s</b>	<b>167</b>
				or	<b>USGPM</b>	<b>2,642</b>
7	<b>Storage Volume</b>	Required Duration of Fire Flow (hours)		Hours	2	
		Required Volume of Fire Flow (m <sup>3</sup> )		m <sup>3</sup>	1200	

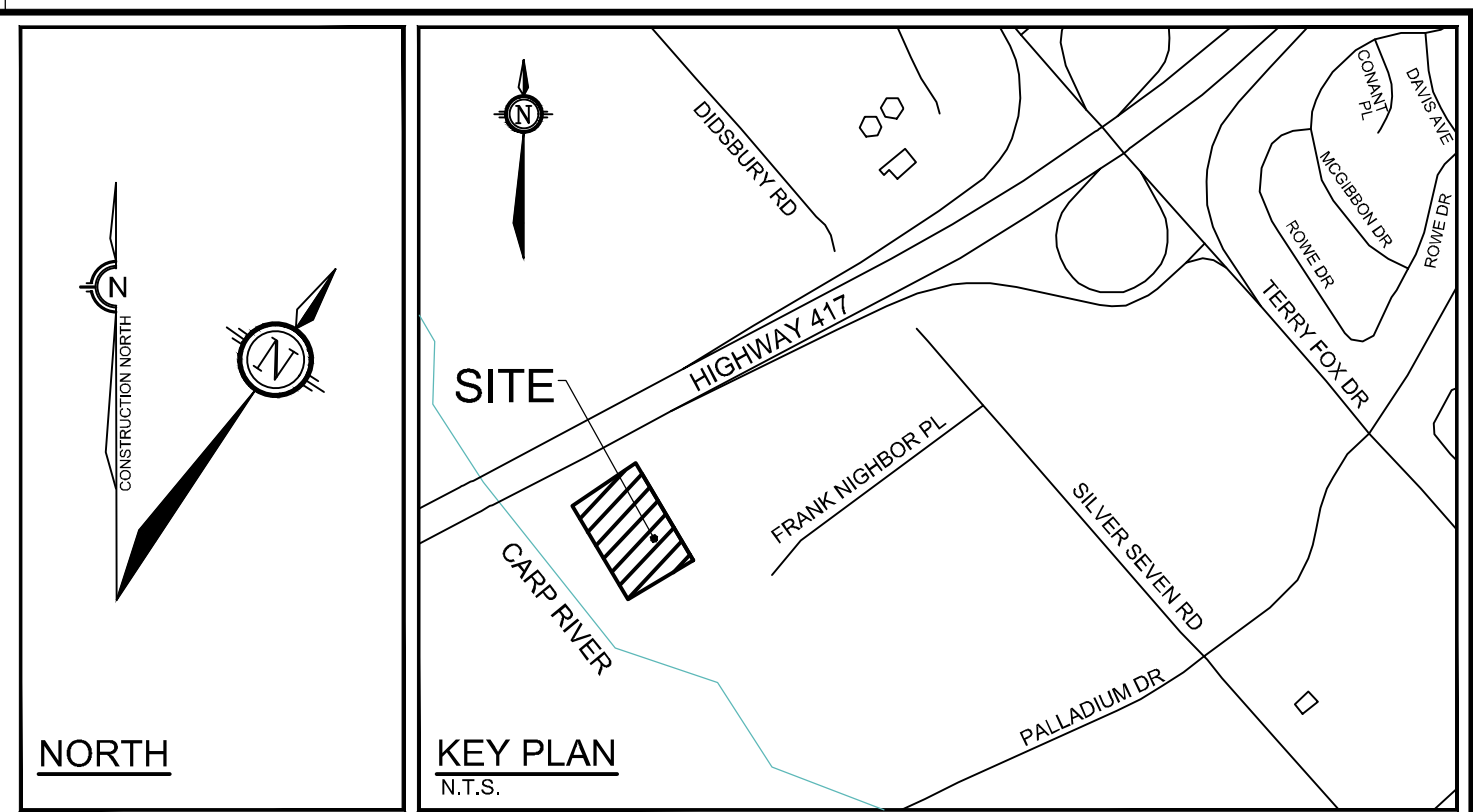
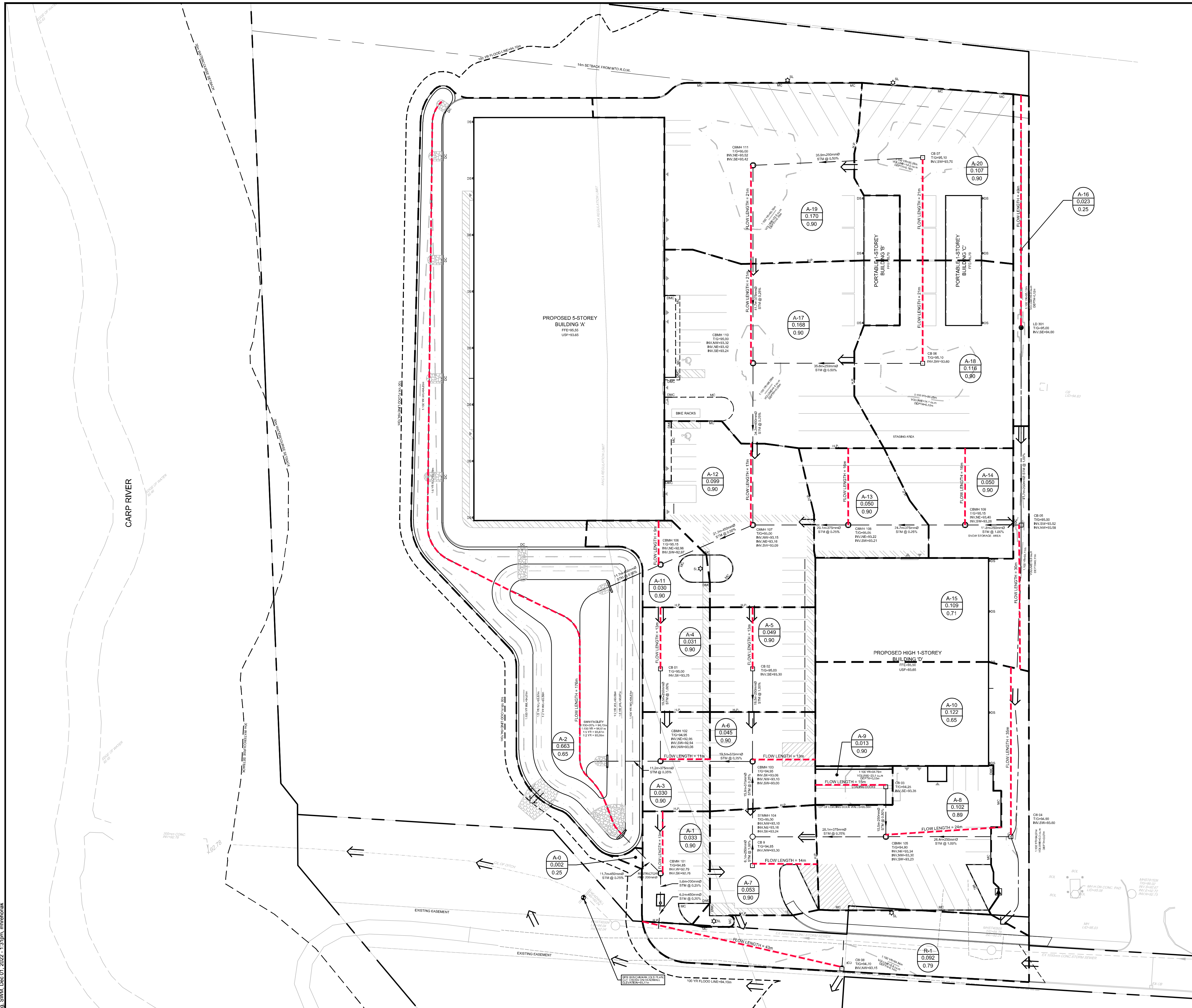
## **APPENDIX E**

**IDF Curves, SWM Modelling Files, Storm Sewer Design Sheet,  
Excerpts from Terry Fox Business Park – Stormwater Design Plan**

APPENDIX 5-A

OTTAWA INTENSITY DURATION FREQUENCY (IDF) CURVE





**LEGEND**

- PROPERTY LINE
- POST-DEVELOPMENT AREA ID
- 1.5 YEAR WEIGHTED RUNOFF COEFFICIENT
- DRAINAGE AREA LIMITS
- MAXIMUM 3:1 SIDESLOPE
- EMERGENCY OVERLAND FLOW ROUTE
- PROPOSED SANITARY MANHOLE
- PROPOSED BUILDING ENTRANCE
- PROPOSED SILT FENCING (OPSD 219.110)
- PROPOSED CATCHBASIN MANHOLE
- PROPOSED STORM MANHOLE
- PROPOSED CATCHBASIN
- PROPOSED HYDRANT AND VALVE
- PROPOSED BARRIER CURB (15cm CURB HEIGHT)
- DEPRESSED BARRIER CURB (0cm CURB HEIGHT)
- PROPOSED MOUNTABLE CURB (5cm CURB HEIGHT)
- DEPRESSED MOUNTABLE CURB (0cm CURB HEIGHT)
- RESTRICTOR PIPE / INLET CONTROL DEVICE
- PROPOSED DOWNSPOUT LOCATION
- PROPOSED FINISHED FLOOR ELEVATION
- PROPOSED UNDERSIDE OF FOOTING ELEVATION
- PROPOSED SITE LIGHTING POLE (REFER TO ELEC)
- PROPOSED MUD MAT / CONSTRUCTION ENTRANCE
- APPROXIMATE PONDING LIMITS
- EXISTING CONCRETE CURB
- EXISTING SANITARY MANHOLE
- EXISTING CATCHBASIN MANHOLE
- EXISTING STORM MANHOLE
- EXISTING CATCHBASIN
- EXISTING HYDRANT & VALVE
- EXISTING TREES / VEGETATION
- EXISTING UTILITY POLE C/W GUY WIRES
- EXISTING FENCE
- EXISTING LIGHT STANDARD

DESIGN EVENT	PRE-DEVELOPMENT CONDITIONS		POST-DEVELOPMENT CONDITIONS				
	UNCONTROLLED FLOW (L/s)	ALLOWABLE RELEASE RATE (L/s)	A-0 DIRECT RUNOFF (L/s)	A-1 to A-20 FLOW (L/s)	R-1 FLOW (L/s)	TOTAL FLOW (L/s)	REDUCTION IN FLOW (L/s or %)*
1:2 YR	92.1	107.9	0.2	53.9	17.1	71.2	20.9 or 23%
1:5 YR	125.0		0.5	60.9	24.2	85.6	39.4 or 32%
1:100 YR	267.7		0.9	71.0	31.0	102.9	164.8 or 62%

DESIGN EVENT	DIAMETER OF RESTRICTOR PIPE (mm)	DIAMETER OF OUTLET PIPE (mm)	DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER ELEVATION (m)	VOLUME (m <sup>3</sup> )
1:2 YR	200mmØ RINGTIGHT (NOMINAL PIPE SIZE)	200	53.9	0.79	93.55	549.0
1:5 YR			60.9	1.10	93.86	857.0
1:100 YR			71.0	1.84	94.60	1911.0

DESIGN EVENT	TYPE OF ICD	DIAMETER OF OUTLET PIPE (mm)	DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER DEPTH (m)	VOLUME (m <sup>3</sup> )
1:2 YR	TEMPEST MHF VORTEX 127mm	200	17.1	0.32	93.47	0.1
1:5 YR			24.2	0.78	93.93	0.3
1:100 YR			31.0	1.69	94.84	5.8

REFER TO PLAN 121326-NDT1 AND 121326-NDT2 FOR CIVIL NOTES, DETAILS AND TABLES

NOTE:  
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMANS, 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.

**OWNER INFORMATION**  
U-HAUL CANADA  
3636 INNES ROAD  
OTTAWA, ONTARIO, K1C 1T1  
DAVID POLLOCK  
PHONE: 1-602-263-6555  
david.pollock@uhaul.com

No.	REVISION	DATE	BY
3	REVISED PER CITY, MVCA & MTO COMMENTS	DEC 5/22	FST
2	REVISED PER CITY COMMENTS	AUG 30/22	FST
1	ISSUED FOR SITE PLAN APPROVAL	MAY 20/22	FST

SCALE  
1:400

**FOR REVIEW ONLY**

DESIGN	SM / MH
CHECKED	FST
DRAWN	SM
CHECKED	SM / FST
APPROVED	MH

**NOVATECH**  
Engineers, Planners & Landscape Architects  
Suite 200, 240 Michael Cowpland Drive  
Ottawa, Ontario, Canada K2M 1P6  
Telephone (613) 254-9643  
Facsimile (613) 254-5867  
Website www.novatech-eng.com

LOCATION  
CITY OF OTTAWA  
30 FRANK NIGHBOR PLACE: U-HAUL SITE

DRAWING NAME  
POST-DEVELOPMENT STORM DRAINAGE AREA PLAN

PROJECT No. 121326  
REV 121326-STM2  
REV # 3  
DRAWING No. 121326-STM2  
Plan #18789

D07-12-22-0088



### Legend

● Junctions

▲ Outfalls

Storages

■ Visible

■ CB

■ CBMH

● STMH

● POND

● LD

Conduits

— Visible

— Major System

— Orifices

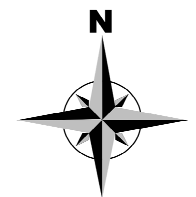
— Weirs

Subcatchments

■ Visible

■ Controlled

■ Direct Runoff



50 m



● Junctions

▲ Outfalls

#### Storages

■ Visible

■ CB

■ CBMH

● STMH

● POND

● LD

#### Conduits

— Visible

— Major System

— Orifices

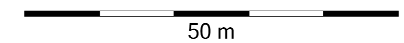
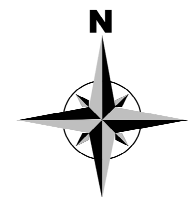
— Weirs

#### Subcatchments

■ Visible

■ Controlled

■ Direct Runoff





# Chicago 4hr - 2 Year PCSWMM Results

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

\*\*\*\*\*

Element Count

\*\*\*\*\*

Number of rain gages ..... 1  
 Number of subcatchments ... 22  
 Number of nodes ..... 30  
 Number of links ..... 42  
 Number of pollutants ..... 0  
 Number of land uses ..... 0

\*\*\*\*\*

Raingage Summary

\*\*\*\*\*

Name	Data Source	Data Type	Recording Interval
Raingage1	C4-2	INTENSITY	10 min.

\*\*\*\*\*

Subcatchment Summary

\*\*\*\*\*

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A-0	0.00	5.00	7.00	2.0000	Raingage1	CARP2
A-1	0.03	25.39	100.00	2.0000	Raingage1	CBMH101
A-10	0.12	34.86	64.00	1.0000	Raingage1	CB04
A-11	0.03	33.33	100.00	1.5000	Raingage1	CBMH106
A-12	0.10	58.23	100.00	2.0000	Raingage1	CBMH107
A-13	0.05	31.25	100.00	2.0000	Raingage1	CBMH108
A-14	0.05	31.25	100.00	2.0000	Raingage1	CBMH109
A-15	0.11	36.33	73.00	1.0000	Raingage1	CB05
A-16	0.02	4.69	7.00	1.5000	Raingage1	LD301
A-17	0.17	80.00	100.00	2.0000	Raingage1	CBMH110
A-18	0.12	55.24	100.00	2.0000	Raingage1	CB06

A-19	0.17	80.95	100.00	2.0000	Raingage1	CBMH111
A-2	0.66	37.67	64.00	1.5000	Raingage1	POND
A-20	0.11	50.95	100.00	2.0000	Raingage1	CB07
A-3	0.03	27.27	100.00	2.0000	Raingage1	CBMH102
A-4	0.03	23.85	100.00	2.0000	Raingage1	CB01
A-5	0.05	37.69	100.00	2.0000	Raingage1	CB02
A-6	0.04	34.62	100.00	2.0000	Raingage1	CBMH103
A-7	0.05	37.86	100.00	2.0000	Raingage1	CB9
A-8	0.10	42.50	99.00	2.0000	Raingage1	CBMH105
A-9	0.01	8.67	100.00	5.5000	Raingage1	CB03
R-1	0.09	21.39	84.00	1.0000	Raingage1	CB08

\*\*\*\*\*

Node Summary

\*\*\*\*\*

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
OGS	JUNCTION	92.67	2.26	0.0	
CARP1	OUTFALL	94.60	0.00	0.0	
CARP2	OUTFALL	94.60	0.00	0.0	
OVL1	OUTFALL	95.19	1.00	0.0	
OVL2	OUTFALL	94.99	1.05	0.0	
OVL4	OUTFALL	94.84	1.00	0.0	
XSTM1	OUTFALL	92.07	1.04	0.0	
XSTM2	OUTFALL	92.15	0.00	0.0	
CB01	STORAGE	93.25	2.75	0.0	
CB02	STORAGE	93.30	2.70	0.0	
CB03	STORAGE	93.35	1.90	0.0	
CB04	STORAGE	93.60	2.30	0.0	
CB05	STORAGE	93.52	2.48	0.0	
CB06	STORAGE	93.60	2.50	0.0	
CB07	STORAGE	93.70	2.40	0.0	
CB08	STORAGE	93.15	2.55	0.0	
CB9	STORAGE	93.30	2.55	0.0	
CBMH101	STORAGE	92.76	3.09	0.0	
CBMH102	STORAGE	92.94	3.01	0.0	
CBMH103	STORAGE	93.00	2.95	0.0	
CBMH105	STORAGE	93.23	2.67	0.0	
CBMH106	STORAGE	92.97	3.18	0.0	

CBMH107	STORAGE	93.09	2.91	0.0
CBMH108	STORAGE	93.21	2.89	0.0
CBMH109	STORAGE	93.28	2.87	0.0
CBMH110	STORAGE	93.24	2.76	0.0
CBMH111	STORAGE	93.42	2.58	0.0
LD301	STORAGE	94.00	2.00	0.0
POND	STORAGE	92.82	3.08	0.0
STMH104	STORAGE	93.10	2.90	0.0

\*\*\*\*\*  
Link Summary  
\*\*\*\*\*

Name	From Node	To Node	Type	Length	%Slope	Roughness
01-102	CB01	CBMH102	CONDUIT	19.5	0.9744	0.0130
02-103	CB02	CBMH103	CONDUIT	19.5	1.0257	0.0130
03-105	CB03	CBMH105	CONDUIT	10.5	0.4762	0.0130
04-105	CB04	CBMH105	CONDUIT	26.4	0.9849	0.0130
05-109	CB05	CBMH109	CONDUIT	11.8	1.0170	0.0130
06-110	CB06	CBMH110	CONDUIT	35.8	0.5028	0.0130
07-111	CB07	CBMH111	CONDUIT	35.9	0.5014	0.0130
101-OGS	CBMH101	OGS	CONDUIT	5.6	0.1786	0.0130
102-POND	CBMH102	POND	CONDUIT	11.2	0.3571	0.0130
103-102	CBMH103	CBMH102	CONDUIT	19.5	0.2564	0.0130
104-103	STMH104	CBMH103	CONDUIT	15.9	0.2516	0.0130
105-104	CBMH105	STMH104	CONDUIT	28.1	0.2491	0.0130
106-POND	CBMH106	POND	CONDUIT	11.7	0.5128	0.0130
107-106	CBMH107	CBMH106	CONDUIT	21.2	0.5189	0.0130
108-107	CBMH108	CBMH107	CONDUIT	20.1	0.2488	0.0130
109-108	CBMH109	CBMH108	CONDUIT	24.7	0.2429	0.0130
110-10	CBMH110	CBMH107	CONDUIT	34.2	0.2632	0.0130
111-110	CBMH111	CBMH110	CONDUIT	41.7	0.2398	0.0130
301-05	LD301	CB05	CONDUIT	41.7	1.0072	0.0130
9-104	CB9	STMH104	CONDUIT	6.1	0.9837	0.0130
OGS-XSTM1	OGS	XSTM1	CONDUIT	6.0	0.1667	0.0130
OLFA1	CBMH101	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA10	CBMH106	CB01	CONDUIT	1.0	1.0001	0.0150
OLFA11	CBMH107	CB02	CONDUIT	1.0	1.0001	0.0150
OLFA12	CBMH108	CBMH107	CONDUIT	1.0	1.0001	0.0150
OLFA13	CBMH109	CB05	CONDUIT	1.0	1.0001	0.0150

OLFA14	CB05	CB04	CONDUIT	1.0	1.0001	0.0350
OLFA15	LD301	CB05	CONDUIT	1.0	1.0001	0.0350
OLFA16	CBMH110	CBMH107	CONDUIT	1.0	1.0001	0.0150
OLFA17	CB06	CBMH110	CONDUIT	1.0	1.0001	0.0150
OLFA18	CBMH111	CBMH110	CONDUIT	1.0	1.0001	0.0150
OLFA19	CB07	CBMH111	CONDUIT	1.0	11.0672	0.0150
OLFA3	CBMH102	CBMH101	CONDUIT	1.0	1.0001	0.0150
OLFA4	CB01	CBMH102	CONDUIT	1.0	1.0001	0.0150
OLFA5	CB02	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA6	CB9	OVLF2	CONDUIT	1.0	1.0001	0.0150
OLFA7	CBMH105	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA9	CB04	OVLF1	CONDUIT	1.0	1.0001	0.0350
OLFR1	CB08	OVLF4	CONDUIT	1.0	1.0001	0.0150
POND-101	POND	CBMH101	CONDUIT	11.7	0.2564	0.0130
08-XTMS2	CB08	XSTM2	ORIFICE			
OVERFLOW	POND	CARP1	WEIR			

\*\*\*\*\*  
Cross Section Summary  
\*\*\*\*\*

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
01-102	CIRCULAR	0.25	0.05	0.06	0.25	1	58.71
02-103	CIRCULAR	0.25	0.05	0.06	0.25	1	60.23
03-105	CIRCULAR	0.25	0.05	0.06	0.25	1	41.04
04-105	CIRCULAR	0.25	0.05	0.06	0.25	1	59.02
05-109	CIRCULAR	0.25	0.05	0.06	0.25	1	59.97
06-110	CIRCULAR	0.25	0.05	0.06	0.25	1	42.17
07-111	CIRCULAR	0.25	0.05	0.06	0.25	1	42.11
101-OGS	CIRCULAR	0.20	0.03	0.05	0.20	1	14.42
102-POND	CIRCULAR	0.38	0.11	0.09	0.38	1	104.79
103-102	CIRCULAR	0.38	0.11	0.09	0.38	1	88.79
104-103	CIRCULAR	0.38	0.11	0.09	0.38	1	87.95
105-104	CIRCULAR	0.38	0.11	0.09	0.38	1	87.51
106-POND	CIRCULAR	0.45	0.16	0.11	0.45	1	204.18
107-106	CIRCULAR	0.45	0.16	0.11	0.45	1	205.38
108-107	CIRCULAR	0.38	0.11	0.09	0.38	1	87.45
109-108	CIRCULAR	0.38	0.11	0.09	0.38	1	86.42
110-10	CIRCULAR	0.45	0.16	0.11	0.45	1	146.27

111-110	CIRCULAR	0.38	0.11	0.09	0.38	1	85.86
301-05	CIRCULAR	0.25	0.05	0.06	0.25	1	59.69
9-104	CIRCULAR	0.25	0.05	0.06	0.25	1	58.98
OGS-XSTM1	CIRCULAR	0.45	0.16	0.11	0.45	1	116.40
OLFA1	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA10	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA11	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA12	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA13	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA14	RECT_OPEN	1.00	1.00	0.33	1.00	1	1373.69
OLFA15	RECT_OPEN	1.00	1.00	0.33	1.00	1	1373.69
OLFA16	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA17	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA18	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA19	RECT_OPEN	1.00	5.00	0.71	5.00	1	88614.40
OLFA3	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA4	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA5	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA6	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA7	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA9	RECT_OPEN	1.00	3.00	0.60	3.00	1	6098.05
OLFR1	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
POND-101	CIRCULAR	0.45	0.16	0.11	0.45	1	144.38

\*\*\*\*\*  
NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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\*\*\*\*\*  
Analysis Options  
\*\*\*\*\*  
Flow Units ..... LPS  
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 ..... 05/11/2022 00:00:00  
Ending Date ..... 05/12/2022 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 ..... 4  
Head Tolerance ..... 0.001500 m

*****		
	Volume	Depth
*****		
Runoff Quantity Continuity	hectare-m	mm
*****		
Initial LID Storage	0.002	1.083
Total Precipitation	0.073	33.885
Evaporation Loss	0.000	0.000
Infiltration Loss	0.011	5.077
Surface Runoff	0.062	28.966
Final Storage	0.002	1.083
Continuity Error (%)	-0.451	

*****		
	Volume	Volume
*****		
Flow Routing Continuity	hectare-m	10 <sup>6</sup> ltr
*****		
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.062	0.625
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.002
External Outflow	0.063	0.627
Flooding Loss	0.000	0.000



A-5		33.88	0.00	0.00	0.00	33.98	0.00	33.98	0.02
10.45	1.003								
A-6		33.89	0.00	0.00	0.00	33.98	0.00	33.98	0.02
9.60	1.003								
A-7		33.89	0.00	0.00	0.00	33.99	0.00	33.99	0.02
11.31	1.003								
A-8		33.88	0.00	0.00	0.28	33.72	0.06	33.78	0.03
21.71	0.997								
A-9		33.88	0.00	0.00	0.00	33.95	0.00	33.95	0.00
2.77	1.002								
R-1		33.89	0.00	0.00	4.67	28.67	0.79	29.46	0.03
17.30	0.870								

\*\*\*\*\*  
Node Depth Summary  
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Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
OGS	JUNCTION	0.55	0.56	93.23	0 01:53	0.56
CARP1	OUTFALL	0.00	0.00	94.60	0 00:00	0.00
CARP2	OUTFALL	0.00	0.00	94.60	0 00:00	0.00
OVL1	OUTFALL	0.00	0.00	95.19	0 00:00	0.00
OVL2	OUTFALL	0.00	0.00	94.99	0 00:00	0.00
OVL4	OUTFALL	0.00	0.00	94.84	0 00:00	0.00
XSTM1	OUTFALL	1.15	1.15	93.22	0 00:00	1.15
XSTM2	OUTFALL	1.07	1.07	93.22	0 00:00	1.07
CB01	STORAGE	0.03	0.31	93.56	0 01:53	0.31
CB02	STORAGE	0.03	0.26	93.56	0 01:53	0.26
CB03	STORAGE	0.02	0.21	93.56	0 01:50	0.21
CB04	STORAGE	0.01	0.10	93.70	0 01:30	0.10
CB05	STORAGE	0.01	0.10	93.62	0 01:31	0.10
CB06	STORAGE	0.01	0.15	93.75	0 01:25	0.15
CB07	STORAGE	0.01	0.15	93.85	0 01:25	0.15
CB08	STORAGE	0.08	0.32	93.47	0 01:30	0.32
CB9	STORAGE	0.03	0.26	93.56	0 01:50	0.26
CBMH101	STORAGE	0.50	0.79	93.55	0 01:53	0.79
CBMH102	STORAGE	0.32	0.62	93.56	0 01:53	0.62

CBMH103	STORAGE	0.26	0.56	93.56	0 01:53	0.56
CBMH105	STORAGE	0.04	0.33	93.56	0 01:50	0.33
CBMH106	STORAGE	0.29	0.59	93.56	0 01:51	0.59
CBMH107	STORAGE	0.17	0.53	93.62	0 01:30	0.53
CBMH108	STORAGE	0.05	0.41	93.62	0 01:30	0.41
CBMH109	STORAGE	0.03	0.35	93.63	0 01:30	0.35
CBMH110	STORAGE	0.04	0.43	93.67	0 01:30	0.43
CBMH111	STORAGE	0.02	0.28	93.70	0 01:30	0.28
LD301	STORAGE	0.00	0.02	94.02	0 01:30	0.02
POND	STORAGE	0.44	0.74	93.56	0 01:53	0.74
STMH104	STORAGE	0.16	0.46	93.56	0 01:50	0.46

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Node Inflow Summary  
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Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
OGS	JUNCTION	0.00	53.88	0 01:53	0	0.6	-0.006
CARP1	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
CARP2	OUTFALL	0.24	0.24	0 01:30	0.000157	0.000157	0.000
OVL1	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OVL2	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OVL4	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
XSTM1	OUTFALL	0.00	53.88	0 01:53	0	0.6	0.000
XSTM2	OUTFALL	0.00	17.09	0 01:30	0	0.0289	0.000
CB01	STORAGE	6.61	6.61	0 01:30	0.0105	0.0105	-0.027
CB02	STORAGE	10.45	10.45	0 01:30	0.0166	0.0166	-0.043
CB03	STORAGE	2.77	2.77	0 01:30	0.00441	0.00441	0.112
CB04	STORAGE	18.32	18.32	0 01:30	0.0285	0.0285	0.544
CB05	STORAGE	18.57	19.17	0 01:30	0.0285	0.0296	0.334
CB06	STORAGE	24.75	24.75	0 01:30	0.0395	0.0395	1.171
CB07	STORAGE	22.83	22.83	0 01:30	0.0364	0.0364	0.773
CB08	STORAGE	17.30	17.30	0 01:30	0.0271	0.0282	1.038
CB9	STORAGE	11.31	11.31	0 01:30	0.018	0.018	-0.028
CBMH101	STORAGE	7.04	53.88	0 01:53	0.0112	0.601	0.002

CBMH102	STORAGE	6.40	77.40	0	01:30	0.0102	0.142	-0.000
CBMH103	STORAGE	9.60	66.80	0	01:30	0.0153	0.12	0.003
CBMH105	STORAGE	21.71	42.10	0	01:29	0.0345	0.0672	-0.313
CBMH106	STORAGE	6.40	170.56	0	01:30	0.0102	0.301	0.000
CBMH107	STORAGE	21.12	166.99	0	01:30	0.0337	0.29	-0.188
CBMH108	STORAGE	10.67	38.34	0	01:30	0.017	0.064	-0.115
CBMH109	STORAGE	10.67	29.72	0	01:30	0.017	0.0465	-0.242
CBMH110	STORAGE	35.84	118.75	0	01:27	0.0572	0.19	-0.565
CBMH111	STORAGE	36.27	59.64	0	01:30	0.0579	0.094	0.333
LD301	STORAGE	0.65	0.65	0	01:30	0.0011	0.0011	-1.426
POND	STORAGE	87.58	332.29	0	01:30	0.15	0.856	-0.000
STMH104	STORAGE	0.00	49.64	0	01:30	0	0.0864	0.025

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Node Surcharge Summary  
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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
OGS	JUNCTION	24.00	0.110	1.700

\*\*\*\*\*  
Node Flooding Summary  
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No nodes were flooded.

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Storage Volume Summary  
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Average Volume	Avg Pcnt	Evap Pcnt	Exfil Pcnt	Maximum Volume	Max Pcnt	Time of Max Occurrence	Maximum Outflow
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Storage Unit	1000 m3	Full	Loss	Loss	1000 m3	Full	days hr:min	LPS
CB01	0.000	0	0	0	0.000	1	0 01:53	6.07
CB02	0.000	0	0	0	0.000	1	0 01:53	9.71
CB03	0.000	0	0	0	0.000	0	0 01:50	2.46
CB04	0.000	0	0	0	0.000	0	0 01:30	18.26
CB05	0.000	0	0	0	0.000	1	0 01:31	19.07
CB06	0.000	0	0	0	0.000	0	0 01:25	25.20
CB07	0.000	0	0	0	0.000	0	0 01:25	23.39
CB08	0.000	0	0	0	0.000	2	0 01:30	17.09
CB9	0.000	0	0	0	0.000	1	0 01:50	10.98
CBMH101	0.001	2	0	0	0.001	3	0 01:53	53.88
CBMH102	0.000	2	0	0	0.001	4	0 01:53	75.95
CBMH103	0.000	1	0	0	0.001	3	0 01:53	65.25
CBMH105	0.000	0	0	0	0.000	1	0 01:50	38.85
CBMH106	0.000	5	0	0	0.001	10	0 01:51	169.19
CBMH107	0.000	1	0	0	0.001	2	0 01:30	164.40
CBMH108	0.000	1	0	0	0.000	5	0 01:30	36.99
CBMH109	0.000	1	0	0	0.000	11	0 01:30	28.02
CBMH110	0.000	0	0	0	0.001	2	0 01:30	112.51
CBMH111	0.000	0	0	0	0.000	1	0 01:30	58.15
LD301	0.000	0	0	0	0.000	0	0 01:30	0.62
POND	0.298	13	0	0	0.549	24	0 01:53	53.06
STMH104	0.000	6	0	0	0.001	16	0 01:50	47.97

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Outfall Loading Summary  
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Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
CARP1	0.00	0.00	0.00	0.000
CARP2	3.22	0.12	0.24	0.000
OVL1	0.00	0.00	0.00	0.000
OVL2	0.00	0.00	0.00	0.000
OVL4	0.00	0.00	0.00	0.000
XSTM1	57.48	15.62	53.88	0.600

XSTM2	99.83	0.61	17.09	0.029
System	22.93	16.35	61.06	0.629

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Link Flow Summary  
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Link	Type	Maximum  Flow  LPS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
01-102	CONDUIT	6.07	0 01:30	0.14	0.10	1.00
02-103	CONDUIT	9.71	0 01:30	0.27	0.16	1.00
03-105	CONDUIT	2.46	0 01:30	0.33	0.06	0.93
04-105	CONDUIT	18.26	0 01:30	0.98	0.31	0.63
05-109	CONDUIT	19.07	0 01:30	1.05	0.32	0.66
06-110	CONDUIT	25.20	0 01:28	0.83	0.60	0.77
07-111	CONDUIT	23.39	0 01:30	0.84	0.56	0.62
101-OGS	CONDUIT	53.88	0 01:53	1.66	3.74	1.00
102-POND	CONDUIT	75.95	0 01:30	0.69	0.72	1.00
103-102	CONDUIT	65.25	0 01:30	0.59	0.73	1.00
104-103	CONDUIT	47.97	0 01:30	0.43	0.55	1.00
105-104	CONDUIT	38.85	0 01:30	0.50	0.44	0.95
106-POND	CONDUIT	169.19	0 01:30	1.06	0.83	1.00
107-106	CONDUIT	164.40	0 01:30	1.03	0.80	1.00
108-107	CONDUIT	36.99	0 01:30	0.40	0.42	1.00
109-108	CONDUIT	28.02	0 01:30	0.51	0.32	0.96
110-10	CONDUIT	112.51	0 01:26	0.92	0.77	0.98
111-110	CONDUIT	58.15	0 01:27	0.79	0.68	0.85
301-05	CONDUIT	0.62	0 01:30	0.38	0.01	0.12
9-104	CONDUIT	10.98	0 01:26	0.61	0.19	1.00
OGS-XSTM1	CONDUIT	53.88	0 01:53	0.34	0.46	1.00
OLFA1	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA10	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA11	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA12	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA13	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA14	CONDUIT	0.00	0 00:00	0.00	0.00	0.00

OLFA15	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA16	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA17	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA18	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA19	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA3	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA4	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA5	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA6	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA7	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA9	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFR1	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
POND-101	CONDUIT	53.06	0 01:55	0.33	0.37	1.00
08-XTMS2	ORIFICE	17.09	0 01:30			1.00
OVERFLOW	WEIR	0.00	0 00:00			0.00

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Flow Classification Summary  
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Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class								Inlet Ctrl
		Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	
01-102	1.00	0.00	0.45	0.00	0.55	0.00	0.00	0.00	0.84	0.00
02-103	1.00	0.00	0.40	0.00	0.60	0.00	0.00	0.00	0.87	0.00
03-105	1.00	0.00	0.00	0.00	0.17	0.00	0.00	0.83	0.02	0.00
04-105	1.00	0.00	0.00	0.00	0.13	0.00	0.00	0.86	0.11	0.00
05-109	1.00	0.00	0.00	0.00	0.09	0.00	0.00	0.90	0.06	0.00
06-110	1.00	0.00	0.00	0.00	0.09	0.00	0.00	0.91	0.07	0.00
07-111	1.00	0.00	0.00	0.00	0.03	0.00	0.00	0.97	0.00	0.00
101-OGS	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
102-POND	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
103-102	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
104-103	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
105-104	1.00	0.00	0.10	0.00	0.90	0.00	0.00	0.00	0.83	0.00
106-POND	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
107-106	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
108-107	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.00

109-108	1.00	0.00	0.00	0.00	0.61	0.00	0.00	0.39	0.36	0.00
110-10	1.00	0.00	0.05	0.00	0.95	0.00	0.00	0.00	0.84	0.00
111-110	1.00	0.00	0.00	0.00	0.15	0.00	0.00	0.85	0.04	0.00
301-05	1.00	0.00	0.00	0.00	0.02	0.00	0.00	0.98	0.01	0.00
9-104	1.00	0.00	0.00	0.00	0.22	0.00	0.00	0.78	0.04	0.00
OGS-XSTM1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
OLFA1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA10	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA11	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA12	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA13	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA14	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA15	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA16	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA17	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA18	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA19	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA3	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA4	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA5	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA6	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA7	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA9	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFR1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POND-101	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

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 Conduit Surcharge Summary  
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Conduit	Hours Full			Hours	Hours
	Both Ends	Upstream	Dnstream	Above Full Normal Flow	Capacity Limited
01-102	1.15	1.15	3.05	0.01	0.01
02-103	0.50	0.50	2.63	0.01	0.01
03-105	0.01	0.01	0.56	0.01	0.01
06-110	0.01	0.01	0.02	0.01	0.01
101-OGS	24.00	24.00	24.00	4.06	4.63

102-POND	3.00	3.00	3.47	0.01	0.08
103-102	2.37	2.37	2.90	0.01	0.01
104-103	1.42	1.42	1.79	0.01	0.01
105-104	0.01	0.01	0.78	0.01	0.01
106-POND	1.93	1.94	2.49	0.01	0.11
107-106	0.82	0.82	1.85	0.01	0.01
108-107	0.08	0.08	0.88	0.01	0.01
109-108	0.01	0.01	0.07	0.01	0.01
110-10	0.01	0.01	0.05	0.01	0.01
9-104	0.51	0.51	1.28	0.01	0.01
OGS-XSTM1	24.00	24.00	24.00	0.01	0.01
POND-101	3.54	3.54	4.18	0.01	0.01

Analysis begun on: Thu Nov 17 14:25:40 2022  
 Analysis ended on: Thu Nov 17 14:25:41 2022  
 Total elapsed time: 00:00:01



# Chicago 4hr - 5 Year PCSWMM Results

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

\*\*\*\*\*

Element Count

\*\*\*\*\*

Number of rain gages ..... 1  
 Number of subcatchments ... 22  
 Number of nodes ..... 30  
 Number of links ..... 42  
 Number of pollutants ..... 0  
 Number of land uses ..... 0

\*\*\*\*\*

Raingage Summary

\*\*\*\*\*

Name	Data Source	Data Type	Recording Interval
Raingage1	C4-5	INTENSITY	10 min.

\*\*\*\*\*

Subcatchment Summary

\*\*\*\*\*

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A-0	0.00	5.00	7.00	2.0000	Raingage1	CARP2
A-1	0.03	25.39	100.00	2.0000	Raingage1	CBMH101
A-10	0.12	34.86	64.00	1.0000	Raingage1	CB04
A-11	0.03	33.33	100.00	1.5000	Raingage1	CBMH106
A-12	0.10	58.23	100.00	2.0000	Raingage1	CBMH107
A-13	0.05	31.25	100.00	2.0000	Raingage1	CBMH108
A-14	0.05	31.25	100.00	2.0000	Raingage1	CBMH109
A-15	0.11	36.33	73.00	1.0000	Raingage1	CB05
A-16	0.02	4.69	7.00	1.5000	Raingage1	LD301
A-17	0.17	80.00	100.00	2.0000	Raingage1	CBMH110
A-18	0.12	55.24	100.00	2.0000	Raingage1	CB06

A-19	0.17	80.95	100.00	2.0000	Raingage1	CBMH111
A-2	0.66	37.67	64.00	1.5000	Raingage1	POND
A-20	0.11	50.95	100.00	2.0000	Raingage1	CB07
A-3	0.03	27.27	100.00	2.0000	Raingage1	CBMH102
A-4	0.03	23.85	100.00	2.0000	Raingage1	CB01
A-5	0.05	37.69	100.00	2.0000	Raingage1	CB02
A-6	0.04	34.62	100.00	2.0000	Raingage1	CBMH103
A-7	0.05	37.86	100.00	2.0000	Raingage1	CB9
A-8	0.10	42.50	99.00	2.0000	Raingage1	CBMH105
A-9	0.01	8.67	100.00	5.5000	Raingage1	CB03
R-1	0.09	21.39	84.00	1.0000	Raingage1	CB08

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Node Summary

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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
OGS	JUNCTION	92.67	2.26	0.0	
CARP1	OUTFALL	94.60	0.00	0.0	
CARP2	OUTFALL	94.60	0.00	0.0	
OVL1	OUTFALL	95.19	1.00	0.0	
OVL2	OUTFALL	94.99	1.05	0.0	
OVL4	OUTFALL	94.84	1.00	0.0	
XSTM1	OUTFALL	92.07	1.04	0.0	
XSTM2	OUTFALL	92.15	0.00	0.0	
CB01	STORAGE	93.25	2.75	0.0	
CB02	STORAGE	93.30	2.70	0.0	
CB03	STORAGE	93.35	1.90	0.0	
CB04	STORAGE	93.60	2.30	0.0	
CB05	STORAGE	93.52	2.48	0.0	
CB06	STORAGE	93.60	2.50	0.0	
CB07	STORAGE	93.70	2.40	0.0	
CB08	STORAGE	93.15	2.55	0.0	
CB9	STORAGE	93.30	2.55	0.0	
CBMH101	STORAGE	92.76	3.09	0.0	
CBMH102	STORAGE	92.94	3.01	0.0	
CBMH103	STORAGE	93.00	2.95	0.0	
CBMH105	STORAGE	93.23	2.67	0.0	
CBMH106	STORAGE	92.97	3.18	0.0	

CBMH107	STORAGE	93.09	2.91	0.0
CBMH108	STORAGE	93.21	2.89	0.0
CBMH109	STORAGE	93.28	2.87	0.0
CBMH110	STORAGE	93.24	2.76	0.0
CBMH111	STORAGE	93.42	2.58	0.0
LD301	STORAGE	94.00	2.00	0.0
POND	STORAGE	92.82	3.08	0.0
STMH104	STORAGE	93.10	2.90	0.0

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Link Summary  
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Name	From Node	To Node	Type	Length	%Slope	Roughness
01-102	CB01	CBMH102	CONDUIT	19.5	0.9744	0.0130
02-103	CB02	CBMH103	CONDUIT	19.5	1.0257	0.0130
03-105	CB03	CBMH105	CONDUIT	10.5	0.4762	0.0130
04-105	CB04	CBMH105	CONDUIT	26.4	0.9849	0.0130
05-109	CB05	CBMH109	CONDUIT	11.8	1.0170	0.0130
06-110	CB06	CBMH110	CONDUIT	35.8	0.5028	0.0130
07-111	CB07	CBMH111	CONDUIT	35.9	0.5014	0.0130
101-OGS	CBMH101	OGS	CONDUIT	5.6	0.1786	0.0130
102-POND	CBMH102	POND	CONDUIT	11.2	0.3571	0.0130
103-102	CBMH103	CBMH102	CONDUIT	19.5	0.2564	0.0130
104-103	STMH104	CBMH103	CONDUIT	15.9	0.2516	0.0130
105-104	CBMH105	STMH104	CONDUIT	28.1	0.2491	0.0130
106-POND	CBMH106	POND	CONDUIT	11.7	0.5128	0.0130
107-106	CBMH107	CBMH106	CONDUIT	21.2	0.5189	0.0130
108-107	CBMH108	CBMH107	CONDUIT	20.1	0.2488	0.0130
109-108	CBMH109	CBMH108	CONDUIT	24.7	0.2429	0.0130
110-10	CBMH110	CBMH107	CONDUIT	34.2	0.2632	0.0130
111-110	CBMH111	CBMH110	CONDUIT	41.7	0.2398	0.0130
301-05	LD301	CB05	CONDUIT	41.7	1.0072	0.0130
9-104	CB9	STMH104	CONDUIT	6.1	0.9837	0.0130
OGS-XSTM1	OGS	XSTM1	CONDUIT	6.0	0.1667	0.0130
OLFA1	CBMH101	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA10	CBMH106	CB01	CONDUIT	1.0	1.0001	0.0150
OLFA11	CBMH107	CB02	CONDUIT	1.0	1.0001	0.0150
OLFA12	CBMH108	CBMH107	CONDUIT	1.0	1.0001	0.0150
OLFA13	CBMH109	CB05	CONDUIT	1.0	1.0001	0.0150

OLFA14	CB05	CB04	CONDUIT	1.0	1.0001	0.0350
OLFA15	LD301	CB05	CONDUIT	1.0	1.0001	0.0350
OLFA16	CBMH110	CBMH107	CONDUIT	1.0	1.0001	0.0150
OLFA17	CB06	CBMH110	CONDUIT	1.0	1.0001	0.0150
OLFA18	CBMH111	CBMH110	CONDUIT	1.0	1.0001	0.0150
OLFA19	CB07	CBMH111	CONDUIT	1.0	11.0672	0.0150
OLFA3	CBMH102	CBMH101	CONDUIT	1.0	1.0001	0.0150
OLFA4	CB01	CBMH102	CONDUIT	1.0	1.0001	0.0150
OLFA5	CB02	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA6	CB9	OVLF2	CONDUIT	1.0	1.0001	0.0150
OLFA7	CBMH105	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA9	CB04	OVLF1	CONDUIT	1.0	1.0001	0.0350
OLFR1	CB08	OVLF4	CONDUIT	1.0	1.0001	0.0150
POND-101	POND	CBMH101	CONDUIT	11.7	0.2564	0.0130
08-XTMS2	CB08	XSTM2	ORIFICE			
OVERFLOW	POND	CARP1	WEIR			

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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
01-102	CIRCULAR	0.25	0.05	0.06	0.25	1	58.71
02-103	CIRCULAR	0.25	0.05	0.06	0.25	1	60.23
03-105	CIRCULAR	0.25	0.05	0.06	0.25	1	41.04
04-105	CIRCULAR	0.25	0.05	0.06	0.25	1	59.02
05-109	CIRCULAR	0.25	0.05	0.06	0.25	1	59.97
06-110	CIRCULAR	0.25	0.05	0.06	0.25	1	42.17
07-111	CIRCULAR	0.25	0.05	0.06	0.25	1	42.11
101-OGS	CIRCULAR	0.20	0.03	0.05	0.20	1	14.42
102-POND	CIRCULAR	0.38	0.11	0.09	0.38	1	104.79
103-102	CIRCULAR	0.38	0.11	0.09	0.38	1	88.79
104-103	CIRCULAR	0.38	0.11	0.09	0.38	1	87.95
105-104	CIRCULAR	0.38	0.11	0.09	0.38	1	87.51
106-POND	CIRCULAR	0.45	0.16	0.11	0.45	1	204.18
107-106	CIRCULAR	0.45	0.16	0.11	0.45	1	205.38
108-107	CIRCULAR	0.38	0.11	0.09	0.38	1	87.45
109-108	CIRCULAR	0.38	0.11	0.09	0.38	1	86.42
110-10	CIRCULAR	0.45	0.16	0.11	0.45	1	146.27

111-110	CIRCULAR	0.38	0.11	0.09	0.38	1	85.86
301-05	CIRCULAR	0.25	0.05	0.06	0.25	1	59.69
9-104	CIRCULAR	0.25	0.05	0.06	0.25	1	58.98
OGS-XSTM1	CIRCULAR	0.45	0.16	0.11	0.45	1	116.40
OLFA1	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA10	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA11	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA12	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA13	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA14	RECT_OPEN	1.00	1.00	0.33	1.00	1	1373.69
OLFA15	RECT_OPEN	1.00	1.00	0.33	1.00	1	1373.69
OLFA16	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA17	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA18	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA19	RECT_OPEN	1.00	5.00	0.71	5.00	1	88614.40
OLFA3	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA4	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA5	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA6	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA7	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA9	RECT_OPEN	1.00	3.00	0.60	3.00	1	6098.05
OLFR1	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
POND-101	CIRCULAR	0.45	0.16	0.11	0.45	1	144.38

\*\*\*\*\*  
NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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\*\*\*\*\*  
Analysis Options  
\*\*\*\*\*  
Flow Units ..... LPS  
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 ..... 05/11/2022 00:00:00  
Ending Date ..... 05/12/2022 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 ..... 4  
Head Tolerance ..... 0.001500 m

*****		
	Volume	Depth
Runoff Quantity Continuity	hectare-m	mm
*****		
Initial LID Storage	0.002	1.083
Total Precipitation	0.097	45.162
Evaporation Loss	0.000	0.000
Infiltration Loss	0.013	5.922
Surface Runoff	0.085	39.454
Final Storage	0.002	1.083
Continuity Error (%)	-0.465	

*****		
	Volume	Volume
Flow Routing Continuity	hectare-m	10 <sup>6</sup> ltr
*****		
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.085	0.852
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.002
External Outflow	0.085	0.854
Flooding Loss	0.000	0.000

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Evaporation Loss ..... 0.000 0.000
Exfiltration Loss ..... 0.000 0.000
Initial Stored Volume ... 0.046 0.461
Final Stored Volume ..... 0.046 0.461
Continuity Error (%) ..... 0.024

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*****
Time-Step Critical Elements
*****
Link 9-104 (5.65%)

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*****
Highest Flow Instability Indexes
*****
Link 08-XTMS2 (123)
Link 9-104 (7)

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*****
Routing Time Step Summary
*****
Minimum Time Step      : 0.50 sec
Average Time Step      : 4.88 sec
Maximum Time Step      : 5.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 2.00
Percent Not Converging : 0.00
Time Step Frequencies :
  5.000 - 3.155 sec : 97.93 %
  3.155 - 1.991 sec : 1.88 %
  1.991 - 1.256 sec : 0.12 %
  1.256 - 0.792 sec : 0.05 %
  0.792 - 0.500 sec : 0.03 %

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

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Peak Runoff	Runoff Coeff	Total Precip	Total Runon	Total Evap	Total Infil	Imperv Runoff	Perv Runoff	Total Runoff	Total Runoff
Subcatchment		mm	mm	mm	mm	mm	mm	mm	10 <sup>6</sup> ltr
LPS									
A-0	0.45	45.16	0.00	0.00	30.22	3.16	12.88	16.04	0.00
A-1	1.002	45.16	0.00	0.00	0.00	45.26	0.00	45.26	0.01
A-10	0.735	45.16	0.00	0.00	12.27	29.07	4.13	33.19	0.04
A-11	1.002	45.16	0.00	0.00	0.00	45.24	0.00	45.24	0.01
A-12	1.003	45.16	0.00	0.00	0.00	45.30	0.00	45.30	0.04
A-13	1.003	45.16	0.00	0.00	0.00	45.29	0.00	45.29	0.02
A-14	1.003	45.16	0.00	0.00	0.00	45.29	0.00	45.29	0.02
A-15	0.807	45.16	0.00	0.00	9.03	33.15	3.31	36.46	0.04
A-16	0.252	45.16	0.00	0.00	33.93	3.16	8.21	11.37	0.00
A-17	1.004	45.16	0.00	0.00	0.00	45.34	0.00	45.34	0.08
A-18	1.004	45.16	0.00	0.00	0.00	45.34	0.00	45.34	0.05
A-19	1.004	45.16	0.00	0.00	0.00	45.34	0.00	45.34	0.08
A-2	0.708	45.16	0.00	0.00	13.47	29.12	2.83	31.95	0.21
A-20	1.004	45.16	0.00	0.00	0.00	45.34	0.00	45.34	0.05
A-3	1.002	45.16	0.00	0.00	0.00	45.24	0.00	45.24	0.01
A-4	1.002	45.16	0.00	0.00	0.00	45.26	0.00	45.26	0.01
A-5	1.002	45.16	0.00	0.00	0.00	45.26	0.00	45.26	0.02

A-6		45.16	0.00	0.00	0.00	45.26	0.00	45.26	0.02
13.02	1.002								
A-7		45.16	0.00	0.00	0.00	45.27	0.00	45.27	0.02
15.34	1.002								
A-8		45.16	0.00	0.00	0.32	44.91	0.17	45.08	0.05
29.47	0.998								
A-9		45.16	0.00	0.00	0.00	45.23	0.00	45.23	0.01
3.76	1.001								
R-1		45.16	0.00	0.00	5.32	38.21	2.01	40.21	0.04
24.58	0.890								

\*\*\*\*\*  
Node Depth Summary  
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Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
OGS	JUNCTION	0.76	0.77	93.44	0 01:59	0.77
CARP1	OUTFALL	0.00	0.00	94.60	0 00:00	0.00
CARP2	OUTFALL	0.00	0.00	94.60	0 00:00	0.00
OVL1	OUTFALL	0.00	0.00	95.19	0 00:00	0.00
OVL2	OUTFALL	0.00	0.00	94.99	0 00:00	0.00
OVL4	OUTFALL	0.00	0.00	94.84	0 00:00	0.00
XSTM1	OUTFALL	1.36	1.36	93.43	0 00:00	1.36
XSTM2	OUTFALL	1.28	1.28	93.43	0 00:00	1.28
CB01	STORAGE	0.23	0.62	93.87	0 02:00	0.62
CB02	STORAGE	0.18	0.57	93.87	0 01:31	0.57
CB03	STORAGE	0.13	0.60	93.95	0 01:30	0.60
CB04	STORAGE	0.02	0.40	94.00	0 01:30	0.39
CB05	STORAGE	0.04	0.56	94.08	0 01:31	0.56
CB06	STORAGE	0.03	0.68	94.28	0 01:30	0.67
CB07	STORAGE	0.02	0.64	94.34	0 01:30	0.63
CB08	STORAGE	0.28	0.78	93.93	0 01:30	0.77
CB9	STORAGE	0.18	0.61	93.91	0 01:30	0.61
CBMH101	STORAGE	0.72	1.10	93.86	0 01:59	1.10
CBMH102	STORAGE	0.54	0.93	93.87	0 01:59	0.93
CBMH103	STORAGE	0.48	0.87	93.87	0 01:56	0.87

CBMH105	STORAGE	0.25	0.72	93.95	0 01:30	0.72
CBMH106	STORAGE	0.51	0.94	93.91	0 01:31	0.94
CBMH107	STORAGE	0.39	0.94	94.03	0 01:31	0.94
CBMH108	STORAGE	0.27	0.84	94.05	0 01:31	0.84
CBMH109	STORAGE	0.20	0.78	94.06	0 01:31	0.78
CBMH110	STORAGE	0.24	0.91	94.15	0 01:30	0.91
CBMH111	STORAGE	0.07	0.81	94.23	0 01:30	0.80
LD301	STORAGE	0.00	0.09	94.09	0 01:31	0.08
POND	STORAGE	0.66	1.05	93.87	0 01:59	1.05
STMH104	STORAGE	0.38	0.81	93.91	0 01:30	0.81

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Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
OGS	JUNCTION	0.00	60.89	0 01:59	0	0.817	-0.003
CARP1	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
CARP2	OUTFALL	0.45	0.45	0 01:30	0.000321	0.000321	0.000
OVL1	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OVL2	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OVL4	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
XSTM1	OUTFALL	0.00	60.89	0 01:59	0	0.817	0.000
XSTM2	OUTFALL	0.00	24.16	0 01:30	0	0.0386	0.000
CB01	STORAGE	8.97	8.97	0 01:30	0.014	0.0146	-0.007
CB02	STORAGE	14.18	14.18	0 01:30	0.0222	0.0229	0.003
CB03	STORAGE	3.76	3.76	0 01:30	0.00588	0.00641	-0.034
CB04	STORAGE	27.30	27.30	0 01:30	0.0405	0.0405	-0.048
CB05	STORAGE	27.19	27.41	0 01:28	0.0398	0.0425	-0.019
CB06	STORAGE	33.57	33.57	0 01:30	0.0526	0.0526	0.025
CB07	STORAGE	30.97	30.97	0 01:30	0.0486	0.0486	0.586
CB08	STORAGE	24.58	24.58	0 01:30	0.037	0.0382	1.285
CB9	STORAGE	15.34	15.34	0 01:30	0.024	0.0245	-0.006
CBMH101	STORAGE	9.55	60.89	0 01:59	0.015	0.817	0.001
CBMH102	STORAGE	8.68	110.11	0 01:30	0.0136	0.197	0.002

CBMH103	STORAGE	13.02	95.29	0	01:30	0.0204	0.169	-0.001
CBMH105	STORAGE	29.47	58.93	0	01:30	0.046	0.0958	-0.013
CBMH106	STORAGE	8.68	233.16	0	01:30	0.0136	0.405	0.001
CBMH107	STORAGE	28.65	227.98	0	01:30	0.0449	0.391	-0.004
CBMH108	STORAGE	14.47	51.42	0	01:29	0.0227	0.0894	0.002
CBMH109	STORAGE	14.47	38.99	0	01:29	0.0227	0.0658	0.026
CBMH110	STORAGE	48.62	156.12	0	01:30	0.0762	0.256	-0.033
CBMH111	STORAGE	49.20	78.82	0	01:30	0.0771	0.126	-0.266
LD301	STORAGE	1.44	3.74	0	01:30	0.00262	0.00276	-0.310
POND	STORAGE	125.88	465.27	0	01:30	0.212	1.24	-0.001
STMH104	STORAGE	0.00	71.07	0	01:30	0	0.124	-0.004

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Node Surcharge Summary  
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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
OGS	JUNCTION	24.00	0.323	1.487

\*\*\*\*\*  
Node Flooding Summary  
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No nodes were flooded.

\*\*\*\*\*  
Storage Volume Summary  
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Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow LPS
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CB01	0.000	0	0	0	0.000	1	0 02:00	8.37
CB02	0.000	0	0	0	0.000	1	0 01:31	13.55
CB03	0.000	0	0	0	0.000	0	0 01:30	3.48
CB04	0.000	0	0	0	0.000	2	0 01:30	26.41
CB05	0.000	0	0	0	0.000	5	0 01:31	25.68
CB06	0.000	0	0	0	0.000	1	0 01:30	32.31
CB07	0.000	0	0	0	0.000	1	0 01:30	29.64
CB08	0.000	1	0	0	0.000	4	0 01:30	24.16
CB9	0.000	0	0	0	0.000	1	0 01:30	14.76
CBMH101	0.001	3	0	0	0.001	4	0 01:59	60.89
CBMH102	0.001	3	0	0	0.001	6	0 01:59	108.26
CBMH103	0.001	3	0	0	0.001	5	0 01:56	93.29
CBMH105	0.000	0	0	0	0.001	1	0 01:30	56.42
CBMH106	0.001	9	0	0	0.001	16	0 01:31	231.45
CBMH107	0.000	1	0	0	0.001	3	0 01:31	224.60
CBMH108	0.000	4	0	0	0.001	11	0 01:31	50.09
CBMH109	0.000	6	0	0	0.001	25	0 01:31	37.73
CBMH110	0.000	1	0	0	0.001	3	0 01:30	151.94
CBMH111	0.000	0	0	0	0.001	2	0 01:30	75.47
LD301	0.000	0	0	0	0.000	0	0 01:31	4.54
POND	0.479	21	0	0	0.857	37	0 01:59	59.98
STMH104	0.000	13	0	0	0.001	28	0 01:30	69.23

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Outfall Loading Summary  
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Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
CARP1	0.00	0.00	0.00	0.000
CARP2	2.28	0.15	0.45	0.000
OVL1	0.00	0.00	0.00	0.000
OVL2	0.00	0.00	0.00	0.000
OVL4	0.00	0.00	0.00	0.000
XSTM1	63.27	15.21	60.89	0.817
XSTM2	98.81	0.51	24.16	0.039

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 System            23.48      15.87      73.32      0.856

\*\*\*\*\*  
 Link Flow Summary  
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Link	Type	Maximum  Flow  LPS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
01-102	CONDUIT	8.37	0 01:30	0.17	0.14	1.00
02-103	CONDUIT	13.55	0 01:30	0.28	0.22	1.00
03-105	CONDUIT	3.48	0 01:30	0.07	0.08	1.00
04-105	CONDUIT	26.41	0 01:30	0.54	0.45	1.00
05-109	CONDUIT	25.68	0 01:32	0.52	0.43	1.00
06-110	CONDUIT	32.31	0 01:30	0.66	0.77	1.00
07-111	CONDUIT	29.64	0 01:30	0.73	0.70	1.00
101-OGS	CONDUIT	60.89	0 01:59	1.88	4.22	1.00
102-POND	CONDUIT	108.26	0 01:30	0.98	1.03	1.00
103-102	CONDUIT	93.29	0 01:30	0.84	1.05	1.00
104-103	CONDUIT	69.23	0 01:30	0.63	0.79	1.00
105-104	CONDUIT	56.42	0 01:30	0.51	0.64	1.00
106-POND	CONDUIT	231.45	0 01:30	1.46	1.13	1.00
107-106	CONDUIT	224.60	0 01:30	1.41	1.09	1.00
108-107	CONDUIT	50.09	0 01:32	0.45	0.57	1.00
109-108	CONDUIT	37.73	0 01:32	0.34	0.44	1.00
110-10	CONDUIT	151.94	0 01:30	0.96	1.04	1.00
111-110	CONDUIT	75.47	0 01:30	0.68	0.88	1.00
301-05	CONDUIT	4.54	0 01:32	0.26	0.08	0.67
9-104	CONDUIT	14.76	0 01:30	0.30	0.25	1.00
OGS-XSTM1	CONDUIT	60.89	0 01:59	0.38	0.52	1.00
OLFA1	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA10	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA11	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA12	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA13	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA14	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA15	CONDUIT	0.00	0 00:00	0.00	0.00	0.00

OLFA16	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA17	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA18	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA19	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA3	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA4	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA5	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA6	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA7	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA9	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFR1	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
POND-101	CONDUIT	59.98	0 02:05	0.38	0.42	1.00
08-XTMS2	ORIFICE	24.16	0 01:30			1.00
OVERFLOW	WEIR	0.00	0 00:00			0.00

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 Flow Classification Summary  
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Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class								
		Up Dry	Down Dry	Sub Dry	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl	
01-102	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
02-103	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
03-105	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
04-105	1.00	0.00	0.20	0.00	0.80	0.00	0.00	0.00	0.87	0.00
05-109	1.00	0.00	0.20	0.00	0.80	0.00	0.00	0.00	0.84	0.00
06-110	1.00	0.00	0.18	0.00	0.78	0.00	0.00	0.04	0.83	0.00
07-111	1.00	0.00	0.00	0.00	0.16	0.00	0.00	0.84	0.07	0.00
101-OGS	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
102-POND	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
103-102	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
104-103	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
105-104	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
106-POND	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
107-106	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
108-107	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
109-108	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

110-10	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
111-110	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.00
301-05	1.00	0.00	0.00	0.00	0.14	0.00	0.00	0.86	0.94	0.00
9-104	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
OGS-XSTM1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
OLFA1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA10	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA11	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA12	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA13	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA14	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA15	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA16	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA17	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA18	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA19	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA3	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA4	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA5	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA6	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA7	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA9	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFR1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POND-101	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

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Conduit Surcharge Summary  
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Conduit	Hours Full			Hours	
	Both Ends	Upstream	Dnstream	Above Full Normal Flow	Capacity Limited
01-102	4.17	4.17	24.00	0.01	0.01
02-103	3.61	3.61	24.00	0.01	0.01
03-105	3.18	3.18	3.61	0.01	0.01
04-105	0.87	0.87	3.26	0.01	0.01
05-109	1.70	1.70	2.78	0.01	0.01
06-110	0.96	0.96	2.60	0.01	0.01

07-111	0.17	0.17	1.72	0.01	0.01
101-OGS	24.00	24.00	24.00	5.08	5.71
102-POND	24.00	24.00	24.00	0.06	0.17
103-102	24.00	24.00	24.00	0.07	0.07
104-103	4.58	4.58	6.11	0.01	0.10
105-104	3.14	3.14	3.75	0.01	0.01
106-POND	24.00	24.00	24.00	0.11	0.19
107-106	3.71	3.71	15.40	0.09	0.09
108-107	3.31	3.31	3.76	0.01	0.01
109-108	2.73	2.73	3.22	0.01	0.01
110-10	2.42	2.42	3.18	0.06	0.12
111-110	1.50	1.50	2.37	0.01	0.01
301-05	0.01	0.01	1.15	0.01	0.01
9-104	3.61	3.61	4.33	0.01	0.01
OGS-XSTM1	24.00	24.00	24.00	0.01	1.49
POND-101	24.00	24.00	24.00	0.01	0.01

Analysis begun on: Thu Nov 17 14:05:29 2022  
Analysis ended on: Thu Nov 17 14:05:29 2022  
Total elapsed time: < 1 sec



# Chicago 4hr - 10 Year PCSWMM Results

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

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Element Count

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Number of rain gages ..... 1  
 Number of subcatchments ... 22  
 Number of nodes ..... 30  
 Number of links ..... 42  
 Number of pollutants ..... 0  
 Number of land uses ..... 0

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Raingage Summary

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Name	Data Source	Data Type	Recording Interval
Raingage1	C4-10	INTENSITY	10 min.

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Subcatchment Summary

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Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A-0	0.00	5.00	7.00	2.0000	Raingage1	CARP2
A-1	0.03	25.39	100.00	2.0000	Raingage1	CBMH101
A-10	0.12	34.86	64.00	1.0000	Raingage1	CB04
A-11	0.03	33.33	100.00	1.5000	Raingage1	CBMH106
A-12	0.10	58.23	100.00	2.0000	Raingage1	CBMH107
A-13	0.05	31.25	100.00	2.0000	Raingage1	CBMH108
A-14	0.05	31.25	100.00	2.0000	Raingage1	CBMH109
A-15	0.11	36.33	73.00	1.0000	Raingage1	CB05
A-16	0.02	4.69	7.00	1.5000	Raingage1	LD301
A-17	0.17	80.00	100.00	2.0000	Raingage1	CBMH110
A-18	0.12	55.24	100.00	2.0000	Raingage1	CB06

A-19	0.17	80.95	100.00	2.0000	Raingage1	CBMH111
A-2	0.66	37.67	64.00	1.5000	Raingage1	POND
A-20	0.11	50.95	100.00	2.0000	Raingage1	CB07
A-3	0.03	27.27	100.00	2.0000	Raingage1	CBMH102
A-4	0.03	23.85	100.00	2.0000	Raingage1	CB01
A-5	0.05	37.69	100.00	2.0000	Raingage1	CB02
A-6	0.04	34.62	100.00	2.0000	Raingage1	CBMH103
A-7	0.05	37.86	100.00	2.0000	Raingage1	CB9
A-8	0.10	42.50	99.00	2.0000	Raingage1	CBMH105
A-9	0.01	8.67	100.00	5.5000	Raingage1	CB03
R-1	0.09	21.39	84.00	1.0000	Raingage1	CB08

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Node Summary

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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
OGS	JUNCTION	92.67	2.26	0.0	
CARP1	OUTFALL	94.60	0.00	0.0	
CARP2	OUTFALL	94.60	0.00	0.0	
OVL1	OUTFALL	95.19	1.00	0.0	
OVL2	OUTFALL	94.99	1.05	0.0	
OVL4	OUTFALL	94.84	1.00	0.0	
XSTM1	OUTFALL	92.07	1.04	0.0	
XSTM2	OUTFALL	92.15	0.00	0.0	
CB01	STORAGE	93.25	2.75	0.0	
CB02	STORAGE	93.30	2.70	0.0	
CB03	STORAGE	93.35	1.90	0.0	
CB04	STORAGE	93.60	2.30	0.0	
CB05	STORAGE	93.52	2.48	0.0	
CB06	STORAGE	93.60	2.50	0.0	
CB07	STORAGE	93.70	2.40	0.0	
CB08	STORAGE	93.15	2.55	0.0	
CB9	STORAGE	93.30	2.55	0.0	
CBMH101	STORAGE	92.76	3.09	0.0	
CBMH102	STORAGE	92.94	3.01	0.0	
CBMH103	STORAGE	93.00	2.95	0.0	
CBMH105	STORAGE	93.23	2.67	0.0	
CBMH106	STORAGE	92.97	3.18	0.0	

CBMH107	STORAGE	93.09	2.91	0.0
CBMH108	STORAGE	93.21	2.89	0.0
CBMH109	STORAGE	93.28	2.87	0.0
CBMH110	STORAGE	93.24	2.76	0.0
CBMH111	STORAGE	93.42	2.58	0.0
LD301	STORAGE	94.00	2.00	0.0
POND	STORAGE	92.82	3.08	0.0
STMH104	STORAGE	93.10	2.90	0.0

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Link Summary  
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Name	From Node	To Node	Type	Length	%Slope	Roughness
01-102	CB01	CBMH102	CONDUIT	19.5	0.9744	0.0130
02-103	CB02	CBMH103	CONDUIT	19.5	1.0257	0.0130
03-105	CB03	CBMH105	CONDUIT	10.5	0.4762	0.0130
04-105	CB04	CBMH105	CONDUIT	26.4	0.9849	0.0130
05-109	CB05	CBMH109	CONDUIT	11.8	1.0170	0.0130
06-110	CB06	CBMH110	CONDUIT	35.8	0.5028	0.0130
07-111	CB07	CBMH111	CONDUIT	35.9	0.5014	0.0130
101-OGS	CBMH101	OGS	CONDUIT	5.6	0.1786	0.0130
102-POND	CBMH102	POND	CONDUIT	11.2	0.3571	0.0130
103-102	CBMH103	CBMH102	CONDUIT	19.5	0.2564	0.0130
104-103	STMH104	CBMH103	CONDUIT	15.9	0.2516	0.0130
105-104	CBMH105	STMH104	CONDUIT	28.1	0.2491	0.0130
106-POND	CBMH106	POND	CONDUIT	11.7	0.5128	0.0130
107-106	CBMH107	CBMH106	CONDUIT	21.2	0.5189	0.0130
108-107	CBMH108	CBMH107	CONDUIT	20.1	0.2488	0.0130
109-108	CBMH109	CBMH108	CONDUIT	24.7	0.2429	0.0130
110-10	CBMH110	CBMH107	CONDUIT	34.2	0.2632	0.0130
111-110	CBMH111	CBMH110	CONDUIT	41.7	0.2398	0.0130
301-05	LD301	CB05	CONDUIT	41.7	1.0072	0.0130
9-104	CB9	STMH104	CONDUIT	6.1	0.9837	0.0130
OGS-XSTM1	OGS	XSTM1	CONDUIT	6.0	0.1667	0.0130
OLFA1	CBMH101	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA10	CBMH106	CB01	CONDUIT	1.0	1.0001	0.0150
OLFA11	CBMH107	CB02	CONDUIT	1.0	1.0001	0.0150
OLFA12	CBMH108	CBMH107	CONDUIT	1.0	1.0001	0.0150
OLFA13	CBMH109	CB05	CONDUIT	1.0	1.0001	0.0150

OLFA14	CB05	CB04	CONDUIT	1.0	1.0001	0.0350
OLFA15	LD301	CB05	CONDUIT	1.0	1.0001	0.0350
OLFA16	CBMH110	CBMH107	CONDUIT	1.0	1.0001	0.0150
OLFA17	CB06	CBMH110	CONDUIT	1.0	1.0001	0.0150
OLFA18	CBMH111	CBMH110	CONDUIT	1.0	1.0001	0.0150
OLFA19	CB07	CBMH111	CONDUIT	1.0	11.0672	0.0150
OLFA3	CBMH102	CBMH101	CONDUIT	1.0	1.0001	0.0150
OLFA4	CB01	CBMH102	CONDUIT	1.0	1.0001	0.0150
OLFA5	CB02	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA6	CB9	OVLF2	CONDUIT	1.0	1.0001	0.0150
OLFA7	CBMH105	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA9	CB04	OVLF1	CONDUIT	1.0	1.0001	0.0350
OLFR1	CB08	OVLF4	CONDUIT	1.0	1.0001	0.0150
POND-101	POND	CBMH101	CONDUIT	11.7	0.2564	0.0130
08-XTMS2	CB08	XSTM2	ORIFICE			
OVERFLOW	POND	CARP1	WEIR			

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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
01-102	CIRCULAR	0.25	0.05	0.06	0.25	1	58.71
02-103	CIRCULAR	0.25	0.05	0.06	0.25	1	60.23
03-105	CIRCULAR	0.25	0.05	0.06	0.25	1	41.04
04-105	CIRCULAR	0.25	0.05	0.06	0.25	1	59.02
05-109	CIRCULAR	0.25	0.05	0.06	0.25	1	59.97
06-110	CIRCULAR	0.25	0.05	0.06	0.25	1	42.17
07-111	CIRCULAR	0.25	0.05	0.06	0.25	1	42.11
101-OGS	CIRCULAR	0.20	0.03	0.05	0.20	1	14.42
102-POND	CIRCULAR	0.38	0.11	0.09	0.38	1	104.79
103-102	CIRCULAR	0.38	0.11	0.09	0.38	1	88.79
104-103	CIRCULAR	0.38	0.11	0.09	0.38	1	87.95
105-104	CIRCULAR	0.38	0.11	0.09	0.38	1	87.51
106-POND	CIRCULAR	0.45	0.16	0.11	0.45	1	204.18
107-106	CIRCULAR	0.45	0.16	0.11	0.45	1	205.38
108-107	CIRCULAR	0.38	0.11	0.09	0.38	1	87.45
109-108	CIRCULAR	0.38	0.11	0.09	0.38	1	86.42
110-10	CIRCULAR	0.45	0.16	0.11	0.45	1	146.27

111-110	CIRCULAR	0.38	0.11	0.09	0.38	1	85.86
301-05	CIRCULAR	0.25	0.05	0.06	0.25	1	59.69
9-104	CIRCULAR	0.25	0.05	0.06	0.25	1	58.98
OGS-XSTM1	CIRCULAR	0.45	0.16	0.11	0.45	1	116.40
OLFA1	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA10	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA11	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA12	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA13	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA14	RECT_OPEN	1.00	1.00	0.33	1.00	1	1373.69
OLFA15	RECT_OPEN	1.00	1.00	0.33	1.00	1	1373.69
OLFA16	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA17	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA18	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA19	RECT_OPEN	1.00	5.00	0.71	5.00	1	88614.40
OLFA3	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA4	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA5	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA6	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA7	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA9	RECT_OPEN	1.00	3.00	0.60	3.00	1	6098.05
OLFR1	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
POND-101	CIRCULAR	0.45	0.16	0.11	0.45	1	144.38

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NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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Analysis Options  
\*\*\*\*\*  
Flow Units ..... LPS  
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 ..... 05/11/2022 00:00:00  
Ending Date ..... 05/12/2022 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 ..... 4  
Head Tolerance ..... 0.001500 m

*****		
	Volume	Depth
Runoff Quantity Continuity	hectare-m	mm
*****		
Initial LID Storage	0.002	1.083
Total Precipitation	0.113	52.557
Evaporation Loss	0.000	0.000
Infiltration Loss	0.014	6.303
Surface Runoff	0.100	46.509
Final Storage	0.002	1.083
Continuity Error (%)	-0.475	

*****		
	Volume	Volume
Flow Routing Continuity	hectare-m	10 <sup>6</sup> ltr
*****		
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.100	1.003
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.002
External Outflow	0.101	1.005
Flooding Loss	0.000	0.000



A-5		52.56	0.00	0.00	0.00	52.66	0.00	52.66	0.03
16.62	1.002								
A-6		52.56	0.00	0.00	0.00	52.66	0.00	52.66	0.02
15.27	1.002								
A-7		52.56	0.00	0.00	0.00	52.67	0.00	52.67	0.03
17.98	1.002								
A-8		52.56	0.00	0.00	0.34	52.24	0.22	52.46	0.05
34.56	0.998								
A-9		52.56	0.00	0.00	0.00	52.62	0.00	52.62	0.01
4.41	1.001								
R-1		52.56	0.00	0.00	5.64	44.46	2.92	47.38	0.04
29.41	0.902								

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Node Depth Summary  
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Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
OGS	JUNCTION	0.97	0.98	93.65	0 02:02	0.98
CARP1	OUTFALL	0.00	0.00	94.60	0 00:00	0.00
CARP2	OUTFALL	0.00	0.00	94.60	0 00:00	0.00
OVL1	OUTFALL	0.00	0.00	95.19	0 00:00	0.00
OVL2	OUTFALL	0.00	0.00	94.99	0 00:00	0.00
OVL4	OUTFALL	0.00	0.00	94.84	0 00:00	0.00
XSTM1	OUTFALL	1.57	1.57	93.64	0 00:00	1.57
XSTM2	OUTFALL	1.49	1.49	93.64	0 00:00	1.49
CB01	STORAGE	0.45	0.87	94.12	0 02:02	0.87
CB02	STORAGE	0.40	0.86	94.16	0 01:30	0.86
CB03	STORAGE	0.35	0.93	94.28	0 01:30	0.93
CB04	STORAGE	0.11	0.75	94.35	0 01:30	0.75
CB05	STORAGE	0.19	0.94	94.46	0 01:31	0.94
CB06	STORAGE	0.11	1.12	94.72	0 01:30	1.11
CB07	STORAGE	0.06	1.10	94.80	0 01:30	1.09
CB08	STORAGE	0.50	1.20	94.35	0 01:30	1.20
CB9	STORAGE	0.40	0.92	94.22	0 01:30	0.92
CBMH101	STORAGE	0.94	1.34	94.10	0 02:02	1.34
CBMH102	STORAGE	0.76	1.18	94.12	0 02:02	1.18

CBMH103	STORAGE	0.70	1.15	94.15	0 01:31	1.15
CBMH105	STORAGE	0.47	1.05	94.28	0 01:30	1.05
CBMH106	STORAGE	0.73	1.24	94.21	0 01:31	1.23
CBMH107	STORAGE	0.62	1.29	94.38	0 01:31	1.29
CBMH108	STORAGE	0.50	1.20	94.41	0 01:31	1.20
CBMH109	STORAGE	0.43	1.15	94.43	0 01:31	1.15
CBMH110	STORAGE	0.47	1.31	94.55	0 01:30	1.31
CBMH111	STORAGE	0.29	1.23	94.65	0 01:30	1.22
LD301	STORAGE	0.01	0.46	94.46	0 01:30	0.46
POND	STORAGE	0.88	1.30	94.12	0 02:03	1.30
STMH104	STORAGE	0.60	1.12	94.22	0 01:30	1.12

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Node Inflow Summary  
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Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
OGS	JUNCTION	0.00	63.52	0 02:02	0	0.962	-0.000
CARP1	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
CARP2	OUTFALL	0.57	0.57	0 01:30	0.000443	0.000443	0.000
OVL1	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OVL2	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OVL4	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
XSTM1	OUTFALL	0.00	63.52	0 02:03	0	0.962	0.000
XSTM2	OUTFALL	0.00	28.86	0 01:30	0	0.0453	0.000
CB01	STORAGE	10.52	10.52	0 01:30	0.0163	0.0169	0.001
CB02	STORAGE	16.62	16.62	0 01:30	0.0258	0.0263	-0.002
CB03	STORAGE	4.41	4.41	0 01:30	0.00684	0.00738	0.023
CB04	STORAGE	33.63	33.63	0 01:30	0.0488	0.05	-0.006
CB05	STORAGE	33.03	33.37	0 01:30	0.0473	0.0529	0.014
CB06	STORAGE	39.36	39.36	0 01:30	0.0612	0.0618	-0.005
CB07	STORAGE	36.30	36.30	0 01:30	0.0564	0.0564	-0.025
CB08	STORAGE	29.41	29.41	0 01:30	0.0436	0.0448	0.943
CB9	STORAGE	17.98	17.98	0 01:30	0.0279	0.0285	0.010
CBMH101	STORAGE	11.20	63.52	0 02:02	0.0174	0.963	0.000

CBMH102	STORAGE	10.18	131.13	0	01:30	0.0158	0.23	-0.000
CBMH103	STORAGE	15.27	113.37	0	01:30	0.0237	0.197	0.000
CBMH105	STORAGE	34.56	70.01	0	01:29	0.0535	0.114	-0.005
CBMH106	STORAGE	10.18	274.34	0	01:30	0.0158	0.476	0.000
CBMH107	STORAGE	33.59	268.64	0	01:30	0.0522	0.461	0.000
CBMH108	STORAGE	16.96	62.46	0	01:30	0.0263	0.107	-0.001
CBMH109	STORAGE	16.96	48.03	0	01:30	0.0263	0.0797	0.001
CBMH110	STORAGE	57.00	182.38	0	01:30	0.0886	0.301	-0.006
CBMH111	STORAGE	57.68	92.26	0	01:30	0.0897	0.148	-0.008
LD301	STORAGE	2.13	10.22	0	01:25	0.00385	0.0048	0.032
POND	STORAGE	152.66	552.80	0	01:30	0.255	1.57	-0.000
STMH104	STORAGE	0.00	84.50	0	01:29	0	0.145	-0.003

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Node Surcharge Summary  
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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
OGS	JUNCTION	24.00	0.534	1.276

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Node Flooding Summary  
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No nodes were flooded.

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Storage Volume Summary  
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Average Volume	Avg Pcnt	Evap Pcnt	Exfil Pcnt	Maximum Volume	Max Pcnt	Time of Max Occurrence	Maximum Outflow
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Storage Unit	1000 m3	Full	Loss	Loss	1000 m3	Full	days hr:min	LPS
CB01	0.000	1	0	0	0.000	2	0 02:02	9.87
CB02	0.000	1	0	0	0.000	2	0 01:30	15.97
CB03	0.000	0	0	0	0.000	1	0 01:30	6.25
CB04	0.000	1	0	0	0.000	4	0 01:30	32.89
CB05	0.000	2	0	0	0.000	9	0 01:31	31.34
CB06	0.000	0	0	0	0.000	1	0 01:30	37.72
CB07	0.000	0	0	0	0.000	1	0 01:30	34.61
CB08	0.000	3	0	0	0.000	6	0 01:30	28.86
CB9	0.000	1	0	0	0.000	2	0 01:30	17.44
CBMH101	0.001	4	0	0	0.002	5	0 02:02	63.52
CBMH102	0.001	5	0	0	0.001	7	0 02:02	129.16
CBMH103	0.001	4	0	0	0.001	6	0 01:31	111.16
CBMH105	0.001	1	0	0	0.001	2	0 01:30	67.17
CBMH106	0.001	13	0	0	0.001	22	0 01:31	272.58
CBMH107	0.001	2	0	0	0.002	4	0 01:31	264.76
CBMH108	0.001	7	0	0	0.001	16	0 01:31	60.63
CBMH109	0.000	14	0	0	0.001	36	0 01:31	45.91
CBMH110	0.001	2	0	0	0.002	5	0 01:30	176.09
CBMH111	0.000	1	0	0	0.001	2	0 01:30	87.79
LD301	0.000	0	0	0	0.000	1	0 01:30	6.12
POND	0.689	30	0	0	1.155	50	0 02:03	62.60
STMH104	0.001	21	0	0	0.001	38	0 01:30	82.14

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Outfall Loading Summary  
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Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
CARP1	0.00	0.00	0.00	0.000
CARP2	2.34	0.20	0.57	0.000
OVL1	0.00	0.00	0.00	0.000
OVL2	0.00	0.00	0.00	0.000
OVL4	0.00	0.00	0.00	0.000
XSTM1	72.22	15.44	63.52	0.962

XSTM2	99.92	0.53	28.86	0.045
System	24.93	16.18	79.68	1.008

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 Link Flow Summary  
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Link	Type	Maximum  Flow  LPS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
01-102	CONDUIT	9.87	0 01:30	0.20	0.17	1.00
02-103	CONDUIT	15.97	0 01:30	0.33	0.27	1.00
03-105	CONDUIT	6.25	0 01:31	0.13	0.15	1.00
04-105	CONDUIT	32.89	0 01:30	0.67	0.56	1.00
05-109	CONDUIT	31.34	0 01:30	0.64	0.52	1.00
06-110	CONDUIT	37.72	0 01:30	0.77	0.89	1.00
07-111	CONDUIT	34.61	0 01:30	0.71	0.82	1.00
101-OGS	CONDUIT	63.52	0 02:02	1.96	4.40	1.00
102-POND	CONDUIT	129.16	0 01:30	1.17	1.23	1.00
103-102	CONDUIT	111.16	0 01:30	1.01	1.25	1.00
104-103	CONDUIT	82.14	0 01:29	0.74	0.93	1.00
105-104	CONDUIT	67.17	0 01:29	0.61	0.77	1.00
106-POND	CONDUIT	272.58	0 01:30	1.71	1.33	1.00
107-106	CONDUIT	264.76	0 01:30	1.66	1.29	1.00
108-107	CONDUIT	60.63	0 01:31	0.55	0.69	1.00
109-108	CONDUIT	45.91	0 01:31	0.42	0.53	1.00
110-10	CONDUIT	176.09	0 01:30	1.11	1.20	1.00
111-110	CONDUIT	87.79	0 01:30	0.79	1.02	1.00
301-05	CONDUIT	9.15	0 01:25	0.24	0.15	1.00
9-104	CONDUIT	17.44	0 01:30	0.36	0.30	1.00
OGS-XSTM1	CONDUIT	63.52	0 02:03	0.40	0.55	1.00
OLFA1	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA10	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA11	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA12	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA13	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA14	CONDUIT	0.00	0 00:00	0.00	0.00	0.00

OLFA15	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA16	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA17	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA18	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA19	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA3	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA4	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA5	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA6	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA7	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA9	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFR1	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
POND-101	CONDUIT	62.60	0 02:05	0.39	0.43	1.00
08-XTMS2	ORIFICE	28.86	0 01:30			1.00
OVERFLOW	WEIR	0.00	0 00:00			0.00

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 Flow Classification Summary  
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Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class								Inlet Ctrl
		Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	
01-102	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
02-103	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
03-105	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
04-105	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
05-109	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
06-110	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
07-111	1.00	0.00	0.19	0.00	0.81	0.00	0.00	0.00	0.80	0.00
101-OGS	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
102-POND	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
103-102	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
104-103	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
105-104	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
106-POND	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
107-106	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
108-107	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

109-108	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
110-10	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
111-110	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
301-05	1.00	0.00	0.75	0.00	0.25	0.00	0.00	0.00	0.91	0.00
9-104	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
OGS-XSTM1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
OLFA1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA10	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA11	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA12	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA13	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA14	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA15	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA16	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA17	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA18	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA19	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA3	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA4	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA5	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA6	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA7	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA9	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFR1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POND-101	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

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 Conduit Surcharge Summary  
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Conduit	Hours Full			Hours	Hours
	Both Ends	Upstream	Dnstream	Above Full Normal Flow	Capacity Limited
01-102	24.00	24.00	24.00	0.01	0.01
02-103	24.00	24.00	24.00	0.01	0.01
03-105	24.00	24.00	24.00	0.01	0.01
04-105	3.37	3.37	24.00	0.01	0.01
05-109	4.08	4.08	6.54	0.01	0.01

06-110	3.38	3.38	5.66	0.01	0.03
07-111	2.56	2.56	4.09	0.01	0.01
101-OGS	24.00	24.00	24.00	5.82	6.48
102-POND	24.00	24.00	24.00	0.13	0.19
103-102	24.00	24.00	24.00	0.13	0.13
104-103	24.00	24.00	24.00	0.01	0.15
105-104	24.00	24.00	24.00	0.01	0.01
106-POND	24.00	24.00	24.00	0.15	0.22
107-106	24.00	24.00	24.00	0.14	0.14
108-107	24.00	24.00	24.00	0.01	0.01
109-108	6.25	6.25	24.00	0.01	0.01
110-10	5.17	5.17	24.00	0.13	0.16
111-110	3.85	3.85	5.08	0.04	0.04
301-05	0.13	0.13	3.54	0.01	0.01
9-104	24.00	24.00	24.00	0.01	0.01
OGS-XSTM1	24.00	24.00	24.00	0.01	2.04
POND-101	24.00	24.00	24.00	0.01	0.01

Analysis begun on: Thu Nov 17 14:31:36 2022  
 Analysis ended on: Thu Nov 17 14:31:37 2022  
 Total elapsed time: 00:00:01



# Chicago 4hr - 25 Year PCSWMM Results

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

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Element Count

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Number of rain gages ..... 1  
 Number of subcatchments ... 22  
 Number of nodes ..... 30  
 Number of links ..... 42  
 Number of pollutants ..... 0  
 Number of land uses ..... 0

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Raingage Summary

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Name	Data Source	Data Type	Recording Interval
Raingage1	C4-25	INTENSITY	10 min.

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Subcatchment Summary

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Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A-0	0.00	5.00	7.00	2.0000	Raingage1	CARP2
A-1	0.03	25.39	100.00	2.0000	Raingage1	CBMH101
A-10	0.12	34.86	64.00	1.0000	Raingage1	CB04
A-11	0.03	33.33	100.00	1.5000	Raingage1	CBMH106
A-12	0.10	58.23	100.00	2.0000	Raingage1	CBMH107
A-13	0.05	31.25	100.00	2.0000	Raingage1	CBMH108
A-14	0.05	31.25	100.00	2.0000	Raingage1	CBMH109
A-15	0.11	36.33	73.00	1.0000	Raingage1	CB05
A-16	0.02	4.69	7.00	1.5000	Raingage1	LD301
A-17	0.17	80.00	100.00	2.0000	Raingage1	CBMH110
A-18	0.12	55.24	100.00	2.0000	Raingage1	CB06

A-19	0.17	80.95	100.00	2.0000	Raingage1	CBMH111
A-2	0.66	37.67	64.00	1.5000	Raingage1	POND
A-20	0.11	50.95	100.00	2.0000	Raingage1	CB07
A-3	0.03	27.27	100.00	2.0000	Raingage1	CBMH102
A-4	0.03	23.85	100.00	2.0000	Raingage1	CB01
A-5	0.05	37.69	100.00	2.0000	Raingage1	CB02
A-6	0.04	34.62	100.00	2.0000	Raingage1	CBMH103
A-7	0.05	37.86	100.00	2.0000	Raingage1	CB9
A-8	0.10	42.50	99.00	2.0000	Raingage1	CBMH105
A-9	0.01	8.67	100.00	5.5000	Raingage1	CB03
R-1	0.09	21.39	84.00	1.0000	Raingage1	CB08

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Node Summary

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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
OGS	JUNCTION	92.67	2.26	0.0	
CARP1	OUTFALL	94.60	0.00	0.0	
CARP2	OUTFALL	94.60	0.00	0.0	
OVL1	OUTFALL	95.19	1.00	0.0	
OVL2	OUTFALL	94.99	1.05	0.0	
OVL4	OUTFALL	94.84	1.00	0.0	
XSTM1	OUTFALL	92.07	1.04	0.0	
XSTM2	OUTFALL	92.15	0.00	0.0	
CB01	STORAGE	93.25	2.75	0.0	
CB02	STORAGE	93.30	2.70	0.0	
CB03	STORAGE	93.35	1.90	0.0	
CB04	STORAGE	93.60	2.30	0.0	
CB05	STORAGE	93.52	2.48	0.0	
CB06	STORAGE	93.60	2.50	0.0	
CB07	STORAGE	93.70	2.40	0.0	
CB08	STORAGE	93.15	2.55	0.0	
CB9	STORAGE	93.30	2.55	0.0	
CBMH101	STORAGE	92.76	3.09	0.0	
CBMH102	STORAGE	92.94	3.01	0.0	
CBMH103	STORAGE	93.00	2.95	0.0	
CBMH105	STORAGE	93.23	2.67	0.0	
CBMH106	STORAGE	92.97	3.18	0.0	

CBMH107	STORAGE	93.09	2.91	0.0
CBMH108	STORAGE	93.21	2.89	0.0
CBMH109	STORAGE	93.28	2.87	0.0
CBMH110	STORAGE	93.24	2.76	0.0
CBMH111	STORAGE	93.42	2.58	0.0
LD301	STORAGE	94.00	2.00	0.0
POND	STORAGE	92.82	3.08	0.0
STMH104	STORAGE	93.10	2.90	0.0

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Link Summary  
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Name	From Node	To Node	Type	Length	%Slope	Roughness
01-102	CB01	CBMH102	CONDUIT	19.5	0.9744	0.0130
02-103	CB02	CBMH103	CONDUIT	19.5	1.0257	0.0130
03-105	CB03	CBMH105	CONDUIT	10.5	0.4762	0.0130
04-105	CB04	CBMH105	CONDUIT	26.4	0.9849	0.0130
05-109	CB05	CBMH109	CONDUIT	11.8	1.0170	0.0130
06-110	CB06	CBMH110	CONDUIT	35.8	0.5028	0.0130
07-111	CB07	CBMH111	CONDUIT	35.9	0.5014	0.0130
101-OGS	CBMH101	OGS	CONDUIT	5.6	0.1786	0.0130
102-POND	CBMH102	POND	CONDUIT	11.2	0.3571	0.0130
103-102	CBMH103	CBMH102	CONDUIT	19.5	0.2564	0.0130
104-103	STMH104	CBMH103	CONDUIT	15.9	0.2516	0.0130
105-104	CBMH105	STMH104	CONDUIT	28.1	0.2491	0.0130
106-POND	CBMH106	POND	CONDUIT	11.7	0.5128	0.0130
107-106	CBMH107	CBMH106	CONDUIT	21.2	0.5189	0.0130
108-107	CBMH108	CBMH107	CONDUIT	20.1	0.2488	0.0130
109-108	CBMH109	CBMH108	CONDUIT	24.7	0.2429	0.0130
110-10	CBMH110	CBMH107	CONDUIT	34.2	0.2632	0.0130
111-110	CBMH111	CBMH110	CONDUIT	41.7	0.2398	0.0130
301-05	LD301	CB05	CONDUIT	41.7	1.0072	0.0130
9-104	CB9	STMH104	CONDUIT	6.1	0.9837	0.0130
OGS-XSTM1	OGS	XSTM1	CONDUIT	6.0	0.1667	0.0130
OLFA1	CBMH101	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA10	CBMH106	CB01	CONDUIT	1.0	1.0001	0.0150
OLFA11	CBMH107	CB02	CONDUIT	1.0	1.0001	0.0150
OLFA12	CBMH108	CBMH107	CONDUIT	1.0	1.0001	0.0150
OLFA13	CBMH109	CB05	CONDUIT	1.0	1.0001	0.0150

OLFA14	CB05	CB04	CONDUIT	1.0	1.0001	0.0350
OLFA15	LD301	CB05	CONDUIT	1.0	1.0001	0.0350
OLFA16	CBMH110	CBMH107	CONDUIT	1.0	1.0001	0.0150
OLFA17	CB06	CBMH110	CONDUIT	1.0	1.0001	0.0150
OLFA18	CBMH111	CBMH110	CONDUIT	1.0	1.0001	0.0150
OLFA19	CB07	CBMH111	CONDUIT	1.0	11.0672	0.0150
OLFA3	CBMH102	CBMH101	CONDUIT	1.0	1.0001	0.0150
OLFA4	CB01	CBMH102	CONDUIT	1.0	1.0001	0.0150
OLFA5	CB02	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA6	CB9	OVLF2	CONDUIT	1.0	1.0001	0.0150
OLFA7	CBMH105	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA9	CB04	OVLF1	CONDUIT	1.0	1.0001	0.0350
OLFR1	CB08	OVLF4	CONDUIT	1.0	1.0001	0.0150
POND-101	POND	CBMH101	CONDUIT	11.7	0.2564	0.0130
08-XTMS2	CB08	XSTM2	ORIFICE			
OVERFLOW	POND	CARP1	WEIR			

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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
01-102	CIRCULAR	0.25	0.05	0.06	0.25	1	58.71
02-103	CIRCULAR	0.25	0.05	0.06	0.25	1	60.23
03-105	CIRCULAR	0.25	0.05	0.06	0.25	1	41.04
04-105	CIRCULAR	0.25	0.05	0.06	0.25	1	59.02
05-109	CIRCULAR	0.25	0.05	0.06	0.25	1	59.97
06-110	CIRCULAR	0.25	0.05	0.06	0.25	1	42.17
07-111	CIRCULAR	0.25	0.05	0.06	0.25	1	42.11
101-OGS	CIRCULAR	0.20	0.03	0.05	0.20	1	14.42
102-POND	CIRCULAR	0.38	0.11	0.09	0.38	1	104.79
103-102	CIRCULAR	0.38	0.11	0.09	0.38	1	88.79
104-103	CIRCULAR	0.38	0.11	0.09	0.38	1	87.95
105-104	CIRCULAR	0.38	0.11	0.09	0.38	1	87.51
106-POND	CIRCULAR	0.45	0.16	0.11	0.45	1	204.18
107-106	CIRCULAR	0.45	0.16	0.11	0.45	1	205.38
108-107	CIRCULAR	0.38	0.11	0.09	0.38	1	87.45
109-108	CIRCULAR	0.38	0.11	0.09	0.38	1	86.42
110-10	CIRCULAR	0.45	0.16	0.11	0.45	1	146.27

111-110	CIRCULAR	0.38	0.11	0.09	0.38	1	85.86
301-05	CIRCULAR	0.25	0.05	0.06	0.25	1	59.69
9-104	CIRCULAR	0.25	0.05	0.06	0.25	1	58.98
OGS-XSTM1	CIRCULAR	0.45	0.16	0.11	0.45	1	116.40
OLFA1	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA10	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA11	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA12	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA13	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA14	RECT_OPEN	1.00	1.00	0.33	1.00	1	1373.69
OLFA15	RECT_OPEN	1.00	1.00	0.33	1.00	1	1373.69
OLFA16	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA17	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA18	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA19	RECT_OPEN	1.00	5.00	0.71	5.00	1	88614.40
OLFA3	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA4	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA5	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA6	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA7	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA9	RECT_OPEN	1.00	3.00	0.60	3.00	1	6098.05
OLFR1	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
POND-101	CIRCULAR	0.45	0.16	0.11	0.45	1	144.38

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NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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Analysis Options  
\*\*\*\*\*  
Flow Units ..... LPS  
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 ..... 05/11/2022 00:00:00  
Ending Date ..... 05/12/2022 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 ..... 4  
Head Tolerance ..... 0.001500 m

*****		
	Volume	Depth
Runoff Quantity Continuity	hectare-m	mm
*****		
Initial LID Storage	0.002	1.083
Total Precipitation	0.133	61.762
Evaporation Loss	0.000	0.000
Infiltration Loss	0.014	6.703
Surface Runoff	0.119	55.357
Final Storage	0.002	1.083
Continuity Error (%)	-0.474	

*****		
	Volume	Volume
Flow Routing Continuity	hectare-m	10 <sup>6</sup> ltr
*****		
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.119	1.194
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.002
External Outflow	0.120	1.196
Flooding Loss	0.000	0.000



A-5		61.76	0.00	0.00	0.00	61.87	0.00	61.87	0.03
19.69	1.002								
A-6		61.76	0.00	0.00	0.00	61.87	0.00	61.87	0.03
18.09	1.002								
A-7		61.76	0.00	0.00	0.00	61.88	0.00	61.88	0.03
21.30	1.002								
A-8		61.76	0.00	0.00	0.36	61.36	0.28	61.64	0.06
40.95	0.998								
A-9		61.76	0.00	0.00	0.00	61.83	0.00	61.83	0.01
5.22	1.001								
R-1		61.76	0.00	0.00	6.01	52.23	4.08	56.31	0.05
35.40	0.912								

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Node Depth Summary  
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Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
OGS	JUNCTION	1.17	1.18	93.85	0 02:05	1.18
CARP1	OUTFALL	0.00	0.00	94.60	0 00:00	0.00
CARP2	OUTFALL	0.00	0.00	94.60	0 00:00	0.00
OVL1	OUTFALL	0.00	0.00	95.19	0 00:00	0.00
OVL2	OUTFALL	0.00	0.00	94.99	0 00:00	0.00
OVL4	OUTFALL	0.00	0.00	94.84	0 00:00	0.00
XSTM1	OUTFALL	1.77	1.77	93.84	0 00:00	1.77
XSTM2	OUTFALL	1.69	1.69	93.84	0 00:00	1.69
CB01	STORAGE	0.67	1.11	94.36	0 02:07	1.11
CB02	STORAGE	0.62	1.12	94.42	0 01:30	1.12
CB03	STORAGE	0.57	1.19	94.54	0 01:31	1.19
CB04	STORAGE	0.32	1.04	94.64	0 01:30	1.04
CB05	STORAGE	0.40	1.34	94.86	0 01:30	1.34
CB06	STORAGE	0.33	1.55	95.15	0 01:31	1.55
CB07	STORAGE	0.23	1.48	95.18	0 01:31	1.48
CB08	STORAGE	0.70	1.60	94.75	0 01:30	1.60
CB9	STORAGE	0.62	1.17	94.47	0 01:30	1.17
CBMH101	STORAGE	1.16	1.59	94.35	0 02:05	1.59
CBMH102	STORAGE	0.98	1.42	94.36	0 02:07	1.42

CBMH103	STORAGE	0.92	1.39	94.39	0 01:31	1.39
CBMH105	STORAGE	0.69	1.30	94.53	0 01:31	1.30
CBMH106	STORAGE	0.95	1.53	94.50	0 01:31	1.53
CBMH107	STORAGE	0.83	1.65	94.74	0 01:30	1.65
CBMH108	STORAGE	0.71	1.57	94.78	0 01:30	1.57
CBMH109	STORAGE	0.64	1.53	94.81	0 01:30	1.53
CBMH110	STORAGE	0.68	1.70	94.94	0 01:30	1.70
CBMH111	STORAGE	0.51	1.63	95.05	0 01:31	1.63
LD301	STORAGE	0.05	0.87	94.87	0 01:30	0.86
POND	STORAGE	1.10	1.54	94.36	0 02:05	1.54
STMH104	STORAGE	0.82	1.37	94.47	0 01:30	1.37

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Node Inflow Summary  
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Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
OGS	JUNCTION	0.00	66.42	0 02:05	0	1.14	-0.000
CARP1	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
CARP2	OUTFALL	0.71	0.71	0 01:30	0.00059	0.00059	0.000
OVL1	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OVL2	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OVL4	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
XSTM1	OUTFALL	0.00	66.42	0 02:05	0	1.14	0.000
XSTM2	OUTFALL	0.00	32.67	0 01:30	0	0.0535	0.000
CB01	STORAGE	12.46	12.46	0 01:30	0.0192	0.0198	0.002
CB02	STORAGE	19.69	19.69	0 01:30	0.0303	0.0309	-0.003
CB03	STORAGE	5.22	19.47	0 01:30	0.00804	0.0134	0.017
CB04	STORAGE	41.62	41.62	0 01:30	0.0591	0.0599	0.002
CB05	STORAGE	40.27	41.81	0 01:30	0.0568	0.0645	0.014
CB06	STORAGE	46.62	46.62	0 01:30	0.0719	0.0723	0.052
CB07	STORAGE	43.00	43.00	0 01:30	0.0663	0.0674	0.122
CB08	STORAGE	35.40	35.40	0 01:30	0.0518	0.0531	0.756
CB9	STORAGE	21.30	21.30	0 01:30	0.0328	0.0334	0.006
CBMH101	STORAGE	13.26	66.42	0 02:05	0.0204	1.15	0.000

CBMH102	STORAGE	12.06	141.54	0	01:30	0.0186	0.271	-0.000
CBMH103	STORAGE	18.09	120.01	0	01:30	0.0278	0.232	0.002
CBMH105	STORAGE	40.95	81.45	0	01:30	0.0629	0.139	0.004
CBMH106	STORAGE	12.06	316.83	0	01:30	0.0186	0.562	-0.000
CBMH107	STORAGE	39.79	308.84	0	01:30	0.0613	0.543	0.000
CBMH108	STORAGE	20.10	77.62	0	01:30	0.0309	0.127	0.001
CBMH109	STORAGE	20.10	59.73	0	01:30	0.0309	0.0954	-0.000
CBMH110	STORAGE	67.52	208.49	0	01:27	0.104	0.354	0.002
CBMH111	STORAGE	68.33	107.06	0	01:27	0.105	0.175	0.017
LD301	STORAGE	3.10	9.25	0	01:23	0.00548	0.00701	0.026
POND	STORAGE	187.28	641.47	0	01:30	0.311	1.96	0.001
STMH104	STORAGE	0.00	85.28	0	01:30	0	0.171	0.001

\*\*\*\*\*  
Node Surcharge Summary  
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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
OGS	JUNCTION	24.00	0.735	1.075

\*\*\*\*\*  
Node Flooding Summary  
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No nodes were flooded.

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Storage Volume Summary  
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	Average Volume	Avg Pcnt	Evap Pcnt	Exfil Pcnt	Maximum Volume	Max Pcnt	Time of Max Occurrence	Maximum Outflow
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Storage Unit	1000 m3	Full	Loss	Loss	1000 m3	Full	days hr:min	LPS
CB01	0.000	1	0	0	0.000	2	0 02:07	11.82
CB02	0.000	1	0	0	0.000	2	0 01:30	19.03
CB03	0.000	0	0	0	0.007	11	0 01:31	24.13
CB04	0.000	2	0	0	0.000	5	0 01:30	40.65
CB05	0.000	4	0	0	0.000	12	0 01:30	40.08
CB06	0.000	0	0	0	0.001	3	0 01:31	43.72
CB07	0.000	0	0	0	0.002	7	0 01:31	46.92
CB08	0.000	4	0	0	0.001	14	0 01:30	32.67
CB9	0.000	1	0	0	0.000	3	0 01:30	20.70
CBMH101	0.001	5	0	0	0.002	6	0 02:05	66.42
CBMH102	0.001	6	0	0	0.002	9	0 02:07	139.50
CBMH103	0.001	5	0	0	0.002	7	0 01:31	117.77
CBMH105	0.001	1	0	0	0.002	2	0 01:31	78.89
CBMH106	0.001	17	0	0	0.002	27	0 01:31	314.95
CBMH107	0.001	3	0	0	0.002	5	0 01:30	304.94
CBMH108	0.001	9	0	0	0.002	21	0 01:30	76.52
CBMH109	0.001	20	0	0	0.002	48	0 01:30	58.32
CBMH110	0.001	2	0	0	0.002	6	0 01:30	198.84
CBMH111	0.001	1	0	0	0.003	5	0 01:31	97.80
LD301	0.000	0	0	0	0.000	2	0 01:30	6.85
POND	0.923	40	0	0	1.498	65	0 02:05	65.44
STMH104	0.001	28	0	0	0.002	47	0 01:30	83.21

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Outfall Loading Summary  
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Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
CARP1	0.00	0.00	0.00	0.000
CARP2	2.56	0.25	0.71	0.001
OVL1	0.00	0.00	0.00	0.000
OVL2	0.00	0.00	0.00	0.000
OVL4	0.00	0.00	0.00	0.000
XSTM1	75.23	17.59	66.42	1.144

XSTM2	99.95	0.62	32.67	0.054
System	25.39	18.46	88.00	1.198

\*\*\*\*\*  
 Link Flow Summary  
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Link	Type	Maximum  Flow  LPS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
01-102	CONDUIT	11.82	0 01:30	0.24	0.20	1.00
02-103	CONDUIT	19.03	0 01:30	0.39	0.32	1.00
03-105	CONDUIT	24.13	0 01:35	0.49	0.59	1.00
04-105	CONDUIT	40.65	0 01:30	0.83	0.69	1.00
05-109	CONDUIT	40.08	0 01:30	0.82	0.67	1.00
06-110	CONDUIT	43.72	0 01:28	0.89	1.04	1.00
07-111	CONDUIT	46.92	0 01:34	0.96	1.11	1.00
101-OGS	CONDUIT	66.42	0 02:05	2.05	4.61	1.00
102-POND	CONDUIT	139.50	0 01:30	1.26	1.33	1.00
103-102	CONDUIT	117.77	0 01:30	1.07	1.33	1.00
104-103	CONDUIT	83.21	0 01:30	0.75	0.95	1.00
105-104	CONDUIT	67.23	0 01:32	0.61	0.77	1.00
106-POND	CONDUIT	314.95	0 01:30	1.98	1.54	1.00
107-106	CONDUIT	304.94	0 01:30	1.92	1.48	1.00
108-107	CONDUIT	76.52	0 01:30	0.69	0.87	1.00
109-108	CONDUIT	58.32	0 01:30	0.53	0.67	1.00
110-10	CONDUIT	198.84	0 01:28	1.25	1.36	1.00
111-110	CONDUIT	97.80	0 01:27	0.89	1.14	1.00
301-05	CONDUIT	8.29	0 01:23	0.20	0.14	1.00
9-104	CONDUIT	20.70	0 01:30	0.42	0.35	1.00
OGS-XSTM1	CONDUIT	66.42	0 02:05	0.42	0.57	1.00
OLFA1	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA10	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA11	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA12	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA13	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA14	CONDUIT	0.00	0 00:00	0.00	0.00	0.00

OLFA15	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA16	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA17	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA18	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA19	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA3	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA4	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA5	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA6	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA7	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA9	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFR1	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
POND-101	CONDUIT	65.44	0 02:15	0.41	0.45	1.00
08-XTMS2	ORIFICE	32.67	0 01:30			1.00
OVERFLOW	WEIR	0.00	0 00:00			0.00

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 Flow Classification Summary  
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Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class								Inlet Ctrl
		Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	
01-102	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
02-103	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
03-105	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
04-105	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
05-109	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
06-110	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
07-111	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
101-OGS	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
102-POND	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
103-102	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
104-103	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
105-104	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
106-POND	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
107-106	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
108-107	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

109-108	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
110-10	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
111-110	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
301-05	1.00	0.00	0.68	0.00	0.32	0.00	0.00	0.00	0.81	0.00
9-104	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
OGS-XSTM1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
OLFA1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA10	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA11	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA12	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA13	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA14	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA15	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA16	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA17	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA18	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA19	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA3	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA4	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA5	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA6	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA7	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA9	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFR1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POND-101	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

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 Conduit Surcharge Summary  
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Conduit	Hours Full			Hours	Hours
	Both Ends	Upstream	Dnstream	Above Full Normal Flow	Capacity Limited
01-102	24.00	24.00	24.00	0.01	0.01
02-103	24.00	24.00	24.00	0.01	0.01
03-105	24.00	24.00	24.00	0.01	0.01
04-105	7.45	7.45	24.00	0.01	0.01
05-109	24.00	24.00	24.00	0.01	0.01

06-110	7.47	7.47	24.00	0.04	0.13
07-111	5.11	5.11	24.00	0.02	0.05
101-OGS	24.00	24.00	24.00	6.71	7.40
102-POND	24.00	24.00	24.00	0.17	0.25
103-102	24.00	24.00	24.00	0.17	0.17
104-103	24.00	24.00	24.00	0.01	0.20
105-104	24.00	24.00	24.00	0.01	0.01
106-POND	24.00	24.00	24.00	0.19	0.25
107-106	24.00	24.00	24.00	0.18	0.18
108-107	24.00	24.00	24.00	0.01	0.01
109-108	24.00	24.00	24.00	0.01	0.01
110-10	24.00	24.00	24.00	0.17	0.20
111-110	24.00	24.00	24.00	0.15	0.15
301-05	2.23	2.23	23.83	0.01	0.01
9-104	24.00	24.00	24.00	0.01	0.01
OGS-XSTM1	24.00	24.00	24.00	0.01	2.71
POND-101	24.00	24.00	24.00	0.01	0.01

Analysis begun on: Thu Nov 17 13:28:14 2022  
 Analysis ended on: Thu Nov 17 13:28:14 2022  
 Total elapsed time: < 1 sec



# Chicago 4hr - 50 Year PCSWMM Results

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

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Element Count

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Number of rain gages ..... 1  
 Number of subcatchments ... 22  
 Number of nodes ..... 30  
 Number of links ..... 42  
 Number of pollutants ..... 0  
 Number of land uses ..... 0

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Raingage Summary

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Name	Data Source	Data Type	Recording Interval
Raingage1	C4-50	INTENSITY	10 min.

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Subcatchment Summary

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Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A-0	0.00	5.00	7.00	2.0000	Raingage1	CARP2
A-1	0.03	25.39	100.00	2.0000	Raingage1	CBMH101
A-10	0.12	34.86	64.00	1.0000	Raingage1	CB04
A-11	0.03	33.33	100.00	1.5000	Raingage1	CBMH106
A-12	0.10	58.23	100.00	2.0000	Raingage1	CBMH107
A-13	0.05	31.25	100.00	2.0000	Raingage1	CBMH108
A-14	0.05	31.25	100.00	2.0000	Raingage1	CBMH109
A-15	0.11	36.33	73.00	1.0000	Raingage1	CB05
A-16	0.02	4.69	7.00	1.5000	Raingage1	LD301
A-17	0.17	80.00	100.00	2.0000	Raingage1	CBMH110
A-18	0.12	55.24	100.00	2.0000	Raingage1	CB06

A-19	0.17	80.95	100.00	2.0000	Raingage1	CBMH111
A-2	0.66	37.67	64.00	1.5000	Raingage1	POND
A-20	0.11	50.95	100.00	2.0000	Raingage1	CB07
A-3	0.03	27.27	100.00	2.0000	Raingage1	CBMH102
A-4	0.03	23.85	100.00	2.0000	Raingage1	CB01
A-5	0.05	37.69	100.00	2.0000	Raingage1	CB02
A-6	0.04	34.62	100.00	2.0000	Raingage1	CBMH103
A-7	0.05	37.86	100.00	2.0000	Raingage1	CB9
A-8	0.10	42.50	99.00	2.0000	Raingage1	CBMH105
A-9	0.01	8.67	100.00	5.5000	Raingage1	CB03
R-1	0.09	21.39	84.00	1.0000	Raingage1	CB08

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Node Summary

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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
OGS	JUNCTION	92.67	2.26	0.0	
CARP1	OUTFALL	94.60	0.00	0.0	
CARP2	OUTFALL	94.60	0.00	0.0	
OVL1	OUTFALL	95.19	1.00	0.0	
OVL2	OUTFALL	94.99	1.05	0.0	
OVL4	OUTFALL	94.84	1.00	0.0	
XSTM1	OUTFALL	92.07	1.04	0.0	
XSTM2	OUTFALL	92.15	0.00	0.0	
CB01	STORAGE	93.25	2.75	0.0	
CB02	STORAGE	93.30	2.70	0.0	
CB03	STORAGE	93.35	1.90	0.0	
CB04	STORAGE	93.60	2.30	0.0	
CB05	STORAGE	93.52	2.48	0.0	
CB06	STORAGE	93.60	2.50	0.0	
CB07	STORAGE	93.70	2.40	0.0	
CB08	STORAGE	93.15	2.55	0.0	
CB9	STORAGE	93.30	2.55	0.0	
CBMH101	STORAGE	92.76	3.09	0.0	
CBMH102	STORAGE	92.94	3.01	0.0	
CBMH103	STORAGE	93.00	2.95	0.0	
CBMH105	STORAGE	93.23	2.67	0.0	
CBMH106	STORAGE	92.97	3.18	0.0	

CBMH107	STORAGE	93.09	2.91	0.0
CBMH108	STORAGE	93.21	2.89	0.0
CBMH109	STORAGE	93.28	2.87	0.0
CBMH110	STORAGE	93.24	2.76	0.0
CBMH111	STORAGE	93.42	2.58	0.0
LD301	STORAGE	94.00	2.00	0.0
POND	STORAGE	92.82	3.08	0.0
STMH104	STORAGE	93.10	2.90	0.0

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Link Summary  
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Name	From Node	To Node	Type	Length	%Slope	Roughness
01-102	CB01	CBMH102	CONDUIT	19.5	0.9744	0.0130
02-103	CB02	CBMH103	CONDUIT	19.5	1.0257	0.0130
03-105	CB03	CBMH105	CONDUIT	10.5	0.4762	0.0130
04-105	CB04	CBMH105	CONDUIT	26.4	0.9849	0.0130
05-109	CB05	CBMH109	CONDUIT	11.8	1.0170	0.0130
06-110	CB06	CBMH110	CONDUIT	35.8	0.5028	0.0130
07-111	CB07	CBMH111	CONDUIT	35.9	0.5014	0.0130
101-OGS	CBMH101	OGS	CONDUIT	5.6	0.1786	0.0130
102-POND	CBMH102	POND	CONDUIT	11.2	0.3571	0.0130
103-102	CBMH103	CBMH102	CONDUIT	19.5	0.2564	0.0130
104-103	STMH104	CBMH103	CONDUIT	15.9	0.2516	0.0130
105-104	CBMH105	STMH104	CONDUIT	28.1	0.2491	0.0130
106-POND	CBMH106	POND	CONDUIT	11.7	0.5128	0.0130
107-106	CBMH107	CBMH106	CONDUIT	21.2	0.5189	0.0130
108-107	CBMH108	CBMH107	CONDUIT	20.1	0.2488	0.0130
109-108	CBMH109	CBMH108	CONDUIT	24.7	0.2429	0.0130
110-10	CBMH110	CBMH107	CONDUIT	34.2	0.2632	0.0130
111-110	CBMH111	CBMH110	CONDUIT	41.7	0.2398	0.0130
301-05	LD301	CB05	CONDUIT	41.7	1.0072	0.0130
9-104	CB9	STMH104	CONDUIT	6.1	0.9837	0.0130
OGS-XSTM1	OGS	XSTM1	CONDUIT	6.0	0.1667	0.0130
OLFA1	CBMH101	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA10	CBMH106	CB01	CONDUIT	1.0	1.0001	0.0150
OLFA11	CBMH107	CB02	CONDUIT	1.0	1.0001	0.0150
OLFA12	CBMH108	CBMH107	CONDUIT	1.0	1.0001	0.0150
OLFA13	CBMH109	CB05	CONDUIT	1.0	1.0001	0.0150

OLFA14	CB05	CB04	CONDUIT	1.0	1.0001	0.0350
OLFA15	LD301	CB05	CONDUIT	1.0	1.0001	0.0350
OLFA16	CBMH110	CBMH107	CONDUIT	1.0	1.0001	0.0150
OLFA17	CB06	CBMH110	CONDUIT	1.0	1.0001	0.0150
OLFA18	CBMH111	CBMH110	CONDUIT	1.0	1.0001	0.0150
OLFA19	CB07	CBMH111	CONDUIT	1.0	11.0672	0.0150
OLFA3	CBMH102	CBMH101	CONDUIT	1.0	1.0001	0.0150
OLFA4	CB01	CBMH102	CONDUIT	1.0	1.0001	0.0150
OLFA5	CB02	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA6	CB9	OVLF2	CONDUIT	1.0	1.0001	0.0150
OLFA7	CBMH105	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA9	CB04	OVLF1	CONDUIT	1.0	1.0001	0.0350
OLFR1	CB08	OVLF4	CONDUIT	1.0	1.0001	0.0150
POND-101	POND	CBMH101	CONDUIT	11.7	0.2564	0.0130
08-XTMS2	CB08	XSTM2	ORIFICE			
OVERFLOW	POND	CARP1	WEIR			

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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
01-102	CIRCULAR	0.25	0.05	0.06	0.25	1	58.71
02-103	CIRCULAR	0.25	0.05	0.06	0.25	1	60.23
03-105	CIRCULAR	0.25	0.05	0.06	0.25	1	41.04
04-105	CIRCULAR	0.25	0.05	0.06	0.25	1	59.02
05-109	CIRCULAR	0.25	0.05	0.06	0.25	1	59.97
06-110	CIRCULAR	0.25	0.05	0.06	0.25	1	42.17
07-111	CIRCULAR	0.25	0.05	0.06	0.25	1	42.11
101-OGS	CIRCULAR	0.20	0.03	0.05	0.20	1	14.42
102-POND	CIRCULAR	0.38	0.11	0.09	0.38	1	104.79
103-102	CIRCULAR	0.38	0.11	0.09	0.38	1	88.79
104-103	CIRCULAR	0.38	0.11	0.09	0.38	1	87.95
105-104	CIRCULAR	0.38	0.11	0.09	0.38	1	87.51
106-POND	CIRCULAR	0.45	0.16	0.11	0.45	1	204.18
107-106	CIRCULAR	0.45	0.16	0.11	0.45	1	205.38
108-107	CIRCULAR	0.38	0.11	0.09	0.38	1	87.45
109-108	CIRCULAR	0.38	0.11	0.09	0.38	1	86.42
110-10	CIRCULAR	0.45	0.16	0.11	0.45	1	146.27

111-110	CIRCULAR	0.38	0.11	0.09	0.38	1	85.86
301-05	CIRCULAR	0.25	0.05	0.06	0.25	1	59.69
9-104	CIRCULAR	0.25	0.05	0.06	0.25	1	58.98
OGS-XSTM1	CIRCULAR	0.45	0.16	0.11	0.45	1	116.40
OLFA1	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA10	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA11	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA12	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA13	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA14	RECT_OPEN	1.00	1.00	0.33	1.00	1	1373.69
OLFA15	RECT_OPEN	1.00	1.00	0.33	1.00	1	1373.69
OLFA16	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA17	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA18	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA19	RECT_OPEN	1.00	5.00	0.71	5.00	1	88614.40
OLFA3	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA4	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA5	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA6	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA7	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA9	RECT_OPEN	1.00	3.00	0.60	3.00	1	6098.05
OLFR1	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
POND-101	CIRCULAR	0.45	0.16	0.11	0.45	1	144.38

\*\*\*\*\*  
NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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\*\*\*\*\*  
Analysis Options  
\*\*\*\*\*  
Flow Units ..... LPS  
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 ..... 05/11/2022 00:00:00  
Ending Date ..... 05/12/2022 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 ..... 4  
Head Tolerance ..... 0.001500 m

*****		
	Volume	Depth
*****		
Runoff Quantity Continuity	hectare-m	mm
-----		
Initial LID Storage	0.002	1.083
Total Precipitation	0.148	68.725
Evaporation Loss	0.000	0.000
Infiltration Loss	0.015	6.981
Surface Runoff	0.134	62.069
Final Storage	0.002	1.083
Continuity Error (%)	-0.466	

*****		
	Volume	Volume
*****		
Flow Routing Continuity	hectare-m	10 <sup>6</sup> ltr
-----		
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.134	1.339
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.002
External Outflow	0.134	1.340
Flooding Loss	0.000	0.000



A-5		68.73	0.00	0.00	0.00	68.83	0.00	68.83	0.03
21.98	1.002								
A-6		68.73	0.00	0.00	0.00	68.83	0.00	68.83	0.03
20.18	1.002								
A-7		68.72	0.00	0.00	0.00	68.84	0.00	68.84	0.04
23.77	1.002								
A-8		68.72	0.00	0.00	0.38	68.26	0.32	68.59	0.07
45.71	0.998								
A-9		68.73	0.00	0.00	0.00	68.80	0.00	68.80	0.01
5.83	1.001								
R-1		68.72	0.00	0.00	6.28	58.11	4.94	63.05	0.06
39.82	0.917								

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Node Depth Summary  
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Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
OGS	JUNCTION	1.24	1.26	93.93	0 02:10	1.26
CARP1	OUTFALL	0.00	0.00	94.60	0 00:00	0.00
CARP2	OUTFALL	0.00	0.00	94.60	0 00:00	0.00
OVL1	OUTFALL	0.00	0.00	95.19	0 00:00	0.00
OVL2	OUTFALL	0.00	0.00	94.99	0 00:00	0.00
OVL4	OUTFALL	0.00	0.00	94.84	0 00:00	0.00
XSTM1	OUTFALL	1.84	1.84	93.91	0 00:00	1.84
XSTM2	OUTFALL	1.76	1.76	93.91	0 00:00	1.76
CB01	STORAGE	0.75	1.22	94.47	0 02:09	1.22
CB02	STORAGE	0.70	1.24	94.54	0 01:30	1.24
CB03	STORAGE	0.65	1.31	94.66	0 01:32	1.31
CB04	STORAGE	0.41	1.21	94.81	0 01:30	1.20
CB05	STORAGE	0.49	1.49	95.01	0 01:30	1.49
CB06	STORAGE	0.41	1.61	95.21	0 01:32	1.61
CB07	STORAGE	0.31	1.53	95.23	0 01:32	1.53
CB08	STORAGE	0.77	1.65	94.80	0 01:31	1.65
CB9	STORAGE	0.70	1.30	94.60	0 01:30	1.30
CBMH101	STORAGE	1.24	1.70	94.46	0 02:11	1.70
CBMH102	STORAGE	1.06	1.53	94.47	0 02:09	1.53

CBMH103	STORAGE	1.00	1.51	94.51	0 01:30	1.51
CBMH105	STORAGE	0.77	1.42	94.65	0 01:30	1.42
CBMH106	STORAGE	1.03	1.64	94.61	0 01:31	1.64
CBMH107	STORAGE	0.92	1.76	94.85	0 01:30	1.76
CBMH108	STORAGE	0.80	1.70	94.91	0 01:30	1.69
CBMH109	STORAGE	0.73	1.66	94.94	0 01:30	1.66
CBMH110	STORAGE	0.77	1.79	95.03	0 01:30	1.79
CBMH111	STORAGE	0.59	1.70	95.12	0 01:32	1.70
LD301	STORAGE	0.07	1.02	95.02	0 01:30	1.02
POND	STORAGE	1.18	1.65	94.47	0 02:11	1.65
STMH104	STORAGE	0.90	1.49	94.59	0 01:30	1.49

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Node Inflow Summary  
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Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
OGS	JUNCTION	0.00	69.14	0 02:11	0	1.28	-0.000
CARP1	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
CARP2	OUTFALL	0.81	0.81	0 01:30	0.000697	0.000697	0.000
OVL1	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OVL2	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OVL4	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
XSTM1	OUTFALL	0.00	69.14	0 02:11	0	1.28	0.000
XSTM2	OUTFALL	0.00	32.31	0 01:31	0	0.0597	0.000
CB01	STORAGE	13.90	13.90	0 01:30	0.0213	0.022	-0.003
CB02	STORAGE	21.98	21.98	0 01:30	0.0337	0.0343	-0.002
CB03	STORAGE	5.83	29.85	0 01:30	0.00894	0.0198	0.034
CB04	STORAGE	47.58	47.58	0 01:30	0.0669	0.0677	0.001
CB05	STORAGE	45.62	48.18	0 01:30	0.0639	0.0732	0.008
CB06	STORAGE	52.03	52.03	0 01:30	0.08	0.0805	0.133
CB07	STORAGE	47.99	47.99	0 01:30	0.0737	0.0746	0.220
CB08	STORAGE	39.82	39.82	0 01:30	0.058	0.0593	0.687
CB9	STORAGE	23.77	23.77	0 01:30	0.0365	0.0371	0.001
CBMH101	STORAGE	14.80	69.14	0 02:10	0.0227	1.28	0.000

CBMH102	STORAGE	13.46	150.90	0	01:30	0.0206	0.301	0.000
CBMH103	STORAGE	20.18	126.78	0	01:30	0.031	0.258	0.001
CBMH105	STORAGE	45.71	91.98	0	01:30	0.07	0.161	0.003
CBMH106	STORAGE	13.46	325.47	0	01:29	0.0206	0.625	0.000
CBMH107	STORAGE	44.40	315.79	0	01:28	0.0682	0.604	0.000
CBMH108	STORAGE	22.43	89.69	0	01:30	0.0344	0.143	0.001
CBMH109	STORAGE	22.43	68.79	0	01:30	0.0344	0.108	0.001
CBMH110	STORAGE	75.35	218.66	0	01:25	0.116	0.392	0.001
CBMH111	STORAGE	76.25	115.46	0	01:25	0.117	0.194	0.088
LD301	STORAGE	3.89	8.69	0	01:22	0.00674	0.0085	0.015
POND	STORAGE	213.64	685.35	0	01:30	0.353	2.17	0.000
STMH104	STORAGE	0.00	88.03	0	01:30	0	0.19	0.001

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Node Surcharge Summary  
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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
OGS	JUNCTION	24.00	0.806	1.004

\*\*\*\*\*  
Node Flooding Summary  
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No nodes were flooded.

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Storage Volume Summary  
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	Average Volume	Avg Pcnt	Evap Pcnt	Exfil Pcnt	Maximum Volume	Max Pcnt	Time of Max Occurrence	Maximum Outflow
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Storage Unit	1000 m3	Full	Loss	Loss	1000 m3	Full	days hr:min	LPS
CB01	0.000	2	0	0	0.000	3	0 02:09	13.22
CB02	0.000	1	0	0	0.000	3	0 01:30	21.25
CB03	0.001	1	0	0	0.013	20	0 01:32	27.31
CB04	0.000	2	0	0	0.000	6	0 01:30	46.45
CB05	0.000	4	0	0	0.001	14	0 01:30	46.44
CB06	0.000	0	0	0	0.005	11	0 01:32	45.32
CB07	0.000	0	0	0	0.006	17	0 01:32	53.48
CB08	0.000	4	0	0	0.003	41	0 01:31	32.31
CB9	0.000	2	0	0	0.000	3	0 01:30	23.10
CBMH101	0.001	5	0	0	0.002	7	0 02:11	69.14
CBMH102	0.001	7	0	0	0.002	9	0 02:09	148.80
CBMH103	0.001	5	0	0	0.002	8	0 01:30	124.45
CBMH105	0.001	1	0	0	0.002	3	0 01:30	89.06
CBMH106	0.001	18	0	0	0.002	29	0 01:31	323.57
CBMH107	0.001	3	0	0	0.002	6	0 01:30	312.02
CBMH108	0.001	10	0	0	0.002	22	0 01:30	88.39
CBMH109	0.001	23	0	0	0.002	53	0 01:30	67.51
CBMH110	0.001	3	0	0	0.002	7	0 01:30	200.49
CBMH111	0.001	1	0	0	0.009	15	0 01:32	109.88
LD301	0.000	0	0	0	0.000	2	0 01:30	7.30
POND	1.023	45	0	0	1.675	73	0 02:11	68.15
STMH104	0.001	31	0	0	0.002	51	0 01:30	85.93

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Outfall Loading Summary  
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Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
CARP1	0.00	0.00	0.00	0.000
CARP2	2.83	0.27	0.81	0.001
OVL1	0.00	0.00	0.00	0.000
OVL2	0.00	0.00	0.00	0.000
OVL4	0.00	0.00	0.00	0.000
XSTM1	71.12	20.85	69.14	1.282

XSTM2	99.95	0.69	32.31	0.060
System	24.84	21.81	92.24	1.342

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 Link Flow Summary  
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Link	Type	Maximum  Flow  LPS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
01-102	CONDUIT	13.22	0 01:30	0.27	0.23	1.00
02-103	CONDUIT	21.25	0 01:30	0.43	0.35	1.00
03-105	CONDUIT	27.31	0 01:35	0.56	0.67	1.00
04-105	CONDUIT	46.45	0 01:30	0.95	0.79	1.00
05-109	CONDUIT	46.44	0 01:30	0.95	0.77	1.00
06-110	CONDUIT	45.32	0 01:25	0.92	1.07	1.00
07-111	CONDUIT	53.48	0 01:37	1.09	1.27	1.00
101-OGS	CONDUIT	69.14	0 02:11	2.14	4.79	1.00
102-POND	CONDUIT	148.80	0 01:30	1.35	1.42	1.00
103-102	CONDUIT	124.45	0 01:30	1.13	1.40	1.00
104-103	CONDUIT	85.93	0 01:30	0.78	0.98	1.00
105-104	CONDUIT	69.37	0 01:33	0.63	0.79	1.00
106-POND	CONDUIT	323.57	0 01:29	2.03	1.58	1.00
107-106	CONDUIT	312.02	0 01:29	1.96	1.52	1.00
108-107	CONDUIT	88.39	0 01:30	0.80	1.01	1.00
109-108	CONDUIT	67.51	0 01:30	0.61	0.78	1.00
110-10	CONDUIT	200.49	0 01:26	1.26	1.37	1.00
111-110	CONDUIT	109.88	0 01:35	0.99	1.28	1.00
301-05	CONDUIT	7.80	0 01:22	0.18	0.13	1.00
9-104	CONDUIT	23.10	0 01:30	0.47	0.39	1.00
OGS-XSTM1	CONDUIT	69.14	0 02:11	0.43	0.59	1.00
OLFA1	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA10	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA11	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA12	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA13	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA14	CONDUIT	0.00	0 00:00	0.00	0.00	0.00

OLFA15	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA16	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA17	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA18	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA19	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA3	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA4	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA5	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA6	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA7	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA9	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFR1	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
POND-101	CONDUIT	68.15	0 02:15	0.43	0.47	1.00
08-XTMS2	ORIFICE	32.31	0 01:31			1.00
OVERFLOW	WEIR	0.00	0 00:00			0.00

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 Flow Classification Summary  
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Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class								Inlet Ctrl
		Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	
01-102	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
02-103	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
03-105	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
04-105	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
05-109	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
06-110	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
07-111	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
101-OGS	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
102-POND	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
103-102	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
104-103	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
105-104	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
106-POND	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
107-106	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
108-107	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

109-108	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
110-10	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
111-110	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
301-05	1.00	0.00	0.63	0.00	0.37	0.00	0.00	0.00	0.75	0.00
9-104	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
OGS-XSTM1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
OLFA1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA10	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA11	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA12	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA13	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA14	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA15	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA16	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA17	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA18	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA19	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA3	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA4	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA5	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA6	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA7	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA9	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFR1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POND-101	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

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 Conduit Surcharge Summary  
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Conduit	Hours Full			Hours	Hours
	Both Ends	Upstream	Dnstream	Above Full Normal Flow	Capacity Limited
01-102	24.00	24.00	24.00	0.01	0.01
02-103	24.00	24.00	24.00	0.01	0.01
03-105	24.00	24.00	24.00	0.01	0.01
04-105	24.00	24.00	24.00	0.01	0.01
05-109	24.00	24.00	24.00	0.01	0.01

06-110	24.00	24.00	24.00	0.06	0.15
07-111	6.84	6.84	24.00	0.03	0.05
101-OGS	24.00	24.00	24.00	7.31	8.00
102-POND	24.00	24.00	24.00	0.19	0.29
103-102	24.00	24.00	24.00	0.19	0.19
104-103	24.00	24.00	24.00	0.01	0.23
105-104	24.00	24.00	24.00	0.01	0.01
106-POND	24.00	24.00	24.00	0.23	0.31
107-106	24.00	24.00	24.00	0.22	0.22
108-107	24.00	24.00	24.00	0.02	0.06
109-108	24.00	24.00	24.00	0.01	0.01
110-10	24.00	24.00	24.00	0.21	0.24
111-110	24.00	24.00	24.00	0.11	0.12
301-05	3.36	3.36	23.83	0.01	0.01
9-104	24.00	24.00	24.00	0.01	0.01
OGS-XSTM1	24.00	24.00	24.00	0.01	3.16
POND-101	24.00	24.00	24.00	0.01	0.01

Analysis begun on: Thu Nov 17 13:22:00 2022  
 Analysis ended on: Thu Nov 17 13:22:00 2022  
 Total elapsed time: < 1 sec



# Chicago 4hr - 100 Year PCSWMM Results

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

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Element Count

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Number of rain gages ..... 1  
 Number of subcatchments ... 22  
 Number of nodes ..... 30  
 Number of links ..... 42  
 Number of pollutants ..... 0  
 Number of land uses ..... 0

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Raingage Summary

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Name	Data Source	Data Type	Recording Interval
Raingage1	C4-100	INTENSITY	10 min.

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Subcatchment Summary

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Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A-0	0.00	5.00	7.00	2.0000	Raingage1	CARP2
A-1	0.03	25.39	100.00	2.0000	Raingage1	CBMH101
A-10	0.12	34.86	64.00	1.0000	Raingage1	CB04
A-11	0.03	33.33	100.00	1.5000	Raingage1	CBMH106
A-12	0.10	58.23	100.00	2.0000	Raingage1	CBMH107
A-13	0.05	31.25	100.00	2.0000	Raingage1	CBMH108
A-14	0.05	31.25	100.00	2.0000	Raingage1	CBMH109
A-15	0.11	36.33	73.00	1.0000	Raingage1	CB05
A-16	0.02	4.69	7.00	1.5000	Raingage1	LD301
A-17	0.17	80.00	100.00	2.0000	Raingage1	CBMH110
A-18	0.12	55.24	100.00	2.0000	Raingage1	CB06

A-19	0.17	80.95	100.00	2.0000	Raingage1	CBMH111
A-2	0.66	37.67	64.00	1.5000	Raingage1	POND
A-20	0.11	50.95	100.00	2.0000	Raingage1	CB07
A-3	0.03	27.27	100.00	2.0000	Raingage1	CBMH102
A-4	0.03	23.85	100.00	2.0000	Raingage1	CB01
A-5	0.05	37.69	100.00	2.0000	Raingage1	CB02
A-6	0.04	34.62	100.00	2.0000	Raingage1	CBMH103
A-7	0.05	37.86	100.00	2.0000	Raingage1	CB9
A-8	0.10	42.50	99.00	2.0000	Raingage1	CBMH105
A-9	0.01	8.67	100.00	5.5000	Raingage1	CB03
R-1	0.09	21.39	84.00	1.0000	Raingage1	CB08

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Node Summary

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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
OGS	JUNCTION	92.67	2.26	0.0	
CARP1	OUTFALL	94.60	0.00	0.0	
CARP2	OUTFALL	94.60	0.00	0.0	
OVL1	OUTFALL	95.19	1.00	0.0	
OVL2	OUTFALL	94.99	1.05	0.0	
OVL4	OUTFALL	94.84	1.00	0.0	
XSTM1	OUTFALL	92.07	1.04	0.0	
XSTM2	OUTFALL	92.15	0.00	0.0	
CB01	STORAGE	93.25	2.75	0.0	
CB02	STORAGE	93.30	2.70	0.0	
CB03	STORAGE	93.35	1.90	0.0	
CB04	STORAGE	93.60	2.30	0.0	
CB05	STORAGE	93.52	2.48	0.0	
CB06	STORAGE	93.60	2.50	0.0	
CB07	STORAGE	93.70	2.40	0.0	
CB08	STORAGE	93.15	2.55	0.0	
CB9	STORAGE	93.30	2.55	0.0	
CBMH101	STORAGE	92.76	3.09	0.0	
CBMH102	STORAGE	92.94	3.01	0.0	
CBMH103	STORAGE	93.00	2.95	0.0	
CBMH105	STORAGE	93.23	2.67	0.0	
CBMH106	STORAGE	92.97	3.18	0.0	

CBMH107	STORAGE	93.09	2.91	0.0
CBMH108	STORAGE	93.21	2.89	0.0
CBMH109	STORAGE	93.28	2.87	0.0
CBMH110	STORAGE	93.24	2.76	0.0
CBMH111	STORAGE	93.42	2.58	0.0
LD301	STORAGE	94.00	2.00	0.0
POND	STORAGE	92.82	3.08	0.0
STMH104	STORAGE	93.10	2.90	0.0

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Link Summary  
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Name	From Node	To Node	Type	Length	%Slope	Roughness
01-102	CB01	CBMH102	CONDUIT	19.5	0.9744	0.0130
02-103	CB02	CBMH103	CONDUIT	19.5	1.0257	0.0130
03-105	CB03	CBMH105	CONDUIT	10.5	0.4762	0.0130
04-105	CB04	CBMH105	CONDUIT	26.4	0.9849	0.0130
05-109	CB05	CBMH109	CONDUIT	11.8	1.0170	0.0130
06-110	CB06	CBMH110	CONDUIT	35.8	0.5028	0.0130
07-111	CB07	CBMH111	CONDUIT	35.9	0.5014	0.0130
101-OGS	CBMH101	OGS	CONDUIT	5.6	0.1786	0.0130
102-POND	CBMH102	POND	CONDUIT	11.2	0.3571	0.0130
103-102	CBMH103	CBMH102	CONDUIT	19.5	0.2564	0.0130
104-103	STMH104	CBMH103	CONDUIT	15.9	0.2516	0.0130
105-104	CBMH105	STMH104	CONDUIT	28.1	0.2491	0.0130
106-POND	CBMH106	POND	CONDUIT	11.7	0.5128	0.0130
107-106	CBMH107	CBMH106	CONDUIT	21.2	0.5189	0.0130
108-107	CBMH108	CBMH107	CONDUIT	20.1	0.2488	0.0130
109-108	CBMH109	CBMH108	CONDUIT	24.7	0.2429	0.0130
110-10	CBMH110	CBMH107	CONDUIT	34.2	0.2632	0.0130
111-110	CBMH111	CBMH110	CONDUIT	41.7	0.2398	0.0130
301-05	LD301	CB05	CONDUIT	41.7	1.0072	0.0130
9-104	CB9	STMH104	CONDUIT	6.1	0.9837	0.0130
OGS-XSTM1	OGS	XSTM1	CONDUIT	6.0	0.1667	0.0130
OLFA1	CBMH101	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA10	CBMH106	CB01	CONDUIT	1.0	1.0001	0.0150
OLFA11	CBMH107	CB02	CONDUIT	1.0	1.0001	0.0150
OLFA12	CBMH108	CBMH107	CONDUIT	1.0	1.0001	0.0150
OLFA13	CBMH109	CB05	CONDUIT	1.0	1.0001	0.0150

OLFA14	CB05	CB04	CONDUIT	1.0	1.0001	0.0350
OLFA15	LD301	CB05	CONDUIT	1.0	1.0001	0.0350
OLFA16	CBMH110	CBMH107	CONDUIT	1.0	1.0001	0.0150
OLFA17	CB06	CBMH110	CONDUIT	1.0	1.0001	0.0150
OLFA18	CBMH111	CBMH110	CONDUIT	1.0	1.0001	0.0150
OLFA19	CB07	CBMH111	CONDUIT	1.0	11.0672	0.0150
OLFA3	CBMH102	CBMH101	CONDUIT	1.0	1.0001	0.0150
OLFA4	CB01	CBMH102	CONDUIT	1.0	1.0001	0.0150
OLFA5	CB02	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA6	CB9	OVLF2	CONDUIT	1.0	1.0001	0.0150
OLFA7	CBMH105	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA9	CB04	OVLF1	CONDUIT	1.0	1.0001	0.0350
OLFR1	CB08	OVLF4	CONDUIT	1.0	1.0001	0.0150
POND-101	POND	CBMH101	CONDUIT	11.7	0.2564	0.0130
08-XTMS2	CB08	XSTM2	ORIFICE			
OVERFLOW	POND	CARP1	WEIR			

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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
01-102	CIRCULAR	0.25	0.05	0.06	0.25	1	58.71
02-103	CIRCULAR	0.25	0.05	0.06	0.25	1	60.23
03-105	CIRCULAR	0.25	0.05	0.06	0.25	1	41.04
04-105	CIRCULAR	0.25	0.05	0.06	0.25	1	59.02
05-109	CIRCULAR	0.25	0.05	0.06	0.25	1	59.97
06-110	CIRCULAR	0.25	0.05	0.06	0.25	1	42.17
07-111	CIRCULAR	0.25	0.05	0.06	0.25	1	42.11
101-OGS	CIRCULAR	0.20	0.03	0.05	0.20	1	14.42
102-POND	CIRCULAR	0.38	0.11	0.09	0.38	1	104.79
103-102	CIRCULAR	0.38	0.11	0.09	0.38	1	88.79
104-103	CIRCULAR	0.38	0.11	0.09	0.38	1	87.95
105-104	CIRCULAR	0.38	0.11	0.09	0.38	1	87.51
106-POND	CIRCULAR	0.45	0.16	0.11	0.45	1	204.18
107-106	CIRCULAR	0.45	0.16	0.11	0.45	1	205.38
108-107	CIRCULAR	0.38	0.11	0.09	0.38	1	87.45
109-108	CIRCULAR	0.38	0.11	0.09	0.38	1	86.42
110-10	CIRCULAR	0.45	0.16	0.11	0.45	1	146.27

111-110	CIRCULAR	0.38	0.11	0.09	0.38	1	85.86
301-05	CIRCULAR	0.25	0.05	0.06	0.25	1	59.69
9-104	CIRCULAR	0.25	0.05	0.06	0.25	1	58.98
OGS-XSTM1	CIRCULAR	0.45	0.16	0.11	0.45	1	116.40
OLFA1	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA10	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA11	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA12	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA13	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA14	RECT_OPEN	1.00	1.00	0.33	1.00	1	1373.69
OLFA15	RECT_OPEN	1.00	1.00	0.33	1.00	1	1373.69
OLFA16	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA17	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA18	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA19	RECT_OPEN	1.00	5.00	0.71	5.00	1	88614.40
OLFA3	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA4	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA5	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA6	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA7	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA9	RECT_OPEN	1.00	3.00	0.60	3.00	1	6098.05
OLFR1	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
POND-101	CIRCULAR	0.45	0.16	0.11	0.45	1	144.38

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NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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\*\*\*\*\*  
Analysis Options  
\*\*\*\*\*  
Flow Units ..... LPS  
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 ..... 05/11/2022 00:00:00  
Ending Date ..... 05/12/2022 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 ..... 4  
Head Tolerance ..... 0.001500 m

*****		
	Volume	Depth
Runoff Quantity Continuity	hectare-m	mm
*****		
Initial LID Storage	0.002	1.083
Total Precipitation	0.164	76.002
Evaporation Loss	0.000	0.000
Infiltration Loss	0.016	7.263
Surface Runoff	0.149	69.087
Final Storage	0.002	1.083
Continuity Error (%)	-0.452	

*****		
	Volume	Volume
Flow Routing Continuity	hectare-m	10 <sup>6</sup> ltr
*****		
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.149	1.490
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.002
External Outflow	0.149	1.491
Flooding Loss	0.000	0.000



A-5		76.00	0.00	0.00	0.00	76.11	0.00	76.11	0.04
24.30	1.001								
A-6		76.00	0.00	0.00	0.00	76.11	0.00	76.11	0.03
22.32	1.001								
A-7		76.00	0.00	0.00	0.00	76.12	0.00	76.12	0.04
26.29	1.002								
A-8		76.00	0.00	0.00	0.40	75.47	0.37	75.84	0.08
50.55	0.998								
A-9		76.00	0.00	0.00	0.00	76.07	0.00	76.07	0.01
6.45	1.001								
R-1		76.00	0.00	0.00	6.56	64.24	5.83	70.07	0.06
44.31	0.922								

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Node Depth Summary  
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Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
OGS	JUNCTION	1.35	1.37	94.04	0 02:13	1.37
CARP1	OUTFALL	0.00	0.00	94.60	0 00:00	0.00
CARP2	OUTFALL	0.00	0.00	94.60	0 00:00	0.00
OVL1	OUTFALL	0.00	0.00	95.19	0 00:00	0.00
OVL2	OUTFALL	0.00	0.00	94.99	0 00:00	0.00
OVL4	OUTFALL	0.00	0.00	94.84	0 00:00	0.00
XSTM1	OUTFALL	1.95	1.95	94.02	0 00:00	1.95
XSTM2	OUTFALL	1.87	1.87	94.02	0 00:00	1.87
CB01	STORAGE	0.88	1.37	94.62	0 02:11	1.37
CB02	STORAGE	0.83	1.39	94.69	0 01:30	1.39
CB03	STORAGE	0.78	1.43	94.78	0 01:33	1.43
CB04	STORAGE	0.53	1.37	94.97	0 01:30	1.37
CB05	STORAGE	0.61	1.59	95.11	0 01:30	1.59
CB06	STORAGE	0.54	1.65	95.25	0 01:32	1.65
CB07	STORAGE	0.44	1.56	95.26	0 01:33	1.56
CB08	STORAGE	0.88	1.69	94.84	0 01:32	1.69
CB9	STORAGE	0.83	1.44	94.74	0 01:30	1.44
CBMH101	STORAGE	1.36	1.84	94.60	0 02:13	1.84
CBMH102	STORAGE	1.19	1.68	94.62	0 02:11	1.68

CBMH103	STORAGE	1.13	1.66	94.66	0 01:30	1.65
CBMH105	STORAGE	0.90	1.56	94.79	0 01:31	1.56
CBMH106	STORAGE	1.16	1.74	94.71	0 01:32	1.74
CBMH107	STORAGE	1.04	1.85	94.94	0 01:30	1.85
CBMH108	STORAGE	0.92	1.79	95.00	0 01:30	1.79
CBMH109	STORAGE	0.85	1.76	95.04	0 01:30	1.76
CBMH110	STORAGE	0.89	1.85	95.09	0 01:31	1.85
CBMH111	STORAGE	0.71	1.74	95.16	0 01:33	1.74
LD301	STORAGE	0.13	1.12	95.12	0 01:31	1.12
POND	STORAGE	1.30	1.79	94.61	0 02:13	1.79
STMH104	STORAGE	1.03	1.63	94.73	0 01:30	1.63

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Node Inflow Summary  
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Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
OGS	JUNCTION	0.00	70.98	0 02:13	0	1.43	-0.000
CARP1	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
CARP2	OUTFALL	0.91	0.91	0 01:30	0.000805	0.000805	0.000
OVL1	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OVL2	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OVL4	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
XSTM1	OUTFALL	0.00	70.98	0 02:13	0	1.43	0.000
XSTM2	OUTFALL	0.00	30.97	0 01:32	0	0.0662	0.000
CB01	STORAGE	15.38	15.38	0 01:30	0.0236	0.0242	0.000
CB02	STORAGE	24.30	24.30	0 01:30	0.0373	0.0379	-0.003
CB03	STORAGE	6.45	41.66	0 01:26	0.00989	0.0284	0.038
CB04	STORAGE	53.65	53.65	0 01:30	0.0751	0.0759	0.002
CB05	STORAGE	51.02	51.30	0 01:30	0.0714	0.0839	0.003
CB06	STORAGE	57.54	57.54	0 01:30	0.0884	0.0889	0.114
CB07	STORAGE	53.07	53.07	0 01:30	0.0815	0.0821	0.241
CB08	STORAGE	44.31	44.31	0 01:30	0.0645	0.0658	0.595
CB9	STORAGE	26.29	26.29	0 01:30	0.0403	0.041	0.001
CBMH101	STORAGE	16.37	70.98	0 02:12	0.0251	1.43	0.000

CBMH102	STORAGE	14.88	158.75	0	01:30	0.0228	0.332	0.000
CBMH103	STORAGE	22.32	131.63	0	01:30	0.0342	0.284	0.000
CBMH105	STORAGE	50.55	100.11	0	01:28	0.0774	0.185	0.000
CBMH106	STORAGE	14.88	323.05	0	01:27	0.0228	0.689	0.000
CBMH107	STORAGE	49.10	312.37	0	01:27	0.0754	0.667	0.000
CBMH108	STORAGE	24.80	94.02	0	01:30	0.0381	0.16	0.000
CBMH109	STORAGE	24.80	70.34	0	01:30	0.0381	0.122	0.000
CBMH110	STORAGE	83.33	220.08	0	01:25	0.128	0.432	0.000
CBMH111	STORAGE	84.32	117.15	0	01:25	0.13	0.213	0.046
LD301	STORAGE	4.72	7.31	0	01:25	0.00806	0.0109	0.058
POND	STORAGE	240.93	715.01	0	01:30	0.398	2.44	0.000
STMH104	STORAGE	0.00	88.28	0	01:30	0	0.21	0.001

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Node Surcharge Summary  
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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
OGS	JUNCTION	24.00	0.917	0.893

\*\*\*\*\*  
Node Flooding Summary  
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No nodes were flooded.

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Storage Volume Summary  
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Average Volume	Avg Pcnt	Evap Pcnt	Exfil Pcnt	Maximum Volume	Max Pcnt	Time of Max Occurrence	Maximum Outflow
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Storage Unit	1000 m3	Full	Loss	Loss	1000 m3	Full	days hr:min	LPS
CB01	0.000	2	0	0	0.001	3	0 02:11	14.71
CB02	0.000	2	0	0	0.001	3	0 01:30	23.60
CB03	0.001	2	0	0	0.022	33	0 01:33	27.51
CB04	0.000	3	0	0	0.001	10	0 01:30	49.60
CB05	0.000	6	0	0	0.001	35	0 01:30	49.63
CB06	0.000	1	0	0	0.009	22	0 01:32	43.97
CB07	0.000	1	0	0	0.011	29	0 01:33	49.08
CB08	0.000	5	0	0	0.006	82	0 01:32	30.97
CB9	0.000	2	0	0	0.001	3	0 01:30	25.64
CBMH101	0.002	5	0	0	0.002	7	0 02:13	70.98
CBMH102	0.001	7	0	0	0.002	10	0 02:11	156.70
CBMH103	0.001	6	0	0	0.002	9	0 01:30	129.35
CBMH105	0.001	2	0	0	0.002	3	0 01:31	96.88
CBMH106	0.001	20	0	0	0.002	30	0 01:32	321.20
CBMH107	0.001	3	0	0	0.002	6	0 01:30	308.17
CBMH108	0.001	12	0	0	0.002	24	0 01:30	92.79
CBMH109	0.001	27	0	0	0.002	56	0 01:30	69.43
CBMH110	0.001	3	0	0	0.006	17	0 01:31	193.56
CBMH111	0.001	2	0	0	0.018	31	0 01:33	107.20
LD301	0.000	0	0	0	0.001	11	0 01:31	12.64
POND	1.180	51	0	0	1.911	83	0 02:13	69.94
STMH104	0.001	35	0	0	0.002	56	0 01:30	86.33

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Outfall Loading Summary  
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Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
CARP1	0.00	0.00	0.00	0.000
CARP2	3.01	0.29	0.91	0.001
OVL1	0.00	0.00	0.00	0.000
OVL2	0.00	0.00	0.00	0.000
OVL4	0.00	0.00	0.00	0.000
XSTM1	71.05	23.23	70.98	1.427

XSTM2	99.95	0.77	30.97	0.066
System	24.86	24.29	94.18	1.494

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 Link Flow Summary  
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Link	Type	Maximum  Flow  LPS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
01-102	CONDUIT	14.71	0 01:30	0.30	0.25	1.00
02-103	CONDUIT	23.60	0 01:30	0.48	0.39	1.00
03-105	CONDUIT	35.22	0 01:26	0.72	0.86	1.00
04-105	CONDUIT	49.60	0 01:28	1.01	0.84	1.00
05-109	CONDUIT	49.63	0 01:32	1.01	0.83	1.00
06-110	CONDUIT	43.97	0 01:24	0.90	1.04	1.00
07-111	CONDUIT	49.08	0 01:42	1.00	1.17	1.00
101-OGS	CONDUIT	70.98	0 02:13	2.19	4.92	1.00
102-POND	CONDUIT	156.70	0 01:30	1.42	1.50	1.00
103-102	CONDUIT	129.35	0 01:30	1.17	1.46	1.00
104-103	CONDUIT	86.33	0 01:30	0.78	0.98	1.00
105-104	CONDUIT	70.03	0 01:33	0.63	0.80	1.00
106-POND	CONDUIT	321.20	0 01:27	2.02	1.57	1.00
107-106	CONDUIT	308.17	0 01:27	1.94	1.50	1.00
108-107	CONDUIT	92.79	0 01:30	0.84	1.06	1.00
109-108	CONDUIT	69.43	0 01:30	0.63	0.80	1.00
110-10	CONDUIT	193.56	0 01:25	1.22	1.32	1.00
111-110	CONDUIT	107.20	0 01:36	0.97	1.25	1.00
301-05	CONDUIT	12.64	0 01:34	0.26	0.21	1.00
9-104	CONDUIT	25.64	0 01:30	0.52	0.43	1.00
OGS-XSTM1	CONDUIT	70.98	0 02:13	0.45	0.61	1.00
OLFA1	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA10	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA11	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA12	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA13	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA14	CONDUIT	0.00	0 00:00	0.00	0.00	0.00

OLFA15	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA16	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA17	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA18	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA19	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA3	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA4	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA5	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA6	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA7	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA9	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFR1	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
POND-101	CONDUIT	69.94	0 02:15	0.44	0.48	1.00
08-XTMS2	ORIFICE	30.97	0 01:32			1.00
OVERFLOW	WEIR	0.00	0 00:00			0.00

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 Flow Classification Summary  
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Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class								Inlet Ctrl
		Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	
01-102	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
02-103	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
03-105	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
04-105	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
05-109	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
06-110	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
07-111	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
101-OGS	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
102-POND	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
103-102	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
104-103	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
105-104	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
106-POND	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
107-106	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
108-107	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

109-108	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
110-10	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
111-110	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
301-05	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
9-104	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
OGS-XSTM1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
OLFA1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA10	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA11	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA12	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA13	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA14	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA15	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA16	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA17	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA18	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA19	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA3	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA4	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA5	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA6	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA7	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA9	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFR1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POND-101	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

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 Conduit Surcharge Summary  
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Conduit	Hours Full			Hours	Hours
	Both Ends	Upstream	Dnstream	Above Full Normal Flow	Capacity Limited
01-102	24.00	24.00	24.00	0.01	0.01
02-103	24.00	24.00	24.00	0.01	0.01
03-105	24.00	24.00	24.00	0.01	0.01
04-105	24.00	24.00	24.00	0.01	0.01
05-109	24.00	24.00	24.00	0.01	0.01

06-110	24.00	24.00	24.00	0.04	0.13
07-111	24.00	24.00	24.00	0.03	0.04
101-OGS	24.00	24.00	24.00	7.99	8.70
102-POND	24.00	24.00	24.00	0.19	0.33
103-102	24.00	24.00	24.00	0.20	0.20
104-103	24.00	24.00	24.00	0.01	0.25
105-104	24.00	24.00	24.00	0.01	0.02
106-POND	24.00	24.00	24.00	0.30	0.38
107-106	24.00	24.00	24.00	0.29	0.29
108-107	24.00	24.00	24.00	0.09	0.11
109-108	24.00	24.00	24.00	0.01	0.01
110-10	24.00	24.00	24.00	0.29	0.31
111-110	24.00	24.00	24.00	0.12	0.13
301-05	4.76	4.76	24.00	0.01	0.01
9-104	24.00	24.00	24.00	0.01	0.01
OGS-XSTM1	24.00	24.00	24.00	0.01	3.57
POND-101	24.00	24.00	24.00	0.01	0.01

Analysis begun on: Thu Nov 17 13:16:09 2022  
 Analysis ended on: Thu Nov 17 13:16:09 2022  
 Total elapsed time: < 1 sec



# Chicago 4hr - 100 Year +20% PCSWMM Results

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

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Element Count

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Number of rain gages ..... 1  
 Number of subcatchments ... 22  
 Number of nodes ..... 30  
 Number of links ..... 42  
 Number of pollutants ..... 0  
 Number of land uses ..... 0

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Raingage Summary

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Name	Data Source	Data Type	Recording Interval
Raingage1	C4-100+20%	INTENSITY	10 min.

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Subcatchment Summary

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Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A-0	0.00	5.00	7.00	2.0000	Raingage1	CARP2
A-1	0.03	25.39	100.00	2.0000	Raingage1	CBMH101
A-10	0.12	34.86	64.00	1.0000	Raingage1	CB04
A-11	0.03	33.33	100.00	1.5000	Raingage1	CBMH106
A-12	0.10	58.23	100.00	2.0000	Raingage1	CBMH107
A-13	0.05	31.25	100.00	2.0000	Raingage1	CBMH108
A-14	0.05	31.25	100.00	2.0000	Raingage1	CBMH109
A-15	0.11	36.33	73.00	1.0000	Raingage1	CB05
A-16	0.02	4.69	7.00	1.5000	Raingage1	LD301
A-17	0.17	80.00	100.00	2.0000	Raingage1	CBMH110
A-18	0.12	55.24	100.00	2.0000	Raingage1	CB06

A-19	0.17	80.95	100.00	2.0000	Raingage1	CBMH111
A-2	0.66	37.67	64.00	1.5000	Raingage1	POND
A-20	0.11	50.95	100.00	2.0000	Raingage1	CB07
A-3	0.03	27.27	100.00	2.0000	Raingage1	CBMH102
A-4	0.03	23.85	100.00	2.0000	Raingage1	CB01
A-5	0.05	37.69	100.00	2.0000	Raingage1	CB02
A-6	0.04	34.62	100.00	2.0000	Raingage1	CBMH103
A-7	0.05	37.86	100.00	2.0000	Raingage1	CB9
A-8	0.10	42.50	99.00	2.0000	Raingage1	CBMH105
A-9	0.01	8.67	100.00	5.5000	Raingage1	CB03
R-1	0.09	21.39	84.00	1.0000	Raingage1	CB08

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Node Summary

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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
OGS	JUNCTION	92.67	2.26	0.0	
CARP1	OUTFALL	94.60	0.00	0.0	
CARP2	OUTFALL	94.60	0.00	0.0	
OVL1	OUTFALL	95.19	1.00	0.0	
OVL2	OUTFALL	94.99	1.05	0.0	
OVL4	OUTFALL	94.84	1.00	0.0	
XSTM1	OUTFALL	92.07	1.04	0.0	
XSTM2	OUTFALL	92.15	0.00	0.0	
CB01	STORAGE	93.25	2.75	0.0	
CB02	STORAGE	93.30	2.70	0.0	
CB03	STORAGE	93.35	1.90	0.0	
CB04	STORAGE	93.60	2.30	0.0	
CB05	STORAGE	93.52	2.48	0.0	
CB06	STORAGE	93.60	2.50	0.0	
CB07	STORAGE	93.70	2.40	0.0	
CB08	STORAGE	93.15	2.55	0.0	
CB9	STORAGE	93.30	2.55	0.0	
CBMH101	STORAGE	92.76	3.09	0.0	
CBMH102	STORAGE	92.94	3.01	0.0	
CBMH103	STORAGE	93.00	2.95	0.0	
CBMH105	STORAGE	93.23	2.67	0.0	
CBMH106	STORAGE	92.97	3.18	0.0	

CBMH107	STORAGE	93.09	2.91	0.0
CBMH108	STORAGE	93.21	2.89	0.0
CBMH109	STORAGE	93.28	2.87	0.0
CBMH110	STORAGE	93.24	2.76	0.0
CBMH111	STORAGE	93.42	2.58	0.0
LD301	STORAGE	94.00	2.00	0.0
POND	STORAGE	92.82	3.08	0.0
STMH104	STORAGE	93.10	2.90	0.0

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Link Summary  
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Name	From Node	To Node	Type	Length	%Slope	Roughness
01-102	CB01	CBMH102	CONDUIT	19.5	0.9744	0.0130
02-103	CB02	CBMH103	CONDUIT	19.5	1.0257	0.0130
03-105	CB03	CBMH105	CONDUIT	10.5	0.4762	0.0130
04-105	CB04	CBMH105	CONDUIT	26.4	0.9849	0.0130
05-109	CB05	CBMH109	CONDUIT	11.8	1.0170	0.0130
06-110	CB06	CBMH110	CONDUIT	35.8	0.5028	0.0130
07-111	CB07	CBMH111	CONDUIT	35.9	0.5014	0.0130
101-OGS	CBMH101	OGS	CONDUIT	5.6	0.1786	0.0130
102-POND	CBMH102	POND	CONDUIT	11.2	0.3571	0.0130
103-102	CBMH103	CBMH102	CONDUIT	19.5	0.2564	0.0130
104-103	STMH104	CBMH103	CONDUIT	15.9	0.2516	0.0130
105-104	CBMH105	STMH104	CONDUIT	28.1	0.2491	0.0130
106-POND	CBMH106	POND	CONDUIT	11.7	0.5128	0.0130
107-106	CBMH107	CBMH106	CONDUIT	21.2	0.5189	0.0130
108-107	CBMH108	CBMH107	CONDUIT	20.1	0.2488	0.0130
109-108	CBMH109	CBMH108	CONDUIT	24.7	0.2429	0.0130
110-10	CBMH110	CBMH107	CONDUIT	34.2	0.2632	0.0130
111-110	CBMH111	CBMH110	CONDUIT	41.7	0.2398	0.0130
301-05	LD301	CB05	CONDUIT	41.7	1.0072	0.0130
9-104	CB9	STMH104	CONDUIT	6.1	0.9837	0.0130
OGS-XSTM1	OGS	XSTM1	CONDUIT	6.0	0.1667	0.0130
OLFA1	CBMH101	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA10	CBMH106	CB01	CONDUIT	1.0	1.0001	0.0150
OLFA11	CBMH107	CB02	CONDUIT	1.0	1.0001	0.0150
OLFA12	CBMH108	CBMH107	CONDUIT	1.0	1.0001	0.0150
OLFA13	CBMH109	CB05	CONDUIT	1.0	1.0001	0.0150

OLFA14	CB05	CB04	CONDUIT	1.0	1.0001	0.0350
OLFA15	LD301	CB05	CONDUIT	1.0	1.0001	0.0350
OLFA16	CBMH110	CBMH107	CONDUIT	1.0	1.0001	0.0150
OLFA17	CB06	CBMH110	CONDUIT	1.0	1.0001	0.0150
OLFA18	CBMH111	CBMH110	CONDUIT	1.0	1.0001	0.0150
OLFA19	CB07	CBMH111	CONDUIT	1.0	11.0672	0.0150
OLFA3	CBMH102	CBMH101	CONDUIT	1.0	1.0001	0.0150
OLFA4	CB01	CBMH102	CONDUIT	1.0	1.0001	0.0150
OLFA5	CB02	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA6	CB9	OVLF2	CONDUIT	1.0	1.0001	0.0150
OLFA7	CBMH105	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA9	CB04	OVLF1	CONDUIT	1.0	1.0001	0.0350
OLFR1	CB08	OVLF4	CONDUIT	1.0	1.0001	0.0150
POND-101	POND	CBMH101	CONDUIT	11.7	0.2564	0.0130
08-XTMS2	CB08	XSTM2	ORIFICE			
OVERFLOW	POND	CARP1	WEIR			

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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
01-102	CIRCULAR	0.25	0.05	0.06	0.25	1	58.71
02-103	CIRCULAR	0.25	0.05	0.06	0.25	1	60.23
03-105	CIRCULAR	0.25	0.05	0.06	0.25	1	41.04
04-105	CIRCULAR	0.25	0.05	0.06	0.25	1	59.02
05-109	CIRCULAR	0.25	0.05	0.06	0.25	1	59.97
06-110	CIRCULAR	0.25	0.05	0.06	0.25	1	42.17
07-111	CIRCULAR	0.25	0.05	0.06	0.25	1	42.11
101-OGS	CIRCULAR	0.20	0.03	0.05	0.20	1	14.42
102-POND	CIRCULAR	0.38	0.11	0.09	0.38	1	104.79
103-102	CIRCULAR	0.38	0.11	0.09	0.38	1	88.79
104-103	CIRCULAR	0.38	0.11	0.09	0.38	1	87.95
105-104	CIRCULAR	0.38	0.11	0.09	0.38	1	87.51
106-POND	CIRCULAR	0.45	0.16	0.11	0.45	1	204.18
107-106	CIRCULAR	0.45	0.16	0.11	0.45	1	205.38
108-107	CIRCULAR	0.38	0.11	0.09	0.38	1	87.45
109-108	CIRCULAR	0.38	0.11	0.09	0.38	1	86.42
110-10	CIRCULAR	0.45	0.16	0.11	0.45	1	146.27

111-110	CIRCULAR	0.38	0.11	0.09	0.38	1	85.86
301-05	CIRCULAR	0.25	0.05	0.06	0.25	1	59.69
9-104	CIRCULAR	0.25	0.05	0.06	0.25	1	58.98
OGS-XSTM1	CIRCULAR	0.45	0.16	0.11	0.45	1	116.40
OLFA1	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA10	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA11	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA12	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA13	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA14	RECT_OPEN	1.00	1.00	0.33	1.00	1	1373.69
OLFA15	RECT_OPEN	1.00	1.00	0.33	1.00	1	1373.69
OLFA16	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA17	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA18	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA19	RECT_OPEN	1.00	5.00	0.71	5.00	1	88614.40
OLFA3	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA4	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA5	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA6	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA7	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA9	RECT_OPEN	1.00	3.00	0.60	3.00	1	6098.05
OLFR1	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
POND-101	CIRCULAR	0.45	0.16	0.11	0.45	1	144.38

\*\*\*\*\*  
NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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\*\*\*\*\*  
Analysis Options  
\*\*\*\*\*  
Flow Units ..... LPS  
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 ..... 05/11/2022 00:00:00  
Ending Date ..... 05/12/2022 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 ..... 4  
Head Tolerance ..... 0.001500 m

*****		
	Volume	Depth
*****		
Runoff Quantity Continuity	hectare-m	mm
-----		
Initial LID Storage	0.002	1.083
Total Precipitation	0.197	91.202
Evaporation Loss	0.000	0.000
Infiltration Loss	0.017	7.820
Surface Runoff	0.181	83.772
Final Storage	0.002	1.083
Continuity Error (%)	-0.423	

*****		
	Volume	Volume
*****		
Flow Routing Continuity	hectare-m	10 <sup>6</sup> ltr
-----		
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.181	1.805
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.002
External Outflow	0.181	1.806
Flooding Loss	0.000	0.000



A-5		91.20	0.00	0.00	0.00	91.31	0.00	91.31	0.04
29.16	1.001								
A-6		91.20	0.00	0.00	0.00	91.31	0.00	91.31	0.04
26.78	1.001								
A-7		91.20	0.00	0.00	0.00	91.32	0.00	91.32	0.05
31.55	1.001								
A-8		91.20	0.00	0.00	0.44	90.53	0.49	91.02	0.09
60.67	0.998								
A-9		91.20	0.00	0.00	0.00	91.28	0.00	91.28	0.01
7.74	1.001								
R-1		91.20	0.00	0.00	7.14	77.05	7.69	84.74	0.08
53.61	0.929								

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Node Depth Summary  
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Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
OGS	JUNCTION	1.35	1.37	94.04	0 01:53	1.37
CARP1	OUTFALL	0.00	0.00	94.60	0 00:00	0.00
CARP2	OUTFALL	0.00	0.00	94.60	0 00:00	0.00
OVL1	OUTFALL	0.00	0.00	95.19	0 00:00	0.00
OVL2	OUTFALL	0.00	0.00	94.99	0 00:00	0.00
OVL4	OUTFALL	0.00	0.02	94.86	0 01:29	0.02
XSTM1	OUTFALL	1.95	1.95	94.02	0 00:00	1.95
XSTM2	OUTFALL	1.87	1.87	94.02	0 00:00	1.87
CB01	STORAGE	0.90	1.45	94.70	0 01:52	1.45
CB02	STORAGE	0.85	1.54	94.84	0 01:30	1.53
CB03	STORAGE	0.80	1.55	94.90	0 01:34	1.55
CB04	STORAGE	0.56	1.50	95.10	0 01:32	1.50
CB05	STORAGE	0.64	1.69	95.21	0 01:30	1.69
CB06	STORAGE	0.57	1.69	95.29	0 01:33	1.69
CB07	STORAGE	0.47	1.59	95.29	0 01:34	1.59
CB08	STORAGE	0.89	1.73	94.88	0 01:29	1.72
CB9	STORAGE	0.85	1.57	94.87	0 01:30	1.57
CBMH101	STORAGE	1.38	1.91	94.67	0 01:53	1.91
CBMH102	STORAGE	1.21	1.76	94.70	0 01:52	1.76

CBMH103	STORAGE	1.15	1.77	94.77	0 01:30	1.77
CBMH105	STORAGE	0.92	1.69	94.92	0 01:31	1.69
CBMH106	STORAGE	1.18	1.82	94.79	0 01:41	1.82
CBMH107	STORAGE	1.07	1.92	95.01	0 01:31	1.92
CBMH108	STORAGE	0.95	1.88	95.09	0 01:31	1.87
CBMH109	STORAGE	0.88	1.86	95.14	0 01:31	1.86
CBMH110	STORAGE	0.92	1.90	95.14	0 01:32	1.90
CBMH111	STORAGE	0.75	1.78	95.20	0 01:34	1.78
LD301	STORAGE	0.16	1.22	95.22	0 01:32	1.22
POND	STORAGE	1.32	1.87	94.69	0 01:53	1.87
STMH104	STORAGE	1.05	1.76	94.86	0 01:30	1.76

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Node Inflow Summary  
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Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
OGS	JUNCTION	0.00	75.46	0 01:53	0	1.58	-0.002
CARP1	OUTFALL	0.00	106.88	0 01:53	0	0.146	0.000
CARP2	OUTFALL	1.11	1.11	0 01:30	0.00103	0.00103	0.000
OVL1	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OVL2	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OVL4	OUTFALL	0.00	27.42	0 01:29	0	0.00343	0.000
XSTM1	OUTFALL	0.00	75.46	0 01:53	0	1.58	0.000
XSTM2	OUTFALL	0.00	31.62	0 01:29	0	0.0762	0.000
CB01	STORAGE	18.45	18.45	0 01:30	0.0283	0.0289	0.001
CB02	STORAGE	29.16	29.16	0 01:30	0.0447	0.0453	-0.001
CB03	STORAGE	7.74	56.73	0 01:26	0.0119	0.0387	0.060
CB04	STORAGE	66.24	66.24	0 01:30	0.0921	0.0928	0.012
CB05	STORAGE	62.20	62.20	0 01:30	0.0868	0.104	0.012
CB06	STORAGE	69.04	69.04	0 01:30	0.106	0.106	0.152
CB07	STORAGE	63.69	63.69	0 01:30	0.0977	0.0982	0.216
CB08	STORAGE	53.61	53.61	0 01:30	0.0779	0.0792	0.450
CB9	STORAGE	31.55	31.55	0 01:30	0.0484	0.049	-0.005
CBMH101	STORAGE	19.64	75.48	0 01:52	0.0301	1.58	0.000

CBMH102	STORAGE	17.86	178.14	0	01:29	0.0274	0.398	-0.001
CBMH103	STORAGE	26.78	145.03	0	01:29	0.041	0.341	-0.000
CBMH105	STORAGE	60.67	114.80	0	01:25	0.0927	0.227	0.000
CBMH106	STORAGE	17.86	333.04	0	01:26	0.0274	0.828	-0.000
CBMH107	STORAGE	58.92	320.83	0	01:25	0.0903	0.801	0.000
CBMH108	STORAGE	29.76	103.69	0	01:30	0.0456	0.194	0.000
CBMH109	STORAGE	29.76	77.42	0	01:30	0.0456	0.148	0.001
CBMH110	STORAGE	99.99	221.14	0	01:24	0.153	0.516	0.005
CBMH111	STORAGE	101.18	130.51	0	01:25	0.155	0.255	0.077
LD301	STORAGE	6.55	10.16	0	01:30	0.0108	0.0151	0.078
POND	STORAGE	298.89	798.84	0	01:30	0.491	2.74	0.001
STMH104	STORAGE	0.00	92.45	0	01:29	0	0.252	0.002

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Node Surcharge Summary  
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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
OGS	JUNCTION	24.00	0.919	0.891

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Node Flooding Summary  
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No nodes were flooded.

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Storage Volume Summary  
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Average Volume	Avg Pcnt	Evap Pcnt	Exfil Pcnt	Maximum Volume	Max Pcnt	Time of Max Occurrence	Maximum Outflow
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Storage Unit	1000 m3	Full	Loss	Loss	1000 m3	Full	days hr:min	LPS
CB01	0.000	2	0	0	0.001	3	0 01:52	17.81
CB02	0.000	2	0	0	0.001	3	0 01:30	28.56
CB03	0.002	3	0	0	0.031	48	0 01:34	25.19
CB04	0.000	3	0	0	0.004	59	0 01:32	54.25
CB05	0.000	7	0	0	0.004	100	0 01:30	56.73
CB06	0.000	1	0	0	0.017	40	0 01:33	43.92
CB07	0.001	1	0	0	0.018	48	0 01:34	47.32
CB08	0.000	6	0	0	0.007	100	0 01:29	59.04
CB9	0.000	2	0	0	0.001	4	0 01:30	30.87
CBMH101	0.002	6	0	0	0.002	8	0 01:53	75.46
CBMH102	0.001	7	0	0	0.002	11	0 01:52	175.95
CBMH103	0.001	6	0	0	0.002	9	0 01:30	142.53
CBMH105	0.001	2	0	0	0.002	3	0 01:31	108.29
CBMH106	0.001	21	0	0	0.002	32	0 01:41	330.99
CBMH107	0.001	3	0	0	0.002	6	0 01:31	315.18
CBMH108	0.001	13	0	0	0.002	27	0 01:31	100.75
CBMH109	0.001	28	0	0	0.002	59	0 01:31	77.60
CBMH110	0.001	4	0	0	0.015	44	0 01:32	192.60
CBMH111	0.001	2	0	0	0.033	55	0 01:34	101.89
LD301	0.000	1	0	0	0.003	43	0 01:32	19.22
POND	1.210	53	0	0	2.049	89	0 01:53	179.98
STMH104	0.001	36	0	0	0.002	61	0 01:30	91.40

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Outfall Loading Summary  
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Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
CARP1	3.87	43.23	106.88	0.146
CARP2	4.60	0.45	1.11	0.001
OVL1	0.00	0.00	0.00	0.000
OVL2	0.00	0.00	0.00	0.000
OVL4	1.30	15.09	27.42	0.003
XSTM1	75.03	24.93	75.46	1.582

XSTM2	99.94	1.19	31.62	0.076
System	26.39	84.89	189.17	1.808

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 Link Flow Summary  
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Link	Type	Maximum  Flow  LPS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
01-102	CONDUIT	17.81	0 01:30	0.36	0.30	1.00
02-103	CONDUIT	28.56	0 01:30	0.58	0.47	1.00
03-105	CONDUIT	48.99	0 01:26	1.00	1.19	1.00
04-105	CONDUIT	54.25	0 01:25	1.11	0.92	1.00
05-109	CONDUIT	56.73	0 01:34	1.16	0.95	1.00
06-110	CONDUIT	43.92	0 01:23	0.89	1.04	1.00
07-111	CONDUIT	47.32	0 01:50	0.96	1.12	1.00
101-OGS	CONDUIT	75.46	0 01:53	2.33	5.23	1.00
102-POND	CONDUIT	175.95	0 01:30	1.59	1.68	1.00
103-102	CONDUIT	142.53	0 01:29	1.29	1.61	1.00
104-103	CONDUIT	91.40	0 01:31	0.83	1.04	1.00
105-104	CONDUIT	80.00	0 01:35	0.72	0.91	1.00
106-POND	CONDUIT	330.99	0 01:26	2.08	1.62	1.00
107-106	CONDUIT	315.18	0 01:26	1.98	1.53	1.00
108-107	CONDUIT	100.75	0 01:31	0.91	1.15	1.00
109-108	CONDUIT	77.60	0 01:31	0.70	0.90	1.00
110-10	CONDUIT	192.60	0 01:24	1.21	1.32	1.00
111-110	CONDUIT	101.89	0 01:48	0.92	1.19	1.00
301-05	CONDUIT	19.22	0 01:36	0.39	0.32	1.00
9-104	CONDUIT	30.87	0 01:29	0.63	0.52	1.00
OGS-XSTM1	CONDUIT	75.46	0 01:53	0.47	0.65	1.00
OLFA1	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA10	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA11	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA12	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA13	CONDUIT	4.10	0 01:31	0.11	0.00	0.01
OLFA14	CONDUIT	0.00	0 00:00	0.00	0.00	0.00

OLFA15	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA16	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA17	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA18	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA19	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA3	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA4	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA5	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA6	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA7	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA9	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFR1	CONDUIT	27.42	0 01:29	0.47	0.00	0.02
POND-101	CONDUIT	73.33	0 01:55	0.46	0.51	1.00
08-XTMS2	ORIFICE	31.62	0 01:29			1.00
OVERFLOW	WEIR	106.88	0 01:53			0.27

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 Flow Classification Summary  
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Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class								Inlet Ctrl
		Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	
01-102	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
02-103	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
03-105	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
04-105	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
05-109	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
06-110	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
07-111	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
101-OGS	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
102-POND	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
103-102	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
104-103	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
105-104	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
106-POND	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
107-106	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
108-107	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

109-108	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
110-10	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
111-110	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
301-05	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
9-104	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
OGS-XSTM1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
OLFA1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA10	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA11	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA12	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA13	1.00	0.99	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
OLFA14	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA15	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA16	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA17	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA18	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA19	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA3	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA4	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA5	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA6	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA7	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA9	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFR1	1.00	0.99	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
POND-101	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

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 Conduit Surcharge Summary  
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Conduit	Hours Full			Hours	Hours
	Both Ends	Upstream	Dnstream	Above Full Normal Flow	Capacity Limited
01-102	24.00	24.00	24.00	0.01	0.01
02-103	24.00	24.00	24.00	0.01	0.01
03-105	24.00	24.00	24.00	0.10	0.01
04-105	24.00	24.00	24.00	0.01	0.01
05-109	24.00	24.00	24.00	0.01	0.01

06-110	24.00	24.00	24.00	0.01	0.14
07-111	24.00	24.00	24.00	0.03	0.04
101-OGS	24.00	24.00	24.00	8.55	9.23
102-POND	24.00	24.00	24.00	0.25	0.38
103-102	24.00	24.00	24.00	0.27	0.27
104-103	24.00	24.00	24.00	0.14	0.32
105-104	24.00	24.00	24.00	0.01	0.08
106-POND	24.00	24.00	24.00	0.36	0.50
107-106	24.00	24.00	24.00	0.35	0.35
108-107	24.00	24.00	24.00	0.14	0.16
109-108	24.00	24.00	24.00	0.01	0.01
110-10	24.00	24.00	24.00	0.42	0.44
111-110	24.00	24.00	24.00	0.18	0.18
301-05	5.24	5.24	24.00	0.01	0.01
9-104	24.00	24.00	24.00	0.01	0.01
OGS-XSTM1	24.00	24.00	24.00	0.01	4.08
POND-101	24.00	24.00	24.00	0.01	0.01

Analysis begun on: Mon Nov 21 10:09:15 2022  
 Analysis ended on: Mon Nov 21 10:09:15 2022  
 Total elapsed time: < 1 sec



# Chicago 3hr - 100 Year PCSWMM Results

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

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Element Count

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Number of rain gages ..... 1  
 Number of subcatchments ... 22  
 Number of nodes ..... 30  
 Number of links ..... 42  
 Number of pollutants ..... 0  
 Number of land uses ..... 0

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Raingage Summary

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Name	Data Source	Data Type	Recording Interval
Raingage1	C3-100	INTENSITY	10 min.

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Subcatchment Summary

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Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A-0	0.00	5.00	7.00	2.0000	Raingage1	CARP2
A-1	0.03	25.39	100.00	2.0000	Raingage1	CBMH101
A-10	0.12	34.86	64.00	1.0000	Raingage1	CB04
A-11	0.03	33.33	100.00	1.5000	Raingage1	CBMH106
A-12	0.10	58.23	100.00	2.0000	Raingage1	CBMH107
A-13	0.05	31.25	100.00	2.0000	Raingage1	CBMH108
A-14	0.05	31.25	100.00	2.0000	Raingage1	CBMH109
A-15	0.11	36.33	73.00	1.0000	Raingage1	CB05
A-16	0.02	4.69	7.00	1.5000	Raingage1	LD301
A-17	0.17	80.00	100.00	2.0000	Raingage1	CBMH110
A-18	0.12	55.24	100.00	2.0000	Raingage1	CB06

A-19	0.17	80.95	100.00	2.0000	Raingage1	CBMH111
A-2	0.66	37.67	64.00	1.5000	Raingage1	POND
A-20	0.11	50.95	100.00	2.0000	Raingage1	CB07
A-3	0.03	27.27	100.00	2.0000	Raingage1	CBMH102
A-4	0.03	23.85	100.00	2.0000	Raingage1	CB01
A-5	0.05	37.69	100.00	2.0000	Raingage1	CB02
A-6	0.04	34.62	100.00	2.0000	Raingage1	CBMH103
A-7	0.05	37.86	100.00	2.0000	Raingage1	CB9
A-8	0.10	42.50	99.00	2.0000	Raingage1	CBMH105
A-9	0.01	8.67	100.00	5.5000	Raingage1	CB03
R-1	0.09	21.39	84.00	1.0000	Raingage1	CB08

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Node Summary

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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
OGS	JUNCTION	92.67	2.26	0.0	
CARP1	OUTFALL	94.60	0.00	0.0	
CARP2	OUTFALL	94.60	0.00	0.0	
OVL1	OUTFALL	95.19	1.00	0.0	
OVL2	OUTFALL	94.99	1.05	0.0	
OVL4	OUTFALL	94.84	1.00	0.0	
XSTM1	OUTFALL	92.07	1.04	0.0	
XSTM2	OUTFALL	92.15	0.00	0.0	
CB01	STORAGE	93.25	2.75	0.0	
CB02	STORAGE	93.30	2.70	0.0	
CB03	STORAGE	93.35	1.90	0.0	
CB04	STORAGE	93.60	2.30	0.0	
CB05	STORAGE	93.52	2.48	0.0	
CB06	STORAGE	93.60	2.50	0.0	
CB07	STORAGE	93.70	2.40	0.0	
CB08	STORAGE	93.15	2.55	0.0	
CB9	STORAGE	93.30	2.55	0.0	
CBMH101	STORAGE	92.76	3.09	0.0	
CBMH102	STORAGE	92.94	3.01	0.0	
CBMH103	STORAGE	93.00	2.95	0.0	
CBMH105	STORAGE	93.23	2.67	0.0	
CBMH106	STORAGE	92.97	3.18	0.0	

CBMH107	STORAGE	93.09	2.91	0.0
CBMH108	STORAGE	93.21	2.89	0.0
CBMH109	STORAGE	93.28	2.87	0.0
CBMH110	STORAGE	93.24	2.76	0.0
CBMH111	STORAGE	93.42	2.58	0.0
LD301	STORAGE	94.00	2.00	0.0
POND	STORAGE	92.82	3.08	0.0
STMH104	STORAGE	93.10	2.90	0.0

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Link Summary  
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Name	From Node	To Node	Type	Length	%Slope	Roughness
01-102	CB01	CBMH102	CONDUIT	19.5	0.9744	0.0130
02-103	CB02	CBMH103	CONDUIT	19.5	1.0257	0.0130
03-105	CB03	CBMH105	CONDUIT	10.5	0.4762	0.0130
04-105	CB04	CBMH105	CONDUIT	26.4	0.9849	0.0130
05-109	CB05	CBMH109	CONDUIT	11.8	1.0170	0.0130
06-110	CB06	CBMH110	CONDUIT	35.8	0.5028	0.0130
07-111	CB07	CBMH111	CONDUIT	35.9	0.5014	0.0130
101-OGS	CBMH101	OGS	CONDUIT	5.6	0.1786	0.0130
102-POND	CBMH102	POND	CONDUIT	11.2	0.3571	0.0130
103-102	CBMH103	CBMH102	CONDUIT	19.5	0.2564	0.0130
104-103	STMH104	CBMH103	CONDUIT	15.9	0.2516	0.0130
105-104	CBMH105	STMH104	CONDUIT	28.1	0.2491	0.0130
106-POND	CBMH106	POND	CONDUIT	11.7	0.5128	0.0130
107-106	CBMH107	CBMH106	CONDUIT	21.2	0.5189	0.0130
108-107	CBMH108	CBMH107	CONDUIT	20.1	0.2488	0.0130
109-108	CBMH109	CBMH108	CONDUIT	24.7	0.2429	0.0130
110-10	CBMH110	CBMH107	CONDUIT	34.2	0.2632	0.0130
111-110	CBMH111	CBMH110	CONDUIT	41.7	0.2398	0.0130
301-05	LD301	CB05	CONDUIT	41.7	1.0072	0.0130
9-104	CB9	STMH104	CONDUIT	6.1	0.9837	0.0130
OGS-XSTM1	OGS	XSTM1	CONDUIT	6.0	0.1667	0.0130
OLFA1	CBMH101	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA10	CBMH106	CB01	CONDUIT	1.0	1.0001	0.0150
OLFA11	CBMH107	CB02	CONDUIT	1.0	1.0001	0.0150
OLFA12	CBMH108	CBMH107	CONDUIT	1.0	1.0001	0.0150
OLFA13	CBMH109	CB05	CONDUIT	1.0	1.0001	0.0150

OLFA14	CB05	CB04	CONDUIT	1.0	1.0001	0.0350
OLFA15	LD301	CB05	CONDUIT	1.0	1.0001	0.0350
OLFA16	CBMH110	CBMH107	CONDUIT	1.0	1.0001	0.0150
OLFA17	CB06	CBMH110	CONDUIT	1.0	1.0001	0.0150
OLFA18	CBMH111	CBMH110	CONDUIT	1.0	1.0001	0.0150
OLFA19	CB07	CBMH111	CONDUIT	1.0	11.0672	0.0150
OLFA3	CBMH102	CBMH101	CONDUIT	1.0	1.0001	0.0150
OLFA4	CB01	CBMH102	CONDUIT	1.0	1.0001	0.0150
OLFA5	CB02	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA6	CB9	OVLF2	CONDUIT	1.0	1.0001	0.0150
OLFA7	CBMH105	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA9	CB04	OVLF1	CONDUIT	1.0	1.0001	0.0350
OLFR1	CB08	OVLF4	CONDUIT	1.0	1.0001	0.0150
POND-101	POND	CBMH101	CONDUIT	11.7	0.2564	0.0130
08-XTMS2	CB08	XSTM2	ORIFICE			
OVERFLOW	POND	CARP1	WEIR			

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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
01-102	CIRCULAR	0.25	0.05	0.06	0.25	1	58.71
02-103	CIRCULAR	0.25	0.05	0.06	0.25	1	60.23
03-105	CIRCULAR	0.25	0.05	0.06	0.25	1	41.04
04-105	CIRCULAR	0.25	0.05	0.06	0.25	1	59.02
05-109	CIRCULAR	0.25	0.05	0.06	0.25	1	59.97
06-110	CIRCULAR	0.25	0.05	0.06	0.25	1	42.17
07-111	CIRCULAR	0.25	0.05	0.06	0.25	1	42.11
101-OGS	CIRCULAR	0.20	0.03	0.05	0.20	1	14.42
102-POND	CIRCULAR	0.38	0.11	0.09	0.38	1	104.79
103-102	CIRCULAR	0.38	0.11	0.09	0.38	1	88.79
104-103	CIRCULAR	0.38	0.11	0.09	0.38	1	87.95
105-104	CIRCULAR	0.38	0.11	0.09	0.38	1	87.51
106-POND	CIRCULAR	0.45	0.16	0.11	0.45	1	204.18
107-106	CIRCULAR	0.45	0.16	0.11	0.45	1	205.38
108-107	CIRCULAR	0.38	0.11	0.09	0.38	1	87.45
109-108	CIRCULAR	0.38	0.11	0.09	0.38	1	86.42
110-10	CIRCULAR	0.45	0.16	0.11	0.45	1	146.27

111-110	CIRCULAR	0.38	0.11	0.09	0.38	1	85.86
301-05	CIRCULAR	0.25	0.05	0.06	0.25	1	59.69
9-104	CIRCULAR	0.25	0.05	0.06	0.25	1	58.98
OGS-XSTM1	CIRCULAR	0.45	0.16	0.11	0.45	1	116.40
OLFA1	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA10	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA11	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA12	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA13	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA14	RECT_OPEN	1.00	1.00	0.33	1.00	1	1373.69
OLFA15	RECT_OPEN	1.00	1.00	0.33	1.00	1	1373.69
OLFA16	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA17	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA18	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA19	RECT_OPEN	1.00	5.00	0.71	5.00	1	88614.40
OLFA3	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA4	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA5	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA6	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA7	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA9	RECT_OPEN	1.00	3.00	0.60	3.00	1	6098.05
OLFR1	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
POND-101	CIRCULAR	0.45	0.16	0.11	0.45	1	144.38

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NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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\*\*\*\*\*  
Analysis Options  
\*\*\*\*\*  
Flow Units ..... LPS  
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 ..... 05/11/2022 00:00:00  
Ending Date ..... 05/12/2022 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 ..... 4  
Head Tolerance ..... 0.001500 m

*****		
	Volume	Depth
*****		
Runoff Quantity Continuity	hectare-m	mm
-----		
Initial LID Storage	0.002	1.083
Total Precipitation	0.155	71.667
Evaporation Loss	0.000	0.000
Infiltration Loss	0.014	6.667
Surface Runoff	0.141	65.362
Final Storage	0.002	1.083
Continuity Error (%)	-0.498	

*****		
	Volume	Volume
*****		
Flow Routing Continuity	hectare-m	10 <sup>6</sup> ltr
-----		
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.141	1.410
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.002
External Outflow	0.141	1.411
Flooding Loss	0.000	0.000



A-5		71.67	0.00	0.00	0.00	71.79	0.00	71.79	0.04
24.30	1.002								
A-6		71.67	0.00	0.00	0.00	71.79	0.00	71.79	0.03
22.32	1.002								
A-7		71.67	0.00	0.00	0.00	71.80	0.00	71.80	0.04
26.29	1.002								
A-8		71.67	0.00	0.00	0.36	71.20	0.37	71.56	0.07
50.55	0.999								
A-9		71.67	0.00	0.00	0.00	71.76	0.00	71.76	0.01
6.45	1.001								
R-1		71.67	0.00	0.00	5.98	60.61	5.73	66.34	0.06
44.24	0.926								

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Node Depth Summary  
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Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
OGS	JUNCTION	1.35	1.37	94.04	0 01:53	1.37
CARP1	OUTFALL	0.00	0.00	94.60	0 00:00	0.00
CARP2	OUTFALL	0.00	0.00	94.60	0 00:00	0.00
OVL1	OUTFALL	0.00	0.00	95.19	0 00:00	0.00
OVL2	OUTFALL	0.00	0.00	94.99	0 00:00	0.00
OVL4	OUTFALL	0.00	0.00	94.84	0 00:00	0.00
XSTM1	OUTFALL	1.95	1.95	94.02	0 00:00	1.95
XSTM2	OUTFALL	1.87	1.87	94.02	0 00:00	1.87
CB01	STORAGE	0.87	1.36	94.61	0 01:51	1.36
CB02	STORAGE	0.82	1.39	94.69	0 01:10	1.39
CB03	STORAGE	0.77	1.43	94.78	0 01:13	1.43
CB04	STORAGE	0.52	1.37	94.97	0 01:10	1.37
CB05	STORAGE	0.61	1.59	95.11	0 01:10	1.59
CB06	STORAGE	0.53	1.65	95.25	0 01:12	1.65
CB07	STORAGE	0.43	1.56	95.26	0 01:13	1.56
CB08	STORAGE	0.88	1.69	94.84	0 01:12	1.69
CB9	STORAGE	0.82	1.44	94.74	0 01:10	1.44
CBMH101	STORAGE	1.35	1.83	94.59	0 01:53	1.83
CBMH102	STORAGE	1.18	1.67	94.61	0 01:51	1.67

CBMH103	STORAGE	1.12	1.65	94.65	0 01:10	1.65
CBMH105	STORAGE	0.89	1.56	94.79	0 01:11	1.56
CBMH106	STORAGE	1.15	1.74	94.71	0 01:12	1.74
CBMH107	STORAGE	1.03	1.85	94.94	0 01:10	1.85
CBMH108	STORAGE	0.91	1.79	95.00	0 01:10	1.79
CBMH109	STORAGE	0.85	1.76	95.04	0 01:10	1.75
CBMH110	STORAGE	0.89	1.85	95.09	0 01:11	1.85
CBMH111	STORAGE	0.71	1.74	95.16	0 01:13	1.74
LD301	STORAGE	0.13	1.12	95.12	0 01:11	1.12
POND	STORAGE	1.30	1.79	94.61	0 01:53	1.79
STMH104	STORAGE	1.02	1.63	94.73	0 01:10	1.63

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Node Inflow Summary  
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Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
OGS	JUNCTION	0.00	70.61	0 01:53	0	1.35	-0.000
CARP1	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
CARP2	OUTFALL	0.90	0.90	0 01:10	0.000789	0.000789	0.000
OVL1	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OVL2	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OVL4	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
XSTM1	OUTFALL	0.00	70.61	0 01:53	0	1.35	0.000
XSTM2	OUTFALL	0.00	30.96	0 01:12	0	0.0628	0.000
CB01	STORAGE	15.38	15.38	0 01:10	0.0223	0.0229	0.005
CB02	STORAGE	24.30	24.30	0 01:10	0.0352	0.0358	0.006
CB03	STORAGE	6.45	41.18	0 01:06	0.00933	0.0276	0.048
CB04	STORAGE	53.39	53.39	0 01:10	0.0714	0.0722	0.003
CB05	STORAGE	50.87	51.16	0 01:10	0.0677	0.0801	0.005
CB06	STORAGE	57.54	57.54	0 01:10	0.0834	0.0839	0.163
CB07	STORAGE	53.07	53.07	0 01:10	0.0769	0.0775	0.279
CB08	STORAGE	44.24	44.24	0 01:10	0.061	0.0624	0.620
CB9	STORAGE	26.29	26.29	0 01:10	0.0381	0.0387	0.005
CBMH101	STORAGE	16.37	70.61	0 01:52	0.0237	1.35	0.000

CBMH102	STORAGE	14.88	158.95	0	01:10	0.0215	0.315	0.000
CBMH103	STORAGE	22.32	131.85	0	01:10	0.0323	0.27	-0.000
CBMH105	STORAGE	50.55	100.07	0	01:08	0.073	0.176	0.003
CBMH106	STORAGE	14.88	323.88	0	01:07	0.0215	0.65	0.000
CBMH107	STORAGE	49.10	313.19	0	01:07	0.0711	0.63	0.000
CBMH108	STORAGE	24.80	94.05	0	01:10	0.0359	0.152	0.000
CBMH109	STORAGE	24.80	70.37	0	01:10	0.0359	0.115	0.001
CBMH110	STORAGE	83.33	221.16	0	01:05	0.121	0.408	0.000
CBMH111	STORAGE	84.32	117.64	0	01:05	0.122	0.201	0.081
LD301	STORAGE	4.62	7.30	0	01:05	0.00784	0.0108	0.048
POND	STORAGE	240.01	715.16	0	01:10	0.378	2.37	0.000
STMH104	STORAGE	0.00	88.52	0	01:10	0	0.2	0.000

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Node Surcharge Summary  
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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
OGS	JUNCTION	24.00	0.917	0.893

\*\*\*\*\*  
Node Flooding Summary  
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No nodes were flooded.

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Storage Volume Summary  
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Average Volume	Avg Pcnt	Evap Pcnt	Exfil Pcnt	Maximum Volume	Max Pcnt	Time of Max Occurrence	Maximum Outflow
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Storage Unit	1000 m3	Full	Loss	Loss	1000 m3	Full	days hr:min	LPS
CB01	0.000	2	0	0	0.001	3	0 01:51	14.71
CB02	0.000	2	0	0	0.001	3	0 01:10	23.60
CB03	0.001	2	0	0	0.021	33	0 01:13	27.63
CB04	0.000	3	0	0	0.001	10	0 01:10	49.57
CB05	0.000	6	0	0	0.001	34	0 01:10	49.51
CB06	0.000	1	0	0	0.009	22	0 01:12	44.13
CB07	0.000	1	0	0	0.011	29	0 01:13	49.24
CB08	0.000	5	0	0	0.006	81	0 01:12	30.96
CB9	0.000	2	0	0	0.001	3	0 01:10	25.64
CBMH101	0.002	5	0	0	0.002	7	0 01:53	70.61
CBMH102	0.001	7	0	0	0.002	10	0 01:51	156.88
CBMH103	0.001	6	0	0	0.002	9	0 01:10	129.55
CBMH105	0.001	2	0	0	0.002	3	0 01:11	96.88
CBMH106	0.001	20	0	0	0.002	30	0 01:12	322.02
CBMH107	0.001	3	0	0	0.002	6	0 01:10	309.00
CBMH108	0.001	12	0	0	0.002	24	0 01:10	92.79
CBMH109	0.001	27	0	0	0.002	56	0 01:10	69.44
CBMH110	0.001	3	0	0	0.006	17	0 01:11	194.31
CBMH111	0.001	2	0	0	0.018	30	0 01:13	107.72
LD301	0.000	0	0	0	0.001	11	0 01:11	12.25
POND	1.172	51	0	0	1.901	83	0 01:53	69.57
STMH104	0.001	35	0	0	0.002	56	0 01:10	86.55

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Outfall Loading Summary  
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Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
CARP1	0.00	0.00	0.00	0.000
CARP2	3.00	0.29	0.90	0.001
OVLF1	0.00	0.00	0.00	0.000
OVLF2	0.00	0.00	0.00	0.000
OVLF4	0.00	0.00	0.00	0.000
XSTM1	71.08	21.97	70.61	1.350

XSTM2	99.95	0.73	30.96	0.063
System	24.86	22.98	93.73	1.413

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 Link Flow Summary  
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Link	Type	Maximum  Flow  LPS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
01-102	CONDUIT	14.71	0 01:10	0.30	0.25	1.00
02-103	CONDUIT	23.60	0 01:10	0.48	0.39	1.00
03-105	CONDUIT	34.73	0 01:06	0.71	0.85	1.00
04-105	CONDUIT	49.57	0 01:08	1.01	0.84	1.00
05-109	CONDUIT	49.51	0 01:12	1.01	0.83	1.00
06-110	CONDUIT	44.13	0 01:04	0.90	1.05	1.00
07-111	CONDUIT	49.24	0 01:22	1.00	1.17	1.00
101-OGS	CONDUIT	70.61	0 01:53	2.18	4.90	1.00
102-POND	CONDUIT	156.88	0 01:10	1.42	1.50	1.00
103-102	CONDUIT	129.55	0 01:10	1.17	1.46	1.00
104-103	CONDUIT	86.55	0 01:10	0.78	0.98	1.00
105-104	CONDUIT	70.06	0 01:13	0.63	0.80	1.00
106-POND	CONDUIT	322.02	0 01:07	2.02	1.58	1.00
107-106	CONDUIT	309.00	0 01:07	1.94	1.50	1.00
108-107	CONDUIT	92.79	0 01:10	0.84	1.06	1.00
109-108	CONDUIT	69.44	0 01:10	0.63	0.80	1.00
110-10	CONDUIT	194.31	0 01:05	1.22	1.33	1.00
111-110	CONDUIT	107.72	0 01:16	0.98	1.25	1.00
301-05	CONDUIT	12.25	0 01:14	0.25	0.21	1.00
9-104	CONDUIT	25.64	0 01:10	0.52	0.43	1.00
OGS-XSTM1	CONDUIT	70.61	0 01:53	0.44	0.61	1.00
OLFA1	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA10	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA11	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA12	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA13	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA14	CONDUIT	0.00	0 00:00	0.00	0.00	0.00

OLFA15	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA16	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA17	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA18	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA19	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA3	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA4	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA5	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA6	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA7	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA9	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFR1	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
POND-101	CONDUIT	69.57	0 01:55	0.44	0.48	1.00
08-XTMS2	ORIFICE	30.96	0 01:12			1.00
OVERFLOW	WEIR	0.00	0 00:00			0.00

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 Flow Classification Summary  
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Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class								Inlet Ctrl
		Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	
01-102	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
02-103	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
03-105	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
04-105	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
05-109	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
06-110	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
07-111	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
101-OGS	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
102-POND	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
103-102	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
104-103	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
105-104	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
106-POND	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
107-106	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
108-107	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

109-108	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
110-10	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
111-110	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
301-05	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
9-104	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
OGS-XSTM1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
OLFA1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA10	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA11	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA12	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA13	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA14	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA15	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA16	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA17	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA18	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA19	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA3	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA4	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA5	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA6	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA7	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA9	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFR1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POND-101	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

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 Conduit Surcharge Summary  
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Conduit	Hours Full			Hours	Hours
	Both Ends	Upstream	Dnstream	Above Full Normal Flow	Capacity Limited
01-102	24.00	24.00	24.00	0.01	0.01
02-103	24.00	24.00	24.00	0.01	0.01
03-105	24.00	24.00	24.00	0.01	0.01
04-105	24.00	24.00	24.00	0.01	0.01
05-109	24.00	24.00	24.00	0.01	0.01

06-110	24.00	24.00	24.00	0.04	0.13
07-111	24.00	24.00	24.00	0.03	0.05
101-OGS	24.00	24.00	24.00	7.60	8.22
102-POND	24.00	24.00	24.00	0.19	0.33
103-102	24.00	24.00	24.00	0.20	0.20
104-103	24.00	24.00	24.00	0.01	0.25
105-104	24.00	24.00	24.00	0.01	0.02
106-POND	24.00	24.00	24.00	0.30	0.37
107-106	24.00	24.00	24.00	0.29	0.29
108-107	24.00	24.00	24.00	0.08	0.11
109-108	24.00	24.00	24.00	0.01	0.01
110-10	24.00	24.00	24.00	0.29	0.31
111-110	24.00	24.00	24.00	0.12	0.13
301-05	4.51	4.51	24.00	0.01	0.01
9-104	24.00	24.00	24.00	0.01	0.01
OGS-XSTM1	24.00	24.00	24.00	0.01	3.32
POND-101	24.00	24.00	24.00	0.01	0.01

Analysis begun on: Mon Nov 21 09:50:13 2022  
 Analysis ended on: Mon Nov 21 09:50:13 2022  
 Total elapsed time: < 1 sec



# SCS 12hr - 100 Year PCSWMM Results

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

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Element Count

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Number of rain gages ..... 1  
 Number of subcatchments ... 22  
 Number of nodes ..... 30  
 Number of links ..... 42  
 Number of pollutants ..... 0  
 Number of land uses ..... 0

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Raingage Summary

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Name	Data Source	Data Type	Recording Interval
Raingage1	SCS12-100	INTENSITY	30 min.

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Subcatchment Summary

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Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A-0	0.00	5.00	7.00	2.0000	Raingage1	CARP2
A-1	0.03	25.39	100.00	2.0000	Raingage1	CBMH101
A-10	0.12	34.86	64.00	1.0000	Raingage1	CB04
A-11	0.03	33.33	100.00	1.5000	Raingage1	CBMH106
A-12	0.10	58.23	100.00	2.0000	Raingage1	CBMH107
A-13	0.05	31.25	100.00	2.0000	Raingage1	CBMH108
A-14	0.05	31.25	100.00	2.0000	Raingage1	CBMH109
A-15	0.11	36.33	73.00	1.0000	Raingage1	CB05
A-16	0.02	4.69	7.00	1.5000	Raingage1	LD301
A-17	0.17	80.00	100.00	2.0000	Raingage1	CBMH110
A-18	0.12	55.24	100.00	2.0000	Raingage1	CB06

A-19	0.17	80.95	100.00	2.0000	Raingage1	CBMH111
A-2	0.66	37.67	64.00	1.5000	Raingage1	POND
A-20	0.11	50.95	100.00	2.0000	Raingage1	CB07
A-3	0.03	27.27	100.00	2.0000	Raingage1	CBMH102
A-4	0.03	23.85	100.00	2.0000	Raingage1	CB01
A-5	0.05	37.69	100.00	2.0000	Raingage1	CB02
A-6	0.04	34.62	100.00	2.0000	Raingage1	CBMH103
A-7	0.05	37.86	100.00	2.0000	Raingage1	CB9
A-8	0.10	42.50	99.00	2.0000	Raingage1	CBMH105
A-9	0.01	8.67	100.00	5.5000	Raingage1	CB03
R-1	0.09	21.39	84.00	1.0000	Raingage1	CB08

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Node Summary

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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
OGS	JUNCTION	92.67	2.26	0.0	
CARP1	OUTFALL	94.60	0.00	0.0	
CARP2	OUTFALL	94.60	0.00	0.0	
OVL1	OUTFALL	95.19	1.00	0.0	
OVL2	OUTFALL	94.99	1.05	0.0	
OVL4	OUTFALL	94.84	1.00	0.0	
XSTM1	OUTFALL	92.07	1.04	0.0	
XSTM2	OUTFALL	92.15	0.00	0.0	
CB01	STORAGE	93.25	2.75	0.0	
CB02	STORAGE	93.30	2.70	0.0	
CB03	STORAGE	93.35	1.90	0.0	
CB04	STORAGE	93.60	2.30	0.0	
CB05	STORAGE	93.52	2.48	0.0	
CB06	STORAGE	93.60	2.50	0.0	
CB07	STORAGE	93.70	2.40	0.0	
CB08	STORAGE	93.15	2.55	0.0	
CB9	STORAGE	93.30	2.55	0.0	
CBMH101	STORAGE	92.76	3.09	0.0	
CBMH102	STORAGE	92.94	3.01	0.0	
CBMH103	STORAGE	93.00	2.95	0.0	
CBMH105	STORAGE	93.23	2.67	0.0	
CBMH106	STORAGE	92.97	3.18	0.0	

CBMH107	STORAGE	93.09	2.91	0.0
CBMH108	STORAGE	93.21	2.89	0.0
CBMH109	STORAGE	93.28	2.87	0.0
CBMH110	STORAGE	93.24	2.76	0.0
CBMH111	STORAGE	93.42	2.58	0.0
LD301	STORAGE	94.00	2.00	0.0
POND	STORAGE	92.82	3.08	0.0
STMH104	STORAGE	93.10	2.90	0.0

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Link Summary  
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Name	From Node	To Node	Type	Length	%Slope	Roughness
01-102	CB01	CBMH102	CONDUIT	19.5	0.9744	0.0130
02-103	CB02	CBMH103	CONDUIT	19.5	1.0257	0.0130
03-105	CB03	CBMH105	CONDUIT	10.5	0.4762	0.0130
04-105	CB04	CBMH105	CONDUIT	26.4	0.9849	0.0130
05-109	CB05	CBMH109	CONDUIT	11.8	1.0170	0.0130
06-110	CB06	CBMH110	CONDUIT	35.8	0.5028	0.0130
07-111	CB07	CBMH111	CONDUIT	35.9	0.5014	0.0130
101-OGS	CBMH101	OGS	CONDUIT	5.6	0.1786	0.0130
102-POND	CBMH102	POND	CONDUIT	11.2	0.3571	0.0130
103-102	CBMH103	CBMH102	CONDUIT	19.5	0.2564	0.0130
104-103	STMH104	CBMH103	CONDUIT	15.9	0.2516	0.0130
105-104	CBMH105	STMH104	CONDUIT	28.1	0.2491	0.0130
106-POND	CBMH106	POND	CONDUIT	11.7	0.5128	0.0130
107-106	CBMH107	CBMH106	CONDUIT	21.2	0.5189	0.0130
108-107	CBMH108	CBMH107	CONDUIT	20.1	0.2488	0.0130
109-108	CBMH109	CBMH108	CONDUIT	24.7	0.2429	0.0130
110-10	CBMH110	CBMH107	CONDUIT	34.2	0.2632	0.0130
111-110	CBMH111	CBMH110	CONDUIT	41.7	0.2398	0.0130
301-05	LD301	CB05	CONDUIT	41.7	1.0072	0.0130
9-104	CB9	STMH104	CONDUIT	6.1	0.9837	0.0130
OGS-XSTM1	OGS	XSTM1	CONDUIT	6.0	0.1667	0.0130
OLFA1	CBMH101	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA10	CBMH106	CB01	CONDUIT	1.0	1.0001	0.0150
OLFA11	CBMH107	CB02	CONDUIT	1.0	1.0001	0.0150
OLFA12	CBMH108	CBMH107	CONDUIT	1.0	1.0001	0.0150
OLFA13	CBMH109	CB05	CONDUIT	1.0	1.0001	0.0150

OLFA14	CB05	CB04	CONDUIT	1.0	1.0001	0.0350
OLFA15	LD301	CB05	CONDUIT	1.0	1.0001	0.0350
OLFA16	CBMH110	CBMH107	CONDUIT	1.0	1.0001	0.0150
OLFA17	CB06	CBMH110	CONDUIT	1.0	1.0001	0.0150
OLFA18	CBMH111	CBMH110	CONDUIT	1.0	1.0001	0.0150
OLFA19	CB07	CBMH111	CONDUIT	1.0	11.0672	0.0150
OLFA3	CBMH102	CBMH101	CONDUIT	1.0	1.0001	0.0150
OLFA4	CB01	CBMH102	CONDUIT	1.0	1.0001	0.0150
OLFA5	CB02	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA6	CB9	OVLF2	CONDUIT	1.0	1.0001	0.0150
OLFA7	CBMH105	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA9	CB04	OVLF1	CONDUIT	1.0	1.0001	0.0350
OLFR1	CB08	OVLF4	CONDUIT	1.0	1.0001	0.0150
POND-101	POND	CBMH101	CONDUIT	11.7	0.2564	0.0130
08-XTMS2	CB08	XSTM2	ORIFICE			
OVERFLOW	POND	CARP1	WEIR			

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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
01-102	CIRCULAR	0.25	0.05	0.06	0.25	1	58.71
02-103	CIRCULAR	0.25	0.05	0.06	0.25	1	60.23
03-105	CIRCULAR	0.25	0.05	0.06	0.25	1	41.04
04-105	CIRCULAR	0.25	0.05	0.06	0.25	1	59.02
05-109	CIRCULAR	0.25	0.05	0.06	0.25	1	59.97
06-110	CIRCULAR	0.25	0.05	0.06	0.25	1	42.17
07-111	CIRCULAR	0.25	0.05	0.06	0.25	1	42.11
101-OGS	CIRCULAR	0.20	0.03	0.05	0.20	1	14.42
102-POND	CIRCULAR	0.38	0.11	0.09	0.38	1	104.79
103-102	CIRCULAR	0.38	0.11	0.09	0.38	1	88.79
104-103	CIRCULAR	0.38	0.11	0.09	0.38	1	87.95
105-104	CIRCULAR	0.38	0.11	0.09	0.38	1	87.51
106-POND	CIRCULAR	0.45	0.16	0.11	0.45	1	204.18
107-106	CIRCULAR	0.45	0.16	0.11	0.45	1	205.38
108-107	CIRCULAR	0.38	0.11	0.09	0.38	1	87.45
109-108	CIRCULAR	0.38	0.11	0.09	0.38	1	86.42
110-10	CIRCULAR	0.45	0.16	0.11	0.45	1	146.27

111-110	CIRCULAR	0.38	0.11	0.09	0.38	1	85.86
301-05	CIRCULAR	0.25	0.05	0.06	0.25	1	59.69
9-104	CIRCULAR	0.25	0.05	0.06	0.25	1	58.98
OGS-XSTM1	CIRCULAR	0.45	0.16	0.11	0.45	1	116.40
OLFA1	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA10	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA11	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA12	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA13	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA14	RECT_OPEN	1.00	1.00	0.33	1.00	1	1373.69
OLFA15	RECT_OPEN	1.00	1.00	0.33	1.00	1	1373.69
OLFA16	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA17	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA18	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA19	RECT_OPEN	1.00	5.00	0.71	5.00	1	88614.40
OLFA3	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA4	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA5	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA6	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA7	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA9	RECT_OPEN	1.00	3.00	0.60	3.00	1	6098.05
OLFR1	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
POND-101	CIRCULAR	0.45	0.16	0.11	0.45	1	144.38

\*\*\*\*\*  
NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
\*\*\*\*\*

\*\*\*\*\*  
Analysis Options  
\*\*\*\*\*  
Flow Units ..... LPS  
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 ..... 05/11/2022 00:00:00  
Ending Date ..... 05/12/2022 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 ..... 4  
Head Tolerance ..... 0.001500 m

*****		
	Volume	Depth
*****		
Runoff Quantity Continuity	hectare-m	mm
*****		
Initial LID Storage	0.002	1.083
Total Precipitation	0.203	93.910
Evaporation Loss	0.000	0.000
Infiltration Loss	0.023	10.812
Surface Runoff	0.180	83.326
Final Storage	0.002	1.084
Continuity Error (%)	-0.241	

*****		
	Volume	Volume
*****		
Flow Routing Continuity	hectare-m	10 <sup>6</sup> ltr
*****		
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.180	1.797
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.002
External Outflow	0.180	1.797
Flooding Loss	0.000	0.000

```

Evaporation Loss ..... 0.000 0.000
Exfiltration Loss ..... 0.000 0.000
Initial Stored Volume ... 0.109 1.089
Final Stored Volume ..... 0.109 1.089
Continuity Error (%) ..... 0.068

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*****
Time-Step Critical Elements
*****
None

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*****
Highest Flow Instability Indexes
*****
Link 08-XTMS2 (108)
Link 9-104 (4)

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*****
Routing Time Step Summary
*****
Minimum Time Step      : 4.50 sec
Average Time Step      : 5.00 sec
Maximum Time Step      : 5.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 2.00
Percent Not Converging  : 0.00
Time Step Frequencies  :
  5.000 - 3.155 sec    : 100.00 %
  3.155 - 1.991 sec    : 0.00 %
  1.991 - 1.256 sec    : 0.00 %
  1.256 - 0.792 sec    : 0.00 %
  0.792 - 0.500 sec    : 0.00 %

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

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Peak Runoff	Runoff Coeff	Total Precip	Total Runon	Total Evap	Total Infil	Imperv Runoff	Perv Runoff	Total Runoff	Total Runoff
Subcatchment		mm	mm	mm	mm	mm	mm	mm	10 <sup>6</sup> ltr
LPS									
A-0	0.38	93.91	0.00	0.00	57.83	6.57	30.06	36.64	0.00
A-1	1.001	93.91	0.00	0.00	0.00	94.04	0.00	94.04	0.03
A-10	0.759	93.91	0.00	0.00	22.91	60.29	11.01	71.31	0.09
A-11	1.001	93.91	0.00	0.00	0.00	94.01	0.00	94.01	0.03
A-12	1.002	93.91	0.00	0.00	0.00	94.09	0.00	94.09	0.09
A-13	1.002	93.91	0.00	0.00	0.00	94.08	0.00	94.08	0.05
A-14	1.002	93.91	0.00	0.00	0.00	94.08	0.00	94.08	0.05
A-15	0.822	93.91	0.00	0.00	17.02	68.77	8.44	77.21	0.08
A-16	0.345	93.91	0.00	0.00	61.70	6.58	25.79	32.36	0.01
A-17	1.002	93.91	0.00	0.00	0.00	94.13	0.00	94.13	0.16
A-18	1.002	93.91	0.00	0.00	0.00	94.13	0.00	94.13	0.11
A-19	1.002	93.91	0.00	0.00	0.00	94.13	0.00	94.13	0.16
A-2	0.743	93.91	0.00	0.00	24.36	60.30	9.50	69.80	0.46
A-20	1.002	93.91	0.00	0.00	0.00	94.13	0.00	94.13	0.10
A-3	1.001	93.91	0.00	0.00	0.00	94.02	0.00	94.02	0.03
A-4	1.001	93.91	0.00	0.00	0.00	94.04	0.00	94.04	0.03
A-5	1.001	93.91	0.00	0.00	0.00	94.04	0.00	94.04	0.05

A-6		93.91	0.00	0.00	0.00	94.04	0.00	94.04	0.04
10.05	1.001								
A-7		93.91	0.00	0.00	0.00	94.05	0.00	94.05	0.05
11.83	1.001								
A-8		93.91	0.00	0.00	0.62	93.21	0.35	93.56	0.10
22.74	0.996								
A-9		93.91	0.00	0.00	0.00	93.98	0.00	93.98	0.01
2.90	1.001								
R-1		93.91	0.00	0.00	10.06	79.18	5.04	84.21	0.08
19.98	0.897								

\*\*\*\*\*  
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
OGS	JUNCTION	1.35	1.37	94.04	0 07:05	1.37
CARP1	OUTFALL	0.00	0.00	94.60	0 00:00	0.00
CARP2	OUTFALL	0.00	0.00	94.60	0 00:00	0.00
OVL1	OUTFALL	0.00	0.00	95.19	0 00:00	0.00
OVL2	OUTFALL	0.00	0.00	94.99	0 00:00	0.00
OVL4	OUTFALL	0.00	0.00	94.84	0 00:00	0.00
XSTM1	OUTFALL	1.95	1.95	94.02	0 00:00	1.95
XSTM2	OUTFALL	1.87	1.87	94.02	0 00:00	1.87
CB01	STORAGE	0.88	1.32	94.57	0 07:01	1.32
CB02	STORAGE	0.83	1.28	94.58	0 07:01	1.28
CB03	STORAGE	0.78	1.26	94.61	0 06:31	1.26
CB04	STORAGE	0.53	1.05	94.65	0 06:30	1.05
CB05	STORAGE	0.62	1.22	94.74	0 06:30	1.22
CB06	STORAGE	0.54	1.26	94.86	0 06:30	1.25
CB07	STORAGE	0.44	1.19	94.89	0 06:30	1.19
CB08	STORAGE	0.88	1.21	94.36	0 06:30	1.21
CB9	STORAGE	0.83	1.29	94.59	0 06:30	1.29
CBMH101	STORAGE	1.37	1.80	94.56	0 07:04	1.80
CBMH102	STORAGE	1.19	1.63	94.57	0 07:03	1.63
CBMH103	STORAGE	1.13	1.58	94.58	0 07:01	1.58

CBMH105	STORAGE	0.90	1.38	94.61	0 06:31	1.38
CBMH106	STORAGE	1.16	1.64	94.61	0 06:31	1.64
CBMH107	STORAGE	1.04	1.61	94.70	0 06:30	1.60
CBMH108	STORAGE	0.92	1.50	94.71	0 06:30	1.50
CBMH109	STORAGE	0.85	1.44	94.72	0 06:30	1.44
CBMH110	STORAGE	0.90	1.53	94.77	0 06:30	1.53
CBMH111	STORAGE	0.72	1.40	94.82	0 06:30	1.40
LD301	STORAGE	0.14	0.74	94.74	0 06:30	0.74
POND	STORAGE	1.31	1.75	94.57	0 07:04	1.75
STMH104	STORAGE	1.03	1.49	94.59	0 06:31	1.49

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Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
OGS	JUNCTION	0.00	68.45	0 07:04	0	1.72	0.000
CARP1	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
CARP2	OUTFALL	0.38	0.38	0 06:30	0.000733	0.000733	0.000
OVL1	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OVL2	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OVL4	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
XSTM1	OUTFALL	0.00	68.45	0 07:04	0	1.72	0.000
XSTM2	OUTFALL	0.00	19.98	0 06:30	0	0.0771	0.000
CB01	STORAGE	6.92	6.92	0 06:10	0.0292	0.0297	0.002
CB02	STORAGE	10.94	10.94	0 06:10	0.0461	0.0466	-0.001
CB03	STORAGE	2.90	10.29	0 06:30	0.0122	0.0195	0.002
CB04	STORAGE	25.30	25.30	0 06:30	0.087	0.0876	0.001
CB05	STORAGE	23.19	26.00	0 06:30	0.0842	0.0944	0.002
CB06	STORAGE	25.90	25.90	0 06:25	0.109	0.11	-0.000
CB07	STORAGE	23.89	23.89	0 06:25	0.101	0.101	0.000
CB08	STORAGE	19.98	19.98	0 06:30	0.0775	0.0786	2.463
CB9	STORAGE	11.83	11.83	0 06:10	0.0498	0.0504	0.002
CBMH101	STORAGE	7.37	68.46	0 07:05	0.031	1.72	-0.000
CBMH102	STORAGE	6.70	83.78	0 06:20	0.0282	0.398	-0.000

CBMH103	STORAGE	10.05	71.54	0	06:19	0.0423	0.339	0.001
CBMH105	STORAGE	22.74	47.68	0	06:30	0.0954	0.205	0.001
CBMH106	STORAGE	6.70	194.04	0	06:30	0.0282	0.842	-0.000
CBMH107	STORAGE	22.10	188.99	0	06:30	0.0931	0.813	0.000
CBMH108	STORAGE	11.16	46.86	0	06:30	0.047	0.189	0.001
CBMH109	STORAGE	11.16	36.48	0	06:30	0.047	0.142	-0.000
CBMH110	STORAGE	37.51	122.99	0	06:30	0.158	0.531	0.000
CBMH111	STORAGE	37.96	61.37	0	06:30	0.16	0.262	0.000
LD301	STORAGE	3.30	3.59	0	06:02	0.00744	0.00905	0.028
POND	STORAGE	122.89	398.12	0	06:30	0.463	2.73	0.000
STMH104	STORAGE	0.00	51.93	0	06:17	0	0.25	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
OGS	JUNCTION	24.00	0.916	0.894

\*\*\*\*\*  
Node Flooding Summary  
\*\*\*\*\*

No nodes were flooded.

\*\*\*\*\*  
Storage Volume Summary  
\*\*\*\*\*

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow LPS
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CB01	0.000	2	0	0	0.000	3	0 07:01	6.64
CB02	0.000	2	0	0	0.000	3	0 07:01	10.66
CB03	0.001	2	0	0	0.011	16	0 06:31	14.21
CB04	0.000	3	0	0	0.000	5	0 06:30	24.96
CB05	0.000	6	0	0	0.000	11	0 06:30	25.33
CB06	0.000	0	0	0	0.000	1	0 06:30	25.43
CB07	0.000	0	0	0	0.000	1	0 06:30	23.42
CB08	0.000	5	0	0	0.000	6	0 06:30	19.98
CB9	0.000	2	0	0	0.000	3	0 06:30	11.59
CBMH101	0.002	6	0	0	0.002	7	0 07:04	68.45
CBMH102	0.001	7	0	0	0.002	10	0 07:03	82.79
CBMH103	0.001	6	0	0	0.002	8	0 07:01	70.46
CBMH105	0.001	2	0	0	0.002	3	0 06:31	46.66
CBMH106	0.001	20	0	0	0.002	29	0 06:31	193.17
CBMH107	0.001	3	0	0	0.002	5	0 06:30	187.36
CBMH108	0.001	12	0	0	0.002	20	0 06:30	45.94
CBMH109	0.001	27	0	0	0.002	46	0 06:30	35.71
CBMH110	0.001	3	0	0	0.002	5	0 06:30	121.02
CBMH111	0.001	1	0	0	0.002	3	0 06:30	60.05
LD301	0.000	0	0	0	0.000	1	0 06:30	4.50
POND	1.186	52	0	0	1.840	80	0 07:04	67.58
STMH104	0.001	36	0	0	0.002	51	0 06:31	50.85

\*\*\*\*\*  
Outfall Loading Summary  
\*\*\*\*\*

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
CARP1	0.00	0.00	0.00	0.000
CARP2	4.18	0.18	0.38	0.001
OVLf1	0.00	0.00	0.00	0.000
OVLf2	0.00	0.00	0.00	0.000
OVLf4	0.00	0.00	0.00	0.000
XSTM1	86.64	22.98	68.45	1.721
XSTM2	99.47	0.90	19.98	0.077

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 System            27.19      24.06      82.45      1.799

\*\*\*\*\*  
 Link Flow Summary  
 \*\*\*\*\*

Link	Type	Maximum  Flow  LPS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
01-102	CONDUIT	6.64	0 06:30	0.14	0.11	1.00
02-103	CONDUIT	10.66	0 06:30	0.22	0.18	1.00
03-105	CONDUIT	14.21	0 06:35	0.29	0.35	1.00
04-105	CONDUIT	24.96	0 06:30	0.51	0.42	1.00
05-109	CONDUIT	25.33	0 06:30	0.52	0.42	1.00
06-110	CONDUIT	25.43	0 06:30	0.52	0.60	1.00
07-111	CONDUIT	23.42	0 06:30	0.48	0.56	1.00
101-OGS	CONDUIT	68.45	0 07:04	2.12	4.75	1.00
102-POND	CONDUIT	82.79	0 06:20	0.75	0.79	1.00
103-102	CONDUIT	70.46	0 06:20	0.64	0.79	1.00
104-103	CONDUIT	50.85	0 06:18	0.46	0.58	1.00
105-104	CONDUIT	40.43	0 06:31	0.37	0.46	1.00
106-POND	CONDUIT	193.17	0 06:30	1.21	0.95	1.00
107-106	CONDUIT	187.36	0 06:30	1.18	0.91	1.00
108-107	CONDUIT	45.94	0 06:30	0.42	0.53	1.00
109-108	CONDUIT	35.71	0 06:30	0.32	0.41	1.00
110-10	CONDUIT	121.02	0 06:30	0.76	0.83	1.00
111-110	CONDUIT	60.05	0 06:30	0.54	0.70	1.00
301-05	CONDUIT	4.50	0 06:33	0.09	0.08	1.00
9-104	CONDUIT	11.59	0 06:30	0.24	0.20	1.00
OGS-XSTM1	CONDUIT	68.45	0 07:04	0.43	0.59	1.00
OLFA1	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA10	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA11	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA12	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA13	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA14	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA15	CONDUIT	0.00	0 00:00	0.00	0.00	0.00

OLFA16	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA17	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA18	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA19	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA3	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA4	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA5	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA6	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA7	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA9	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFR1	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
POND-101	CONDUIT	67.58	0 07:05	0.42	0.47	1.00
08-XTMS2	ORIFICE	19.98	0 06:30			1.00
OVERFLOW	WEIR	0.00	0 00:00			0.00

\*\*\*\*\*  
 Flow Classification Summary  
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Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class								
		Up Dry	Down Dry	Sub Dry	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl	
01-102	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
02-103	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
03-105	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
04-105	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
05-109	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
06-110	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
07-111	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
101-OGS	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
102-POND	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
103-102	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
104-103	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
105-104	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
106-POND	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
107-106	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
108-107	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
109-108	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

110-10	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
111-110	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
301-05	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
9-104	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
OGS-XSTM1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
OLFA1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA10	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA11	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA12	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA13	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA14	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA15	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA16	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA17	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA18	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA19	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA3	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA4	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA5	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA6	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA7	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA9	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFR1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POND-101	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

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Conduit Surcharge Summary  
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Conduit	Hours Full			Hours	
	Both Ends	Upstream	Dnstream	Above Full Normal Flow	Capacity Limited
01-102	24.00	24.00	24.00	0.01	0.01
02-103	24.00	24.00	24.00	0.01	0.01
03-105	24.00	24.00	24.00	0.01	0.01
04-105	24.00	24.00	24.00	0.01	0.01
05-109	24.00	24.00	24.00	0.01	0.01
06-110	24.00	24.00	24.00	0.01	0.01

07-111	24.00	24.00	24.00	0.01	0.01
101-OGS	24.00	24.00	24.00	10.28	12.63
102-POND	24.00	24.00	24.00	0.01	0.45
103-102	24.00	24.00	24.00	0.01	0.01
104-103	24.00	24.00	24.00	0.01	0.01
105-104	24.00	24.00	24.00	0.01	0.01
106-POND	24.00	24.00	24.00	0.01	0.49
107-106	24.00	24.00	24.00	0.01	0.01
108-107	24.00	24.00	24.00	0.01	0.01
109-108	24.00	24.00	24.00	0.01	0.01
110-10	24.00	24.00	24.00	0.01	0.01
111-110	24.00	24.00	24.00	0.01	0.01
301-05	5.20	5.20	24.00	0.01	0.01
9-104	24.00	24.00	24.00	0.01	0.01
OGS-XSTM1	24.00	24.00	24.00	0.01	3.52
POND-101	24.00	24.00	24.00	0.01	0.01

Analysis begun on: Mon Nov 21 09:51:21 2022  
Analysis ended on: Mon Nov 21 09:51:21 2022  
Total elapsed time: < 1 sec



# SCS 24hr - 100 Year PCSWMM Results

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

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Element Count

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Number of rain gages ..... 1  
 Number of subcatchments ... 22  
 Number of nodes ..... 30  
 Number of links ..... 42  
 Number of pollutants ..... 0  
 Number of land uses ..... 0

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Raingage Summary

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Name	Data Source	Data Type	Recording Interval
Raingage1	SCS24-100	INTENSITY	60 min.

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Subcatchment Summary

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Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A-0	0.00	5.00	7.00	2.0000	Raingage1	CARP2
A-1	0.03	25.39	100.00	2.0000	Raingage1	CBMH101
A-10	0.12	34.86	64.00	1.0000	Raingage1	CB04
A-11	0.03	33.33	100.00	1.5000	Raingage1	CBMH106
A-12	0.10	58.23	100.00	2.0000	Raingage1	CBMH107
A-13	0.05	31.25	100.00	2.0000	Raingage1	CBMH108
A-14	0.05	31.25	100.00	2.0000	Raingage1	CBMH109
A-15	0.11	36.33	73.00	1.0000	Raingage1	CB05
A-16	0.02	4.69	7.00	1.5000	Raingage1	LD301
A-17	0.17	80.00	100.00	2.0000	Raingage1	CBMH110
A-18	0.12	55.24	100.00	2.0000	Raingage1	CB06

A-19	0.17	80.95	100.00	2.0000	Raingage1	CBMH111
A-2	0.66	37.67	64.00	1.5000	Raingage1	POND
A-20	0.11	50.95	100.00	2.0000	Raingage1	CB07
A-3	0.03	27.27	100.00	2.0000	Raingage1	CBMH102
A-4	0.03	23.85	100.00	2.0000	Raingage1	CB01
A-5	0.05	37.69	100.00	2.0000	Raingage1	CB02
A-6	0.04	34.62	100.00	2.0000	Raingage1	CBMH103
A-7	0.05	37.86	100.00	2.0000	Raingage1	CB9
A-8	0.10	42.50	99.00	2.0000	Raingage1	CBMH105
A-9	0.01	8.67	100.00	5.5000	Raingage1	CB03
R-1	0.09	21.39	84.00	1.0000	Raingage1	CB08

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Node Summary

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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
OGS	JUNCTION	92.67	2.26	0.0	
CARP1	OUTFALL	94.60	0.00	0.0	
CARP2	OUTFALL	94.60	0.00	0.0	
OVL1	OUTFALL	95.19	1.00	0.0	
OVL2	OUTFALL	94.99	1.05	0.0	
OVL4	OUTFALL	94.84	1.00	0.0	
XSTM1	OUTFALL	92.07	1.04	0.0	
XSTM2	OUTFALL	92.15	0.00	0.0	
CB01	STORAGE	93.25	2.75	0.0	
CB02	STORAGE	93.30	2.70	0.0	
CB03	STORAGE	93.35	1.90	0.0	
CB04	STORAGE	93.60	2.30	0.0	
CB05	STORAGE	93.52	2.48	0.0	
CB06	STORAGE	93.60	2.50	0.0	
CB07	STORAGE	93.70	2.40	0.0	
CB08	STORAGE	93.15	2.55	0.0	
CB9	STORAGE	93.30	2.55	0.0	
CBMH101	STORAGE	92.76	3.09	0.0	
CBMH102	STORAGE	92.94	3.01	0.0	
CBMH103	STORAGE	93.00	2.95	0.0	
CBMH105	STORAGE	93.23	2.67	0.0	
CBMH106	STORAGE	92.97	3.18	0.0	

CBMH107	STORAGE	93.09	2.91	0.0
CBMH108	STORAGE	93.21	2.89	0.0
CBMH109	STORAGE	93.28	2.87	0.0
CBMH110	STORAGE	93.24	2.76	0.0
CBMH111	STORAGE	93.42	2.58	0.0
LD301	STORAGE	94.00	2.00	0.0
POND	STORAGE	92.82	3.08	0.0
STMH104	STORAGE	93.10	2.90	0.0

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Link Summary  
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Name	From Node	To Node	Type	Length	%Slope	Roughness
01-102	CB01	CBMH102	CONDUIT	19.5	0.9744	0.0130
02-103	CB02	CBMH103	CONDUIT	19.5	1.0257	0.0130
03-105	CB03	CBMH105	CONDUIT	10.5	0.4762	0.0130
04-105	CB04	CBMH105	CONDUIT	26.4	0.9849	0.0130
05-109	CB05	CBMH109	CONDUIT	11.8	1.0170	0.0130
06-110	CB06	CBMH110	CONDUIT	35.8	0.5028	0.0130
07-111	CB07	CBMH111	CONDUIT	35.9	0.5014	0.0130
101-OGS	CBMH101	OGS	CONDUIT	5.6	0.1786	0.0130
102-POND	CBMH102	POND	CONDUIT	11.2	0.3571	0.0130
103-102	CBMH103	CBMH102	CONDUIT	19.5	0.2564	0.0130
104-103	STMH104	CBMH103	CONDUIT	15.9	0.2516	0.0130
105-104	CBMH105	STMH104	CONDUIT	28.1	0.2491	0.0130
106-POND	CBMH106	POND	CONDUIT	11.7	0.5128	0.0130
107-106	CBMH107	CBMH106	CONDUIT	21.2	0.5189	0.0130
108-107	CBMH108	CBMH107	CONDUIT	20.1	0.2488	0.0130
109-108	CBMH109	CBMH108	CONDUIT	24.7	0.2429	0.0130
110-10	CBMH110	CBMH107	CONDUIT	34.2	0.2632	0.0130
111-110	CBMH111	CBMH110	CONDUIT	41.7	0.2398	0.0130
301-05	LD301	CB05	CONDUIT	41.7	1.0072	0.0130
9-104	CB9	STMH104	CONDUIT	6.1	0.9837	0.0130
OGS-XSTM1	OGS	XSTM1	CONDUIT	6.0	0.1667	0.0130
OLFA1	CBMH101	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA10	CBMH106	CB01	CONDUIT	1.0	1.0001	0.0150
OLFA11	CBMH107	CB02	CONDUIT	1.0	1.0001	0.0150
OLFA12	CBMH108	CBMH107	CONDUIT	1.0	1.0001	0.0150
OLFA13	CBMH109	CB05	CONDUIT	1.0	1.0001	0.0150

OLFA14	CB05	CB04	CONDUIT	1.0	1.0001	0.0350
OLFA15	LD301	CB05	CONDUIT	1.0	1.0001	0.0350
OLFA16	CBMH110	CBMH107	CONDUIT	1.0	1.0001	0.0150
OLFA17	CB06	CBMH110	CONDUIT	1.0	1.0001	0.0150
OLFA18	CBMH111	CBMH110	CONDUIT	1.0	1.0001	0.0150
OLFA19	CB07	CBMH111	CONDUIT	1.0	11.0672	0.0150
OLFA3	CBMH102	CBMH101	CONDUIT	1.0	1.0001	0.0150
OLFA4	CB01	CBMH102	CONDUIT	1.0	1.0001	0.0150
OLFA5	CB02	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA6	CB9	OVLF2	CONDUIT	1.0	1.0001	0.0150
OLFA7	CBMH105	CB9	CONDUIT	1.0	1.0001	0.0150
OLFA9	CB04	OVLF1	CONDUIT	1.0	1.0001	0.0350
OLFR1	CB08	OVLF4	CONDUIT	1.0	1.0001	0.0150
POND-101	POND	CBMH101	CONDUIT	11.7	0.2564	0.0130
08-XTMS2	CB08	XSTM2	ORIFICE			
OVERFLOW	POND	CARP1	WEIR			

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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
01-102	CIRCULAR	0.25	0.05	0.06	0.25	1	58.71
02-103	CIRCULAR	0.25	0.05	0.06	0.25	1	60.23
03-105	CIRCULAR	0.25	0.05	0.06	0.25	1	41.04
04-105	CIRCULAR	0.25	0.05	0.06	0.25	1	59.02
05-109	CIRCULAR	0.25	0.05	0.06	0.25	1	59.97
06-110	CIRCULAR	0.25	0.05	0.06	0.25	1	42.17
07-111	CIRCULAR	0.25	0.05	0.06	0.25	1	42.11
101-OGS	CIRCULAR	0.20	0.03	0.05	0.20	1	14.42
102-POND	CIRCULAR	0.38	0.11	0.09	0.38	1	104.79
103-102	CIRCULAR	0.38	0.11	0.09	0.38	1	88.79
104-103	CIRCULAR	0.38	0.11	0.09	0.38	1	87.95
105-104	CIRCULAR	0.38	0.11	0.09	0.38	1	87.51
106-POND	CIRCULAR	0.45	0.16	0.11	0.45	1	204.18
107-106	CIRCULAR	0.45	0.16	0.11	0.45	1	205.38
108-107	CIRCULAR	0.38	0.11	0.09	0.38	1	87.45
109-108	CIRCULAR	0.38	0.11	0.09	0.38	1	86.42
110-10	CIRCULAR	0.45	0.16	0.11	0.45	1	146.27

111-110	CIRCULAR	0.38	0.11	0.09	0.38	1	85.86
301-05	CIRCULAR	0.25	0.05	0.06	0.25	1	59.69
9-104	CIRCULAR	0.25	0.05	0.06	0.25	1	58.98
OGS-XSTM1	CIRCULAR	0.45	0.16	0.11	0.45	1	116.40
OLFA1	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA10	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA11	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA12	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA13	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA14	RECT_OPEN	1.00	1.00	0.33	1.00	1	1373.69
OLFA15	RECT_OPEN	1.00	1.00	0.33	1.00	1	1373.69
OLFA16	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA17	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA18	RECT_OPEN	1.00	5.00	0.71	5.00	1	26637.72
OLFA19	RECT_OPEN	1.00	5.00	0.71	5.00	1	88614.40
OLFA3	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA4	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA5	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA6	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA7	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
OLFA9	RECT_OPEN	1.00	3.00	0.60	3.00	1	6098.05
OLFR1	RECT_OPEN	1.00	3.00	0.60	3.00	1	14228.79
POND-101	CIRCULAR	0.45	0.16	0.11	0.45	1	144.38

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NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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Analysis Options  
\*\*\*\*\*  
Flow Units ..... LPS  
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 ..... 05/11/2022 00:00:00  
Ending Date ..... 05/12/2022 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 ..... 4  
Head Tolerance ..... 0.001500 m

*****		
	Volume	Depth
*****		
Runoff Quantity Continuity	hectare-m	mm
-----		
Initial LID Storage	0.002	1.083
Total Precipitation	0.228	105.660
Evaporation Loss	0.000	0.000
Infiltration Loss	0.029	13.354
Surface Runoff	0.199	92.261
Final Storage	0.003	1.303
Continuity Error (%)	-0.165	

*****		
	Volume	Volume
*****		
Flow Routing Continuity	hectare-m	10 <sup>6</sup> ltr
-----		
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.199	1.989
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.001
External Outflow	0.198	1.981
Flooding Loss	0.000	0.000



A-7		105.66	0.00	0.00	0.00	105.67	0.00	105.67	0.06
6.73	1.000								
A-8		105.66	0.00	0.00	0.78	104.63	0.29	104.92	0.11
12.91	0.993								
A-9		105.66	0.00	0.00	0.00	105.66	0.00	105.66	0.01
1.65	1.000								
R-1		105.66	0.00	0.00	12.66	88.70	4.27	92.97	0.09
11.14	0.880								

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Node Depth Summary  
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Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
OGS	JUNCTION	1.35	1.36	94.03	0 13:22	1.36
CARP1	OUTFALL	0.00	0.00	94.60	0 00:00	0.00
CARP2	OUTFALL	0.00	0.00	94.60	0 00:00	0.00
OVL1	OUTFALL	0.00	0.00	95.19	0 00:00	0.00
OVL2	OUTFALL	0.00	0.00	94.99	0 00:00	0.00
OVL4	OUTFALL	0.00	0.00	94.84	0 00:00	0.00
XSTM1	OUTFALL	1.95	1.95	94.02	0 00:00	1.95
XSTM2	OUTFALL	1.87	1.87	94.02	0 00:00	1.87
CB01	STORAGE	0.88	1.26	94.51	0 13:23	1.26
CB02	STORAGE	0.83	1.22	94.52	0 13:01	1.22
CB03	STORAGE	0.78	1.18	94.53	0 13:01	1.18
CB04	STORAGE	0.53	0.94	94.54	0 13:00	0.94
CB05	STORAGE	0.61	1.05	94.57	0 13:00	1.05
CB06	STORAGE	0.53	1.01	94.61	0 13:00	1.01
CB07	STORAGE	0.43	0.92	94.62	0 13:00	0.92
CB08	STORAGE	0.87	0.98	94.13	0 13:00	0.98
CB9	STORAGE	0.83	1.22	94.52	0 13:01	1.22
CBMH101	STORAGE	1.36	1.74	94.50	0 13:23	1.74
CBMH102	STORAGE	1.19	1.57	94.51	0 13:22	1.57
CBMH103	STORAGE	1.13	1.52	94.52	0 13:02	1.52
CBMH105	STORAGE	0.90	1.30	94.53	0 13:01	1.30
CBMH106	STORAGE	1.16	1.56	94.53	0 13:00	1.56

CBMH107	STORAGE	1.04	1.47	94.56	0 13:00	1.47
CBMH108	STORAGE	0.92	1.35	94.56	0 13:00	1.35
CBMH109	STORAGE	0.85	1.28	94.56	0 13:00	1.28
CBMH110	STORAGE	0.89	1.34	94.58	0 13:00	1.34
CBMH111	STORAGE	0.71	1.18	94.60	0 13:00	1.18
LD301	STORAGE	0.13	0.57	94.57	0 13:00	0.57
POND	STORAGE	1.30	1.69	94.51	0 13:23	1.69
STMH104	STORAGE	1.03	1.42	94.52	0 13:01	1.42

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Node Inflow Summary  
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Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
OGS	JUNCTION	0.00	64.58	0 13:23	0	1.9	0.000
CARP1	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
CARP2	OUTFALL	0.19	0.19	0 13:00	0.000657	0.000657	0.000
OVL1	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OVL2	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OVL4	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
XSTM1	OUTFALL	0.00	64.58	0 13:23	0	1.9	0.000
XSTM2	OUTFALL	0.00	11.14	0 13:00	0	0.0825	0.000
CB01	STORAGE	3.93	3.93	0 12:55	0.0327	0.0331	0.011
CB02	STORAGE	6.22	6.22	0 12:55	0.0518	0.052	0.007
CB03	STORAGE	1.65	4.34	0 13:00	0.0137	0.0171	0.018
CB04	STORAGE	13.85	13.85	0 13:00	0.0939	0.0941	0.006
CB05	STORAGE	12.75	14.47	0 13:00	0.0919	0.0997	0.016
CB06	STORAGE	14.72	14.72	0 13:00	0.123	0.123	0.006
CB07	STORAGE	13.58	13.58	0 13:00	0.113	0.113	0.006
CB08	STORAGE	11.14	11.14	0 13:00	0.0855	0.0864	5.061
CB9	STORAGE	6.73	6.73	0 12:20	0.056	0.0563	0.005
CBMH101	STORAGE	4.19	64.58	0 13:22	0.0349	1.9	0.000
CBMH102	STORAGE	3.81	50.00	0 12:20	0.0317	0.436	0.003
CBMH103	STORAGE	5.71	43.03	0 12:20	0.0475	0.372	0.004
CBMH105	STORAGE	12.91	26.59	0 13:00	0.107	0.219	0.007

CBMH106	STORAGE	3.81	110.71	0	13:00	0.0317	0.935	0.001
CBMH107	STORAGE	12.56	107.70	0	13:00	0.105	0.903	0.003
CBMH108	STORAGE	6.35	26.46	0	13:00	0.0528	0.206	0.006
CBMH109	STORAGE	6.35	20.49	0	13:00	0.0528	0.153	0.006
CBMH110	STORAGE	21.32	70.11	0	13:00	0.177	0.594	0.005
CBMH111	STORAGE	21.57	34.93	0	13:00	0.18	0.293	0.006
LD301	STORAGE	1.95	2.46	0	12:05	0.00679	0.00756	0.209
POND	STORAGE	71.75	229.98	0	13:00	0.501	2.9	0.000
STMH104	STORAGE	0.00	31.86	0	12:20	0	0.272	0.005

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Node Surcharge Summary  
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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
OGS	JUNCTION	24.00	0.914	0.896

\*\*\*\*\*  
Node Flooding Summary  
\*\*\*\*\*

No nodes were flooded.

\*\*\*\*\*  
Storage Volume Summary  
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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 LPS
CB01	0.000	2	0	0	0.000	3	0 13:23	3.80

CB02	0.000	2	0	0	0.000	2	0 13:01	6.08
CB03	0.001	1	0	0	0.007	11	0 13:01	5.40
CB04	0.000	3	0	0	0.000	5	0 13:00	13.68
CB05	0.000	6	0	0	0.000	10	0 13:00	14.15
CB06	0.000	0	0	0	0.000	1	0 13:00	14.50
CB07	0.000	0	0	0	0.000	1	0 13:00	13.35
CB08	0.000	5	0	0	0.000	5	0 13:00	11.14
CB9	0.000	2	0	0	0.000	3	0 13:01	6.60
CBMH101	0.002	6	0	0	0.002	7	0 13:23	64.58
CBMH102	0.001	7	0	0	0.002	10	0 13:22	49.44
CBMH103	0.001	6	0	0	0.002	8	0 13:02	42.43
CBMH105	0.001	2	0	0	0.002	2	0 13:01	26.07
CBMH106	0.001	20	0	0	0.002	27	0 13:00	110.28
CBMH107	0.001	3	0	0	0.002	5	0 13:00	106.90
CBMH108	0.001	12	0	0	0.002	18	0 13:00	26.00
CBMH109	0.001	27	0	0	0.002	41	0 13:00	20.12
CBMH110	0.001	3	0	0	0.002	5	0 13:00	69.15
CBMH111	0.001	1	0	0	0.001	2	0 13:00	34.29
LD301	0.000	0	0	0	0.000	1	0 13:00	2.39
POND	1.177	51	0	0	1.737	76	0 13:23	63.51
STMH104	0.001	35	0	0	0.002	49	0 13:01	31.26

\*\*\*\*\*  
Outfall Loading Summary  
\*\*\*\*\*

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
CARP1	0.00	0.00	0.00	0.000
CARP2	4.20	0.15	0.19	0.001
OVLFI	0.00	0.00	0.00	0.000
OVLFI2	0.00	0.00	0.00	0.000
OVLFI4	0.00	0.00	0.00	0.000
XSTM1	97.36	22.57	64.58	1.899
XSTM2	97.64	0.98	11.14	0.083
System	28.46	23.70	74.13	1.982

\*\*\*\*\*  
 Link Flow Summary  
 \*\*\*\*\*

Link	Type	Maximum  Flow  LPS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
01-102	CONDUIT	3.80	0 13:00	0.08	0.06	1.00
02-103	CONDUIT	6.08	0 13:00	0.12	0.10	1.00
03-105	CONDUIT	5.40	0 13:04	0.11	0.13	1.00
04-105	CONDUIT	13.68	0 13:00	0.28	0.23	1.00
05-109	CONDUIT	14.15	0 13:00	0.29	0.24	1.00
06-110	CONDUIT	14.50	0 13:00	0.30	0.34	1.00
07-111	CONDUIT	13.35	0 13:00	0.27	0.32	1.00
101-OGS	CONDUIT	64.58	0 13:23	2.00	4.48	1.00
102-POND	CONDUIT	49.44	0 12:20	0.45	0.47	1.00
103-102	CONDUIT	42.43	0 12:20	0.38	0.48	1.00
104-103	CONDUIT	31.26	0 12:20	0.28	0.36	1.00
105-104	CONDUIT	25.28	0 12:20	0.23	0.29	1.00
106-POND	CONDUIT	110.28	0 13:00	0.69	0.54	1.00
107-106	CONDUIT	106.90	0 13:00	0.67	0.52	1.00
108-107	CONDUIT	26.00	0 13:00	0.24	0.30	1.00
109-108	CONDUIT	20.12	0 13:00	0.18	0.23	1.00
110-10	CONDUIT	69.15	0 13:00	0.43	0.47	1.00
111-110	CONDUIT	34.29	0 13:00	0.31	0.40	1.00
301-05	CONDUIT	2.39	0 13:02	0.05	0.04	1.00
9-104	CONDUIT	6.60	0 12:55	0.13	0.11	1.00
OGS-XSTM1	CONDUIT	64.58	0 13:23	0.41	0.55	1.00
OLFA1	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA10	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA11	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA12	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA13	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA14	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA15	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA16	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA17	CONDUIT	0.00	0 00:00	0.00	0.00	0.00

OLFA18	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA19	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA3	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA4	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA5	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA6	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA7	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFA9	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OLFR1	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
POND-101	CONDUIT	63.51	0 13:22	0.40	0.44	1.00
08-XTMS2	ORIFICE	11.14	0 13:00			1.00
OVERFLOW	WEIR	0.00	0 00:00			0.00

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 Flow Classification Summary  
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Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class								
		Up Dry	Down Dry	Sub Dry	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl	
01-102	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
02-103	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
03-105	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
04-105	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
05-109	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
06-110	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
07-111	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
101-OGS	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
102-POND	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
103-102	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
104-103	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
105-104	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
106-POND	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
107-106	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
108-107	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
109-108	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
110-10	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
111-110	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

301-05	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
9-104	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
OGS-XSTM1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
OLFA1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA10	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA11	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA12	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA13	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA14	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA15	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA16	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA17	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA18	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA19	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA3	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA4	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA5	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA6	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA7	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFA9	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLFR1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POND-101	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

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Conduit Surcharge Summary  
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Conduit	Hours Full			Hours	Hours
	Both Ends	Upstream	Dnstream	Above Full Normal Flow	Capacity Limited
01-102	24.00	24.00	24.00	0.01	0.01
02-103	24.00	24.00	24.00	0.01	0.01
03-105	24.00	24.00	24.00	0.01	0.01
04-105	24.00	24.00	24.00	0.01	0.01
05-109	24.00	24.00	24.00	0.01	0.01
06-110	24.00	24.00	24.00	0.01	0.01
07-111	24.00	24.00	24.00	0.01	0.01
101-OGS	24.00	24.00	24.00	10.53	14.42

102-POND	24.00	24.00	24.00	0.01	0.01
103-102	24.00	24.00	24.00	0.01	0.01
104-103	24.00	24.00	24.00	0.01	0.01
105-104	24.00	24.00	24.00	0.01	0.01
106-POND	24.00	24.00	24.00	0.01	0.01
107-106	24.00	24.00	24.00	0.01	0.01
108-107	24.00	24.00	24.00	0.01	0.01
109-108	24.00	24.00	24.00	0.01	0.01
110-10	24.00	24.00	24.00	0.01	0.01
111-110	24.00	24.00	24.00	0.01	0.01
301-05	4.96	4.96	24.00	0.01	0.01
9-104	24.00	24.00	24.00	0.01	0.01
OGS-XSTM1	24.00	24.00	24.00	0.01	3.08
POND-101	24.00	24.00	24.00	0.01	0.01

Analysis begun on: Mon Nov 21 09:52:32 2022  
Analysis ended on: Mon Nov 21 09:52:33 2022  
Total elapsed time: 00:00:01



**30 Frank Nighbour - UHAUL - 5 Year Storm Sewer Design Sheet**

LOCATION			AREA (Ha)		FLOW					PROPOSED SEWER								Q/Qfull
AREA ID	FROM	TO	TOTAL AREA	C	INDIV 2.78 AR	ACCUM 2.78 AR	TIME OF CONC.	RAINFALL INTENSITY I	PEAK FLOW Q (l/s)	NOM PIPE SIZE (mm)	ACT PIPE SIZE (mm)	PIPE SLOPE (%)	LENGTH (m)	CAPACITY (l/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min.)	EXCESS CAPACITY (l/s)	
A-20	CB 07	CBMH 111	0.107	0.900	0.27	0.27	10.00	104.19	27.89	250.0	254.0	0.50	35.9	43.91	0.87	0.69	16.02	0.64
A-19	CBMH 111	CBMH 110	0.170	0.900	0.43	0.69	10.69	100.68	69.78	375.0	381.0	0.25	41.7	91.55	0.80	0.87	21.77	0.76
A-18	CB 06	CBMH 110	0.116	0.900	0.29	0.29	10.00	104.19	30.24	250.0	254.0	0.50	35.8	43.91	0.87	0.69	13.67	0.69
A-17	CBMH 110	CBMH 107	0.168	0.900	0.42	1.40	11.56	96.63	135.63	450.0	457.0	0.25	34.2	148.69	0.91	0.63	13.06	0.91
A-16	LD 301	CB 05	0.023	0.250	0.02	0.02	10.00	104.19	1.67	250.0	254.0	1.00	41.7	62.10	1.22	0.57	60.44	0.03
A-15	CB 05	CBMH 109	0.109	0.710	0.22	0.23	10.57	101.29	23.41	250.0	254.0	1.00	11.8	62.10	1.22	0.16	38.69	0.38
A-14	CBMH 109	CBMH 108	0.050	0.900	0.13	0.36	10.73	100.50	35.80	375.0	381.0	0.25	24.7	91.55	0.80	0.51	55.75	0.39
A-13	CBMH 108	CBMH 107	0.050	0.900	0.13	0.48	11.24	98.06	47.20	375.0	381.0	0.25	20.1	91.55	0.80	0.42	44.35	0.52
A-12	CBMH 107	CBMH 106	0.099	0.900	0.25	2.13	12.19	93.90	200.27	450.0	457.0	0.50	21.2	210.28	1.28	0.28	10.02	0.95
A-11	CBMH 106	POND	0.030	0.900	0.08	2.21	12.46	92.76	204.80	450.0	457.0	0.50	11.7	210.28	1.28	0.15	5.49	0.97
A-10	CB 04	CBMH 105	0.122	0.650	0.22	0.22	10.00	104.19	22.97	250.0	254.0	1.00	26.4	62.10	1.22	0.36	39.13	0.37
A-9	CB 03	CBMH 105	0.013	0.900	0.03	0.03	10.00	104.19	3.39	250.0	254.0	0.50	10.5	43.91	0.87	0.20	40.52	0.08
A-8	CBMH 105	STMMH 104	0.102	0.890	0.25	0.51	10.36	102.33	51.71	375.0	381.0	0.25	28.1	91.55	0.80	0.58	39.83	0.56
A-7	CB 09	STMMH 104	0.053	0.900	0.13	0.13	10.00	104.19	13.82	250.0	254.0	1.00	6.1	62.10	1.22	0.08	48.28	0.22
	STMMH 104	CBMH 103	0.000	0.000	0.00	0.64	10.94	99.46	63.45	375.0	381.0	0.25	15.9	91.55	0.80	0.33	28.10	0.69
A-5	CB 02	CBMH 103	0.049	0.900	0.12	0.12	10.00	104.19	12.77	250.0	254.0	1.00	19.5	62.10	1.22	0.27	49.33	0.21
A-6	CBMH 103	CBMH 102	0.045	0.900	0.11	0.87	11.27	97.92	85.49	375.0	381.0	0.25	19.5	91.55	0.80	0.41	6.05	0.93
A-4	CB 01	CBMH 102	0.031	0.900	0.08	0.08	10.00	104.19	8.08	250.0	254.0	1.00	19.5	62.10	1.22	0.27	54.02	0.13
A-3	CBMH 102	POND	0.030	0.900	0.08	1.03	11.68	96.09	98.57	375.0	381.0	0.35	11.2	108.32	0.95	0.20	9.76	0.91
A-2	POND	CBMH 101	0.663	0.650	1.20	1.20	12.62	92.15	110.40	450.0	457.0	0.25	11.7	148.69	0.91	0.22	38.30	0.74
A-1	CBMH 101	OGS	0.033	0.900	0.08	1.28	12.83	91.29	116.91	100 Year Controlled Flow Through Restrictor Pipe = 71.0 L/s								
	OGS	EXISTING	0.000	0.000	0.00	1.28	12.83	91.29	71.00	450.0	457.0	0.20	6.0	133.00	0.81	0.12	62.00	0.53

**Definitions**

Q = 2.78 AIR  
 Q = Peak Flow, in Litres per second (L/s)  
 A = Area in hectares (ha)  
 I = 5 YEAR Rainfall Intensity (mm/h)  
 R = Runoff Coefficient

**Notes:**

1) Ottawa Rainfall-Intensity Curve  
 2) Min Velocity = 0.76 m/sec.  
 3) 5 Year intensity =  $998.071 / (\text{time} + 6.053)^{0.814}$   
 10 Year intensity =  $1174.184 / (\text{time} + 6.014)^{0.816}$   
 100 Year intensity =  $1735.688 / (\text{time} + 6.014)^{0.820}$

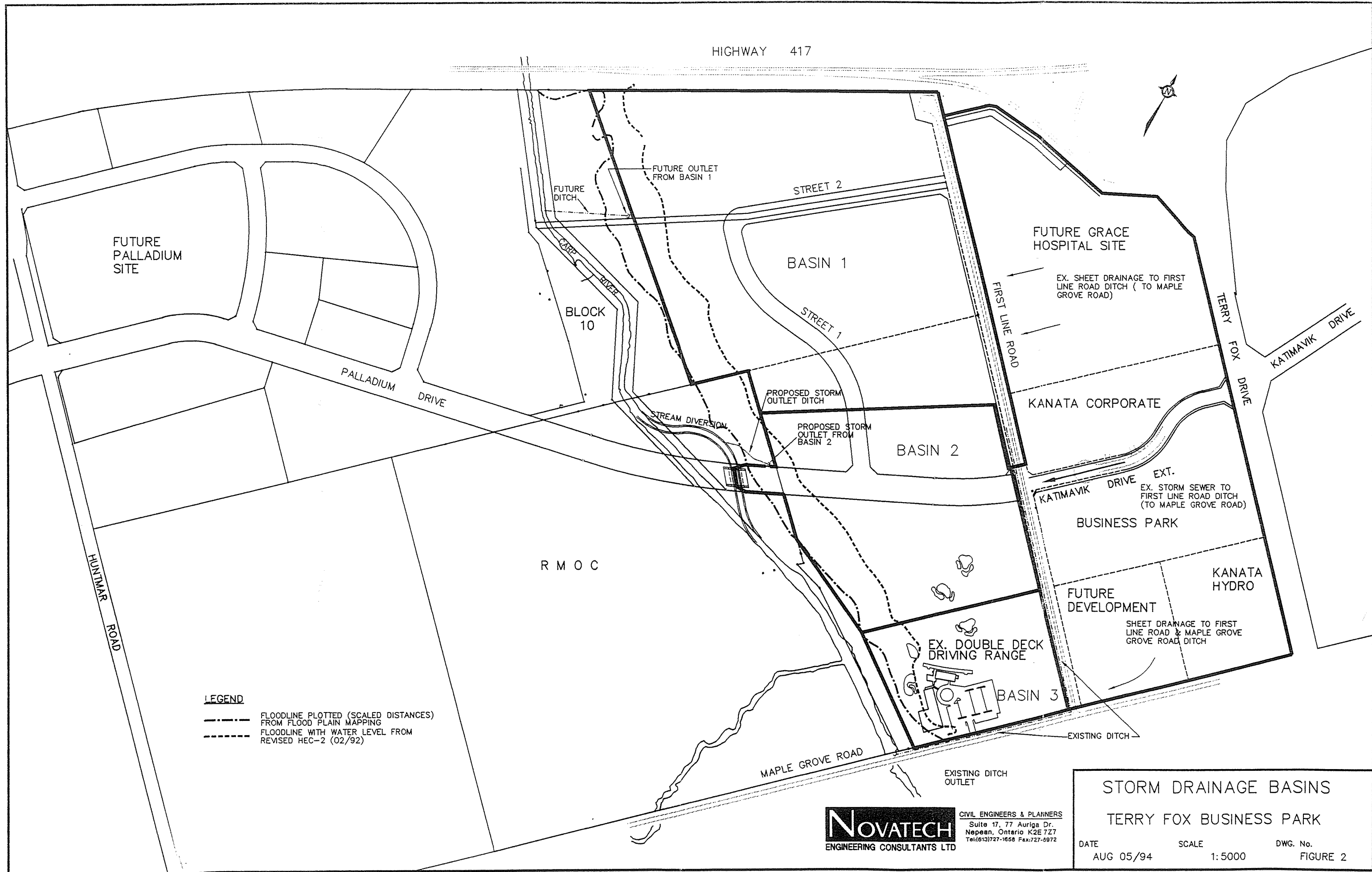
**TERRY FOX BUSINESS PARK  
STORMWATER DESIGN PLAN**

**RMOC FILE NO.: 15-90-18.07  
MMA FILE NO.: 06T-90019**

**Prepared by:**

**NOVATECH ENGINEERING CONSULTANTS LTD.**

**August 4, 1994**



**LEGEND**

- FLOODLINE PLOTTED (SCALED DISTANCES) FROM FLOOD PLAIN MAPPING
- - - FLOODLINE WITH WATER LEVEL FROM REVISED HEC-2 (02/92)

**NOVATECH**  
 ENGINEERING CONSULTANTS LTD  
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**STORM DRAINAGE BASINS**  
**TERRY FOX BUSINESS PARK**  
 DATE: AUG 05/94      SCALE: 1:5000      DWG. No. FIGURE 2

## 6.0 PROPOSED STORMWATER DESIGN CRITERIA

The storm drainage of the site will be consistent with a dual drainage concept whereby the minor drainage system relies on roadway gutters, catchbasins and storm sewers to convey 1:5 year return period flows to the Carp River outlet. On-site controls will restrict release rates to 50 L/s/ha for each developable lot which is slightly in excess of the pre-development rate. The other half of the dual drainage system is the major system drainage which will convey flows in excess of the 1:5 year flows overland via roadways and drainage swales to the Carp River or control it on-site and release it at the 5 year pre-development rate. The hydrologic analysis has indicated that neither option will increase Carp River peak flows.

The principal elements or guidelines for the stormwater design plan are as follows:

- On-site flow restricted to 50 L/s/ha maximum by a combination of roof top storage, inlet control or other devices. Individual lot developers will be required to provide on-lot grading and drainage control to attenuate site drainage to the stipulated maximum for the 5 year design event.
- Roadway catchbasins with inlet capacity for the 1:5 year design event.
- Storm sewer pipe designed to convey post-development right-of-way (R.O.W.) flows for the 1:5 year design event and the on-site flows restricted to 50 L/s/ha maximum.
- The developer will have the option of controlling the 5 year - 100 year event and releasing it through the storm sewer (at 50 L/s/ha max.) or, alternatively, releasing it uncontrolled via the major system drainage network. This shall be a site specific consideration.
- Catchbasins/manholes shall contain sumps and will require regular maintenance. Sumps may have to be cleaned out more often than a conventional parking lot drainage network.
- Future lot developers shall submit stormwater management calculations which should either be based on the modified rational method or an appropriate stormwater management model such as OTTSWMM. Calculations which should be submitted in support of the design should include:
  - i) Allowable run-off;
  - ii) Post-development run-off;
  - iii) Storage calculations (5 year);
  - iv) Method of providing storage, including volume calculations, and
  - v) Orifice and outlet weir calculations.

- Site grading should ensure that OSD's retain ponding without flooding buildings and maximum ponding depths in parking lots should be limited to between 0.25m and 0.30m.
- Site developments should incorporate feasible BMP's for improved water quality such as:
  - infiltration trenches or basins
  - sumps in catchbasins and catchbasin manholes
  - grassed swales
- If overland flow routes (major system) are incorporated in the design, then the overland major system slope should be 0.1% minimum as measured from summit to summit.
- Existing Katimavik Road storm drainage outlet culvert will be relocated to the existing First Line Road ditch south of future Palladium Drive. Some minor re-ditching along First Line Road may be required.

## **APPENDIX F**

### **Inlet Control Device Information**

# IPEX Tempest™ Inlet Control Devices

Municipal Technical Manual Series

Vol. I, 2nd Edition

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The information contained here within is based on current information and product design at the time of publication and is subject to change without notification. IPEX does not guarantee or warranty the accuracy, suitability for particular applications, or results to be obtained therefrom.

## PRODUCT TECHNICAL SPECIFICATION

### General

Inlet control devices (ICD's) are designed to provide flow control at a specified rate for a given water head level and also provide odour and floatable control. All ICD's will be IPEX Tempest or approved equal.

All devices shall be removable from a universal mounting plate. An operator from street level using only a T-bar with a hook will be able to retrieve the device while leaving the universal mounting plate secured to the catch basin wall face. The removal of the TEMPEST devices listed above must not require any unbolting or special manipulation or any special tools.

High Flow (HF) Sump devices will consist of a removable threaded cap which can be accessible from street level with out entry into the catchbasin (CB). The removal of the threaded cap shall not require any special tools other than the operator's hand.

ICD's shall have no moving parts.

### Materials

ICD's are to be manufactured from Polyvinyl Chloride (PVC) or Polyurethane material, designed to be durable enough to withstand multiple freeze-thaw cycles and exposure to harsh elements.

The inner ring seal will be manufactured using a Buna or Nitrile material with hardness between Duro 50 and Duro 70.

The wall seal is to be comprised of a 3/8" thick Neoprene Closed Cell Sponge gasket which is attached to the back of the wall plate.

All hardware will be made from 304 stainless steel.

### Dimensioning

The Low Medium Flow (LMF), High Flow (HF) and the High Flow (HF) Sump shall allow for a minimum outlet pipe diameter of 200mm with a 600mm deep Catch Basin sump.

### Installation

Contractor shall be responsible for securing, supporting and connecting the ICD's to the existing influent pipe and catchbasin/manhole structure as specified and designed by the Engineer.



## PRODUCT INFORMATION: TEMPEST HF & MHF ICD

### Product Description

Our HF, HF Sump and MHF ICD's are designed to accommodate catch basins or manholes with sewer outlet pipes 6" in diameter or larger. Any storm sewer larger than 12" may require custom modification. However, IPEX can custom build a TEMPEST device to accommodate virtually any storm sewer size.

Available in 5 preset flow curves, these ICDs have the ability to provide constant flow rates: 9lps (143 gpm) and greater

### Product Function

**TEMPEST HF (High Flow):** designed to manage moderate to higher flows 15 L/s (240 gpm) or greater and prevent the propagation of odour and floatables. With this device, the cross-sectional area of the device is larger than the orifice diameter and has been designed to limit head losses. The HF ICD can also be ordered without flow control when only odour and floatable control is required.



**TEMPEST HF (High Flow) Sump:** The height of a sewer outlet pipe in a catch basin is not always conveniently located. At times it may be located very close to the catch basin floor, not providing enough sump for one of the other TEMPEST ICDs with universal back plate to be installed. In these applications, the HF Sump is offered. The HF Sump offers the same features and benefits as the HF ICD; however, is designed to raise the outlet in a square or round catch basin structure. When installed, the HF sump is fixed in place and not easily removed. Any required service to the device is performed through a clean-out located in the top of the device which can be often accessed from ground level.



### TEMPEST MHF (Medium to High Flow):

The MHF plate or plug is designed to control flow rates 9 L/s (143 gpm) or greater. It is not designed to prevent the propagation of odour and floatables.



### Product Construction

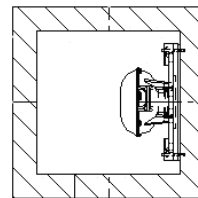
The HF, HF Sump and MHF ICDs are built to be light weight at a maximum weight of 6.8 Kg (14.6 lbs).

### Product Applications

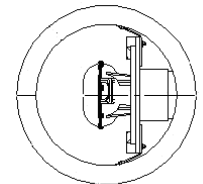
The HF and MHF ICD's are available to accommodate both square and round applications:



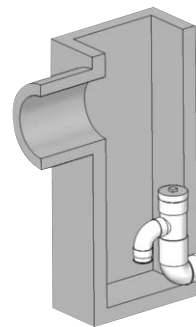
#### Square Application



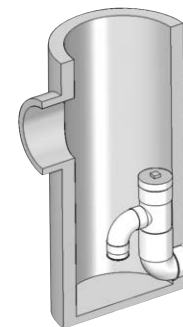
#### Round Application



The HF Sump is available to accommodate low to no sump applications in both square and round catch basins:

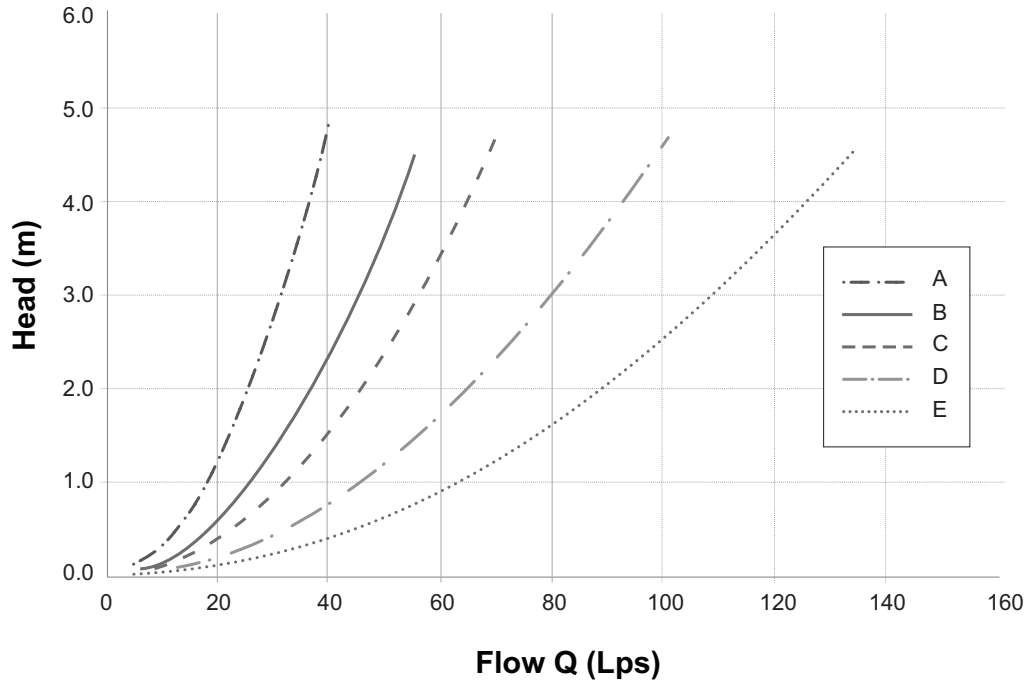


Square Catch Basin



Round Catch Basin

**Chart 3: HF & MHF Preset Flow Curves**



TEMPEST  
 HF & MHF ICD

## PRODUCT INSTALLATION

### Instructions to assemble a TEMPEST HF or MHF ICD into a Square Catch Basin:

1. Materials and tooling verification:
  - Tooling: impact drill, 3/8" concrete bit, torque wrench for 9/16" nut, hand hammer, level, and marker.
  - Material: (4) concrete anchor 3/8 x 3-1/2, (4) washers, (4) nuts, universal mounting plate, ICD device
2. Use the mounting wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
3. Use an impact drill with a 3/8" concrete bit to make the four holes at a minimum of 1-1/2" depth up to 2-1/2". Clean the concrete dust from the holes.
4. Install the anchors (4) in the holes by using a hammer. Thread the nuts on the top of the anchors to protect the threads when you hit the anchors with the hammer. Remove the nuts from the ends of the anchors.
5. Install the universal wall mounting plate on the anchors and screw the 4 nuts in place with a maximum torque of 40 N.m (30 lbf-ft). There should be no gap between the wall mounting plate and the catch basin wall.
6. From the ground above using a reach bar, lower the device by hooking the end of the reach bar to the handle of the ICD device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered in to the universal wall mounting plate and has created a seal.



### WARNING

- Verify that the outlet pipe doesn't protrude into the catch basin. If it does, cut down the pipe flush to the catch basin wall.
- Call your IPEX representative for more information or if you have any questions about our products.

### Instructions to assemble a TEMPEST HF or MHF ICD into a Round Catch Basin:

#### STEPS:

1. Materials and tooling verification.
  - Tooling: impact drill, 3/8" concrete bit, torque wrench for 9/16" nut, hand hammer, level and marker.
  - Material: (4) concrete anchor 3/8 x 3-1/2, (4) washers and (4) nuts, spigot CB wall plate, universal mounting plate hub adaptor, ICD device.
2. Use the round catch basin spigot adaptor to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
3. Use an impact drill with a 3/8" concrete bit to make the four holes at a depth between 1-1/2" to 2-1/2". Clean the concrete dust from the holes.
4. Install the anchors (4) in the holes by using a hammer. Thread the nuts on the top of the anchors to protect the threads when you hit the anchors with the hammer. Remove the nuts from the ends of the anchors.
5. Install the spigot CB wall plate on the anchors and screw the 4 nuts in place with a maximum torque of 40 N.m (30 lbf-ft). There should be no gap between the spigot CB wall plate and the catch basin wall.
6. Put solvent cement on the hub of the universal mounting plate, hub adaptor and the spigot of the CB wall plate, then slide the hub over the spigot. Make sure the universal mounting plate is at the horizontal and its hub is completely inserted onto the spigot. Normally, the corners of the hub adaptor should touch the catch basin wall.
7. From ground above using a reach bar, lower the device by hooking the end of the reach bar to the handle of the ICD device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered in to the wall mounting plate and has created a seal.



### WARNING

- Verify that the outlet pipe doesn't protrude into the catch basin. If it does, cut down the pipe flush to the catch basin wall.
- The solvent cement which is used in this installation is to be approved for PVC.
- The solvent cement should not be used below 0°C (32°F) or in a high humidity environment. Refer to the IPEX solvent cement guide to confirm the required curing time or visit the IPEX Online Solvent Cement Training Course available at [www.ipexinc.com](http://www.ipexinc.com).
- Call your IPEX representative for more information or if you have any questions about our products.

## Instructions to assemble a TEMPEST HF Sump into a Square or Round Catch Basin:

### STEPS:

1. Materials and tooling verification:
  - Tooling: impact drill, 3/8" concrete bit, torque wrench for 9/16" nut, hand hammer, level, mastic tape and metal strapping
  - Material: (2) concrete anchor 3/8 x 3-1/2, (2) washers, (2) nuts, HF Sump pieces (2).
2. Apply solvent cement to the spigot end of the top half of the sump. Apply solvent cement to the hub of the bottom half of the sump. Insert the spigot of the top half of the sump into the hub of the bottom half of the sump.
3. Install the 8" spigot of the device into the outlet pipe. Use the mastic tape to seal the device spigot into the outlet pipe. You should use a level to be sure that the fitting is standing at the vertical.
4. Use an impact drill with a 3/8" concrete bit to make a series of 2 holes along each side of the body throat. The depth of the hole should be between 1-1/2" to 2-1/2". Clean the concrete dust from the 2 holes.
5. Install the anchors (2) in the holes by using a hammer. Put the nuts on the top of the anchors to protect the threads when you hit the anchors. Remove the nuts from the ends of the anchors.
6. Cut the metal strapping to length and connect each end of the strapping to the anchors. Screw the nuts in place with a maximum torque of 40 N.m (30 lbf-ft). The device should be completely flush with the catch basin wall.



### WARNING

- Verify that the outlet pipe doesn't protrude into the catch basin. If it does, cut down the pipe flush to the catch basin wall.
- The solvent cement which is used in this installation is to be approved for PVC.
- The solvent cement should not be used below 0°C (32°F) or in a high humidity environment. Refer to the IPEX solvent cement guide to confirm the required curing time or visit the IPEX Online Solvent Cement Training Course available at [www.ipexinc.com](http://www.ipexinc.com).
- Call your IPEX representative for more information or if you have any questions about our products.

## PRODUCT TECHNICAL SPECIFICATION

### General

Inlet control devices (ICD's) are designed to provide flow control at a specified rate for a given water head level and also provide odour and floatable control where specified. All ICD's will be IPEX Tempest or approved equal.

All devices shall be removable from a universal mounting plate. An operator from street level using only a T-bar with a hook shall be able to retrieve the device while leaving the universal mounting plate secured to the catch basin wall face. The removal of the TEMPEST devices listed above shall not require any unbolting or special manipulation or any special tools.

High Flow (HF) Sump devices shall consist of a removable threaded cap which can be accessible from street level with out entry into the catchbasin (CB). The removal of the threaded cap shall not require any special tools other than the operator's hand.

ICD's shall have no moving parts.

### Materials

ICD's are to be manufactured from Polyvinyl Chloride (PVC) or Polyurethane material, designed to be durable enough to withstand multiple freeze-thaw cycles and exposure to harsh elements.

The inner ring seal will be manufactured using a Buna or Nitrile material with hardness between Duro 50 and Duro 70.

The wall seal is to be comprised of a 3/8" thick Neoprene Closed Cell Sponge gasket which is attached to the back of the wall plate.

All hardware will be made from 304 stainless steel.

### Dimensioning

The Low Medium Flow (LMF), High Flow (HF) and the High Flow (HF) Sump shall allow for a minimum outlet pipe diameter of 200mm with a 600mm deep Catch Basin sump.

### Installation

Contractor shall be responsible for securing, supporting and connecting the ICD's to the existing influent pipe and catchbasin/manhole structure as specified and designed by the Engineer.

## **APPENDIX G**

### **Water Quality Treatment Unit Information**



# INFORMATION REQUEST FORM



Tel: (905) 948-0000

Fax: (905) 948-0577

E-mail: [info@echelonenvironmental.ca](mailto:info@echelonenvironmental.ca)

## GENERAL PROJECT DATA

PROJECT NAME: \_\_\_\_\_  
 CITY: \_\_\_\_\_  
 ENGINEER: \_\_\_\_\_  
 DATE: \_\_\_\_\_

## BASIN DATA

A<sub>TOTAL</sub>: \_\_\_\_\_ ha.  
 A<sub>IMP.</sub>: \_\_\_\_\_ ha.  
 C<sub>RATIONAL</sub>: \_\_\_\_\_  
 T<sub>c</sub>: \_\_\_\_\_ MIN.  
**PEAK FLOW AT CDS UNIT**      **PEAK SITE DISCHARGE**  
 Q: \_\_\_\_\_ L/S      \_\_\_\_\_ L/S  
 RETURN FREQUENCY: \_\_\_\_\_ yr.      \_\_\_\_\_ yr.

## FOR ORIFICE CONTROLLED SITES

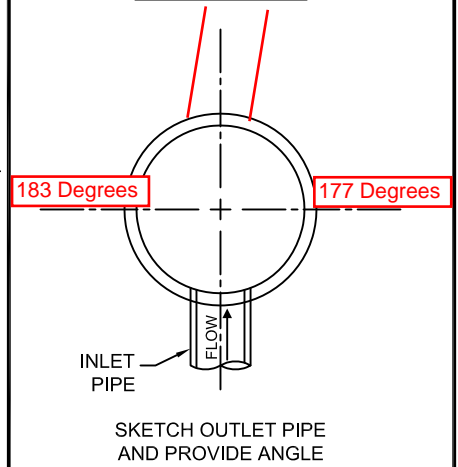
ORIFICE SIZE: \_\_\_\_\_ mm  
 HEAD ON ORIFICE: \_\_\_\_\_ mm  
 MULTIPLE CONTROL POINTS: YES  NO

## STORAGE-DISCHARGE PARAMETERS

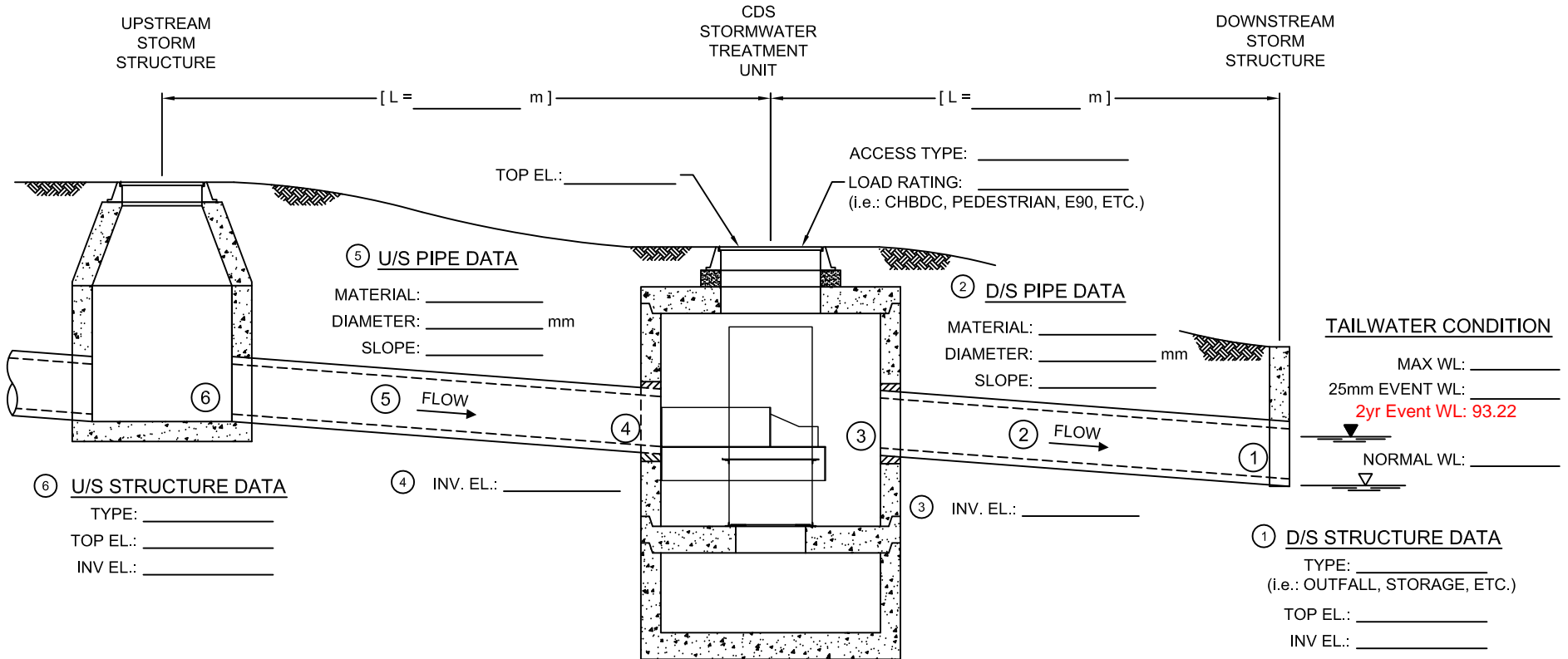
DESIGN STORM	Q (L/s)	STORAGE (M <sup>3</sup> )
25 mm	_____	_____
2 YEAR	_____	_____
5 YEAR	_____	_____
10 YEAR	_____	_____
25 YEAR	_____	_____
50 YEAR	_____	_____
100 YEAR	_____	_____

STORAGE TYPE: \_\_\_\_\_  
 Storage is BEFORE or AFTER CDS unit (circle)

## INLET/OUTLET PIPE ORIENTATION



## COMPLETE SECTION BELOW IF HYDRAULIC CALCULATIONS ARE REQUIRED:



connecting 450mm invert 92.66

**VORTECHS SYSTEM® ESTIMATED FLOW CALCULATIONS**  
**30 FRANK NIGHBOUR PLACE**  
**OTTAWA, ON**  
**MODEL 3000 IN-LINE**



**Vortechs Orifice**

Cd = 0.56  
A (m<sup>2</sup>) = 0.021  
Crest Elevation (m) = 92.78

**Weir**

Cd = 6.2  
Weir Crest Length (m) = 0.052  
Crest Elevation (m) = 93.36

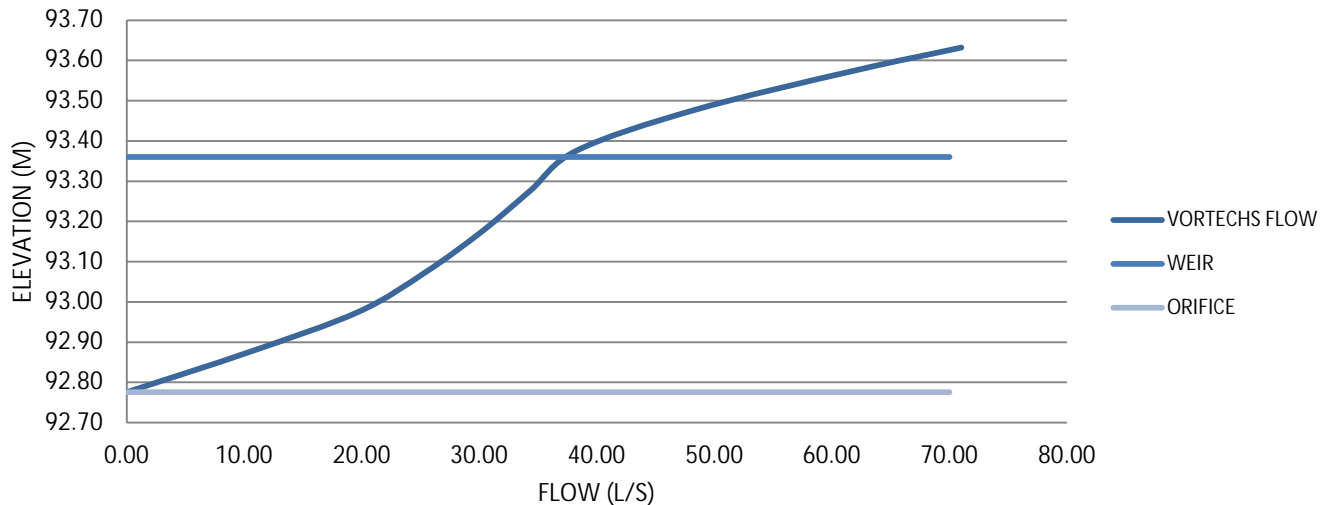
Head (m)	Elevation (m)	Orifice Flow (l/s)	Weir Flow (l/s)	Total Flow (l/s)
0.00	92.78	0.00	0.00	0.00
0.10	92.88	10.46	0.00	10.46
0.20	92.98	19.77	0.00	19.77
0.30	93.08	25.55	0.00	25.55
0.40	93.18	30.25	0.00	30.25
0.50	93.28	34.31	0.00	34.31
0.60	93.38	37.94	0.34	38.28
0.70	93.48	41.24	6.96	48.21
0.80	93.58	44.31	17.74	62.05
0.86	93.63	45.93	25.08	71.01
<b>0.61</b>	<b>93.46</b>	<b>40.06</b>	<b>5.85</b>	<b>45.91</b>
<b>0.34</b>	<b>93.56</b>	<b>29.88</b>	<b>16.02</b>	<b>45.90</b>
<b>0.39</b>	<b>93.61</b>	<b>31.90</b>	<b>22.02</b>	<b>53.91</b>
<b>0.37</b>	<b>94.39</b>	<b>31.13</b>	<b>39.87</b>	<b>71.00</b>

The above four rows represent the 25mm (under the 25mm and 2-yr river levels), 2-yr and 100-yr storms based on Carp river levels of 92.85, 93.22 and 94.02 respectively.

Calculated by: JAK

11/30

**VORTECHS STAGE DISCHARGE CURVE**



**VORTECHS SYSTEM® ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION  
BASED ON AN AVERAGE PARTICLE SIZE OF 80 MICRONS**

**30 FRANK NIGHBOUR PLACE**

**OTTAWA, ON**

**MODEL 3000 IN-LINE**



Design Ratio<sup>1</sup> = 
$$\frac{(2.06 \text{ hectares}) \times (0.79) \times (2.775)}{(1.8 \text{ m}^2)} = 2.47$$

<b>Rainfall Intensity</b> mm/hr	<b>Operating Rate<sup>2</sup></b> % of capacity	<b>Flow Treated</b> (l/s)	<b>% Total Rainfall</b> Volume <sup>3</sup>	<b>Rmvl. Effic<sup>4</sup></b> (%)	<b>Rel. Effic<sup>4</sup></b> (%)
0.5	1.8	0.9	9.2%	98.0%	9.0%
1.0	3.6	1.8	10.6%	98.0%	10.4%
1.5	5.4	2.8	9.9%	98.0%	9.7%
2.0	7.2	3.7	8.4%	97.6%	8.2%
2.5	9.1	4.6	7.7%	96.3%	7.4%
3.0	10.9	5.5	5.9%	96.0%	5.7%
3.5	12.7	6.5	4.4%	94.7%	4.1%
4.0	14.5	7.4	4.7%	92.8%	4.3%
4.5	16.3	8.3	3.3%	90.6%	3.0%
5.0	18.1	9.2	3.0%	88.8%	2.7%
6.0	21.7	11.1	5.4%	86.8%	4.7%
7.0	25.4	12.9	4.4%	84.9%	3.7%
8.0	29.0	14.8	3.5%	83.1%	2.9%
9.0	32.6	16.6	2.8%	81.1%	2.3%
10.0	36.2	18.5	2.2%	78.8%	1.7%
15.0	54.3	27.7	7.0%	61.8%	4.3%
20.0	72.4	36.9	4.5%	46.2%	2.1%
25.0	90.6	46.2	1.4%	18.2%	0.3%
30.0	108.7	55.4	0.7%	0.0%	0.0%
35.0	126.8	64.6	0.5%	0.0%	0.0%
40.0	144.9	73.9	0.5%	0.0%	0.0%

86.5%

**Predicted Annual Runoff Volume Treated = 95.0%**  
**Assumed Removal Efficiency of remaining % = 0.0%**  
**Removal Efficiency Adjustment<sup>5</sup> = 0.0%**  
**Predicted Net Annual Load Removal Efficiency = 87%**

1 - Design Ratio = (Total Drainage Area) x (Runoff Coefficient) x (Rational Method Conversion) / Grit Chamber Area

- The Total Drainage Area and Runoff Coefficient are specified by the site engineer.

- The rational method conversion based on the units in the above equation is 2.775.

2 - Operating Rate (% of capacity) = percentage of peak operating rate of 68 l/s/m<sup>2</sup>.

3 - Based on 42 years of hourly rainfall data from Canadian Station 6105976, Ottawa CDA, ON

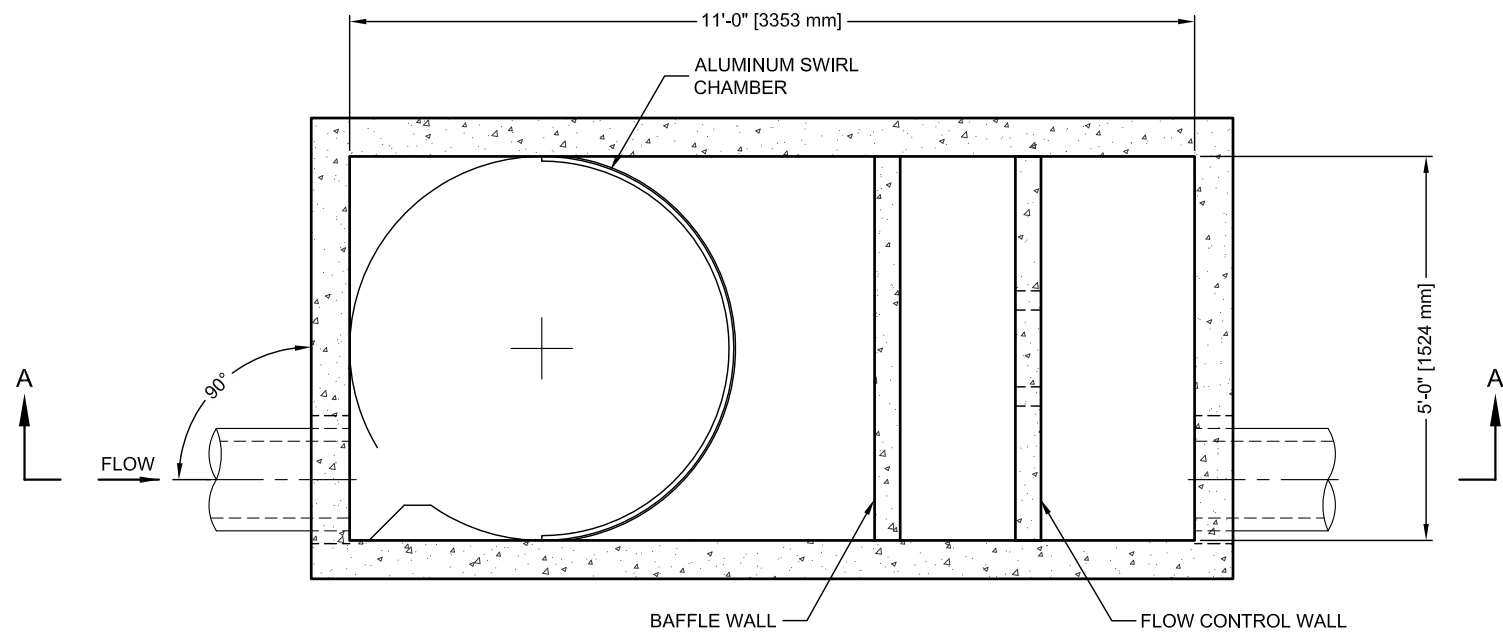
4 - Based on Contech Construction Products laboratory verified removal of an average particle size of 80 microns (see Technical Bulletin #1).

5- Reduction not necessary due to controlled flow rates.

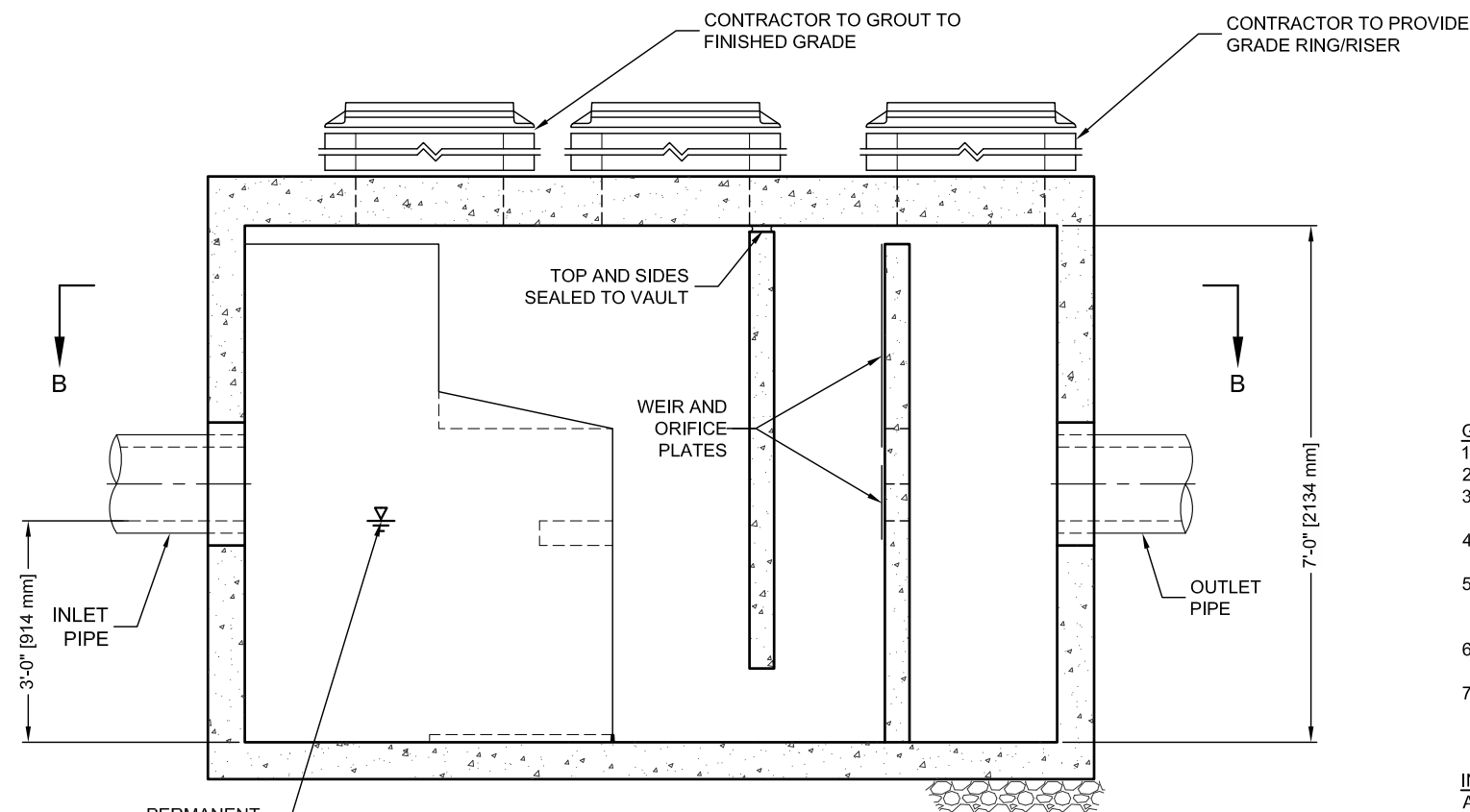
Calculated by: JAK 11/28 | Checked by:



I:\COMMON\CAD\TREATMENT\20 VORTECHS\40 STANDARD DRAWINGS\DWG\X-3000-DTL.DWG 8/6/2014 1:52 PM



**SECTION B-B**

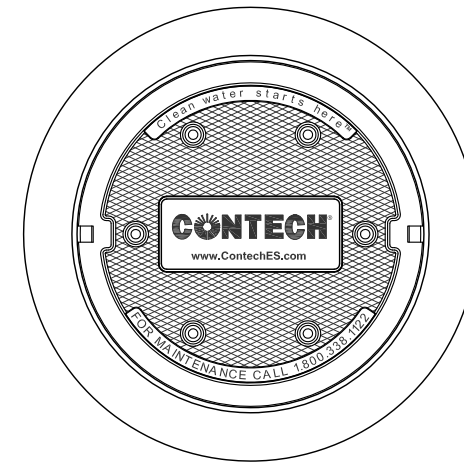


**SECTION A-A**

**VORTECHS 3000 DESIGN NOTES**

VORTECHS 3000 RATED TREATMENT CAPACITY IS 4.5 CFS, OR PER LOCAL REGULATIONS. IF THE SITE CONDITIONS EXCEED RATED TREATMENT CAPACITY, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

THE STANDARD INLET/OUTLET CONFIGURATION IS SHOWN. FOR OTHER CONFIGURATION OPTIONS, PLEASE CONTACT YOUR CONTECH REPRESENTATIVE. [www.ContechES.com](http://www.ContechES.com)



**FRAME AND COVER**  
(DIAMETER VARIES)  
N.T.S.

**SITE SPECIFIC DATA REQUIREMENTS**

STRUCTURE ID	*		
WATER QUALITY FLOW RATE (CFS)	*		
PEAK FLOW RATE (CFS)	*		
RETURN PERIOD OF PEAK FLOW (YRS)	*		
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*
RIM ELEVATION	*		
ANTI-FLOTATION BALLAST	WIDTH	HEIGHT	
	*	*	
NOTES/SPECIAL REQUIREMENTS:			
* PER ENGINEER OF RECORD			

**GENERAL NOTES**

- CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
- DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
- FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH REPRESENTATIVE. [www.ContechES.com](http://www.ContechES.com)
- VORTECHS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
- STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET AASHTO M306 LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
- INLET PIPE(S) MUST BE PERPENDICULAR TO THE VAULT AND AT THE CORNER TO INTRODUCE THE FLOW TANGENTIALLY TO THE SWIRL CHAMBER. DUAL INLETS NOT TO HAVE OPPOSING TANGENTIAL FLOW DIRECTIONS.
- OUTLET PIPE(S) MUST BE DOWN STREAM OF THE FLOW CONTROL BAFFLE AND MAY BE LOCATED ON THE SIDE OR END OF THE VAULT. THE FLOW CONTROL WALL MAY BE TURNED TO ACCOMMODATE OUTLET PIPE KNOCKOUTS ON THE SIDE OF THE VAULT.

**INSTALLATION NOTES**

- ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
- CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE VORTECHS STRUCTURE (LIFTING CLUTCHES PROVIDED).
- CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
- CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
- CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.



THIS PRODUCT MAY BE PROTECTED BY THE FOLLOWING  
U.S. PATENT: 5,759,415; RELATED FOREIGN PATENTS.



[www.ContechES.com](http://www.ContechES.com)  
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069  
800-338-1122 513-645-7000 513-645-7993 FAX

**VORTECHS 3000  
STANDARD DETAIL**

**GENERAL NOTES:**

- 1. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
2. DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION...
3. OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA BEFORE COMMENCING CONSTRUCTION.
4. BEFORE COMMENCING CONSTRUCTION OBTAIN AND PROVIDE PROOF OF COMPREHENSIVE...
5. COMPLETE ALL WORKS IN ACCORDANCE WITH THE MOST CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS...
6. RESTORE ALL DISTURBED AREAS ON-SITE AND OFF-SITE, INCLUDING TRENCHES AND SURFACES...
7. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL, ORGANIC MATERIAL AND DEBRIS...
8. ALL ELEVATIONS ARE GEODETIC.
9. REFER TO GEOTECHNICAL REPORT NO. P06153-1 REVISION 1, DATED APRIL 28, 2022...
10. REFER TO ARCHITECTS AND LANDSCAPE ARCHITECTS DRAWINGS FOR BUILDING AND HARD SURFACE AREAS AND DIMENSIONS.
11. REFER TO THE DEVELOPMENT SERVICING STUDY & STORMWATER MANAGEMENT REPORT (R-2022-014) PREPARED BY NOVATECH.
12. SAW CUT AND KEY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10).
13. PROVIDE LINE/PARKING PAINTING AS REQUIRED PER THE ARCHITECTURAL SITE PLAN.

**GRADING NOTES:**

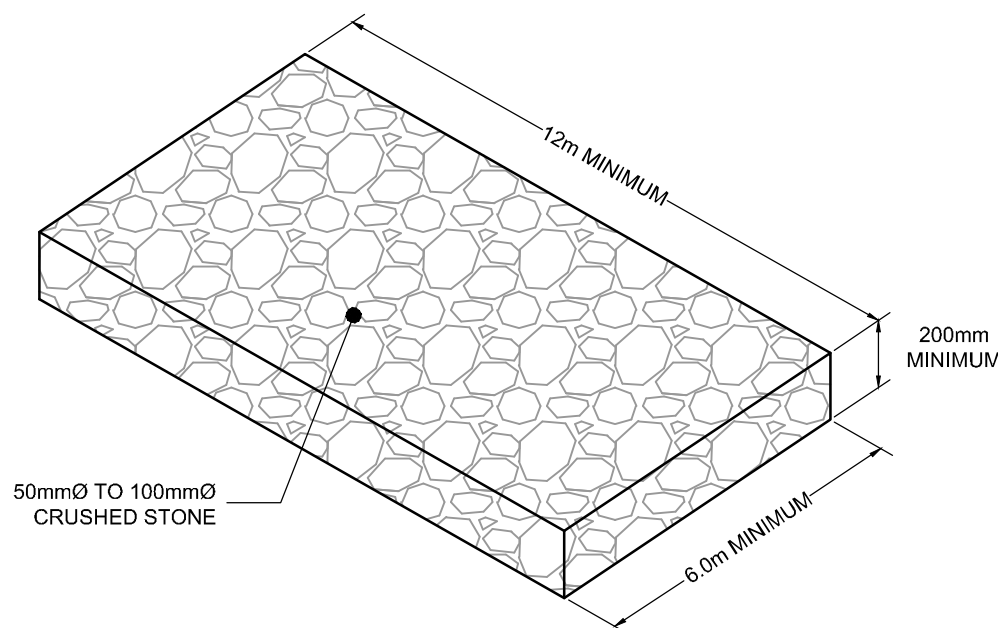
- 1. ALL TOPSOIL, ORGANIC OR DELETERIOUS MATERIAL MUST BE ENTIRELY REMOVED FROM BENEATH THE PROPOSED BUILDING PAVED AREAS AS DIRECTED BY THE SITE ENGINEER OR GEOTECHNICAL ENGINEER.
2. EXPOSED SUBGRADES IN PROPOSED PAVED AREAS SHOULD BE PROOF ROLLED WITH A LARGE STEEL DRUM ROLLER AND INSPECTED BY THE GEOTECHNICAL ENGINEER...
3. ANY SOFT AREAS EVIDENT FROM THE PROOF ROLLING SHOULD BE SUB-EXCAVATED AND REPLACED WITH SUITABLE MATERIAL...
4. THE GRANULAR BASE SHOULD BE COMPACTED TO AT LEAST 98% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY VALUE.
5. MINIMUM OF 2% GRADE FOR ALL GRASS AREAS UNLESS OTHERWISE NOTED.
6. MAXIMUM TERRACING GRADE TO BE 3:1 UNLESS OTHERWISE NOTED.
7. ALL GRADES BY CURBS ARE EDGE OF PAVEMENT GRADES UNLESS OTHERWISE INDICATED.
8. CONCRETE BARRIER CURBS ARE TO BE CONSTRUCTED PER CITY OF OTTAWA STANDARDS (SC1.1) AT A HEIGHT OF 150mm AND ALL DEPRESSIONS ARE TO BE CONSTRUCTED FLUSH...
9. CONCRETE MOUNTABLE CURBS ARE TO BE CONSTRUCTED PER CITY OF OTTAWA STANDARD (SC1.3) AT A HEIGHT OF 50mm AND ALL DEPRESSIONS ARE TO BE CONSTRUCTED FLUSH...
10. REFER TO LANDSCAPE PLAN FOR PLANTING AND OTHER LANDSCAPE FEATURE DETAILS.
11. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GRADING PLAN INDICATING AS-BUILT ELEVATIONS OF ALL DESIGN GRADES SHOWN ON THIS PLAN.

**EROSION AND SEDIMENT CONTROL NOTES:**

- THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE...
1. ALL EROSION AND SEDIMENT CONTROLS ARE TO BE INSTALLED TO THE SATISFACTION OF THE ENGINEER AND THE CITY OF OTTAWA...
2. EROSION AND SEDIMENT CONTROL MEASURES WILL BE IMPLEMENTED DURING CONSTRUCTION IN ACCORDANCE WITH THE 'GUIDELINES ON EROSION AND SEDIMENT CONTROL...
3. TO PREVENT SURFACE EROSION FROM ENTERING ANY STORM SEWER SYSTEM DURING CONSTRUCTION...
4. TO LIMIT EROSION; MINIMIZE THE AMOUNT OF EXPOSED SOILS AT ANY GIVEN TIME...
5. FOR MATERIAL STOCKPILING; MINIMIZE THE AMOUNT OF EXPOSED MATERIALS AT ANY GIVEN TIME...
6. THE SEDIMENT CONTROL MEASURES SHALL ONLY BE REMOVED WHEN, IN THE OPINION OF THE ENGINEER...
7. THE CONTRACTOR SHALL IMMEDIATELY REPORT TO THE ENGINEER ANY ACCIDENTAL DISCHARGES OF SEDIMENT MATERIAL INTO ANY STORM SEWER SYSTEM...
8. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES...
9. ROADWAYS ARE TO BE SWEEP AS REQUIRED OR AS DIRECTED BY THE ENGINEER AND/OR THE MUNICIPALITY.
10. THE CONTRACTOR SHALL ENSURE PROPER DUST CONTROL IS PROVIDED WITH THE APPLICATION OF WATER...
11. MONITOR DUST LEVELS DURING SITE PREPARATION/EXCAVATION, AND CONSTRUCTION ACTIVITIES...
12. MINIMIZE THE RELEASE OF DUST FROM GRAVEL, PAVED AREAS AND EXPOSED SOILS...

**PAVEMENT STRUCTURES:**

- LIGHT DUTY (NEW PAVEMENT)
50mm HL3 or SUPERPAVE 12.5
150mm GRANULAR 'A'
300mm GRANULAR 'B' TYPE II
ASPHALT GRADE PG 58-34
HEAVY DUTY (NEW PAVEMENT)
40mm HL3 or SUPERPAVE 12.5
50mm HL8 or SUPERPAVE 19.0
150mm GRANULAR 'A'
450mm GRANULAR 'B' TYPE II
ASPHALT GRADE PG 58-34



**MUD MAT DETAIL**  
NOT TO SCALE

**BENCHMARK INFO:**

CUT CROSS LOCATED ON THE TOP OF THE EXISTING CONCRETE HEADWALL NEAR THE WEST LIMIT OF THE MUNICIPAL STORM SEWER OUTFALL TO THE CARP RIVER...
ALL ELEVATIONS ARE REFERRED TO THE CGVD28:78 GEODETIC DATUM...
THE EXISTING GRADES SHOWN ON THE PLANS ARE TAKEN DIRECTLY FROM TOPOGRAPHICAL SURVEY PLAN (Ref. # 21-10-026-00), PREPARED BY J.D. BARNES LIMITED...
SURROUNDING BACKGROUND TOPO INFORMATION BEYOND THE LIMITS OF THE SITE SURVEY ARE SHOWN FROM CITY OF OTTAWA 1:2000 MAPPING FOR CONTEXT ONLY.

**SEWER NOTES:**

- 1. SUPPLY AND CONSTRUCT ALL SEWERS AND APPURTENANCES IN ACCORDANCE WITH THE MOST CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS...
2. SPECIFICATIONS:
ITEM: CATCHBASIN (600x600mm), STORM/SANITARY MANHOLE (1200mmØ), CB, FRAME & COVER, SANITARY MH FRAME & COVER, STORM/CBMH MANHOLE FRAME AND COVER, WATERTIGHT MH FRAME AND COVER, LANDSCAPE DRAIN (ELBOW, COVER & PIPE), SEWER TRENCH.
SPEC. No.: 705.010, 701.010, 400.020, 401.010, 401.010, 401.030, S29/S31, S6.
REFERENCE: OPSD, OPSD, OPSD, OPSD, OPSD, OPSD, CITY OF OTTAWA, CITY OF OTTAWA.
3. ALL STORM AND SANITARY SERVICE LATERALS SHALL BE EQUIPPED WITH BACKFLOW PREVENTION DEVICES AS PER THE CITY OF OTTAWA STANDARD DETAILS S14 AND S14.1 OR S14.2.
4. INSULATE ALL PIPES (SANI/ST) THAT HAVE LESS THAN 1.8m COVER WITH HI-40 INSULATION PER INSULATION DETAIL FOR SHALLOW SEWERS...
5. SERVICES ARE TO BE CONSTRUCTED TO 1.0m FROM FACE OF BUILDING AT A MINIMUM SLOPE OF 1.0%.
6. PIPE BEDDING, COVER AND BACKFILL ARE TO BE COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY...
7. FLEXIBLE CONNECTIONS ARE REQUIRED FOR CONNECTING PIPES TO MANHOLES...
8. THE OWNER SHALL REQUIRE THAT THE SITE SERVICING CONTRACTOR PERFORM FIELD TESTS FOR QUALITY CONTROL...
9. ALL STORM MANHOLES AND CATCHBASIN MANHOLES ARE TO HAVE 300mm SLUMPS UNLESS OTHERWISE INDICATED...
10. ALL CATCHBASINS, MANHOLES AND/OR CATCHBASIN MANHOLES THAT ARE TO HAVE ICD'S INSTALLED WITHIN THEM ARE TO HAVE 600mm SLUMPS.
11. ALL WEEPING TILE SYSTEMS ARE TO BE PUMPED TO THE SURFACE AS INDICATED ON THE GENERAL PLAN OF SERVICES DRAWING...
12. CONTRACTOR TO TELEVIEW (CCTV) ALL PROPOSED SEWERS...
13. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GENERAL PLAN OF SERVICES INDICATING ALL SERVICING AS-BUILT INFORMATION...

CRITICAL SEWER PIPE CROSSING TABLE with columns: CROSSING, LOWER PIPE, HIGHER PIPE, CLEARANCE, SURFACE ELEVATION. Lists various pipe sizes and materials like 300mmØ TWM=91.24, 200mmØ STM INV=93.14, etc.

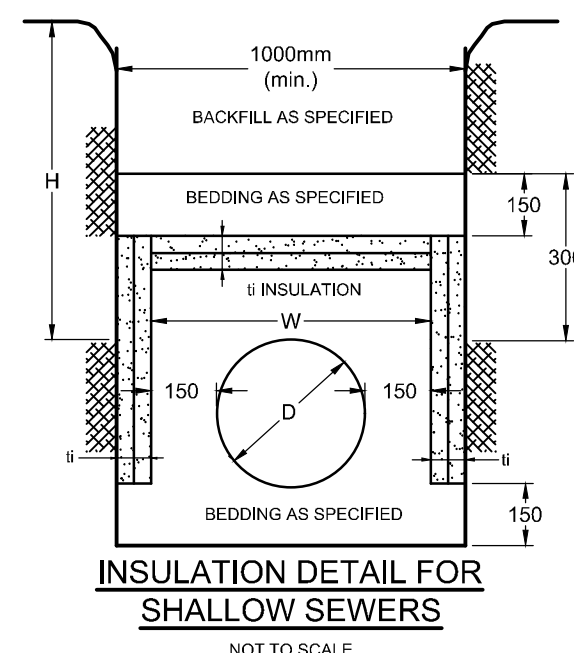
**WATERMAIN NOTES:**

- 1. SUPPLY AND CONSTRUCT ALL WATERMANS AND APPURTENANCES IN ACCORDANCE WITH THE CITY OF OTTAWA STANDARDS AND SPECIFICATIONS...
2. SPECIFICATIONS:
ITEM: WATERMAIN TRENCHING, HYDRANT INSTALLATION, THERMAL INSULATION IN SHALLOW TRENCHES, THERMAL INSULATION AT OPEN STRUCTURES, VALVE BOX ASSEMBLY, WATERMAIN CROSSING BELOW SEWER, WATERMAIN CROSSING OVER SEWER, WATERMAIN.
SPEC. No.: W17, W19, W22, W23, W24, W25, W25.2, PVC DR 18.
REFERENCE: CITY OF OTTAWA, CITY OF OTTAWA, CITY OF OTTAWA, CITY OF OTTAWA, CITY OF OTTAWA, CITY OF OTTAWA, CITY OF OTTAWA.
3. WATERMAIN SHALL BE MINIMUM 2.4m DEPTH BELOW GRADE...
4. PROVIDE MINIMUM 0.5m CLEARANCE BETWEEN OUTSIDE OF PIPES AT ALL CROSSINGS...
5. WATER SERVICE IS TO BE CONSTRUCTED TO WITHIN 1.0m OF FOUNDATION WALL AND CAPPED.

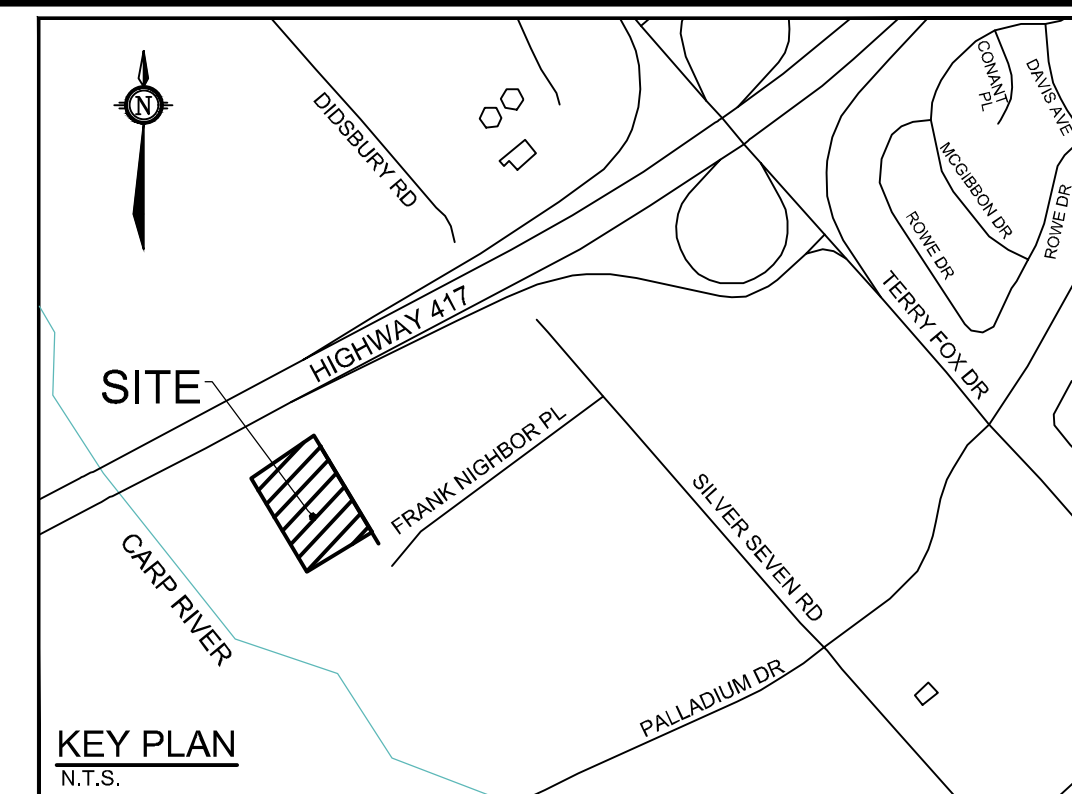
U-HAUL SITE FLOWS & STORMWATER MANAGEMENT TABLE with columns: DESIGN EVENT, UNCONTROLLED FLOW, ALLOWABLE RATE, A-0, A-1 to A-20, R-1, TOTAL FLOW, REDUCTION IN FLOW. Includes notes on reduced flow compared to pre-development conditions.

AREA A-1 to A-20: RESTRICTOR PIPE DATA - CBMH 101 with columns: DESIGN EVENT, RESTRICTOR PIPE, DIAMETER OF OUTLET PIPE, DESIGN FLOW, DESIGN HEAD, WATER ELEVATION, VOLUME. Includes note on restrictor pipe to be iPEX ring tight PVC DR35 pipe only.

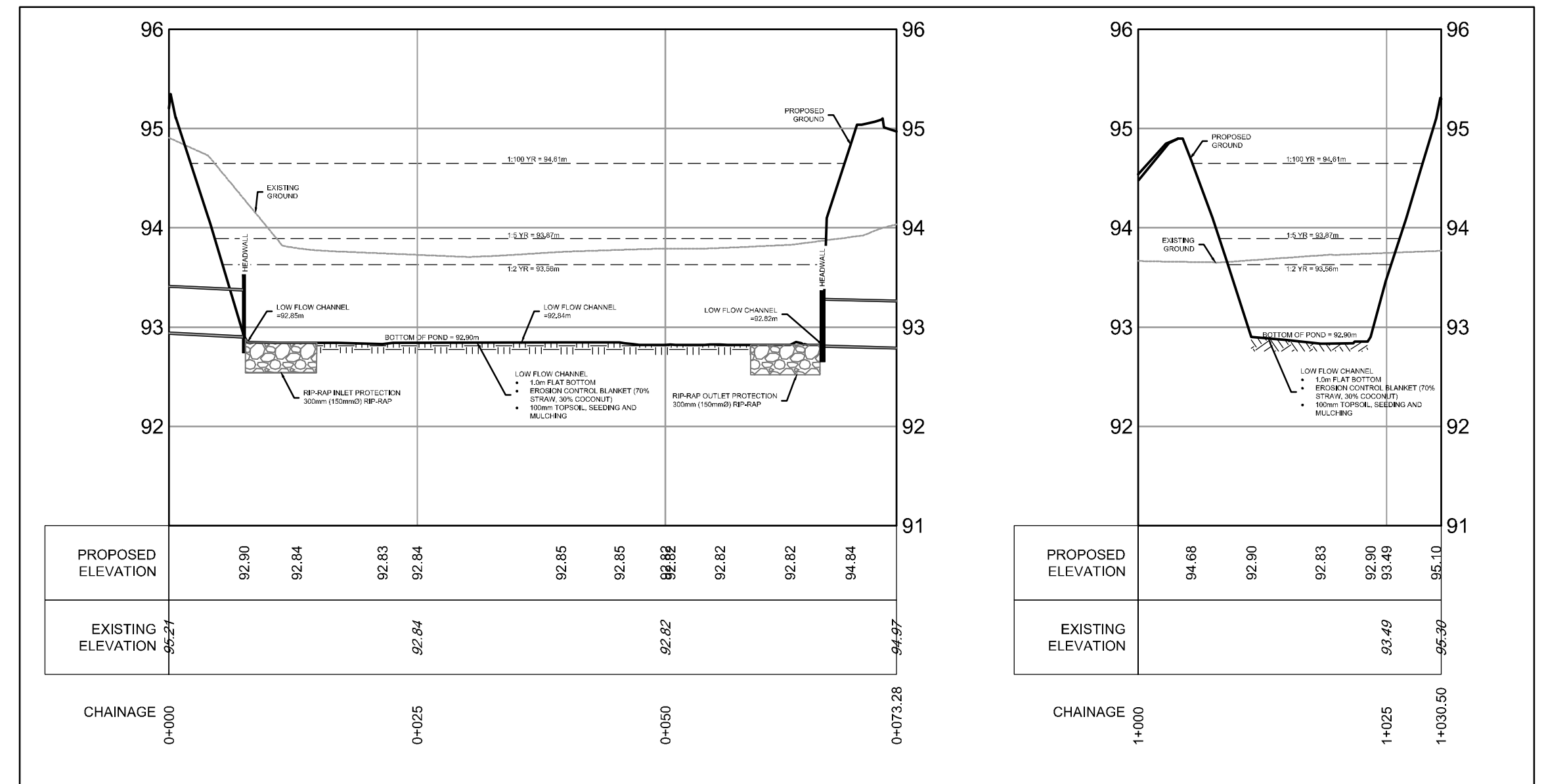
AREA R-1: ICD TABLE - CB 08 with columns: DESIGN EVENT, TYPE OF ICD, DIAMETER OF OUTLET PIPE, DESIGN FLOW, DESIGN HEAD, WATER DEPTH, VOLUME.



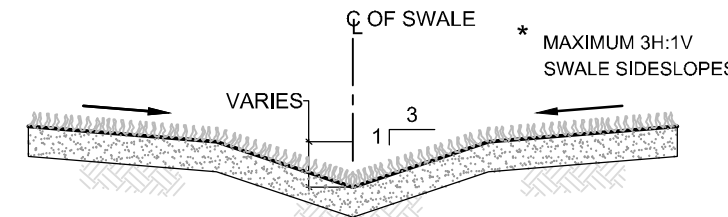
INSULATION NOTES table with columns: COVER (mm), INSULATION THICKNESS (mm). Lists values for covers from 1800-1900 to 3000-4000.



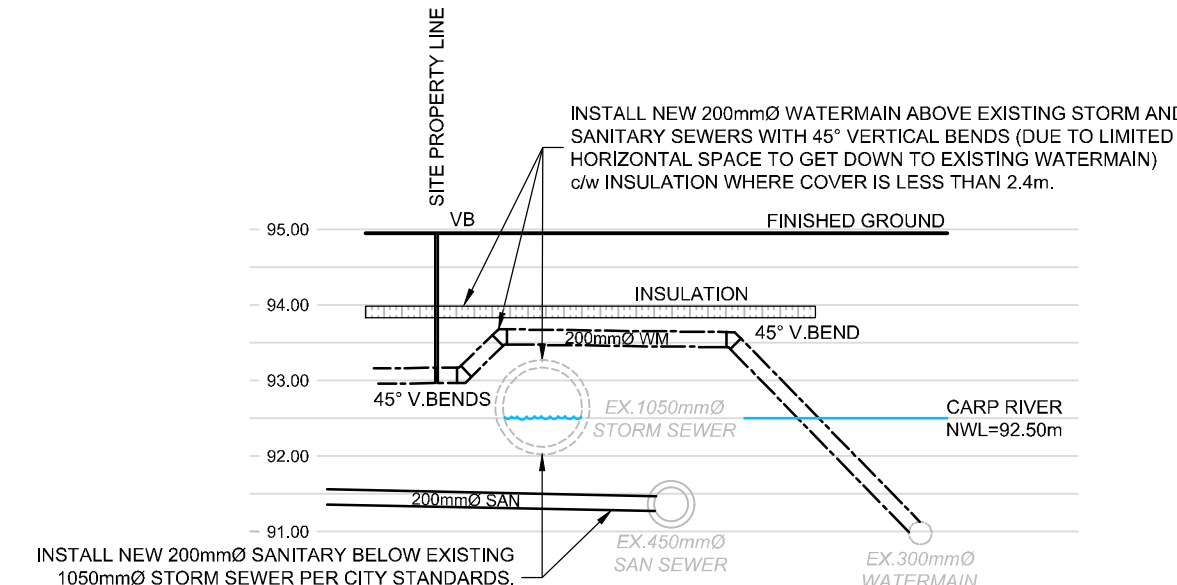
**SECTION A-A**



**POND CROSS-SECTION**  
SCALE: 1:500 (H), 1:50 (V)



**TYPICAL SWALE SECTION**  
SCALE: 1:300 (H), 1:150 (V)



**WATERMAIN CONNECTION AND CROSSING SECTION**  
NOT TO SCALE

THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE GRADING AND SERVICING DESIGN DRAWINGS

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

OWNER INFORMATION
U-HAUL CANADA
3636 INNES ROAD
OTTAWA, ONTARIO, K1C 1T1
DAVID POLLOCK
PHONE: 1-602-263-6555
david.pollock@uhaul.com

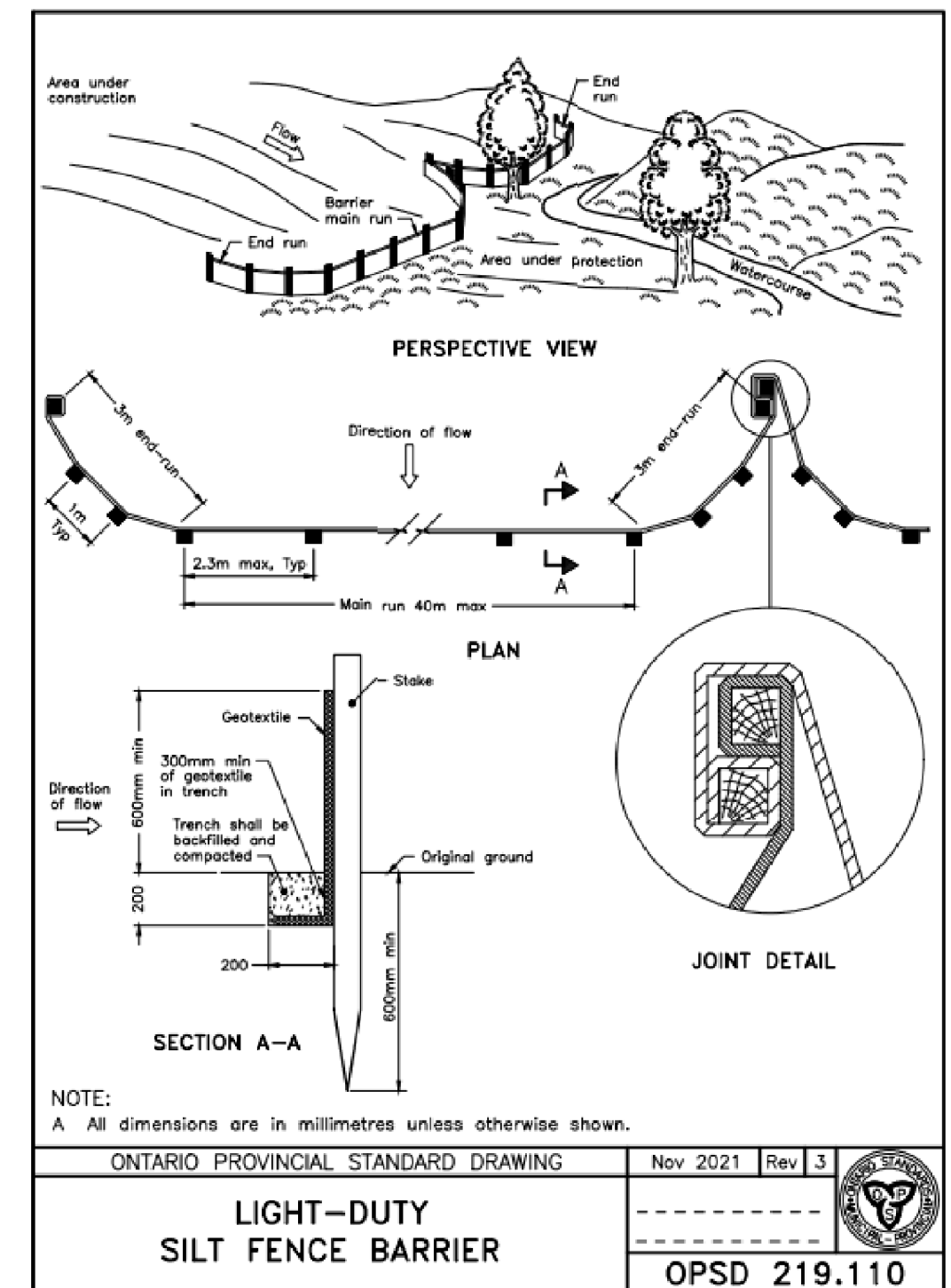
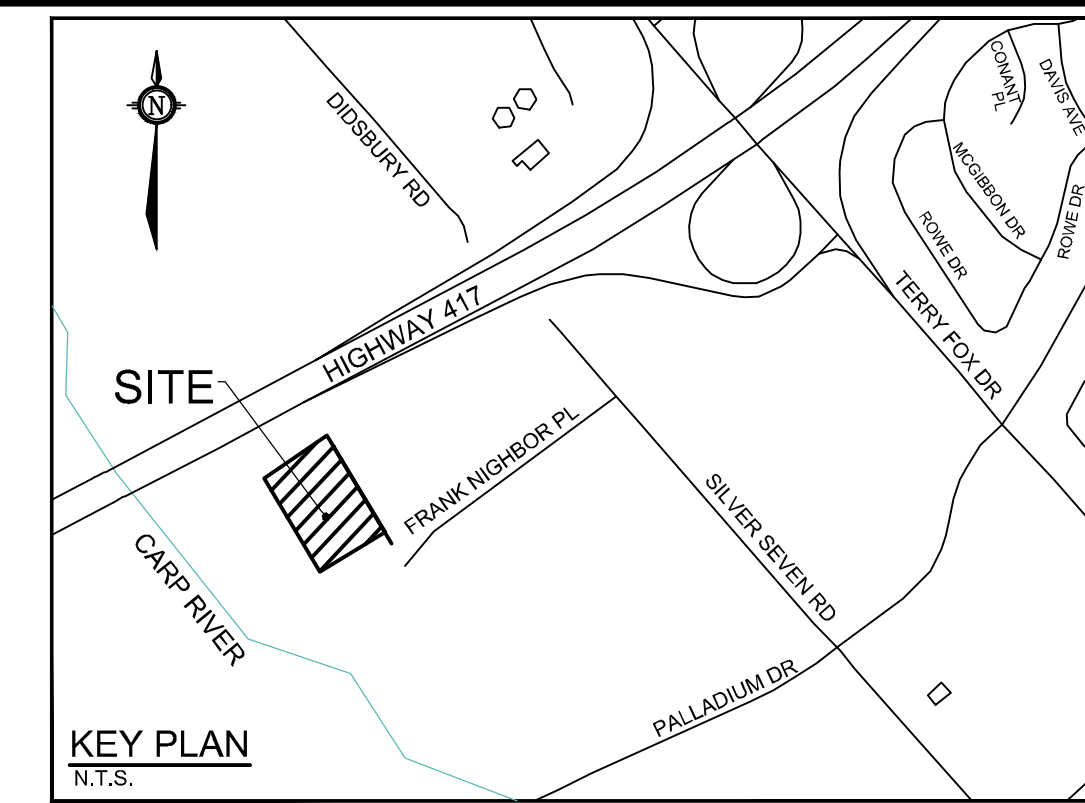
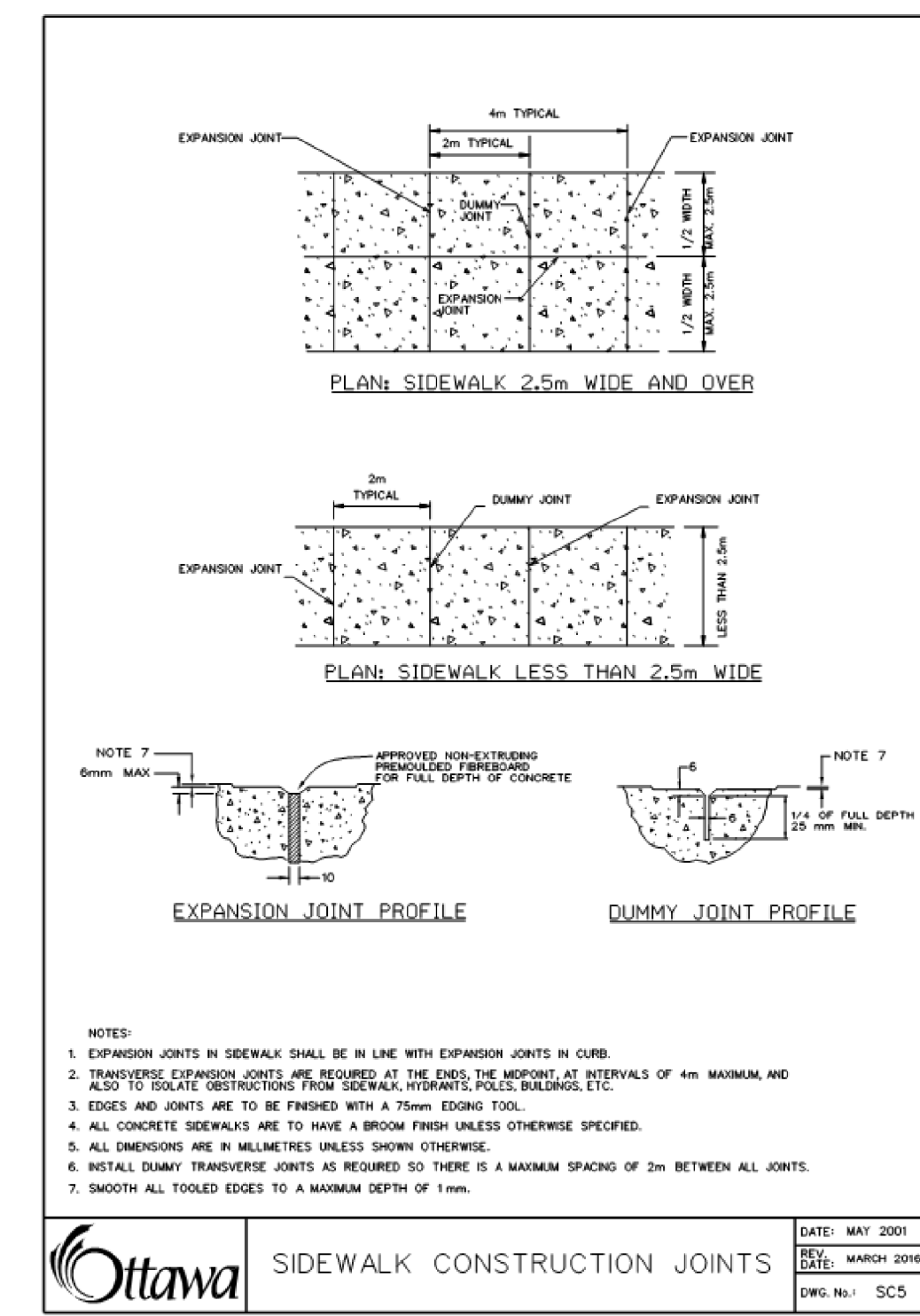
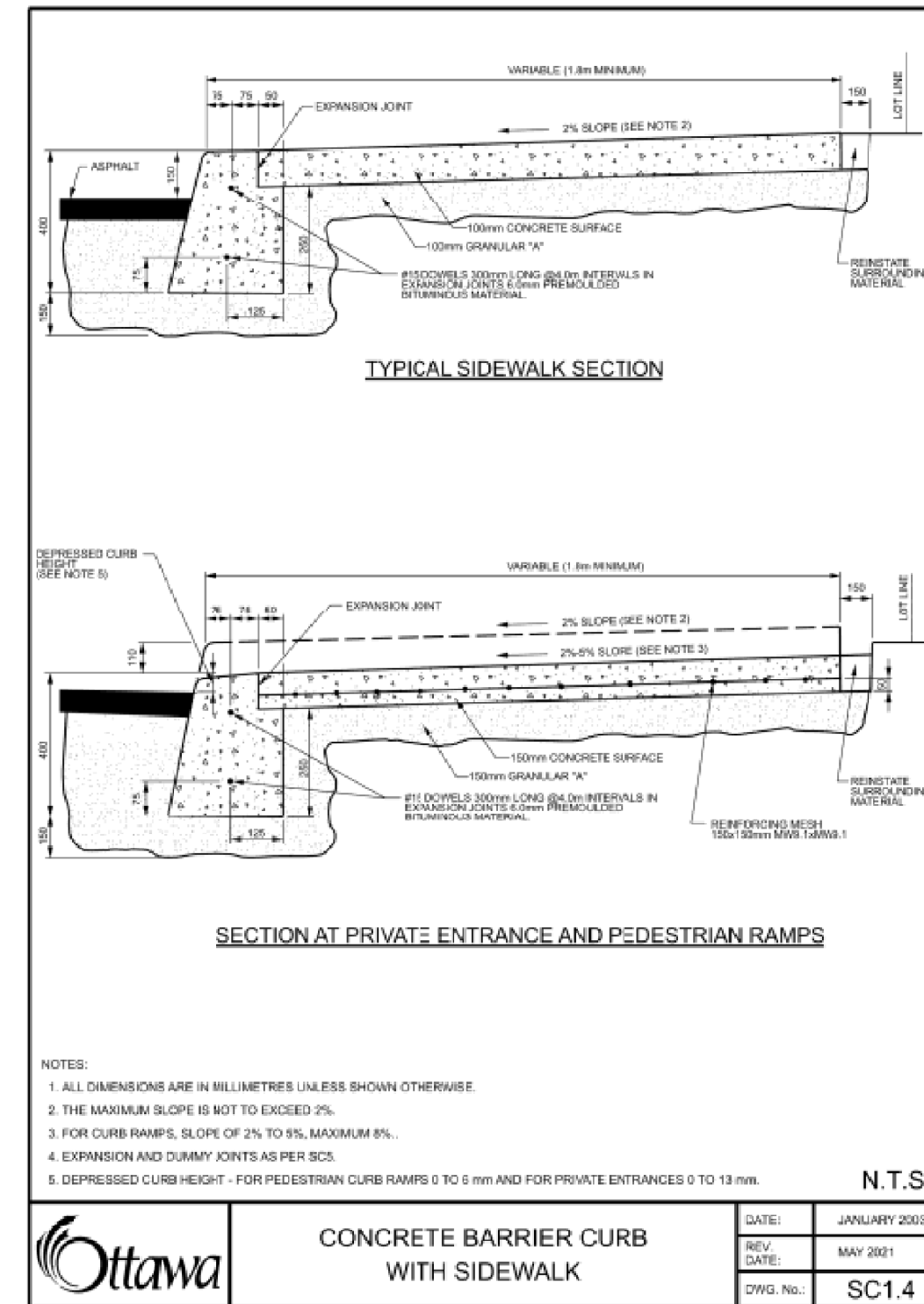
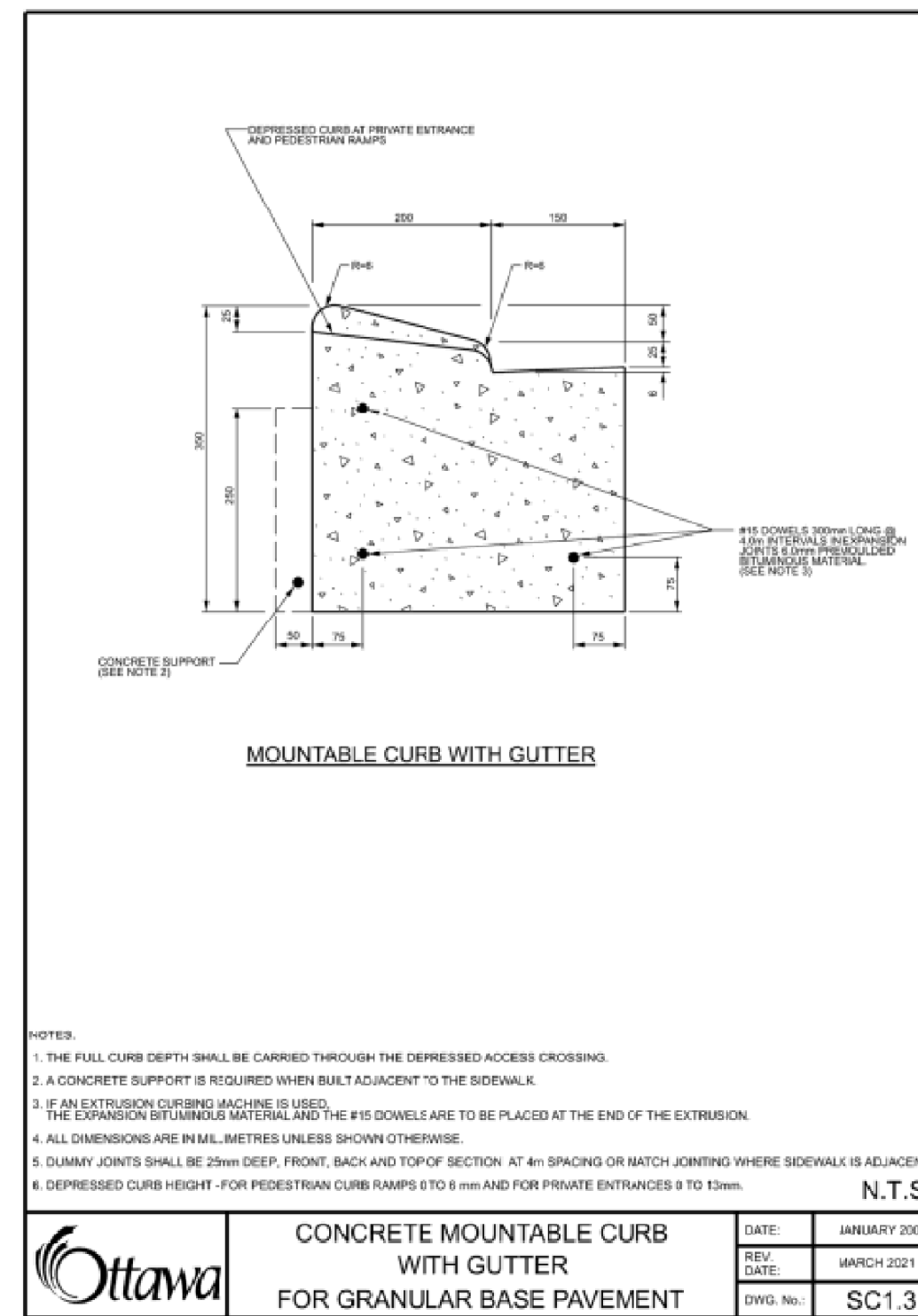
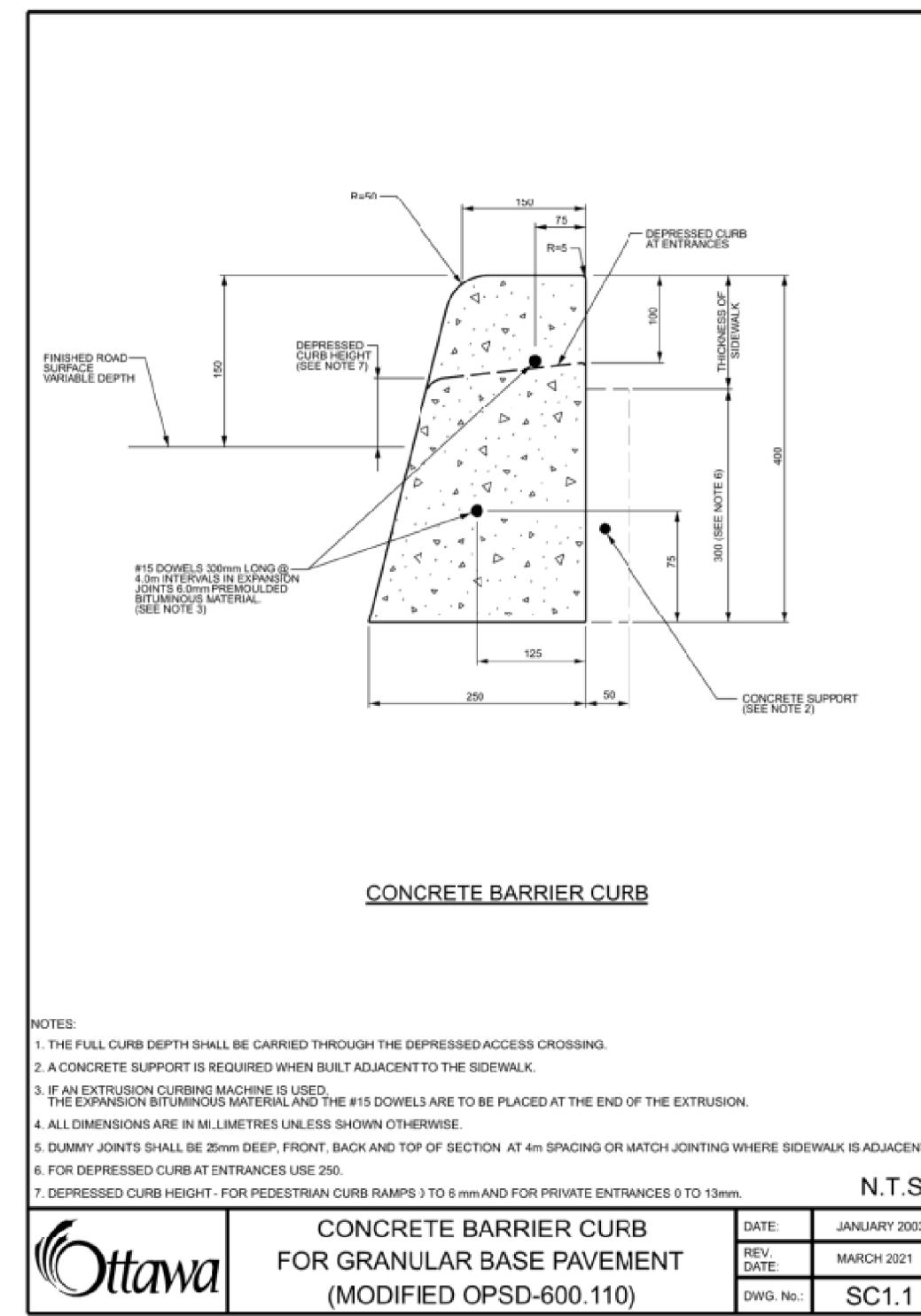
Revision table with columns: No., REVISION, DATE, BY. Includes entries for 'REVISED PER CITY, MVCA & MTO COMMENTS' and 'ISSUED FOR SITE PLAN APPROVAL'.

Scale table with columns: SCALE, DESIGN, CHECKED, DRAWN. Lists scales like 'AS INDICATED' and 'SM / FST'.

FOR REVIEW ONLY section with a table for design checks and a circular stamp: LICENSED PROFESSIONAL ENGINEER M.J. HREHORAK 10021236 DEC 5/22 PROVINCE OF ONTARIO.

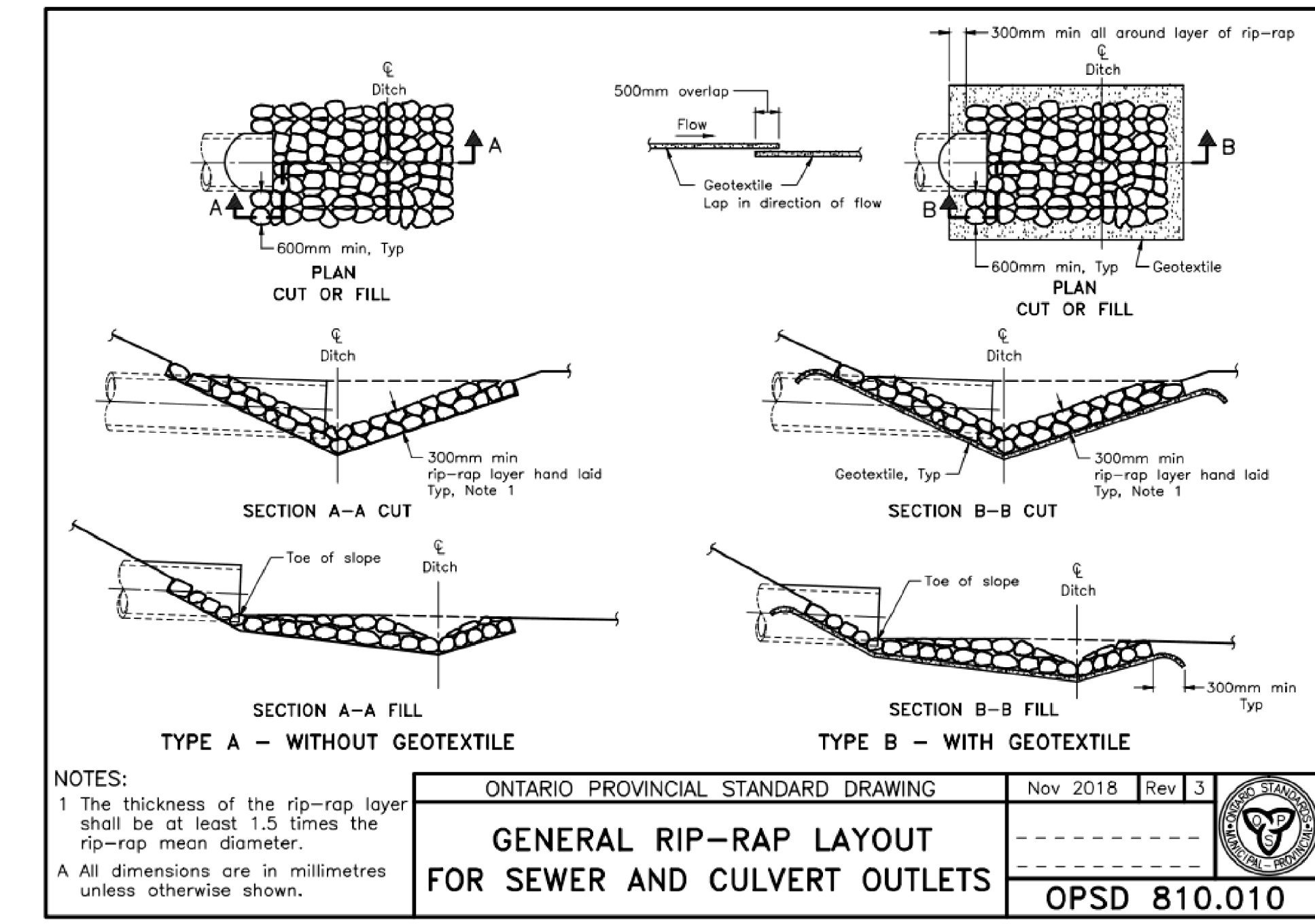
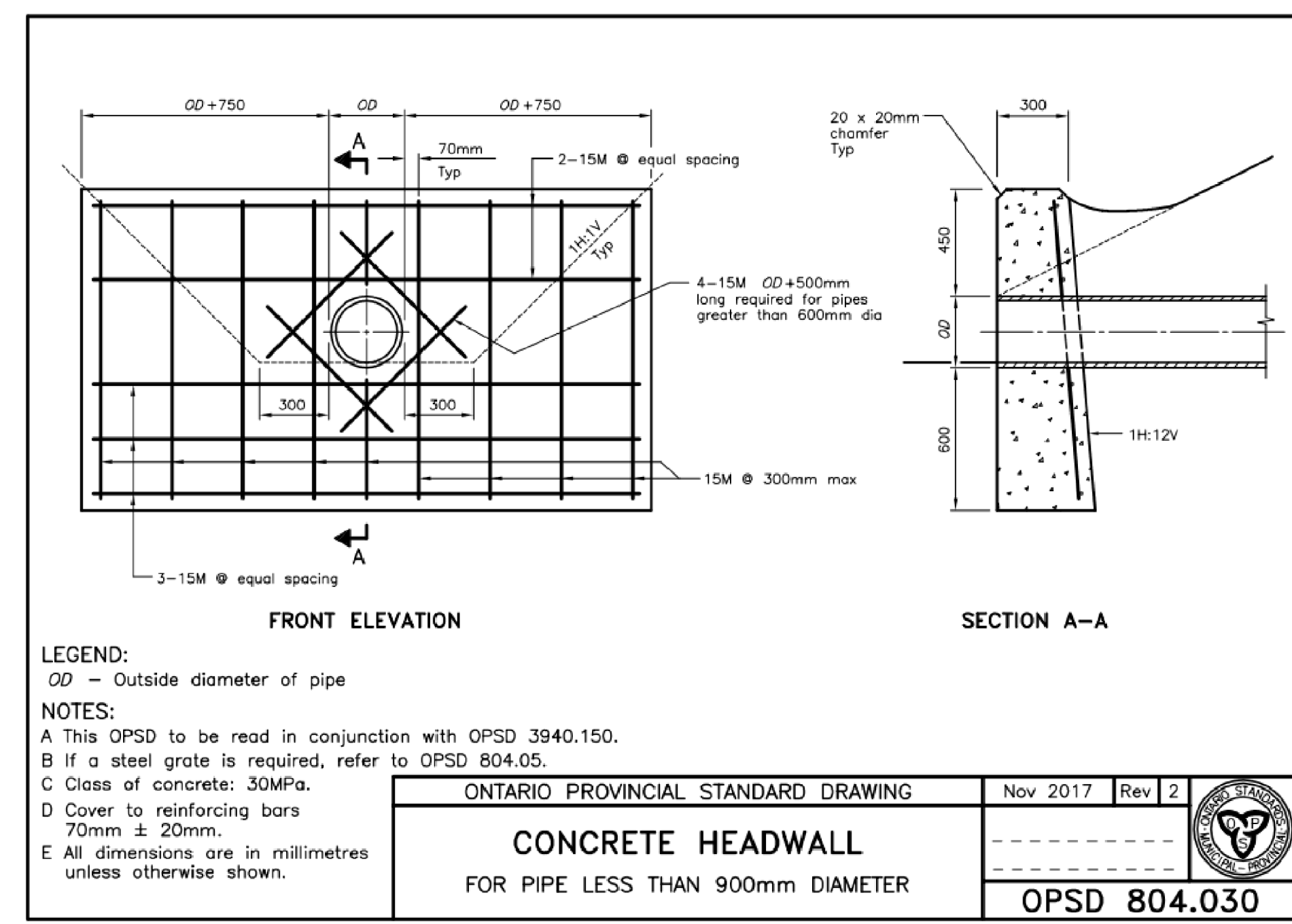
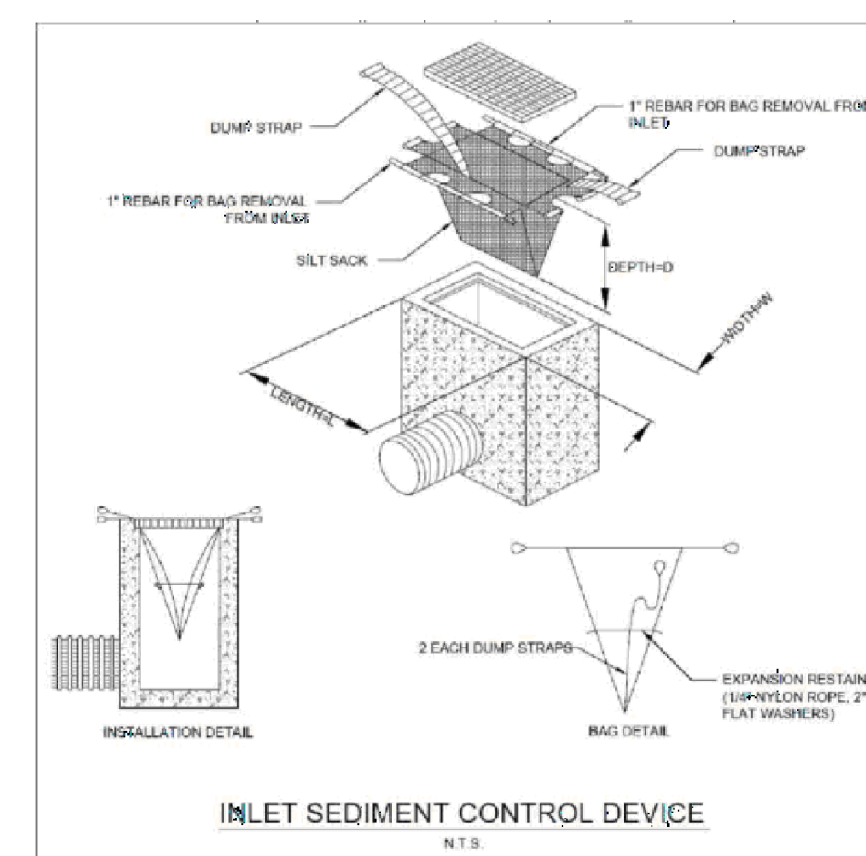
NOVATECH logo and contact information: Engineers, Planners & Landscape Architects, Suite 200, 240 Michael Cowpland Drive, Ottawa, Ontario, Canada K2M 1P6.

LOCATION CITY OF OTTAWA
30 FRANK NIGHBOR PLACE: U-HAUL SITE
DRAWING NAME NOTES AND DETAILS PLAN
PROJECT No. 121326
REV # 3
DRAWING No. 121326-NDT1



**Erosion and Sediment Control Responsibilities:**

ESC Measure	Symbol	Specification	During Construction		After Construction Prior to Final Acceptance		After Final Acceptance	
			Installation Responsibility	Inspection/Maintenance Responsibility	Inspection Frequency	Approval to Remove	Removal Responsibility	Inspection/Maintenance Responsibility
Silt Fence	---	OPSD 219.110	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Consultant	Developer's Contractor	N/A
Filter Fabric	Indicated in ESC Note #3	Erosion and Sediment Control Notes	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Consultant	Developer's Contractor	N/A
Muc Mat	[M/M]	Drawing Details	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Developer's Contractor	Developer's Contractor	N/A
Dust Control	Location as Required Around Site	Erosion and Sediment Control Notes	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Consultant	Developer's Contractor	N/A
Stabilized Material Stockpiling	Location as Required by Contractor	Erosion and Sediment Control Notes	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Developer's Contractor	Developer's Contractor	N/A
Sediment Basin (for flows being pumped out of excavations)	Location as Required by Contractor	---	Developer's Contractor	Developer's Contractor	After Every Rainstorm	Developer's Contractor	Developer's Contractor	N/A



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**OWNER INFORMATION**  
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 3636 INNES ROAD  
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 DAVID POLLOCK  
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 david.pollock@uhaul.com

No.	REVISION	DATE	BY
2	REVISED PER CITY, MVCA & MTO COMMENTS	DEC 5/22	FST
1	REVISED PER CITY COMMENTS	AUG 30/22	FST

SCALE: AS INDICATED

DESIGN: SM / FST  
 CHECKED: FST  
 DRAWN: SM

FOR REVIEW ONLY

CHECKED: SM / FST  
 APPROVED: FST

PROFESSIONAL ENGINEER  
 M. L. HREHORAK  
 10021258  
 DEC 5/22  
 PROVINCE OF ONTARIO

**NOVATECH**  
 Engineers, Planners & Landscape Architects  
 Suite 200, 240 Michael Cowpland Drive  
 Ottawa, Ontario, Canada K2M 1P6  
 Telephone: (613) 254-9643  
 Facsimile: (613) 254-5867  
 Website: www.novatech-eng.com

LOCATION: CITY OF OTTAWA  
 30 FRANK NIGHBOR PLACE: U-HAUL SITE

DRAWING NAME: NOTES AND DETAILS PLAN

PROJECT No.: 121326  
 REV: REV # 2  
 DRAWING No.: 121326-NDT2

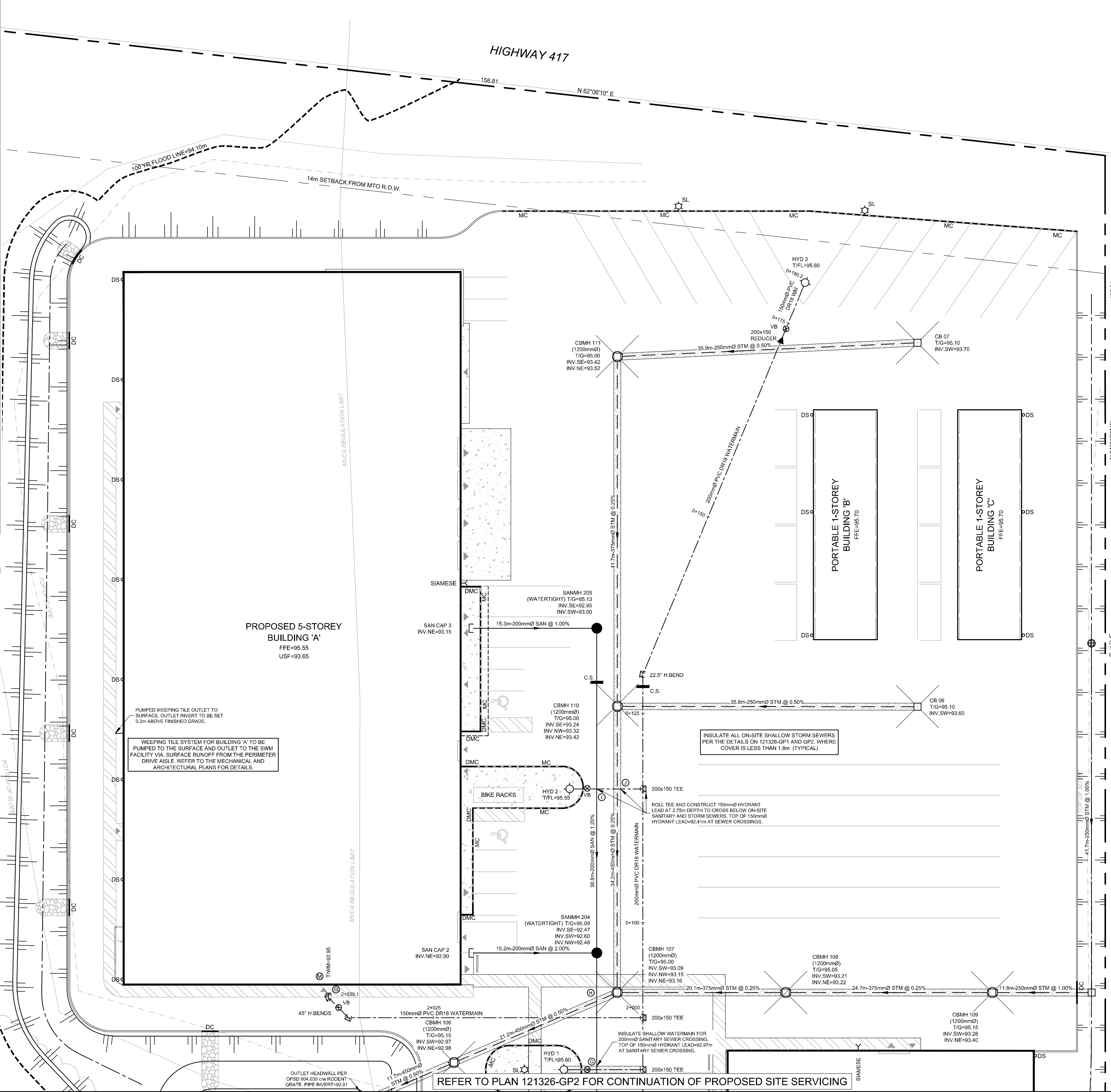
Plan #18789

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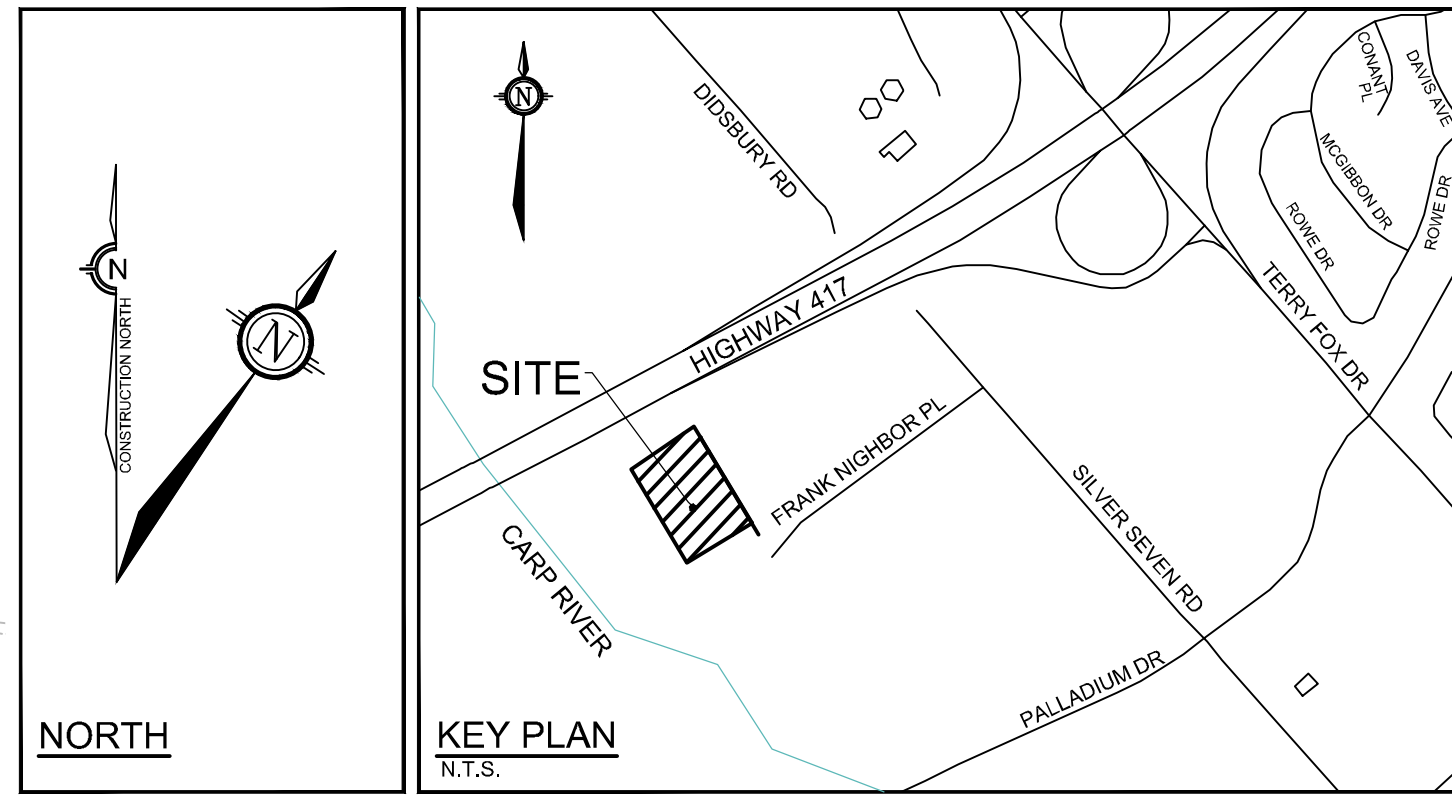
PROPOSED 200mmØ / 150mmØ WATERMAIN TABLE			
STATION	SURFACE ELEVATION	T/M ELEVATION	COMMENTS
0+000	94.88	91.10	CONNECTION FROM ABOVE TO EX. 300mmØ WM
0+002.5	94.89	93.64	45° VERTICAL BEND
0+003.3	94.98	93.65	CROSS ABOVE EX. 450Ø SAN (±1.8m CLEARANCE)
0+005.0	95.01	93.75	CROSS BELOW EX. 1050Ø STM (±0.3m CLEARANCE)
0+005.5	94.93	93.67	45° VERTICAL BEND
0+006.1	94.94	93.16	45° VERTICAL BEND
0+006.4	94.95	93.15	200mmØ VALVE AND VALVE BOX
0+007.4	95.04	93.12	11.25° HORIZONTAL BEND
0+025.9	95.02	92.62	CROSS BELOW 375mmØ STM (±0.55m CLEARANCE)
0+027.4	95.07	92.67	CROSS ABOVE 200mmØ SAN (±0.4m CLEARANCE)
0+029.9	95.15	92.75	200 x 200 x 200 TEE FOR BLDG 'D' SERVICE (1+000)
0+050	95.18	92.78	---
0+075	95.21	92.81	---
0+082.4	95.14	92.74	200 x 200 x 150 TEE FOR HYDRANT No.1
0+088.6	95.08	92.68	200 x 200 x 150 TEE FOR BLDG 'A' SERVICE (2+000)
0+091.6	95.04	92.64	CROSS BELOW 375mmØ STM (±0.5m CLEARANCE)
0+100	95.12	92.62	---
0+116.0	95.14	92.47	200 x 200 x 150 TEE FOR HYDRANT No.2
0+126.0	95.04	92.64	CROSS BELOW 375mmØ STM (±0.65m CLEARANCE)
0+129.6	95.07	92.67	22.5° HORIZONTAL BEND
0+150	95.35	92.95	---
0+170.7	95.31	92.91	CROSS BELOW 375mmØ STM (±0.6m CLEARANCE)
0+173.2	95.32	92.92	200 x 150 REDUCER
0+174.2	95.34	92.94	150mmØ VALVE AND VALVE BOX
0+180.2	95.41	93.00	FIRE HYDRANT No.3
1+000	95.15	92.75	200 x 200 x 200 TEE FOR BLDG 'D' SERVICE (0+029.9)
1+003.0	95.14	92.74	200mmØ VALVE AND VALVE BOX
1+025.0	95.02	92.62	CROSS BELOW 375mmØ STM (±0.7m CLEARANCE)
1+033.7	95.10	92.70	45° HORIZONTAL BEND
1+037.1	95.18	92.78	45° HORIZONTAL BEND
1+042.2	95.48	92.95	CAP 1.0m FROM BLDG 'D' FOUNDATION WALL
2+000	95.08	92.68	200 x 200 x 150 TEE FOR BLDG 'A' SERVICE (0+088.6)
2+002.5	95.09	92.67	22.5° VERTICAL BEND
2+004.4	95.10	91.88	22.5° VERTICAL BEND
2+005.5	95.06	91.88	CROSS BELOW 200mmØ SAN (±0.5m CLEARANCE)
2+006.6	95.12	91.88	22.5° VERTICAL BEND
2+008.3	95.18	92.58	22.5° VERTICAL BEND
2+010.1	95.19	92.60	CROSS BELOW 375mmØ STM (±0.5m CLEARANCE)
2+025	95.33	92.93	---
2+035.1	95.37	92.93	45° HORIZONTAL BEND
2+036.8	95.40	92.95	150mmØ VALVE AND VALVE BOX
2+038.5	95.49	92.95	45° HORIZONTAL BEND
2+039.1	95.52	92.95	CAP 1.0m FROM BLDG 'A' FOUNDATION WALL

• 300mm x 300mm x 200mm CONNECTION TO EXISTING 300mmØ WATERMAIN BY CITY FORCES. EXACT ELEVATION TO BE FIELD DETERMINED.  
 •• PROVIDE THERMAL INSULATION AS PER CITY OF OTTAWA DETAIL W22 IN SHALLOW TRENCHES AND/OR CITY OF OTTAWA DETAIL W23 ADJACENT TO OPEN STRUCTURES.

NOTE:  
 THE POSITION OF ALL POLE LINES, CONDUITS, WATERMANS, 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.



REFER TO PLAN 121326-GP2 FOR CONTINUATION OF PROPOSED SITE SERVICING



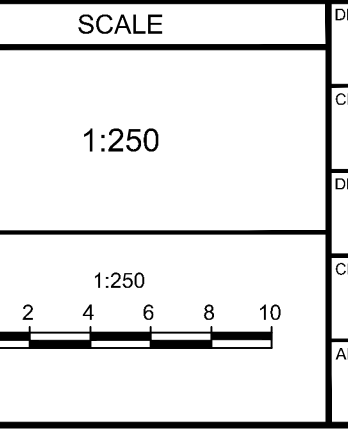
- LEGEND**
- PROPERTY LINE
  - SAN MH 201 PROPOSED SANITARY MH & SEWER
  - CBMH 104 PROPOSED CATCHBASIN MANHOLE & SEWER (c/w 3.0m RADIAL SUBDRAINS PER GEOTECH)
  - STM MH 103 PROPOSED STORM MANHOLE & SEWER (c/w 3.0m RADIAL SUBDRAINS PER GEOTECH)
  - CB 03 PROPOSED CATCHBASIN AND LEAD
  - HYD 2 PROPOSED HYDRANT AND VALVE
  - DC PROPOSED BARRIER CURB (15cm CURB HEIGHT)
  - MC PROPOSED MOUNTABLE CURB (5cm CURB HEIGHT)
  - DMC DEPRESSED MOUNTABLE CURB (0cm CURB HEIGHT)
  - 200mmØ PROPOSED WATERMAIN AND DIAMETER
  - VB PROPOSED VALVE AND VALVEBOX
  - BEND PROPOSED BEND AND THRUSTBLOCK 11.25°, 22.5°, 45° or TEE
  - PROPOSED WATER METER AND REMOTE METER
  - PROPOSED CAP
  - RESTRICTOR PIPE PROPOSED RESTRICTOR PIPE / INLET CONTROL DEVICE
  - DS PROPOSED DOWNSPOUT LOCATION
  - THERMAL INSULATION FOR SHALLOW SEWERS
  - PROPOSED BUILDING ENTRANCE
  - C.S. PROPOSED CLAY SEAL SEEPAGE BARRIER (PER GEOTECHNICAL REPORT)
  - SL PROPOSED SITE LIGHTING POLE (REFER TO ELEC)
  - PROPOSED TRANSFORMER
  - EXISTING CONCRETE CURB
  - EXISTING SANITARY MANHOLE AND SEWER
  - EXISTING CATCHBASIN MANHOLE AND SEWER
  - EXISTING STORM MANHOLE AND SEWER
  - EXISTING CATCHBASIN C/W CATCHBASIN LEAD
  - EXISTING HYDRANT
  - EXISTING UTILITY POLE C/W CUY WIRES
  - EXISTING WATERMAIN
  - EXISTING HYDRANT C/W VALVE & LEAD
  - EXISTING LIGHT STANDARD
  - EXISTING FENCE
  - EXISTING OVERHEAD UTILITY WIRES

**BENCHMARK INFO:**  
 CUT CROSS LOCATED ON THE TOP OF THE EXISTING CONCRETE HEADWALL NEAR THE WEST LIMIT OF THE MUNICIPAL STORM SEWER OUTFALL TO THE CARP RIVER. GEODETIC ELEVATION = 93.77m.  
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 SURROUNDING BACKGROUND TOPO INFORMATION BEYOND THE LIMITS OF THE SITE SURVEY ARE SHOWN FROM CITY OF OTTAWA 1:2000 MAPPING FOR CONTEXT ONLY.

REFER TO PLAN 121326-NDT1 AND 121326-NDT2 FOR CIVIL NOTES, DETAILS AND TABLES

**OWNER INFORMATION**  
 U-HAUL CANADA  
 3636 INNES ROAD  
 OTTAWA, ONTARIO, K1C 1T1  
 DAVID POLLOCK  
 PHONE: 1-602-263-6555  
 david.pollock@uhaul.com

No.	REVISION	DATE	BY
3	REVISED PER CITY, MVCA & MTO COMMENTS	DEC 5/22	FST
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1	ISSUED FOR SITE PLAN APPROVAL	MAY 20/22	FST



DESIGN	SM / FST
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DRAWN	SM
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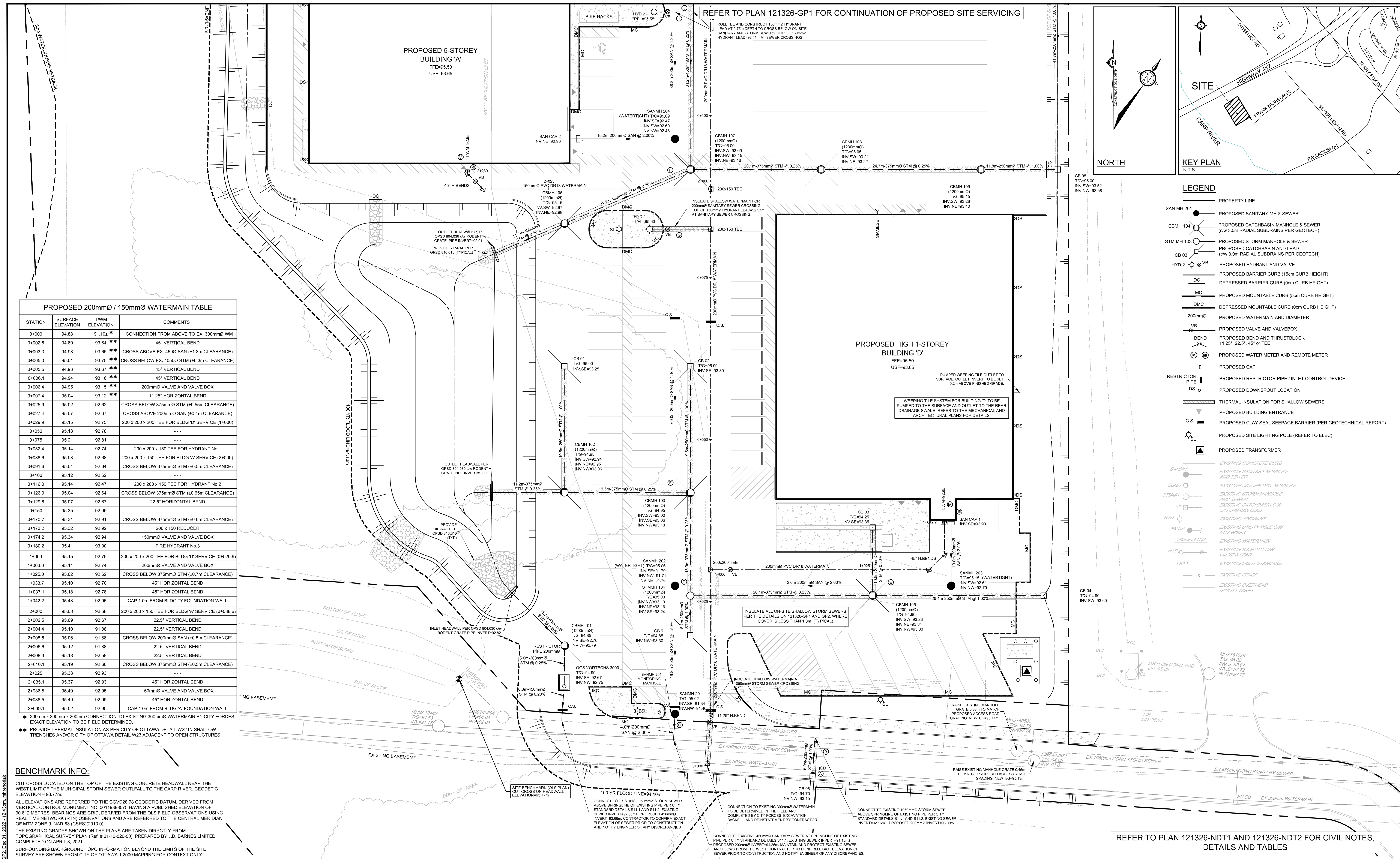
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LOCATION: CITY OF OTTAWA  
 30 FRANK NIGHBOR PLACE: U-HAUL SITE

DRAWING NAME: GENERAL PLAN OF SERVICES

PROJECT No.: 121326  
 REV: REV # 3  
 DRAWING No.: 121326-GP1  
 Plan #18789

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**PROPOSED 200mmØ / 150mmØ WATERMAIN TABLE**

STATION	SURFACE ELEVATION	TWMM ELEVATION	COMMENTS
0+000	94.88	91.10	CONNECTION FROM ABOVE TO EX. 300mmØ WM
0+002.5	94.89	93.64	45° VERTICAL BEND
0+003.3	94.98	93.65	CROSS ABOVE EX. 4500 SAN (±1.8m CLEARANCE)
0+005.0	95.01	93.75	CROSS BELOW EX. 10500 STM (±0.3m CLEARANCE)
0+005.5	94.93	93.67	45° VERTICAL BEND
0+006.1	94.94	93.16	45° VERTICAL BEND
0+006.4	94.95	93.15	200mmØ VALVE AND VALVE BOX
0+007.4	95.04	93.12	11.25° HORIZONTAL BEND
0+025.9	95.02	92.62	CROSS BELOW 375mmØ STM (±0.55m CLEARANCE)
0+027.4	95.07	92.67	CROSS ABOVE 200mmØ SAN (±0.4m CLEARANCE)
0+029.9	95.15	92.75	200 x 200 x 200 TEE FOR BLDG 'D' SERVICE (1+000)
0+050	95.18	92.78	---
0+075	95.21	92.81	---
0+082.4	95.14	92.74	200 x 200 x 150 TEE FOR HYDRANT No.1
0+088.6	95.08	92.68	200 x 200 x 150 TEE FOR BLDG 'A' SERVICE (2+000)
0+091.6	95.04	92.64	CROSS BELOW 375mmØ STM (±0.5m CLEARANCE)
0+100	95.12	92.62	---
0+116.0	95.14	92.47	200 x 200 x 150 TEE FOR HYDRANT No.2
0+126.0	95.04	92.64	CROSS BELOW 375mmØ STM (±0.65m CLEARANCE)
0+129.6	95.07	92.67	22.5° HORIZONTAL BEND
0+150	95.35	92.95	---
0+170.7	95.31	92.91	CROSS BELOW 375mmØ STM (±0.6m CLEARANCE)
0+173.2	95.32	92.92	200 x 150 REDUCER
0+174.2	95.34	92.94	150mmØ VALVE AND VALVE BOX
0+180.2	95.41	93.00	FIRE HYDRANT No.3
1+000	95.15	92.75	200 x 200 x 200 TEE FOR BLDG 'D' SERVICE (0+029.9)
1+003.0	95.14	92.74	200mmØ VALVE AND VALVE BOX
1+025.0	95.02	92.62	CROSS BELOW 375mmØ STM (±0.7m CLEARANCE)
1+033.7	95.10	92.70	45° HORIZONTAL BEND
1+037.1	95.18	92.78	45° VERTICAL BEND
1+042.2	95.48	92.95	CAP 1.0m FROM BLDG 'D' FOUNDATION WALL
2+000	95.08	92.68	200 x 200 x 150 TEE FOR BLDG 'A' SERVICE (0+088.6)
2+002.5	95.09	92.67	22.5° VERTICAL BEND
2+004.4	95.10	91.88	22.5° VERTICAL BEND
2+005.5	95.06	91.88	CROSS BELOW 200mmØ SAN (±0.5m CLEARANCE)
2+006.6	95.12	91.88	22.5° VERTICAL BEND
2+008.3	95.18	92.58	22.5° VERTICAL BEND
2+010.1	95.19	92.60	CROSS BELOW 375mmØ STM (±0.5m CLEARANCE)
2+025	95.33	92.93	---
2+035.1	95.37	92.93	45° HORIZONTAL BEND
2+036.8	95.40	92.95	150mmØ VALVE AND VALVE BOX
2+038.5	95.49	92.95	45° HORIZONTAL BEND
2+039.1	95.52	92.95	CAP 1.0m FROM BLDG 'A' FOUNDATION WALL

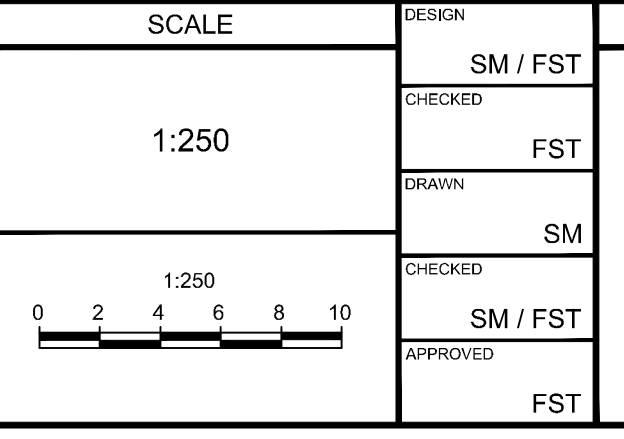
\* 300mm x 300mm x 200mm CONNECTION TO EXISTING 300mmØ WATERMAIN BY CITY FORCES EXACT ELEVATION TO BE FIELD DETERMINED.  
 \*\* PROVIDE THERMAL INSULATION AS PER CITY OF OTTAWA DETAIL W22 IN SHALLOW TRENCHES AND/OR CITY OF OTTAWA DETAIL W23 ADJACENT TO OPEN STRUCTURES.

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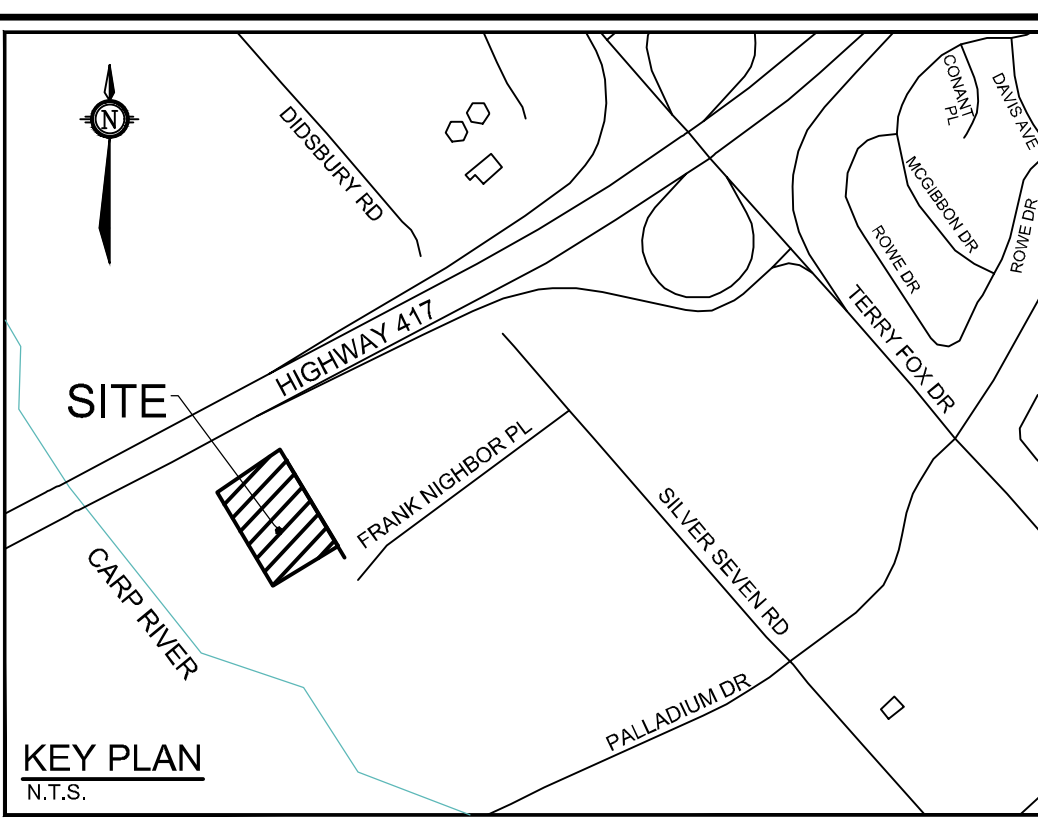
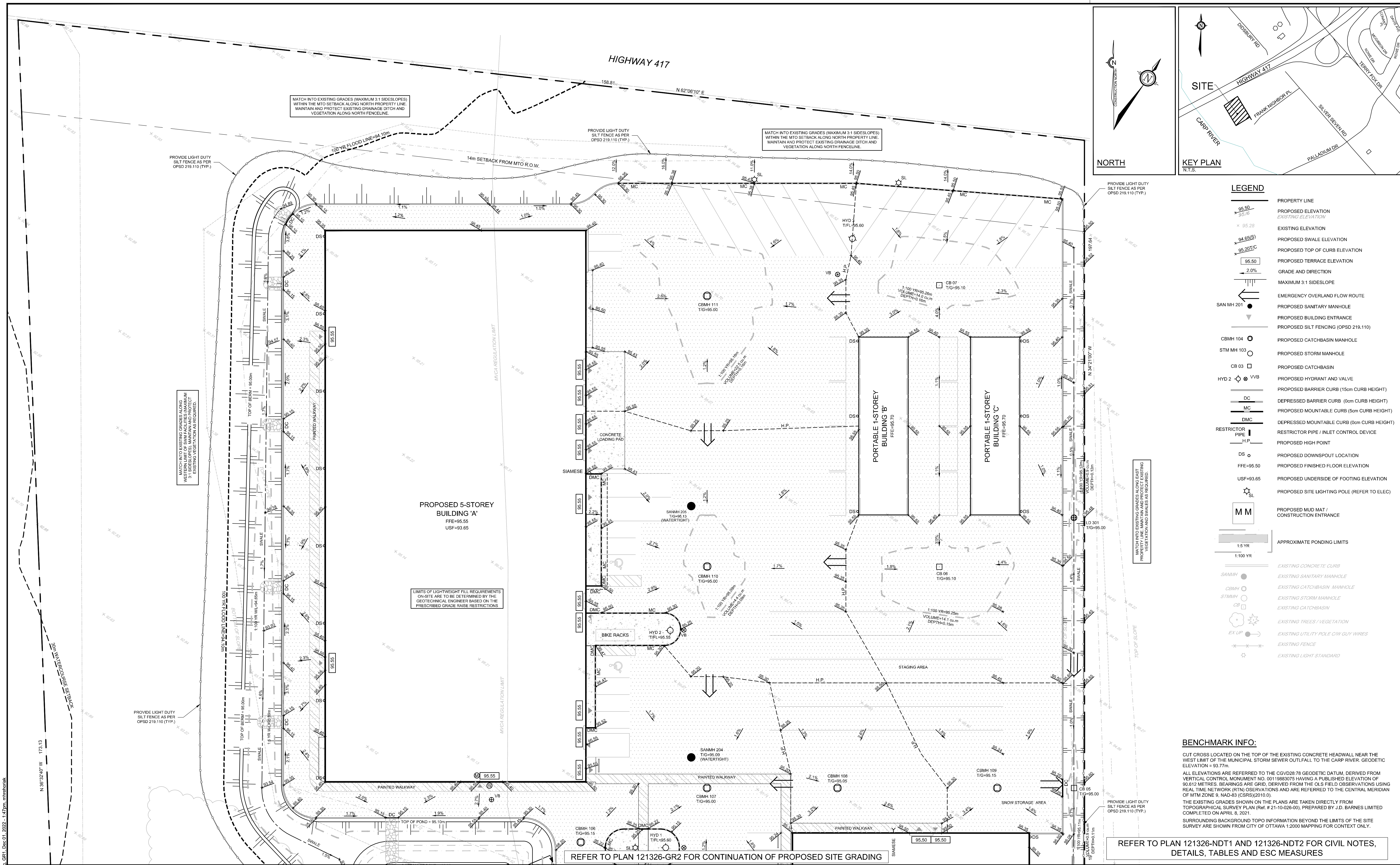
**LOCATION**  
 CITY OF OTTAWA  
 30 FRANK NIGHBOR PLACE: U-HAUL SITE

**DRAWING NAME**  
 GENERAL PLAN OF SERVICES

PROJECT No. 121326  
 REV # 3  
 DRAWING No. 121326-GP2  
 Plan #18789

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D07-12-22-008



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**SCALE**  
1:250

0 2 4 6 8 10

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DESIGN: SM / FST  
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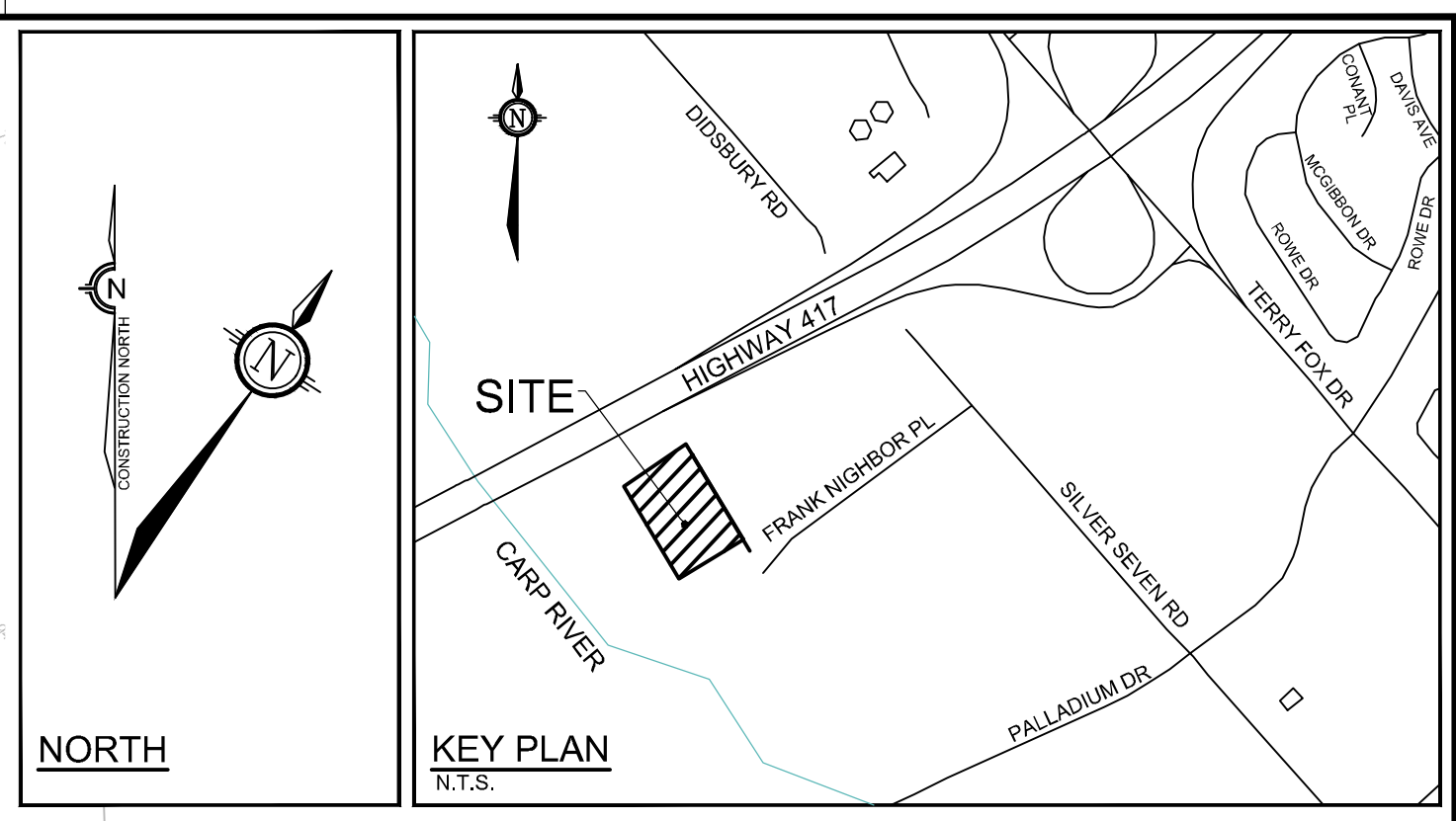
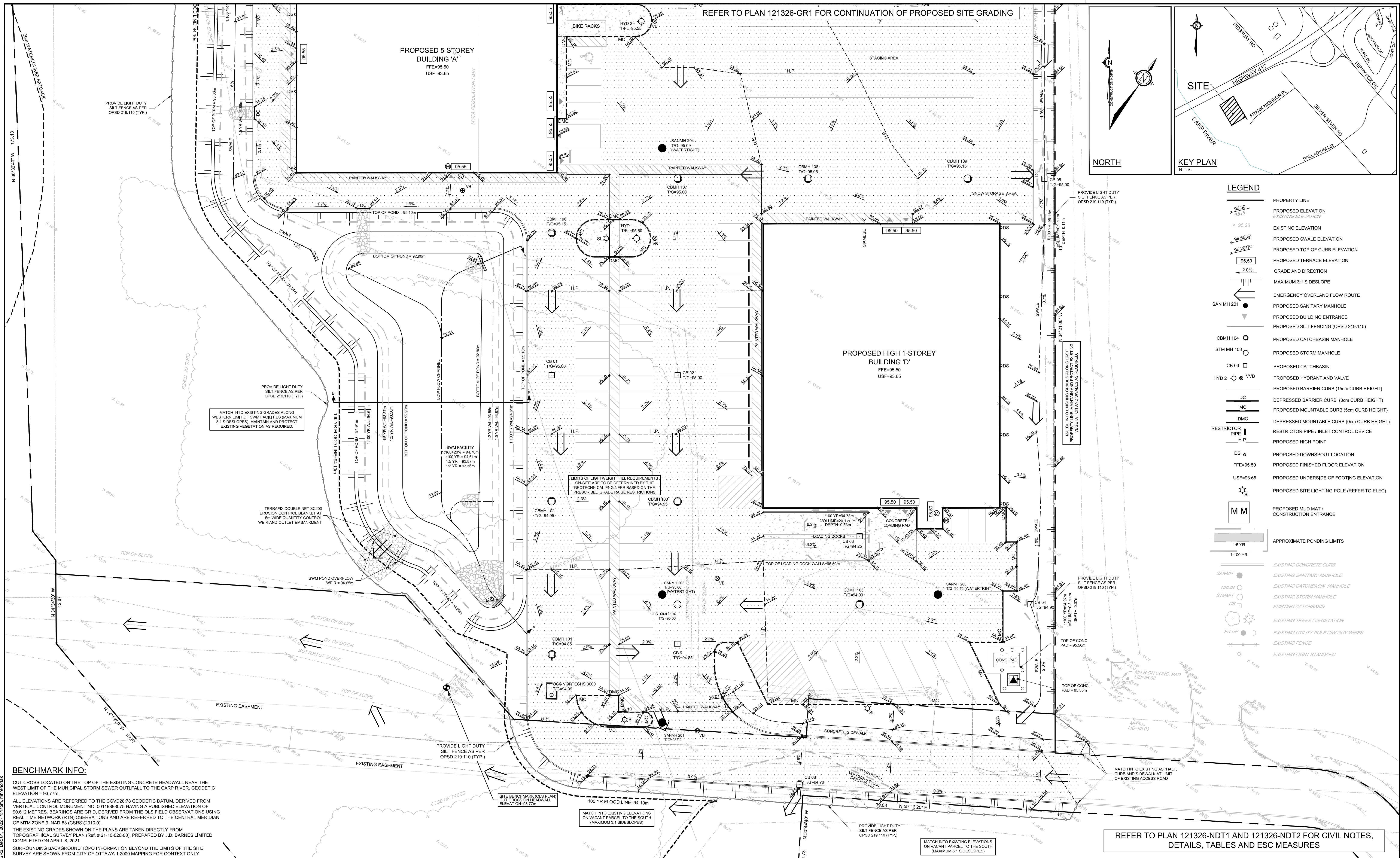
**LICENCED PROFESSIONAL ENGINEER**  
M. J. HREHORIAK  
10021236  
DEC 5/22  
PROVINCE OF ONTARIO

**LOCATION**  
CITY OF OTTAWA  
30 FRANK NIGHBOR PLACE: U-HAUL SITE

**DRAWING NAME**  
GRADING AND EROSION & SEDIMENT CONTROL PLAN

PROJECT No. 121326  
REV # 3  
DRAWING No. 121326-GR1  
Plan #18789

D07-12-22-0088



**LEGEND**

	PROPERTY LINE
	PROPOSED ELEVATION
	EXISTING ELEVATION
	PROPOSED SWALE ELEVATION
	PROPOSED TOP OF CURB ELEVATION
	PROPOSED TERRACE ELEVATION
	GRADE AND DIRECTION
	MAXIMUM 3:1 SIDESLOPE
	EMERGENCY OVERLAND FLOW ROUTE
	PROPOSED SANITARY MANHOLE
	PROPOSED BUILDING ENTRANCE
	PROPOSED SILT FENCING (OPSD 219.110)
	PROPOSED CATCHBASIN MANHOLE
	PROPOSED STORM MANHOLE
	PROPOSED CATCHBASIN
	PROPOSED HYDRANT AND VALVE
	PROPOSED BARRIER CURB (15cm CURB HEIGHT)
	PROPOSED MOUNTABLE CURB (5cm CURB HEIGHT)
	PROPOSED MOUNTABLE CURB (5cm CURB HEIGHT)
	RESTRICTOR PIPE / INLET CONTROL DEVICE
	PROPOSED HIGH POINT
	PROPOSED DOWNSPOUT LOCATION
	PROPOSED FINISHED FLOOR ELEVATION
	PROPOSED UNDERSIDE OF FOOTING ELEVATION
	PROPOSED SITE LIGHTING POLE (REFER TO ELEC)
	PROPOSED MUD MAT / CONSTRUCTION ENTRANCE
	APPROXIMATE PONDING LIMITS
	EXISTING CONCRETE CURB
	EXISTING SANITARY MANHOLE
	EXISTING CATCHBASIN MANHOLE
	EXISTING STORM MANHOLE
	EXISTING CATCHBASIN
	EXISTING TREES / VEGETATION
	EXISTING UTILITY POLE C/W GUY WIRES
	EXISTING FENCE
	EXISTING LIGHT STANDARD

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