Functional Servicing Report

Chick-fil-A

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Functional Servicing Report

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Chick-fil-A College Square

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1 Legal Notification

This Report was prepared by EXP Services Inc. for the account of Chick-fil-A.

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2 Introduction

EXP Inc. has been retained by Chick-fil-A to prepare a Functional Servicing Report (FSR) to assess the servicing requirements relating to the proposed development located at 1984 Baseline Road which is located in Ottawa, Ontario. For additional background information, please refer to **Appendix A**, **EXP Drawing A100**.

This Functional Servicing Report (FSR) identifies and presents the servicing requirements for the proposed project. This FSR includes municipal water, sanitary drainage, and stormwater management (SWM) services, prior to the detailed design being undertaken. The Report will outline the requirements for site servicing for the proposed development and determine the available existing and proposed municipal servicing for discharge of storm and sanitary flows and water servicing.

2.1 Site Description

2.1.1 Existing Site

The property under study is a 0.250 ha site located on the northwest corner of Baseline Road and Woodroffe Avenue in Ottawa, Ontario. The subject site is currently occupied by Beer Store and parking spaces and bounded by BMO Bank of Montreal and parking spaces to the south and an existing parking lot to the east.

The current site is an existing commercial development with parking spaces. See **Figure 1** for an aerial view of the existing site.

Figure 1: Existing Site

2.1.2 Proposed Site

The project entails the construction of a proposed Chick-fil-A accompanied by the necessary sidewalks, landscape areas, parking lot and drive aisles.

The proposed development involves the construction of a proposed Chick-fil-A at the center of the site and will consist of a 464 m^2 building, parking spaces, sidewalk, landscape areas, and drive thru. The existing infrastructure on the subject site will be demolished and modified to meet the requirements of the proposed development. The proposed building for the subject site will be serviced from the existing systems within the existing plaza which will consider demonstrating the use of services and capacity.

For more detailed information regarding the building and site location, please refer to the **EXP Drawing A100 - Site Plan** provided in **Appendix A**.

2.2 References

The following documents were referred to in the preparation of this report:

- City of Ottawa Sewer Design Guidelines, Second Edition, October 2012
- Technical Bulletin PIEDTB-2018-01
- City of Ottawa Water Design Guidelines, Section 4.2.2 of the Water Distribution Guidelines.
- Ontario Building Code or Fire Underwriter Surveys
- Technical Bulletin ISTB-2021-03
- Technical Bulletin ISTB-2018-02, Appendix I Table 1

3 Sanitary Sewer Servicing

3.1 Sanitary Sewer System

The proposed Chick-fil-A site at 1984 Baseline Road, Ottawa, Ontario will connect to the existing sanitary infrastructure within the existing commercial development. The sanitary sewage flow from the site will be directed to the existing sanitary MH situated south of the subject site and then to the internal system. The inverts, size and slope of the existing sanitary service is to be confirmed on field by the contractor. The existing sanitary sewers, maintenance holes, as well as the proposed sanitary sewer arrangement for the Chick-fil-A Development are shown on **EXP Drawing PS100 – Site Servicing** in **Appendix B.**

Sanitary sewage outflow from the site is calculated using the current City of Ottawa Sewer Design Guidelines and Technical Bulletin PIEDTB-2018-01 as depicted in **Table 1** below. Sewage flows will be calculated based on use as a commercial site with an average design flow of **0.324 L/sec/ha** (28,000 L/gross ha/day) plus allowances for infiltration. Based on the site area of **0.250** hectares, the sanitary flow equates to **0.20 L/s**.

Table 1: Proposed Sanitary Design Criteria (City of Ottawa Standards)

Avg. Flow Rate	0.08	L/sec/ha
Peak Hourly Factor	1.5	Per Harmon Formula
Total Area	0.250	ha
Infiltration	0.08	L/s/ha

The Dry Weather proposed sanitary flow is depicted in **Table 2** below.

Table 2: Dry Weather Sanitary Flow

Type of Flow	Proposed Flow (L/s)
Average Domestic Flow (L/s)	0.324 L/sec/ha * 0.250 ha = **0.081 L/s**
Peak Domestic Flow (L/s)	0.081 L/s * 1.5 = **0.122 L/s**

The Wet Weather proposed sanitary flow is depicted in **Table 3** below.

Table 3: Wet Weather Sanitary Flow

Type of Flow	Proposed Flow (L/s)
Peak Domestic Flow (L/s)	0.122 L/s
Infiltration Flow (L/s)	0.33 L/sec/ha * 0.250 ha = **0.083 L/s**
TOTAL FLOW (L/s)	**0.205 L/s**

The sanitary sewage flow from the proposed Chick-fil-A site will discharge to the existing sanitary manhole located south of the proposed Chick-fil-A.

3.2 Downstream Considerations

The Asset Management team at the City of Ottawa will analyze the system to ensure there is adequate residual capacity in the receiving and downstream wastewater system to support the proposed flow of **0.205 L/s** for the development. In the existing condition, the site is occupied with a similar size commercial building and has the same total area. Hence, the proposed flow will have an insignificant difference from the existing flow. It is expected that the **0.205 L/s** is acceptable.

3.3 Proposed Sanitary Service

EXP proposes to service the proposed development with a proposed 150mm connection at 2.0% with a grease interceptor to the existing sanitary MH located south of the site. The setup will include venting. The proposed connection to the building will be 150mm at 2.0% slope. The sanitary service connection to the proposed building, will be designed to the Ottawa Standards, as shown on **EXP Drawing PS100 – Site Servicing Plan in Appendix B**.

4 Water Supply and Appurtenances

4.1 Existing Water Supply

According to the survey conducted by JD BARNES on July 7, 2025, there is an existing 150mm watermain and an existing 50mm water service located south and east of the proposed restaurant respectively. The existing watermain are shown on **EXP Drawing PS101 – Site Servicing and Novatech Drawing 101075 – GP – General Plan of Services in Appendix B.**

4.2 Proposed Water Demand

The unit rate and peaking factors of water consumption, minimum pipe size and allowable pressure in line were established from the City of Ottawa Water Design Guidelines.

The pressures and volumes must be sufficient for peak hour conditions and under fire conditions as established by the City of Ottawa Standards. New water supply and distribution systems should maintain normal operating pressures between 345 kPa (50 psi) and 552 kPa (80 psi) during maximum daily flow. The maximum sustained operating pressure shall not exceed 552 kPa (81 psi). Minimum residual pressure at any hydrant shall not be less than 140 KPa (20 PSI).

4.2.1.1 Fire Flow

A detailed Fire Flow calculation has been prepared using the recommendation for the Fire Underwriters Survey as per City of Ottawa Technical Bulletin ISTB-2021-03. The fire flow calculation indicates that the recommended fire flow for this proposed development will be **6,000 l/min (100 litres/sec)**.

Calculations for the required domestic and fire flow demand are provided in **Appendix C**.

Currently, there is an existing class AA fire hydrant south of the proposed building for fire fighting purposes. The proposed building is 30 m unobstructed distance to the proposed fire department connection. Fire protection of the proposed building will be via the existing fire hydrant since the building is located within the 45 m range permitted by the Ontario Building Code; therefore, a private fire hydrant is not required. Refer to the **EXP Drawing PS100 – Site Servicing** within **Appendix B** showing the extent of proposed water servicing to be installed. Under proposed conditions, the existing fire hydrant is utilized.

As per City of Ottawa Technical Bulletin ISTB-2018-02, the combined flow of all contributing fire hydrants within 150 meters of the building must meet or exceed the required fire flow. Appendix I of the same bulletin is summarized in **Table 4.**

Table 4: Maximum Flow to be considered from a given hydrant (City of Ottawa, Technical Bulletin ISTB-2018-02)

Class	Distance (m)	Contribution (L/min)
AA	≤ 75	5,700
	> 75 and ≤ 150	3,800

The nearest existing Class AA fire hydrant is within 75 meters of the proposed building. There are two additional municipal Class AA fire hydrant within 75 meters and 150 meters of the proposed building each. The existing development was serviced with the existing hydrants. With the similar building size, the proposed building that will have similar required fire flow will be serviced with the existing hydrants as the existing condition.

4.2.2 Demand Requirements

It is proposed that the site will be serviced via a new 50mm diameter water service for domestic flow, connected into the existing 50mm water service as continuation located to the east of the existing store. The proposed water service contains a water valve located at the connection to the existing watermain.

Water demands for the proposed development were determined from the City of Ottawa Water Design Guidelines; the design criteria is summarized in **Table 6**.

Table 5: Proposed Water Distribution Design Criteria (City of Ottawa Water Design Guidelines)

Total Area	0.250	ha
Commercial Average Daily Demand	28,000	L/ha/day
Commercial Maximum Daily Demand	1.5 * Average Day	L/gross ha/day
Commercial Maximum Hour Demand	1.8 * Average Day	L/gross ha/day
Chick-fil-A Hours Open Hours	11	Hours

The total water demand for the site is estimated as the maximum daily water demand plus fire, resulting in a total demand of approximately (0.27 l/s + 100 l/s) = **100.27 L/s**. The total water demand was calculated in **Table 6**.

Table 6: Water Demand Calculations

Demand Type	Total Demand (L/s)
Commercial Average Daily Demand	((28,000 L/ha/day * 0.250 ha)/ 11 Hours) = **0.177 L/s**
Commercial Maximum Daily Demand	**0.27 L/s**
Commercial Maximum Hourly Demand	0.32 L/s
Fire Flow (FUS method)	**100 L/s**
Maximum Daily Demand + Fire Flow	**100.27 L/s**

Fire protection of the proposed building will be via the existing fire hydrant at the south of the site since the building is located within the 90 m range of the existing fire hydrant.

Refer to the **EXP Drawing PS100 – Site Servicing Plan** within **Appendix B**. showing the extent of proposed water servicing, to be installed.

4.3 Proposed Connection

As part of the proposed project, we plan to connect the new Chick-fil-A building to the existing water infrastructure. This connection will ensure that the building has access to the necessary water supply for its operations and can utilize the existing infrastructure efficiently.

The City of Ottawa's asset management team has supplied the boundary conditions for the downstream municipal watermain at the subject property based on the following information: the type of development is a commercial development, with an average daily demand of 0.117 L/s, a maximum daily demand of 0.27 L/s, and a maximum hourly daily demand of 0.32 L/s. The required fire flow, according to the FUS Method, is 100 L/s, and according to the OBC Method, it is 30 L/s. For detailed correspondence with the City regarding these boundary conditions, please refer to Appendix D. The boundary conditions in the 406 mm, Woodroffe Avenue municipal watermain provided by the City of Ottawa at the subject property indicate a minimum HGL of 126.6 m and a maximum HGL of 132.6 m. Refer to Boundary Conditions for 1984 Baseline Road within Appendix G.

Based on these boundary conditions and the calculated headloss off the private watermain, the headloss calculation indicates a peak hour pressure of 58.73 psi at the building and a max day + Fire Flow #1 of 58.30 psi. The minimum requirement for maximum hourly demand is 40 psi, and the maximum requirement for maximum hourly demand is 80 psi. Therefore, there is sufficient pressure to service the proposed development. The calculated head loss calculations for the private watermain can be found in Appendix G.

Currently, the subject site is occupied with the existing building that is similar in size and use, commercial. Given that the proposed building is similar to the existing building, it is anticipated that the required flows will be similar. The water system will have adequate supply and pressure.

5 Stormwater Management

5.1 Pre-Development Hydrology

5.1.1 Existing Drainage

The subject site is currently occupied by an existing commercial building with parking spaces. The subject site has on-site catch basins on the south side and on the east side of the existing building, which capture drainage from the parking spaces, concrete areas, and landscape areas around the building. In the predevelopment conditions, the catchment areas are divided into three as shown in **EXP Drawing SWM100 - Pre-Development Drainage Plan within Appendix B**. Area 101 is captured within the site. However, Area 102 and 103 are flowing towards the streets, Baseline Road and Woodroffe Avenue respectively. Refer to **Novatech Drawing 101075 – GR – Grading & Drainage Plan** for more information.

The existing storm sewer that drains this site is a private on site 200mm diameter STM, located south of the proposed site within the existing commercial development. According to **Novatech Drawing 101075 – GP – General Plan of Services**, the site drains to the existing 2100mm diameter storm sewer running along the east boundary. This existing servicing plan shows that the existing storm system does not have any Inlet Control Device and any treatment unit for the existing development.

The subject site falls within the **Ottawa River Watershed**.

5.1.2 External Drainage

Based on the existing topography, there are no external drainage areas draining to the subject property. Refer to **EXP Drawing SWM100 - Pre-Development Drainage Plan** within **Appendix B**.

5.2 Stormwater Management Analysis

The storm drainage system for the Chick-fil-A site collects water through a series of catch basins, roof drains, and a catch basin manhole. According to the City of Ottawa requirements, the site must have an accessible storm sewer with a private storm main network internal to the site. As per these requirements, we are utilizing the existing storm infrastructure, and the storm flows from our site are then conveyed via the existing private on-site storm sewer system.

The proposed Chick-fil-A development is situated on what is currently an existing commercial building. Although the area is mostly hard surface in its current state, the proposed development will have more hard surface areas than the existing. A 100mm diameter orifice tube will be placed to control the flow to have less flow than the allowable release rate. However, the existing site does not have any inlet control device. Having the orifice tube will enhance the stormwater management of the subject site.

Although the proposed restaurant development will have a slight increase in the total amount of stormwater runoff generated due to the increase in hard surface and additional controlled area, proposed upgrade on the stormwater system will provide better management. Please refer to the Post-Development Drainage plan, **EXP Drawing SWM200**, available in **Appendix B**.

The City of Ottawa rainfall IDF Parameters have been used for the storm analysis. These parameters were taken from City of Ottawa Sewer Design Guidelines Second Edition dated October 2012. The rainfall intensity for the site was calculated using the following equation:

$i = A \times (B + Tc)\ C$

Where:

i = Rainfall intensity (mm/hr)
Tc = Time of Concentration (minutes)
A, B and C are IDF parameters

Table 7: Rainfall IDF Parameters

Storm Return Interval (yr)	A	B	C
1: 2	732.951	6.20	0.81
1: 5	998.071	6.05	0.814
1: 10	1174.184	6.01	0.816
1: 25	1402.884	6.02	0.819
1: 50	1569.58	6.01	0.82
1: 100	1735.688	6.01	0.82

For 25mm 4-hour Chicago design storm, 24 rainfall increments with 10 minutes storm time step that are provided from Visual OTTHYMO were used. The increment input are provided in **Appendix D**.

5.2.1 Analysis Methodology

Visual OTTHYMO v6 (VO) was used to calculate the predevelopment storm flow calculations and to determine the post development required storm detention volumes based on the required release rate. Visual OTTHYMO is a successful hydrologic management model that has been used for projects including Watershed Studies, Sub-watershed Studies, Master Drainage Plans, Functional Stormwater Management Plans, Site Plans, and Stormwater Management Pond Design. VO has been accepted by the Ministry of Environment, the Ministry of Natural Resources, the Ministry of Transportation, the Ministry of Municipal Affairs, the Association of Conservation Authorities of Ontario, and most municipal governments, as a valid hydrologic simulation model.

For drainage areas with significant imperviousness such as the allocated area, the “Standhyd” method is used to determine the effective rainfall in Otthymo. This method is used in urban watersheds to simulate runoff by

calculating the effective rainfall over the pervious and impervious areas and then adding the resulting unit hydrographs. **Table 8** below summarized the allowable catchment characteristics refer to **EXP Drawing SWM100** and **SWM200 within Appendix B**.

Table 8: Predevelopment Catchment Parameter

Area ID	Otthymo Hydrograph No.	Area (ha)	Hydrograph Method	% Impervious	Imperviousness Directly Connected %	Loss Method for Pervious Area	CN for Pervious Area	Time to Peak (T_p) hr
Area 101A	1	0.119	STANHYD	90	90	SCS	80	-
Area 101B (Uncontrolled)	4	0.046	STANHYD	83	83	SCS	80	-
TOTAL SITE		0.165						
Area 102 & 103 (To ROW)	8	0.008	STANHYD	9	9	SCS	80	-

Table 9: Predevelopment Release Rate below presents a summary of the pre-development peak flows for all storm events generated from the VO model. For more detailed information, please refer to the Pre-Development VO model output provided in Appendix D. The predevelopment release rate below includes Area 101A and Area 10B.

Table 9: Predevelopment Release Rate

Storm Event (yr)	Peak Flow (cms)	Peak Flow (l/s)
2 Year	0.032	32.0
5 Year	0.044	44.0
10 Year	0.052	52.0
25 Year	0.062	62.0
50 Year	0.069	69.0
100 Year	0.077	77.0
25mm 4hr	0.020	20.0

5.3 Allowable Release Rate

The existing private on site 200mm diameter STM located south of the proposed restaurant has been designed to accommodate the stormwater flow from the subject site at a run-off co-efficient of 0.83.

Existing Contributing Drainage Area = 0.119 ha & 0.046 ha (Area 101A & Area 101B)
Runoff Coefficient C (Area 101A) = 0.83
Runoff Coefficient C (Area 101B) = 0.78

Proposed Contributing Drainage Area = 0.14 ha (Area 201, 202 & 205)
Proposed Contributing Drainage Area (Uncontrolled) = 0.069 ha (Area 203)
Runoff Coefficient C (Area 201, 202 & 205) = 0.90
Runoff Coefficient C (Area 203) = 0.78

Due to grading modifications, a portion of the site that was previously landscaped and drained uncontrolled to the street will now be captured by proposed storm structures within the proposed development and existing storm structures within existing internal driveways. However, as shown in the storm calculations included in **Appendix E**, the overall flow from the subject site can be accommodated by the proposed and existing storm systems.

The following **Table 10**: Post Development Catchment Characteristic summarises the parameters used in Visual Otthymo to model the post-development catchments. Note that Area 201 & Area202 are controlled by an inlet control device has been modeled as one catchment for modelling purposes. Storm catchments for the proposed development and the existing condition are shown in **SWM200** in Appendix B. The Post Development Visual Otthymo Model Schematic is included in Appendix D. Note that due to increase in drainage captured area, the total area under the post development scenario is 0.038 ha larger than the predevelopment area. However, the allowable flow rate will be controlled to Pre-Development levels.

Table 10: Post Development Catchment Characteristic

Area ID	Otthymo Hydrograph No.	Area (ha)	Hydrograph Method	% Impervious	Imperviousness Directly Connected %	Loss Method for Pervious Area	CN for Pervious Area	Time to Peak (T_p) hr
Area 201 & 202	1	0.088	STANHYD	0.97	0.97	SCS	80	-
Area 205	4	0.046	STANHYD	0.99	0.99	SCS	99	-
CONTORLLED TOTAL SITE		**0.134**						
Area 203 (Uncontrolled)	12	0.069	STANDHYD	0.75	0.75	SCS	80	
TOTAL SITE		**0.203**						
Area 204 & 206 (To ROW)	9	0.048	STANDHYD	0.27	0.27	SCS	80	

The comparison between the pre-development release rate and post development release rates can be found in **Table 11**: Pre & Post Development Peak Flow. As shown, there is a negligible increase for the 2-year, 5-year, and 10-year storm events, but the remainder of the proposed storm flows are less than the pre-development flows.

Table 11: Pre & Post Development Peak Flow

Storm Event (yr)	Pre-Dev. Peak Flow (cms)	Post-Dev. Peak Flow (cms)
2	0.032	0.036
5	0.044	0.050
10	0.052	0.056
25	0.062	0.061
50	0.069	0.064
100	0.077	0.067
25mm 4hr	0.020	0.023

While developing the proposed development, the stormwater system of the site will be upgraded, providing better stormwater management. The existing site does not have any inlet control device. The site has uncontrolled flow captured of 77.0 L/s (Area 101A & 101B) and uncontrolled flow to ROW of 13.0 L/s (Area 102 & 103) at 100-year. However, the proposed site will enhance the system by reducing the flow rates, having 67.0 L/s (Area 201, 202 & 205 with a 100mm orifice tube and Area 203) , from the site and uncontrolled 11.0 /s (Area 204 & 206) to ROW.

Although the proposed development will be primarily hard surface with an addition of controlled area, since the area is mostly hard surface in its current state, there will be a slight increase in storm runoff generated by the site. The uncontrolled area will be reduced from 0.085 ha to 0.048 ha, meaning that there will be more controlled area. By having a 100mm diameter orifice tube, there will be no negative impacts on the overall stormwater management systems. The existing drainage patterns at 1984 Baseline Road will be improved to self-contain the site. Furthermore, no additional flows will be directed to the existing municipal storm sewer systems beyond what they currently receive from the subject area.

For a detailed breakdown of the pre- and post-development run-off coefficient and storage, see calculations in **Appendix E,** as well as **Novatech Drawing 101075 – GP – General Plan of Services** within **Appendix B** for the downstream storm systems.

5.3.1 Post Development Storage Requirements

The following **Table 12**: Storage Requirement Summary – Sewer and Surface is a summary of the volume requirements for the minor and major storm events for the sewer system and surface storage. As shown, the volume provided exceeds the storage required. Please refer to Appendix E for Calculations and the Visual Otthymo output file in Appendix D for more information.

Table 12: Storage Requirement Summary – Sewer and Surface

Storm Event	Storage Volume Provided (m^3)	Storage Volume Required (m^3)	Water Elevation (m)	Ponding Depth (m)
2 yr	25.32	7	85.98	0.00
5 yr		9	86.35	0.00
10 yr		11	86.41	0.06
25 yr		16	86.45	0.10
50 yr		1	86.47	0.12
100 yr		22	86.48	0.13
25mm 4hr		4	86.39	0.04

5.4 Stormwater Quantity Management

The existing system does not have any inlet control device nor control measure for quantity management. We are proposing new infrastructure to improve and control the post-development flows to avoid any negative impact.

Stormwater quantity will be controlled through the proposed ICD located at the downstream end of the private sewer system within the subject site before it releases to the private existing system. This approach ensures that post-development flows from the site that did not have any inlet control device are managed effectively and controlled to the acceptable allowable release rate for this commercial development.

5.5 Stormwater Quality Management

The stormwater quality control for the development will adhere to the City of Ottawa's stormwater management criteria:

- *Quality Control – Suspended Solids:*
  a) Provide enhanced level of protection for suspended soils removal through train treatment
  b) Demonstrate ISO 14034 Environmental Technology Verification (ETV) protocol for sizing OGS units.

This target will be achieved through the proposed stormwater management system. An oil grit separator, EFO4, will be installed for quality treatment to ensure compliance with the City of Ottawa's standards.

The existing condition does not have any quality treatment unit. By having an EFO4 in the proposed development, the site will provide better and effective control, ensuring that the stormwater management system meets all required standards. The Area 201, 202, and 205 will be treated with the treatment unit. Since Area 203 will not be controlled as the current state, the area will be untreated. However, having the treatment unit will improve the stormwater quality management compared to the existing condition.

5.6 Storm Conveyance

Storm drainage for the subject site will be collected by a series catch basins, roof drains and catch basin manhole. Storm flows are then conveyed via the proposed storm sewer system to the existing private onsite storm sewer system.

The existing sewer connection is located at the south of the existing commercial building. The proposed grading will improve the existing drainage patterns to self-contain the site. As shown in the site grading and site servicing drawings located in **Appendix B** this site has been designed to integrate both minor and major storm systems. The overall site grading ensures that the existing drainage pattern on adjacent properties has not been altered and stormwater runoff from the subject development has been self-contained.

5.6.1 Minor System: Storm Sewer

The site has been graded to contain the stormwater from the site, and to direct it through a series of catch basins located throughout the site and roof water leaders on the building. These catch basins and roof drains flow into an underground storm sewer system (minor system). The underground storm sewer has been designed to accommodate the 5-year peak storm event based on City of Ottawa's Intensity Duration Frequency (IDF) curve with Time of Concentration of (Tc) 10 minutes, using Rational Method. Storm sewer sizing and gradients will maintain a minimum velocity of 0.9 m/sec and maximum 3.0 m/sec. The detailed design of the minor system is provided in **Appendix E**.

5.6.2 Major System: Overland Flow

In the event of a major storm, defined as storms 100-year post-development peak flow rate leaving the site area to the 100-year pre-development peak flow rate, the outlet control provided in the system in the form of an Inlet Control Device will utilize the available storm sewer infrastructure by allowing the system to back up, thus providing the required storage. Outlet controls in the sewer system are designed to restrict the post-development flows exiting from the system to the 100-year predevelopment allowable release rate. Thus, effectively restricting the flows by detaining the water in the system to release it at an allowable release rate. This will ensure that it will not have any impact on downstream overland flow capacity, and the municipal sewers. The controlled release rates of stormwater are directed to a Stormceptor to ensure that runoff from the site is treated to the City of Ottawa water quality requirements before it is released from the site.

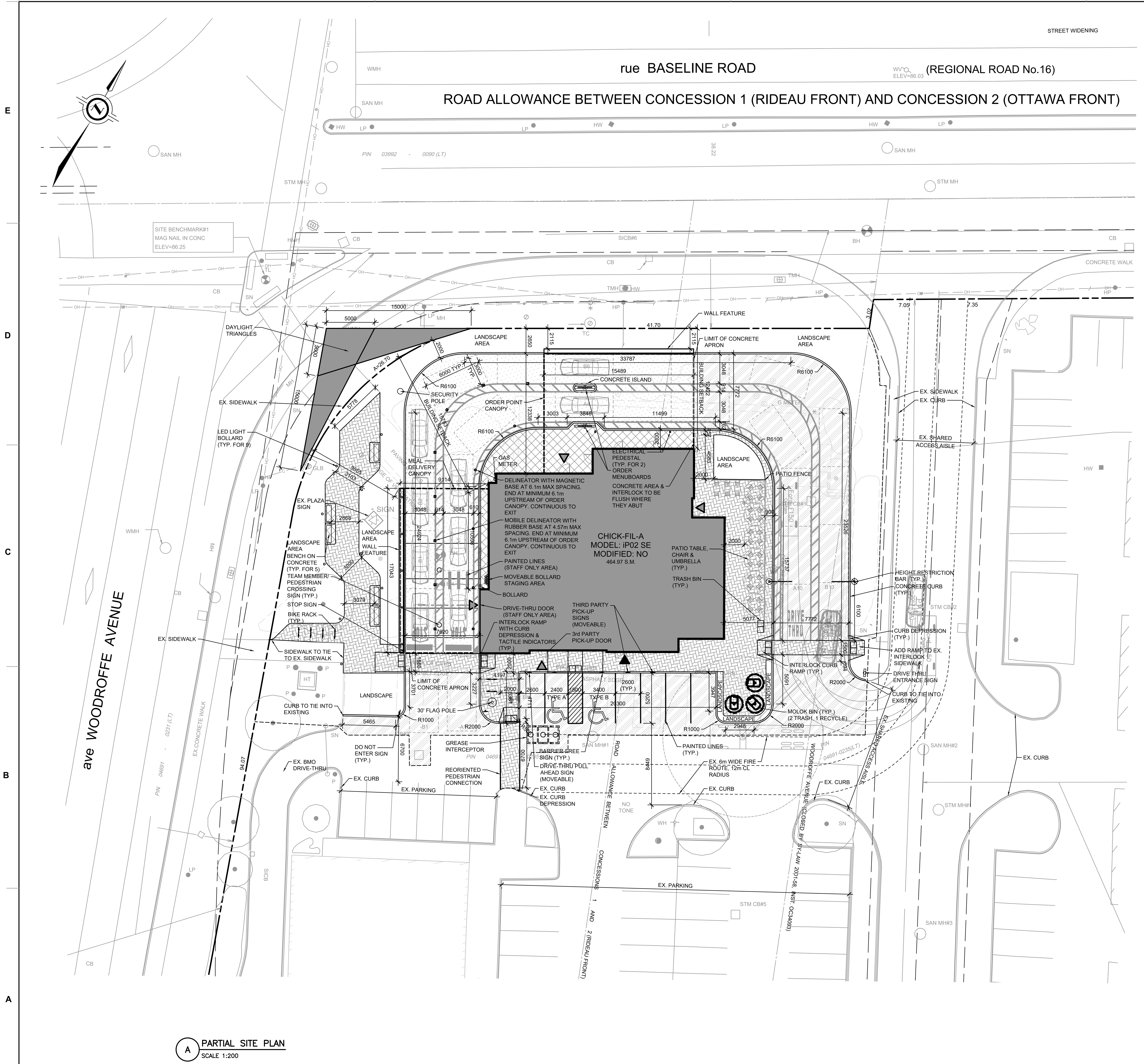
In events larger than the 100-year return storm, the site has been graded to include an overland flow route. This route allows the stormwater to overtop the local highpoints and flow overland and off-site existing commercial development, consistent with the existing overland flow route. The existing overland discharge point is towards Baseline Road. The major overland flow routes are shown on **EXP Drawing SWM100**, and **SWM200** in **Appendix B**.

6 Conclusion

Implementation of the design outlined in this report will ensure that the site can be serviced and complies with the requirements of the reviewing authorities and is of acceptable quality both during and after construction. In summary:

- Type of development: Commercial Development
- The total development area is 0.250 ha.
- The site will discharge sanitary flows to the existing SAN MH situated south of the proposed restaurant. The proposed Wet Weather Sanitary Flow is 0.21 L/s.
- The proposed sanitary connection is 150mm diameter with slope of 2.0%.
- The average water daily demand is 0.18 L/s
- The maximum water daily demand: 0.27 L/s
- The maximum hourly daily demand: 0.32 L/s
- The required fire flow demand using the FUS Method is 100 L/s
- The combined flow of all four contributing fire hydrants is 158.3 L/s, which exceeds the required fire flow of 6,000 L/min (100 L/s).
- The total water demand for the site is estimated as the maximum day water demand plus fire, resulting in a total demand of approximately Maximum Daily Demand + Fire Flow= (0.27 l/s + 100 l/s) = 100.27 L/s.
- A 100mm orifice tube will be placed for quantity control, and the flow will be discharging to the private on-site storm sewers, while improving existing conditions.
- An EFO4 will be placed for quality treatment.

Appendix A
Site Plan



A PARTIAL SITE PLAN
SCALE 1:200

DEVELOPMENT STATISTICS		
BY-LAW 2008-250: MIXED USE - COMMERCIAL ZONE II (MC F(1.5) H(34))		
	REQUIREMENT ZONING BY-LAW	PROPOSED
MIN. LOT AREA	0.0m	lease area ~2,390sq.m.
MIN. LOT WIDTH	0.0m	lease area ~42m
GFA (MEASURED FROM INTERIORS OF OUTSIDE WALLS)	0.0m	~424sq.m.
MIN. FRONT YARD & CORNER SIDE YARD SETBACK (ABUTTING RAPID TRANSIT CORRIDOR)	2.0m	2.65m CANOPY 12.4m BUILDING 1.965m FEATURE WALL
MIN. INTERIOR SIDE YARD SETBACK (ABUTTING RAPID TRANSIT CORRIDOR)	2.0m	
MIN. REAR YARD SETBACK (ABUTTING RAPID TRANSIT CORRIDOR)	2.0m	
MAX. FLOOR SPACE INDEX	1.5	0.19
MIN. BUILDING HEIGHT	6.7m	6.7m
MAX. BUILDING HEIGHT	34m	
LANDSCAPE COVERAGE		515.41m2 ~21.6%
MIN. WIDTH OF LANDSCAPE AREA	0.0m	2.0m
MIN. LANDSCAPE BUFFER ADJACENT TO STREET	2.0m	2.0m
MIN. LANDSCAPE BUFFER ALONG REAR AND SIDE YARDS	2.5m	
PARKING RATE FOR CHICK-FIL-A	MAX. 4/100SQ.M OF GFA = 19	7
EX. SHARED PARKING		56
PARKING FOR CHICK-FIL-A	2.6x5.2m	2.6x5.2m
BARRIER-FREE FOR CHICK-FIL-A	1-25 SPACES = 1 26-50 SPACES = 2 TYPE 'A' 3.4x5.2m TYPE 'B' 2.4x5.2m	1 @ TYPE 'A' 3.4x5.2m 1 @ TYPE 'B' 2.4x5.2m
RESTAURANT STACKING FOR CHICK-FIL-A	MIN. 7 QUEUING SPACES @ 3.0x5.7m	27 @ 3.0x6.0m
LOADING FOR CHICK-FIL-A	GFA <1999SQ.M. = 0	0
AISLE WIDTH	MIN. 6.7m FOR DOUBLE LANE TRAFFIC	6.7m
BICYCLE PARKING FOR CHICK-FIL A	MIN. 1/250SQ.M. OF GFA + 2	12
SIDEWALK ACCESS	MIN. 2.0m WIDE WITH DISTINGUISHED MATERIALS	2.0m
CURB SIDE PATIO	MIN. 2.0m CLEAR PEDESTRIAN PATH MIN. 0.8m SETBACK FROM EDGE OF CURB	2.0m & 0.9m

SITE STATS		
SEATING		
SE INTERIOR SEATING		86
PATIO SEATING		30
STACKING		
ENTRANCE TO PICK-UP POINT		25
PICK-UP POINT TO EXIT		2
ORDER POINT TO PICK-UP POINT		12
TOTAL STACK		27
ADJACENT PARCEL INFORMATION		
NORTH	MC 01[310]	COMMERCIAL PLAZA WITH RESTAURANTS & ANIMAL HOSPITAL HIKING AREA & SWM POND
EAST	MC R5A[1157]	COMMERCIAL PLAZA WITH GROCERY & DEPT. STORE THIRD & FIFTH DENSITY RESIDENTIAL USES
SOUTH	MC 12	COMMERCIAL PLAZA WITH RESTAURANTS & RETAIL ALGONQUIN COLLEGE
WEST	MC[1331] I1A	RAIL CONSTRUCTION AREA & COMMERCIAL USES SIR GUY CARLETON SECONDARY SCHOOL

GENERAL NOTES:

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2. ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS NOTED OTHERWISE.
3. DRAWING PRODUCED FROM J. D. BARNES LTD. DRAWING 25-10-063-00 DATED JULY 7, 2025. REFER TO SURVEY FOR BENCHMARK AND GEODETIC INFORMATION.
4. ALL DIMENSIONS MUST BE VERIFIED BY THE GC PRIOR TO CONSTRUCTION. ANY DISCREPANCIES MUST BE BROUGHT TO THE ATTENTION OF CHICK-FIL-A'S REPRESENTATIVE.
5. ALL WORK TO BE DONE BY THE GC UNLESS NOTED OTHERWISE.
6. DRAWINGS ARE TO BE USED IN CONJUNCTION WITH SPECIFICATIONS.
7. ALL WORK IS TO BE COMPLETED AS PER PROVINCIAL AND LOCAL REGULATIONS.
8. EVERYTHING TO BE CONSIDERED NEW UNLESS NOTED OTHERWISE.
9. MAKE GOOD ALL AREA'S DISTURBED DURING CONSTRUCTION.
10. GC IS RESPONSIBLE FOR ALL LOCATES BEFORE CONSTRUCTION START.

LEGEND

- HW — EX. HANDWELL
- BH — EX. BOREHOLE
- SN — EX. SIGN
- P — EX. POST/BOLLARD
- EX. TELECOMMUNICATION MANHOLE
- EX. TELECOMMUNICATION CHAMBER
- EX. TELECOMMUNICATION MARK
- EX. SHRUB
- CONC — EX. CONCRETE
- ELEV — EX. ELEVATION
- CB — EX. CATCH BASIN
- MH — EX. MANHOLE
- SAN — EX. MANHOLE
- MH — EX. MANHOLE
- WK — EX. WATER KEY
- WH — EX. WATER HYDRANT
- EX. TREE
- HT — EX. HYDRO JUNCTION BOX
- HMH — EX. HYDRO MAN HOLE
- NEW CONCRETE CURB
- NEW CURB DEPRESSION
- NEW STORM MH
- NEW SANITARY MH
- NEW STORM CB
- NEW STORM CBMH
- MAIN ENTRANCE
- ALTERNATE ENTRANCE
- LIGHT DUTY ASPHALT
- HEAVY DUTY CONCRETE
- LIGHT DUTY CONCRETE
- INTERLOCKING PAVING STONES
- STEEL BOLLARD (SEE DWG. C9.1 & C9.4B)
- MAGNETIC BOLLARD (SEE DWGS. C9.4A&B)
- RUBBER BASE BOLLARD (SEE DWGS. C9.4A&B)
- LIMIT OF DEVELOPMENT

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CHICK-FIL-A
COLLEGE SQUARE
1984 Baseline Road
Ottawa, ON

FSR#30088

BUILDING TYPE / SIZE: iP02 SE
RELEASE: XXXXXXXXX

REVISION SCHEDULE

NO.	DATE	DESCRIPTION
E	2025-09-17	FOR SPA
F	2025-11-07	FOR SPA

Issued for SPA

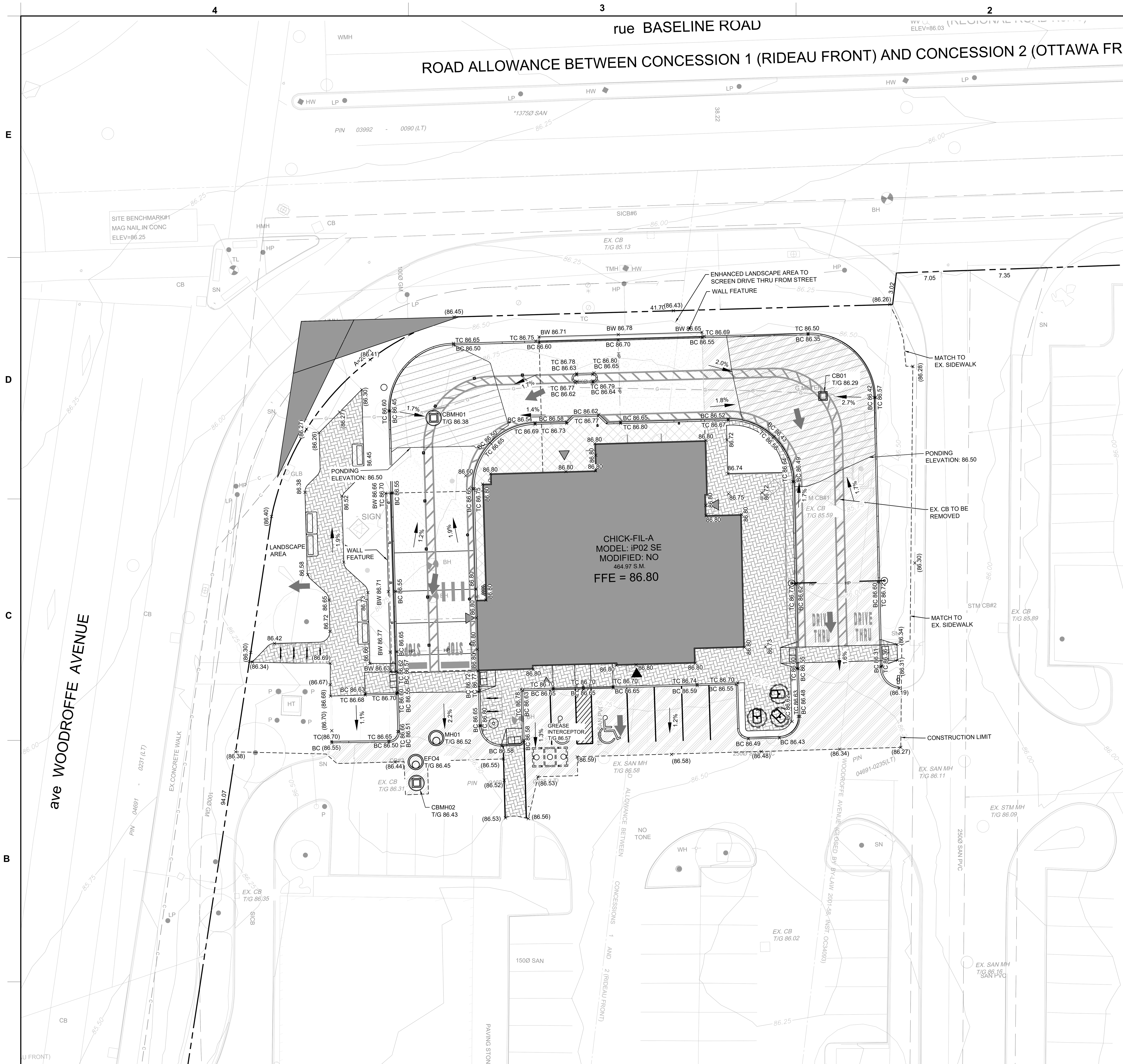
CITY # SPA xx REGION # Cxx
CONSULTANT PROJECT # BRM0023002042-W0
PROJECT STATUS SPA
DATE JULY 2025
DRAWN BY T.M.

SHEET
SITE PLAN

SHEET NUMBER
A100

E:\BRM\BRM-23002042-W0\60 Execution\65 Drawings\10-30096-A100-RF.dwg
12 November 2025

Appendix B
Engineering Drawings



A SITE GRADING PLAN
SCALE 1:200

SCALE: 1:200

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LEGEND

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SN	EX. SIGN
P	EX. POST/BOLLARD
	EX. TELECOMMUNICATION MANHOLE
	EX. TELECOMMUNICATION CHAMBER
	EX. TELECOMMUNICATION MARK
	EX. SHRUB
CONC	EX. CONCRETE
ELEV	EX. ELEVATION
CB	EX. CATCH BASIN
MH	EX. MANHOLE
SAN	EX. MANHOLE
MH	EX. MANHOLE
WK	EX. WATER KEY
WH	EX. WATER HYDRANT
	EX. TREE
HT	EX. HYDRO JUNCTION BOX
HMH	EX. HYDRO MAN HOLE
HP	EX. HYDRO POLE
TC	EX. TELEPHONE CHAMBER
GLB	EX. GROUND LEVEL BOX
	PROPERTY LINE
	NEW CONCRETE CURB
	NEW CURB DEPRESSION
	NEW YARD LIGHT
	NEW STORM MH
	NEW SANITARY MH
	NEW STORM CB
	NEW STORM CBMH
	MAIN ENTRANCE
	ALTERNATE ENTRANCE
	LIGHT DUTY ASPHALT
	HEAVY DUTY CONCRETE
	LIGHT DUTY CONCRETE
	HEAVY DUTY ASPHALT
	INTERLOCKING PAVING STONES
	PONDING
× XXX.XX	EX. ELEVATION
× (XXX.XX)	MATCH EX. ELEVATION
+ XXX.XX	PROP. ELEVATION
+ TCXXX.XX	PROP. TOP OF CURB ELEVATION
+ BCXXX.XX	PROP. BOTTOM OF CURB ELEVATION
3.1%	PROP. SLOPE
	OVERLAND FLOW
86.00	EX. CONTOUR LINE
	DEMOLITION

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CHICK-FIL-A COLLEGE SQUARE

1984 Baseline Road
Ottawa, ON

FSR#30088

BUILDING TYPE / SIZE: iP02 SE
RELEASE: XXXXXXXXX

REVISION SCHEDULE

NO.	DATE	DESCRIPTION
A	2025-09-17	ISSUED FOR UTILITY REVIEW
B	2025-09-23	ISSUED FOR SPA
C	2025-11-14	ISSUED FOR SPA

Issued for SPA

CITY # SPA xx REGION # Cxx
CONSULTANT PROJECT # BRM0023002042-W0
PROJECT STATUS SPA
DATE SEPTEMBER 2025
DRAWN BY J.K.

SHEET
SITE GRADING PLAN

SHEET NUMBER
CS100

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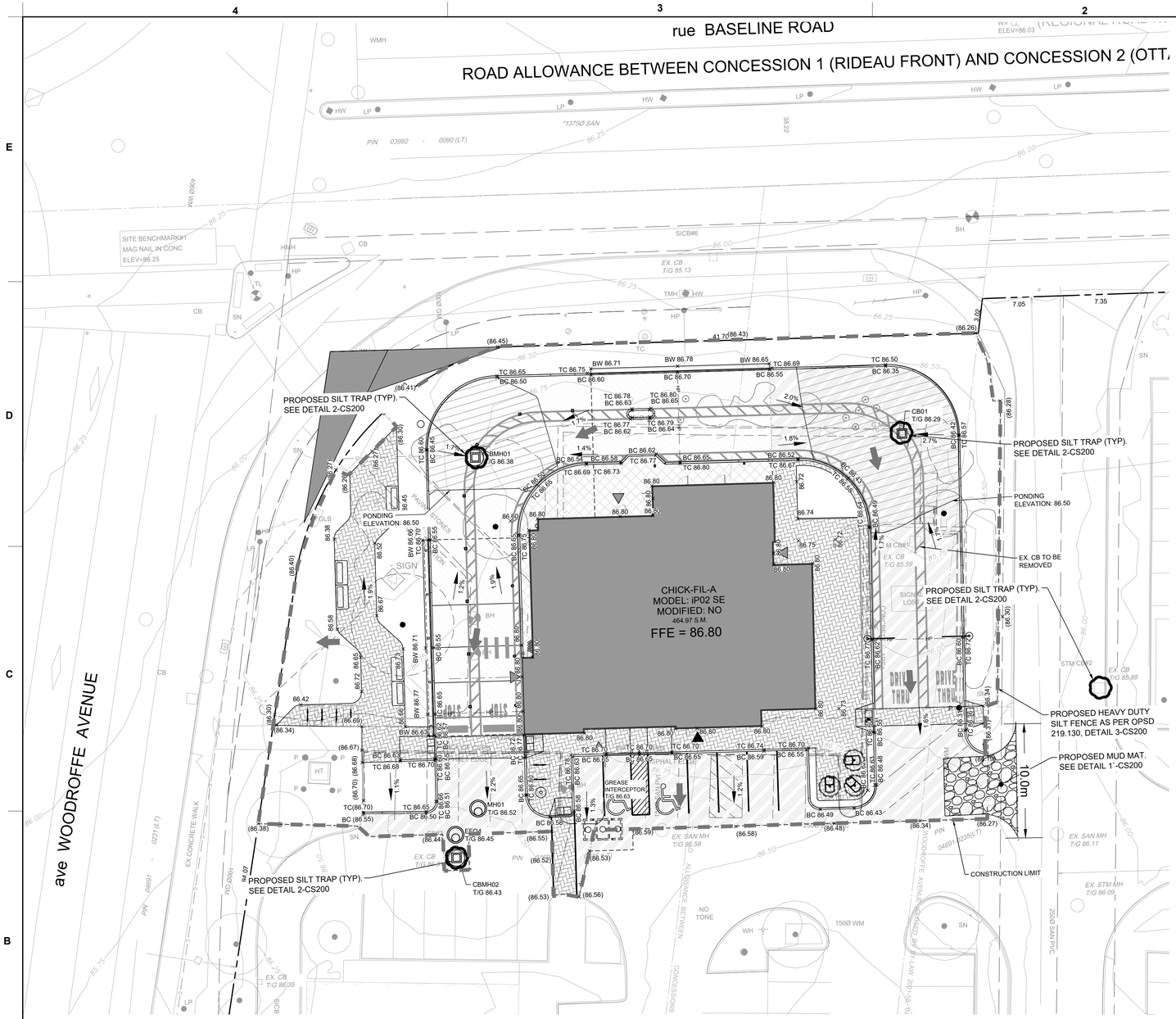
9 November 2025



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	EX.	TELECOMMUNICATION CHAMBER
	EX.	TELECOMMUNICATION MARK
	EX.	SHRUB
CONC	EX.	CONCRETE
ELEV	EX.	ELEVATION
CB	EX.	CATCH BASIN
MH	EX.	MANHOLE
SAN MH	EX.	MANHOLE
WK	EX.	WATER KEY
WH	EX.	WATER HYDRANT
	EX.	TREE
HYD MMH	EX.	HYDRO JUNCTION BOX
	EX.	HYDRO MAN HOLE
HP	EX.	HYDRO POLE
TC	EX.	TELEPHONE CHAMBER
GLB	EX.	GROUND LEVEL BOX

	PROPERTY LINE
	NEW CONCRETE CURB
	NEW CURB DEPRESSION
	NEW YARD LIGHT
	NEW STORM MH
	NEW SANITARY MH
	NEW STORM CB
	NEW STORM CBMH
	MAIN ENTRANCE
	ALTERNATE ENTRANCE
	LIGHT DUTY ASPHALT
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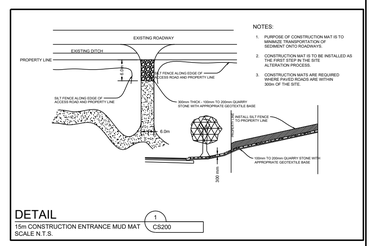
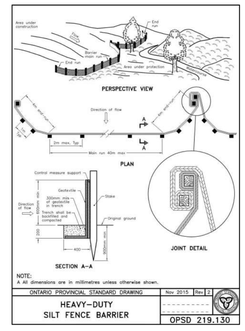
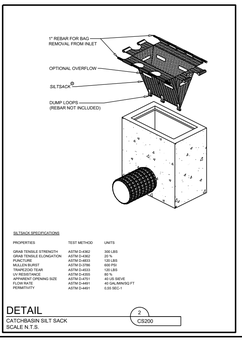
	INTERLOCKING PAVING STONES
	PONDING
× XXX.XX	EX. ELEVATION
× (XXX.XX)	MATCH EX. ELEVATION
+ XXX.XX	PROP. ELEVATION
+ TCXXX.XX	PROP. TOP OF CURB ELEVATION
+ BCXXX.XX	PROP. BOTTOM OF CURB ELEVATION
1%	PROP. SLOPE
	OVERLAND FLOW
86.00	EX. CONTOUR LINE
	DEMOLITION



DETAIL
1 — 15m CONSTRUCTION ENTRANCE MUD MAT — CS200
SCALE N.T.S.





DETAIL
2 — CATCHBASIN SILT SACK — CS200
SCALE N.T.S.

A EROSION AND SEDIMENT CONTROL PLAN
SCALE 1:200

5 0m 5 10 15
SCALE: 1:200

ESC NOTES:

1. THE CONTRACTOR SHALL ENDEAVOR TO PREVENT MUD TRACKING ONTO EXISTING RIGHTS-OF-WAY AND PROVIDE FOR CLEAN UP AT HIS OWN EXPENSE AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE TO CONTROL DUST IN THE PROJECT AND HE SHALL PROVIDE, AT HIS OWN EXPENSE, CONTROLLING MEASURES AS DIRECTED BY THE ENGINEER AND THE CITY.
2. ALL EXTERNAL AREAS DISTURBED DUE TO CONSTRUCTION SHALL BE RESTORED TO THEIR ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE CITY.
3. PRIOR TO THE COMMENCEMENT OF SITE GRADING WORKS, ALL SILT CONTROL DEVICES SHALL BE INSTALLED AND OPERATIONAL. THE EXACT LOCATION TO BE DETERMINED IN THE FIELD AND APPROVED BY THE CITY OF OTTAWA. THE CONTRACTOR SHALL MAINTAIN ALL WORKS UNTIL SERVICING CONSTRUCTION IS COMPLETED TO THE SATISFACTION OF THE ENGINEER AND THE CITY OF OTTAWA.
4. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE ROUTINELY INSPECTED AND MAINTAINED IN PROPER WORKING ORDER AND CLEANED PERIODICALLY AS REQUIRED BY THE COMMISSIONER OF ENGINEERING.
5. ALL CONSTRUCTION VEHICLES SHALL EXIT THIS SITE VIA THE TEMPORARY CONSTRUCTION ACCESS.
6. SILT CONTROL FENCE TO REMAIN IN PLACE UNTIL THE WORKING AREA HAS BEEN STABILIZED AND VEGETATED, TO THE SATISFACTION OF THE CITY OF OTTAWA.
7. CONTRACTOR TO CLEAN ADJACENT ROADS ON A REGULAR BASIS OF THE SATISFACTION OF THE AFFECTED AUTHORITY.
8. THE LOCATION AND ELEVATION OF ALL EXISTING SERVICES AND UTILITIES ARE TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR AT THEIR EXPENSE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE RESTORATION AND/ OR REPAIR OF EXISTING UTILITIES DISTURBED DURING CONSTRUCTION.
9. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE "OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS." THE GENERAL CONTRACTOR SHALL BE DESIGNATED AS THE CONSTRUCTOR AS IN THE ACT.
10. IF ANY AREA OF THE SITE IS SCHEDULED TO REMAIN UNTOUCHED FOR THE MORE THAN 30 DAYS, IT SHOULD BE SEEDED IMMEDIATELY.
11. ALL WORKS TO BE IN ACCORDANCE WITH THE CITY OF OTTAWA.
12. THE EROSION AND SEDIMENT CONTROLS SHALL BE MODIFIED AS NECESSARY AND IN AN APPROPRIATE FASHION TO ENSURE ADEQUATE PROTECTION OF THE RECEIVING WATERCOURSE AND NATURAL HERITAGE SYSTEM.
13. EROSION AND SEDIMENT CONTROLS WITHIN THE REGULATED AREA MUST BE INSTALLED, MAINTAINED AND REMOVED TO THE SATISFACTION OF CONSERVATION ALTON.
14. ALL EROSION AND SEDIMENT CONTROLS ARE TO BE INSTALLED ACCORDING TO THE APPROVED PLANS PRIOR TO COMMENCEMENT OF ANY EARTH MOVING WORK ON THE SITE AND SHALL REMAIN IN PLACE UNTIL ALL DISTURBED AREAS ARE STABILIZED WITH THE INTENDED GROUND COVER.
15. EROSION AND SEDIMENT CONTROLS SHALL BE INSPECTED BY THE BUILDER/DEVELOPER:
    - 15.1. WEEKLY
    - 15.2. BEFORE AND AFTER ANY PREDICTED RAINFALL EVENT.
    - 15.3. FOLLOWING AN UNPREDICTED RAINFALL EVENT.
    - 15.4. DAILY, DURING EXTENDED DURATION RAINFALL EVENTS.
    - 15.5. AFTER SIGNIFICANT SNOW MELT EVENTS.
16. EROSION AND SEDIMENT CONTROLS SHALL BE MAINTAINED IN PROPER WORKING ORDER AT ALL TIMES. DAMAGED OR CLOGGED DEVICES SHALL BE REPAIRED WITHIN 48 HOURS.
17. WHERE A SITE REQUIRES DEWATERING AND WHERE THE EXPELLED WATER CAN BE FREELY RELEASED TO A SUITABLE RECEIVER, THE EXPELLED WATER SHALL BE TREATED TO CAPTURE SUSPENDED PARTICLES GREATER THAN 40 MICRON IN SIZE. THE CAPTURED SEDIMENT SHALL BE DISPOSED OF PROPERLY PER MOECC GUIDELINES. THE CLEAN EXPELLED WATER SHALL FREELY RELEASE TO A SUITABLE RECEIVER THAT DOES NOT CREATE DOWNSTREAM ISSUES INCLUDING BUT NOT LIMITED TO EROSION, FLOODING - NUISANCE OR OTHERWISE, INTERFERENCE ISSUES, ETC.
18. EXISTING STORM SEWER AND DRAINAGE DITCHES ADJACENT TO THE WORKS SHALL BE PROTECTED AT ALL TIMES FROM THE ENTRY OF SEDIMENT/SILT THAT MAY MIGRATE FROM THE SITE. FOR STORM SEWERS: ALL INLETS (REAR LOT CB, ROAD CB, PIPE INLETS, ETC.) MUST BE SECURED/FITTED WITH SILT CONTROL MEASURES. FOR DRAINAGE DITCHES: THE INSTALLATION OF ROCK CHECK DAMNS, SILT FENCE, SEDIMENT CONTAINMENT DEVICES SHALL BE INSPECTED AND MAINTAINED PER ITEMS 15 AND 16 ABOVE.
19. IN THE EVENT OF A SPILL (RELEASE OF DELETERIOUS MATERIAL) ON OR EMANATING FROM THE SITE, THE OWNER OR OWNERS AGENT SHALL IMMEDIATELY NOTIFY THE MOECC AND FOLLOW ANY PRESCRIBED CLEAN UP PROCEDURE. THE OWNER OR OWNERS AGENT WILL ADDITIONALLY IMMEDIATELY NOTIFY THE CITY.

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CHICK-FIL-A COLLEGE SQUARE

1984 Baseline Road
Ottawa, ON

FSR#30088

BUILDING TYPE / SIZE: iP02 SE
RELEASE: XXXXXXXXX

REVISION SCHEDULE

NO.	DATE	DESCRIPTION
A	2025-09-17	ISSUED FOR UTILITY REVIEW
B	2025-09-23	ISSUED FOR SPA
C	2025-11-14	ISSUED FOR SPA

CITY # SPA xx REGION # Cxx
CONSULTANT PROJECT # BRM0023002042-W0
PROJECT STATUS SPA
DATE SEPTEMBER 2025
DRAWN BY J.K.

SHEET
EROSION AND SEDIMENT CONTROL PLAN

SHEET NUMBER
CS200

Issued for SPA

E:\BRM\BRM-23002042-W0\60 Execution\65 Drawings\01-30096-CS200-RC.dwg
7 November 2025

LEGISLATION, REGULATION AND CODES:

1. ALL WORK WITHIN THE CITY RIGHT-OF-WAY SHALL BE CONSTRUCTED ACCORDING TO THE LATEST CITY OF OTTAWA STANDARD DRAWINGS AND SPECIFICATIONS,ONTARIO PROVINCIAL STANDARD DRAWINGS AND SPECIFICATIONS MAY, SUBJECT TO THE APPROVAL OF CITY OF OTTAWA, BE USED WHERE NO CITY STANDARD OR SPECIFICATION IS AVAILABLE.
2. ALL WORK SHALL BE COMPLETED ACCORDING TO THE CURRENT *OCCUPATIONAL HEALTH AND SAFETY ACT* AND *REGULATIONS FOR CONSTRUCTION PROJECTS*. THE GENERAL CONTRACTOR SHALL BE DEEMED TO BE THE CONSTRUCTOR AS DEFINED IN THE ACT.
3. ALL TEMPORARY TRAFFIC CONTROL AND SIGNAGE DURING CONSTRUCTION SHALL BE ACCORDING TO THE CURRENT *ONTARIO TRAFFIC MANUAL BOOK 7: TEMPORARY CONDITIONS FIELD EDITION.*
4. ANY PERSON AUTHORIZED TO CARRY OUT WORK ON WATERMAINS, SHALL COMPLY WITH THE *QUALITY MANAGEMENT SYSTEM* (QMS).

CONSTRUCTION NOTES:

1. ALL AREAS DISTURBED DURING CONSTRUCTION WITHIN THE CITY'S RIGHT-OF-WAY SHALL BE RESTORED TO ORIGINAL OR BETTER CONDITION AND TO THE SATISFACTION OF THE CONTRACT ADMINISTRATOR. GRASS AREAS SHALL BE TREATED WITH 100mm OF TOPSOIL AND SHALL BE SODDED ACCORDING TO THE CITY STANDARDS.
2. ALL EXISTING UTILITIES SHOWN ON DRAWINGS (PLAN AND PROFILE) ARE FOR REFERENCE PURPOSES ONLY. THE CONTRACTOR SHALL SATISFY THEMSELVES AS TO THE ACTUAL LOCATION AND DEPTH OF ANY UTILITY AND SHALL BE LIABLE FOR ALL OR ANY DAMAGE.
3. ANY DISCREPANCIES BETWEEN SITE CONDITIONS AND CONSTRUCTION DRAWINGS MUST BE REPORTED TO THE ENGINEER PRIOR TO COMMENCEMENT OF CONSTRUCTION AND APPROPRIATE ACTION TAKEN TO THE SATISFACTION OF THE CONTRACT ADMINISTRATOR.
4. ALL SURVEY STAKE LAYOUT POINTS SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION. ANY DISCREPANCIES BETWEEN THE DRAWINGS AND THE LAYOUT SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER.
5. ATTENTION IS DIRECTED TO THE POSSIBILITY OF EXISTING PRIVATE SPRINKLERS AND LIGHTING SYSTEMS WITHIN THE RIGHT-OF-WAY, WHICH ARE NOT SHOWN ON THE PLANS. LOCATING, WORKING AROUND AND PROTECTING THESE SYSTEMS SHALL BE COMPLETED AT NO EXTRA COST TO THE REGIONAL MUNICIPALITY OF CITY.
6. ALL DIMENSIONS ARE EXPRESSED IN METERS (m) AND PIPE SIZES ARE EXPRESSED IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.
7. ALL MATERIAL FOR SEWER, FORCEMAIN, WATERMAIN, HYDRANTS AND APPURTENANCES, SHALL BE ACCORDING TO THE CITY OF OTTAWA STANDARDS/ GUIDELINES.
8. SERVICE CONNECTIONS AND UTILITY CUTS MADE IN ROAD PAVEMENTS SHALL BE BACKFILLED WITH UNSHRINKABLE FILL.
9. AT ALL LOCATIONS WHERE THE PROPOSED WATERMAIN CROSSES UNDER OR ABOVE THE EXISTING SEWERS, OR UTILITIES, GRANULAR 'A' NATIVE OR GRANULAR 'A' RCM BEDDING MATERIAL IS TO EXTEND FROM THE LOWER PIPE TO THE TOP OF THE UPPER PIPE. GRANULAR 'A' NATIVE OR GRANULAR 'A' RCM TO BE COMPACTED TO MINIMUM 98% OF MAXIMUM DRY DENSITY.
10. CONTRACTOR TO PROVIDE ADEQUATE SUPPORT DURING CONSTRUCTION BETWEEN THE NEW WATERMAIN AND EXISTING GAS MAINS. MAINTAIN 300mm MINIMUM VERTICAL CLEARANCES BETWEEN THE NEW WATERMAIN AND EXISTING GAS MAINS LESS THAN 300mm IN DIAMETER. MAINTAIN 600mm MINIMUM VERTICAL CLEARANCES BETWEEN THE NEW WATERMAIN AND EXISTING GAS MAINS EQUAL TO OR GREATER THAN 300mm DIAMETER.
11. ALL EXISTING WATERMAINS AND SEWER PIPES LARGER THAN 300mm DIAMETER SHALL BE SUPPORTED ACCORDING TO THE CITY OF OTTAWA.

WATERMAIN NOTES:

1. ALL WATERMAIN MATERIALS AND INSTALLATION SHALL CONFORM TO THE LATEST REVISIONS OF THE STANDARDS AND SPECIFICATIONS OF CITY OF OTTAWA, ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS).
2. PVC WATERMAINS SHALL BE MINIMUM DR 18 CLASS 235 (AWWA) C900-07 OR MOLECULARLY ORIENTED POLYVINYL CHLORIDE (PVCO) PIPES RANGING IN SIZE FROM 100mm TO 300mm DIA. PRESSURE CLASS 235 AWWA C909-09. PVC PIPES RANGING IN SIZE FROM 350mm THROUGH 600mm DIA., SHALL BE PRESSURE RATING 235, DR 18, ACCORDING TO AWWA C905-10.
3. NO WORK SHALL COMMENCE UNLESS A CITY WATER WORKS INSPECTOR IS ON SITE. WATERMAIN CONNECTIONS BY CITY OF OTTAWA FORCES WITH ALL EXCAVATION BACKFILL AND ROAD REINSTATEMENT BY CONTRACTOR.
4. VALVE BOXES SHALL BE INSTALLED AS PER CITY OF OTTAWA.
5. ALL CURB AND VALVE BOXES TO BE LOCATED AT STREET LINE.
6. ALL FIRE HYDRANTS TO BE CONSTRUCTED, INSTALLED AND LOCATED AS PER CITY OF OTTAWA STANDARDS.
7. HYDRANT LEADS SHALL BE MINIMUM DR 18 CLASS 235 (AWWA) C900-07 OR PRESSURE CLASS 235 AWWA C909-09.
8. EMBEDMENT MATERIAL FOR FLEXIBLE PIPE SHALL BE ACCORDING TO OPSD 802.010 AND USING GRANULAR 'A' NATIVE OR GRANULAR 'A' RCM AND COMPACTED TO MINIMUM 98% OF MAXIMUM DRY DENSITY.
9. ALL WATERMAINS TO BE INSTALLED AT MINIMUM COVER OF 1.8m.
10. IF WATERMAIN MUST BE DEFLECTED TO MEET ALIGNMENT, ENSURE THAT THE AMOUNT OF DEFLECTION USED IS LESS THAN HALF THAT RECOMMENDED BY THE MANUFACTURER.
11. DISINFECTION AND TESTING OF WATERMAIN TO BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS.
12. WATER METERS TO BE INSTALLED AS PER CITY OF OTTAWA STANDARDS.
13. THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY CAPS, PLUGS AND BLOW-OFFS AND NOZZLES REQUIRED FOR TESTING AND DISINFECTION OF THE WATERMAIN.
14. INSULATION FOR WATERMAIN CROSSING OVER AND BELOW SEWER SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS, WHERE WATERMAIN COVER IS LESS THAN 1.7m.
15. WHERE THE SEPARATION BETWEEN SERVICES AND MANHOLES IS LESS THAN 2.5m, WATER SERVICES ARE TO BE INSULATED AS PER CITY OF OTTAWA STDARDS.
16. WATERMAINS MUST FOLLOW THE ONTARIO MINISTRY OF THE ENVIRONMENT PROCEDURE F-6-1 THAT GOVERNS THE SEPARATION OF SEWERS AND WATERMAINS. A MINIMUM VERTICAL CLEARANCE OF 0.30m WHEN CROSSING OVER AND 0.50m WHEN CROSSING UNDER SEWERS AND ALL OTHER UTILITIES IS REQUIRED. WATERMAINS MUST ALSO MAINTAIN 2.5m HORIZONTAL SEPARATION WITH SEWERS. ADEQUATE STRUCTURAL SUPPORT FOR THE SEWERS IS REQUIRED TO PREVENT EXCESSIVE DEFLECTION OF JOINTS AND SETTLING. THE LENGTH OF WATER PIPE SHALL BE CENTERED AT THE POINT OF CROSSING SO THAT THE JOINTS WILL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE SEWER.
17. MECHANICAL THRUST RESTRAINTS SHALL BE INSTALLED AT ALL FITTINGS, BENDS, TEES, CROSSES, REDUCERS, VALVES, CAPS AND PLUGS FOR ALL WATERMAIN SIZES. MECHANICAL RESTRAINTS AT JOINTS SHALL BE INSTALLED AT EVERY PIPE JOINT WITHIN 6.1m OF EITHER SIDE OF ALL FITTINGS FOR WATERMAINS 100mm DIA. OR LARGER.
18. CITY IN-SERVICE WATER VALVES, CURB STOPS, FIRE HYDRANTS CAN ONLY BE OPERATED BY CITY STAFF OR REPRESENTATIVES.
19. ALL NEW WATERMAINS SHALL BE INSULATED WHERE THE COVER IS LESS THAN 1.65m.

WATERMAIN - FILL AREAS:

1. PIPES ARE NOT TO BE LAID ON FILL UNTIL THE FIELD DENSITY TEST REPORTS HAVE BEEN SUBMITTED AND APPROVED BY THE ENGINEER.
2. FILL TO BE PLACES TO A MINIMUM OF 600mm ABOVE THE WATERMAIN GRADES AND 3m MINIMUM ON EACH SIDE PRIOR TO WATERMAIN LAYING COMPACTED TO A MINIMUM OF 100% OF MAXIMUM DRY DENSITY IN 300mm LIFTS.
3. SOIL DENSITY TESTS SHALL BE TAKEN ALONG CENTERLINE OF THE WATERMAIN AND ON LINES 1.5m ON EITHER SIDE OF SAME AT A MAXIMUM INTERVAL OF 30m. TESTS TO BE TAKEN AT EACH 600mm LIFT.
4. ALL HYDRANTS, TEES, VALVES, BENDS, PLUGS AND EACH PIPE JOINT ARE TO BE MECHANICALLY RESTRAINED.
5. PIPE JOINT DEFLECTIONS ARE NOT ALLOWED.

EROSION AND SEDIMENT CONTROL:

1. EROSION AND SEDIMENT CONTROL (ESC) MEASURES WILL BE IMPLEMENTED PRIOR TO, AND MAINTAINED DURING CONSTRUCTION PHASES, TO PREVENT ENTRY OF SEDIMENT INTO THE WATER. ALL DAMAGED EROSION AND SEDIMENT CONTROL MEASURES SHOULD BE REPAIRED OR REPLACED, OR BOTH, WITHIN 48 HOURS OF INSPECTION.
2. ALL DISTURBED AREAS WILL BE MINIMIZED TO THE EXTENT POSSIBLE, AND TEMPORARILY OR PERMANENTLY STABILIZED OR RESTORED AS THE WORK PROGRESSES.
3. THE EROSION AND SEDIMENT CONTROL STRATEGIES OUTLINED ON THE PLANS ARE NOT STATIC AND MAY NEED TO BE UPGRADED/AMENDED AS SITE CONDITIONS CHANGE TO MINIMIZE SEDIMENT LADEN RUNOFF FROM LEAVING THE WORK AREA. IF THE PRESCRIBED MEASURES ON THE PLANS ARE NOT EFFECTIVE IN PREVENTING RELEASE OF A DELETERIOUS SUBSTANCE, THEN ALTERNATIVE MEASURES MUST BE IMPLEMENTED IMMEDIATELY TO MINIMIZE POTENTIAL ECOLOGICAL IMPACTS AND A TORONTO REGION CONSERVATION AUTHORITY ENFORCEMENT OFFICE SHOULD BE IMMEDIATELY CONTACTED. ADDITIONAL ESC MEASURES TO BE KEPT ON SITE AND USED AS NECESSARY.
4. ALL ACTIVITIES, INCLUDING MAINTENANCE PROCEDURES, WILL BE CONTROLLED TO PREVENT THE ENTRY OF PETROLEUM PRODUCTS, DEBRIS, RUBBLE, CONCRETE,OR OTHER DELETERIOUS SUBSTANCES INTO THE WATER. VEHICULAR REFUELING AND MAINTENANCE WILL BE CONDUCTED A MINIMUM OF 30m FROM THE WATER.
5. ALL GRADES WITHIN THE REGULATORY FLOOD PLAN WILL BE MAINTAINED OR MATCHED.

SANITARY SERVICE NOTES:

1. ALL SANITARY SEWER MATERIALS AND INSTALLATION SHALL CONFORM TO THE LATEST REVISIONS OF THE STANDARDS AND SPECIFICATIONS OF THE CITY OF OTTAWA, ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS).
2. ALL SANITARY SEWERS SHALL BE PVC DR 28, INSTALLED AT 2%, UNLESS OTHERWISE NOTED.
3. SANITARY SERVICE CONNECTIONS SHALL BE SINGLE, 150mm DIA. MINIMUM, PVC DR 28 INSTALLED AT 2%.
4. SANITARY MAINTANENCE HOLES SHALL HAVE WATERTIGHT FRAMES AND COVERS IN PONDING AREAS ACCORDING TO OPSD 401.030.

STORM SERVICE NOTES:

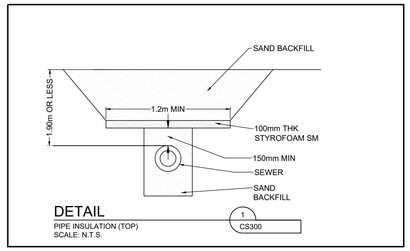
1. ALL STORM SEWER MATERIALS AND INSTALLATION SHALL CONFORM TO THE LATEST REVISIONS OF THE STANDARDS AND SPECIFICATIONS OF THE CITY OF OTTAWA, ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS).
2. ALL REINFORCED CONCRETE STORM SEWER PIPE SHALL BE IN ACCORDANCE WITH CSA A257.2 (LATEST AMENDMENT). ALL NON-REINFORCED CONCRETE STORM SEWER PIPE SHALL BE IN ACCORDANCE WITH CSA A257.L (LATEST AMENDMENT). PIPE SHALL BE JOINTED WITH STD. RUBBER GASKETS AS PER CSA A257.3 (LATEST AMENDMENT).
3. EMBEDMENT MATERIAL FOR FLEXIBLE PIPE SHALL BE ACCORDING TO OPSD 802.010 AND USING GRANULAR 'A' NATIVE OR GRANULAR 'A' RCM BEDDING MATERIAL AND COMPACTED TO MINIMUM 98% OF MAXIMUM DRY DENSITY.
4. BEDDING FOR RIGID PIPE SHALL BE CLASS 'B' BEDDING MATERIAL ACCORDING TO OPSD 802.031 AND USING GRANULAR 'A' NATIVE OR GRANULAR 'A' RCM BEDDING MATERIAL ACCORDING TO TS 1010 AND COMPACTED TO MINIMUM 98% OF MAXIMUM DRY DENSITY.
5. MINIMUM SOIL COVER TO BE 1.9m TO PROTECT SEWERS FROM FROST DAMAGE. IN AREAS WHERE ADEQUATE FROST COVER CANNOT BE ACHIEVED, EQUIVALENT THERMAL INSULATION TO BE INSTALLED AS PER DETAIL 1 CS300.
6. STORM MANHOLE FRAME AND COVERS SHALL BE AS PER OPSD 701.010(1200mmØ) AND CBS SHALL BE AS PER OPSD 705.010.
7. SAFETY PLATFORMS SHALL BE IN ACCORDANCE WITH OPSD 404.02.
8. CONTRACTOR SHALL ENSURE THAT CATCHBASINS ARE INSTALLED AT THE LOW POINT OF SAG CURB WORKS.
9. THE STORM SEWER CLASSES HAVE BEEN DESIGNED BASED ON BEDDING CONDITIONS SPECIFIED. WHERE THE SPECIFIED TRENCH WIDTH IS EXCEEDED, THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE ADDITIONAL BEDDING, A DIFFERENT TYPE OF BEDDING OR A HIGHER PIPE STRENGTH AT HIS OWN EXPENSE AND SHALL ALSO BE RESPONSIBLE FOR EXTRA TEMPORARY AND/OR PERMANENT REPAIRS MADE NECESSARY BY THE WIDENED TRENCH.
10. THE CONTRACTOR SHALL CONDUCT CCTV INSPECTION OF ALL NEWLY INSTALLED STORM SEWERS AND EXISTING SEWERS CONNECTED TO. THE TEST SHALL BE PERFORMED IMMEDIATELY AFTER SEWERS INSTALLED.
11. SINGLE CATCHBASINS SHALL BE ACCORDING TO 705.010 COMPLETE WITH GOSS TRAP, WHERE SPECIFIED. FRAME AND COVER SHALL BE ACCORDING TO OPSD 400.070.
12. CATCHBASIN LEADS TO BE 250mm PVC DR 35 FOR SINGLE CATCHBASINS AND 300mm PVC DR 35 FOR DOUBLE CATCHBASINS. THEY ARE TO BE AT A 1.0% SLOPE (MIN.) UNLESS OTHERWISE NOTED.
13. CONNECTION DETAIL FOR SEWER PIPE AT CATCHBASINS AND MAINTENANCE HOLES SHALL BE ACCORDING TO OPSD 708.020.

GENERAL NOTES:

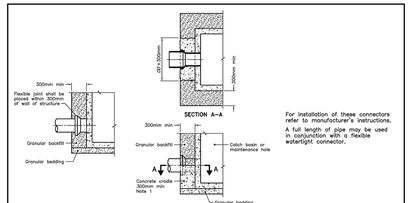
1. ALL WORKS AND MATERIALS SHALL CONFORM TO THE LATEST REVISIONS OF THE STANDARDS AND SPECIFICATIONS OF CITY OF OTTAWA, ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS), WHERE APPLICABLE.
2. THE LOCATION OF UTILITIES IS APPROXIMATE ONLY, AND THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR IS RESPONSIBLE TO PROVIDE THE LOCATION AND STATUS OF UTILITIES AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION OF PLANT AND EQUIPMENT FROM DAMAGE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OR REPLACEMENT OF ANY SERVICES OR UTILITIES DISTURBED DURING CONSTRUCTION, TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION.
3. THE CONTRACTOR SHALL VERIFY THE LOCATION AND ELEVATION OF EXISTING SERVICES PRIOR TO ANY CONSTRUCTION. THE CONTRACTOR SHALL CONFIRM LOCATIONS AND ELEVATIONS OF EXISTING SERVICES AND STRUCTURES TO BE CONNECTED TO AND EXISTING SERVICES THAT MAY BE DAMAGED OR CAUSE CONFLICTS PRIOR TO CONSTRUCTION OF ANY NEW SEWER, WATER AND/OR STORM WATER WORKS. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION. ANY DISCREPANCIES, INTERPRETATIONS, CHANGES AND ADDITIONS TO THESE DRAWINGS MUST BE BROUGHT TO THE ATTENTION OF THE ENGINEER, WHEN NOTED AND BEFORE PROCEEDING WITH CONSTRUCTION WORKS. DO NOT CONTINUE CONSTRUCTION IN AREAS WHERE DISCREPANCIES APPEAR UNTIL SUCH DISCREPANCIES HAVE BEEN RESOLVED.
4. ALL ELEVATIONS ARE GEODETIC AND UTILIZE METRIC UNITS. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED. ALL DRAWINGS SHOULD NOT BE SCALED BY THE CONTRACTOR. ANY MISSING OR QUESTIONABLE DIMENSIONS ARE TO BE CONFIRMED WITH THE ENGINEER IN WRITING.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS REQUIRED AND BEAR COST OF THE SAME.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXCAVATION, BACKFILL AND REINSTATEMENT OF ALL AREAS DISTURBED DURING CONSTRUCTION TO THE SATISFACTION OF THE ENGINEER, CITY OF OTTAWA AND THE AUTHORITY HAVING JURISDICTION.
7. ANY AREAS BEYOND THE LIMIT OF THE SITE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION AT THE CONTRACTOR'S EXPENSE.
8. THE CONTRACTOR SHALL COMPLY WITH CITY OF OTTAWA REQUIREMENTS FOR TRAFFIC CONTROL WHEN WORKING ON CITY STREETS. ALL CONSTRUCTION SIGNAGE MUST CONFORM TO THE M.T.O. MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (LATEST AMENDMENT).
9. THE SUPPORT OF ALL UTILITIES SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
10. THERE WILL BE NO SUBSTITUTION OF MATERIALS UNLESS WRITTEN APPROVAL BY THE ENGINEER HAS BEEN OBTAINED.
11. EXCESS EXCAVATED MATERIAL SHALL BE REMOVED FROM THE SITE AS PER OPSS.MUNI.180.
12. THE SITE LAYOUT IS THE RESPONSIBILITY OF THE CONTRACTOR. AS-BUILT SITE SERVICING & GRADING DRAWINGS SHALL BE MAINTAINED ON SITE BY THE CONTRACTOR.
13. THE CONTRACTOR WILL BE RESPONSIBLE FOR ADDITIONAL BEDDING OR ADDITIONAL STRENGTH PIPE IF THE MAXIMUM TRENCH WIDTH, AS SPECIFIED BY OPSD, IS EXCEEDED.
14. ALL NECESSARY CLEARING AND GRUBBING SHALL BE COMPLETED BY THE CONTRACTOR. REVIEW WITH ENGINEER AND THE CITY OF OTTAWA PRIOR TO ANY TREE CUTTING.
15. ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAW CUT TO FORM A NEAT AND STRAIGHT LINE PRIOR TO PLACING NEW PAVEMENT. THE GRANULAR BASE COURSES AND ASPHALT LAYERS SHALL BE STEPPED AS PER DETAIL ON THIS DRAWING.
16. THE CONTRACTOR SHALL APPRAISE THEMSELVES OF ALL SURFACE AND SUBSURFACE CONDITIONS TO BE ENCOUNTERED AND SHALL CARRY OUT THEIR OWN TEST PITS AS REQUIRED TO MAKE THEIR OWN INDEPENDENT ASSESSMENT OF GROUND CONDITIONS. THE CONTRACTOR SHALL NOT MAKE ANY CLAIM FOR ANY EXTRA COST DUE TO ANY SUCH GROUND CONDITIONS VARYING FROM THOSE ANTICIPATED BY THE CONTRACTOR.
17. DO NOT CONSTRUCT USING DRAWINGS THAT ARE NOT MARKED "ISSUED FOR CONSTRUCTION".
18. CIVIL DRAWINGS TO BE READ IN CONJUNCTION WITH ARCHITECTURAL, LANDSCAPE AND LEGAL DRAWINGS.
19. ALL NECESSARY CLEARING AND GRUBBING SHALL BE COMPLETED BY THE CONTRACTOR. REVIEW WITH CONTRACT ADMINISTRATOR AND THE CITY OF OTTAWA PRIOR TO ANY TREE CUTTING.
20. ALL WORK TO BE DONE BY THE GENERAL CONTRACTOR UNLESS NOTED OTHERWISE.

GENERAL NOTES FOR GRADING:

1. IT SHALL BE THE BUILDER'S RESPONSIBILITY TO ENSURE THAT GRADING AROUND HYDRANTS, TRANSFORMERS, AND UTILITY PEDESTALS, ETC., MEET CURRENT CITY OF OTTAWA, HYDRO AND UTILITY COMPANY REQUIREMENTS.
2. ALL GROUND SURFACES SHALL BE EVENLY GRADED WITHOUT PONDING AREAS AND WITHOUT LOW POINTS EXCEPT WHERE APPROVED SWALE OR CATCH BASIN OUTLETS ARE PROVIDED.
3. CONTRACTOR TO ADJUST EXISTING CATCH BASINS, MANHOLES, FIRE HYDRANTS, VALVE CHAMBERS AND VALVE BOXES TO FINAL GRADE AS REQUIRED.
4. CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT EXISTING FOUNDATIONS OF ADJACENT BUILDINGS DURING EXCAVATION AND CONSTRUCTION PERIOD.
5. GRADING IN GRASSED AREAS WILL BE BETWEEN 2% TO 7%. GRADES IN EXCESS OF 7% WILL REQUIRE A MAXIMUM 3:1 TERRACING.`



DETAIL 1 — PIPE INSULATION (TOP) — CS300
SCALE: N.T.S.



NOTES:
1 Pipe shall be supported with concrete or unshrinkable fill to the first pipe joint.
All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING — Nov 2016 Rev 4
SUPPORT FOR PIPE AT CATCH BASIN OR MAINTENANCE HOLE
OPSD 708.020

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CHICK-FIL-A COLLEGE SQUARE

1984 Baseline Road
Ottawa, ON

FSR#30088

BUILDING TYPE / SIZE: iP02 SE
RELEASE: XXXXXXXXX

REVISION SCHEDULE

NO.	DATE	DESCRIPTION
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B	2025-09-23	ISSUED FOR SPA
C	2025-11-14	ISSUED FOR SPA

CITY # SPA xx REGION # Cxx
CONSULTANT PROJECT # BRM0023002042-W0
PROJECT STATUS SPA
DATE SEPTEMBER 2025
DRAWN BY J.K.

SHEET
NOTES & DETAIL

SHEET NUMBER
CS300

Issued for SPA

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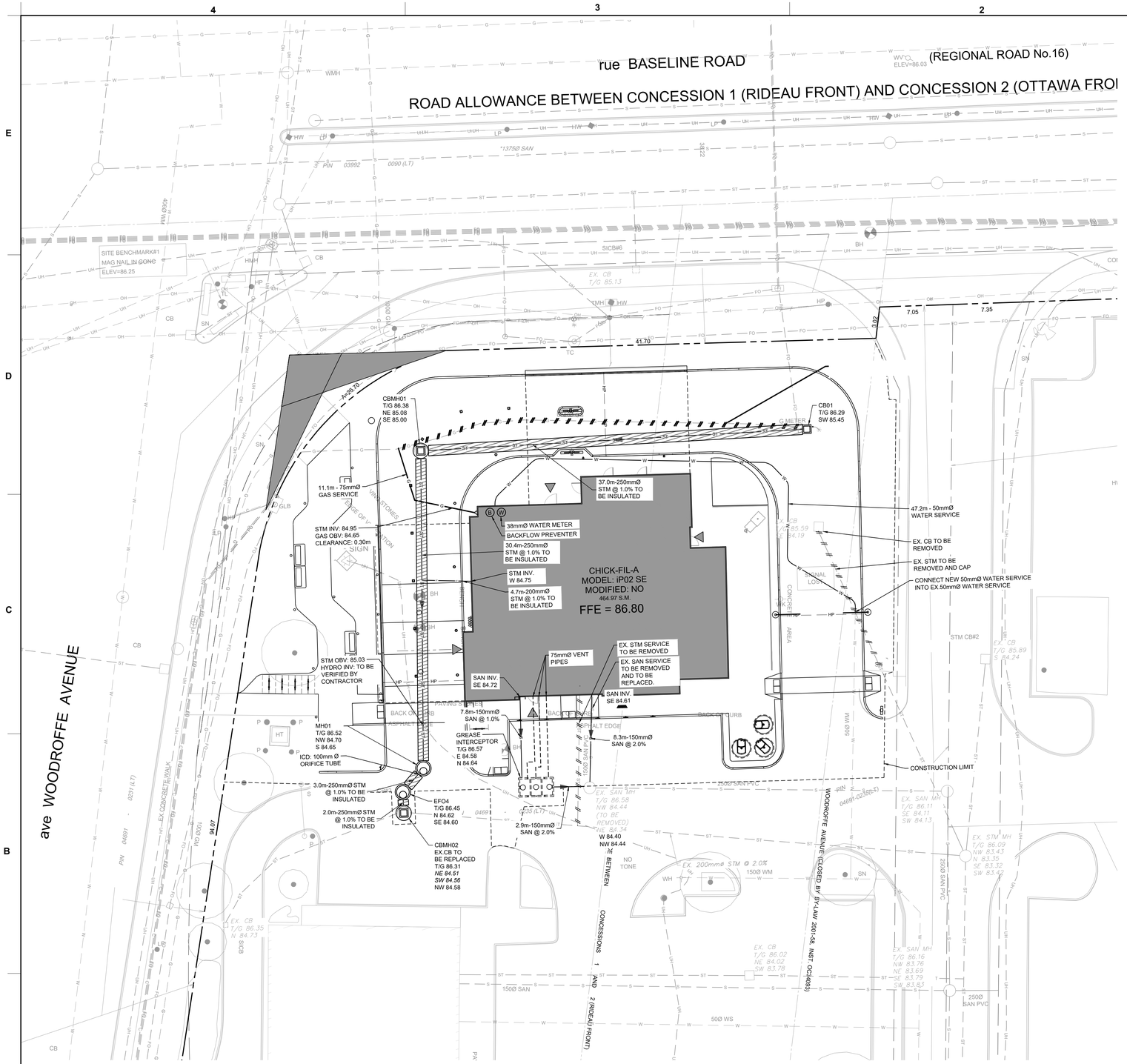
7 November 2025



A SITE SERVICING PLAN
SCALE 1:200

5 0m 5 10 15
SCALE: 1:200

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11 November 2025

GENERAL NOTES:

1. ALL ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
2. ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS NOTED OTHERWISE.
3. DRAWING PRODUCED FROM J. D. BARNES LTD. DRAWING 25-10-063-00 DATED JULY 7, 2025. REFER TO SURVEY FOR BENCHMARK AND GEODETIC INFORMATION.
4. ALL DIMENSIONS MUST BE VERIFIED BY THE GC PRIOR TO CONSTRUCTION. ANY DISCREPANCIES MUST BE BROUGHT TO THE ATTENTION OF CHICK-FIL-A'S REPRESENTATIVE.
5. ALL WORK TO BE DONE BY THE GC UNLESS NOTED OTHERWISE.
6. DRAWINGS ARE TO BE USED IN CONJUNCTION WITH SPECIFICATIONS.
7. ALL WORK IS TO BE COMPLETED AS PER PROVINCIAL AND LOCAL REGULATIONS.
8. EVERYTHING TO BE CONSIDERED NEW UNLESS NOTED OTHERWISE.
9. MAKE GOOD ALL AREA'S DISTURBED DURING CONSTRUCTION.
10. GC IS RESPONSIBLE FOR ALL LOCATES BEFORE CONSTRUCTION START.
11. CONTRACTOR TO PERFORM POST-CONSTRUCTION CCTV INVESTIGATION OF STORM AND SANITARY PIPES.
12. THE EXISTING STORM, SANITARY, AND WATER SERVICES MUST BE IN A GREAT CONDITION IF THE SERVICES ARE REUSED.

LEGEND

- HW EX. HANDWELL
- BH EX. BOREHOLE
- SN EX. SIGN
- P EX. POST/BOLLARD
- TC EX. TELECOMMUNICATION MANHOLE
- EX. TELECOMMUNICATION CHAMBER
- EX. TELECOMMUNICATION MARK
- EX. SHRUB
- CONC EX. CONCRETE
- ELEV EX. ELEVATION
- CB EX. CATCH BASIN
- MH EX. MANHOLE
- SAN EX. MANHOLE
- MH EX. MANHOLE
- WK EX. WATER KEY
- WH EX. WATER HYDRANT
- EX. TREE
- HT EX. HYDRO JUNCTION BOX
- HMH EX. HYDRO MAN HOLE
- HP EX. HYDRO POLE
- TC EX. TELEPHONE CHAMBER
- GLB EX. GROUND LEVEL BOX
- PROPERTY LINE
- EX. CONC. CURB
- FO EX. UNDERGROUND FIBRE OPTICS
- ST EX. STORM SEWER
- S EX. SANITARY SEWER
- W EX. WATER MAINS
- G EX. NATURAL GAS
- OH EX. OVERHEAD HYDRO
- UH EX. UNDERGROUND HYDRO
- UH EX. UNDERGROUND CABLE
- UH EX. UNDERGROUND TELEPHONE
- NEW CONCRETE CURB
- NEW CURB DEPRESSION
- NEW YARD LIGHT
- NEW STORM MH
- NEW SANITARY MH
- NEW STORM CB
- NEW STORM CBMH
- MAIN ENTRANCE
- ALTERNATE ENTRANCE
- ST NEW STORM SEWER
- S NEW SANITARY SEWER
- W NEW WATER SERVICE
- G NEW GAS SERVICE
- UH NEW HYDRO SERVICE
- UB NEW BELL SERVICE
- REMOVAL
- PIPE INSULATION TYP.

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CHICK-FIL-A COLLEGE SQUARE

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FSR#30088

BUILDING TYPE / SIZE: iP02 SE
RELEASE: XXXXXXXXX

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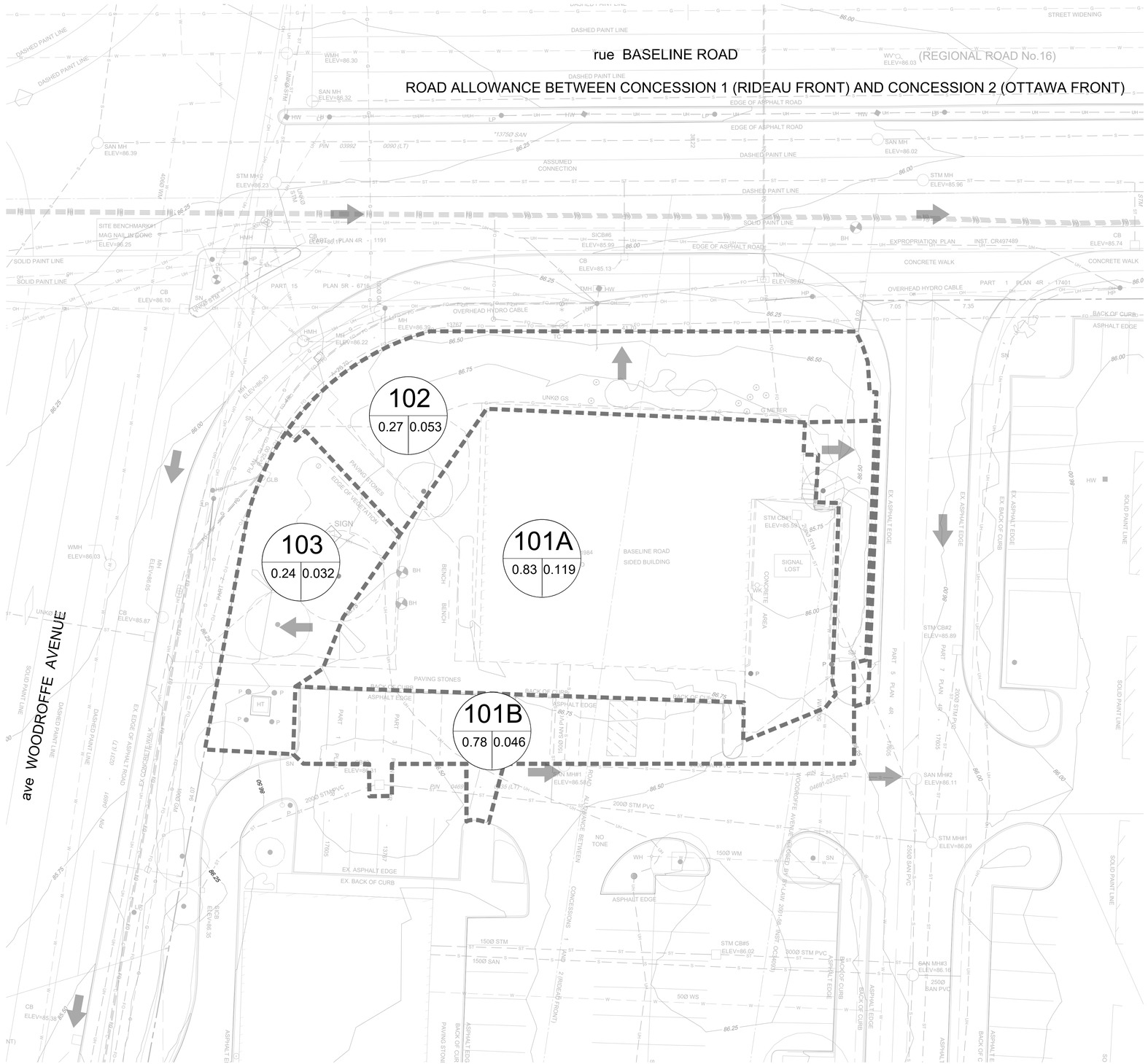
CITY # SPA xx REGION # Cxx
CONSULTANT PROJECT # BRM0023002042-W0
PROJECT STATUS SPA
DATE SEPTEMBER 2025
DRAWN BY J.K.

SHEET
SITE SERVICING PLAN

SHEET NUMBER
PS100

Issued for SPA



A PRE-DEVELOPMENT
SCALE 1:200

5 0m 5 10 15
SCALE: 1:200

LEGEND:

- SUB-CATCHMENT BOUNDARY
- 101 — AREA ID
- 0.65 | 0.265 — RUNOFF COEFFICIENT | AREA (HA)
- OVERLAND FLOW

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PROJECT STATUS SPA
DATE SEPTEMBER 2025
DRAWN BY J.K.

SHEET
PRE-DEVELOPMENT DRAINAGE PLAN

SHEET NUMBER
SWM100

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9 November 2025

rue BASELINE ROAD

(REGIONAL ROAD No.16)

ROAD ALLOWANCE BETWEEN CONCESSION 1 (RIDEAU FRONT) AND CONCESSION 2 (OTTAWA FRONT)

STREET WIDENING

ave WOODROFFE AVENUE

204
0.20 | 0.013

206
0.47 | 0.034

202
0.90 | 0.041

205
0.90 | 0.046

201
0.87 | 0.047

203
0.78 | 0.069

A POST-DEVELOPMENT
SCALE 1:200

SCALE: 1:200

LEGEND:

- SUB-CATCHMENT BOUNDARY
- 201 — AREA ID
- 0.85 | 0.265 — RUNOFF COEFFICIENT | AREA (HA)
- PONDING
- OVERLAND FLOW

Chick-fil-A
5200 Buffington Road
Atlanta, Georgia 30349-2998

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PROJECT STATUS SPA
DATE SEPTEMBER 2025
DRAWN BY J.K.

SHEET
POST-DEVELOPMENT DRAINAGE PLAN

SHEET NUMBER
SW200

Issued for SPA

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7 November 2025

Appendix C
Fire Flow Calculations

PROJECT NO. : BRM-23002042-W0
PROJECT NAME. : Chick-fil-A College Square
Date: October, 2025

Fire Underwriters Survey (FUS) Calculations

Required Fire Flow Calculation

F = 220 x C x √A **L/min** *FUS Water Supply for Public Fire Protection, 2020*

F = Required Fire Flow
C = Construction Type Coefficient
A = Total Above-Ground Floor Area (m^2)

1 Estimate of Fire Flow (Baseline)

OBC Occupancy	Commercial	
Foot Print	465	m^2
Number of Storeys	1	

Level	Area (m^2)
1	465

Construction Class

Construction Class	Non Combustible
Coefficient	1.0

Total Area of Building

A=	465	m^2

Fire Flow

F= 220 * 1* √465
F= 4744
F= 5000 **L/min** *rounded to nearest 1000L/min, must be >2000 L/min*

2 Occupancy Charge

Contents	Free Burning
Charge	0.15

O= F * Occupancy Charge
O= 5000*-0.15
O= 750 **L/min** *no rounding*

3 Automatic Sprinkler Reduction

NFPA Sprinkler Standard	No	0%	0%
Standard Water Supply	No	0%	
Fully Supervised System	No	0%	

S= F * Sprinkler Reduction
S= 5000*0%
S= 0 **L/min** *no rounding*

4 Exposure Increase

Direction	Distance (m)	Charge	TOTAL
North	>45	0%	0%
East	>45	0%	
South	>45	0%	
West	>45	0%	

max 75%

E= F * Exposure Charge
E= 5000*0%
E= 0 **L/min** *no rounding*

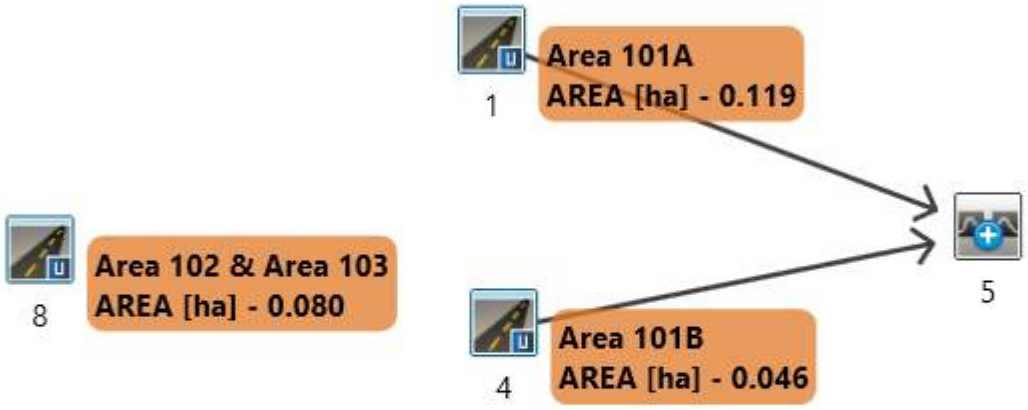
H Adjusted Fire Flow

Fa= F+O+E+S
Fa= 5000+750-0-0
Fa= 5750 L/min
Fa= 6000 **L/min** *rounded to nearest 1000L/min*

REQUIRED FIRE FLOW	**6000**	**L/min**
	100	**L/s**
	1585	**usgm**

Appendix D
Visual Otthymo Model

Pre-Development VOH Model Schematic



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================================================================================
==================================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO
6.2\VO2\voin.dat
  Output  filename: C:\Users\KimJo\AppData\Local\Civica\VH5\5f9fa1fb-
87a1-436c-84fa-29e684f29ce0\df4f0f28-bffb-49f2-8753-d499fadd72bb\scenar
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DATE: 09/22/2025                          TIME: 02:22:21

USER:


COMMENTS: _____

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  ************************************************
  ** SIMULATION : 002yr 4hr 10min Chicago Copy  **
  ************************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 732.951
| Ptotal= 33.89 mm |                          B=   6.200
--------------------                          C=   0.810
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  4.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33

                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
                0.00    2.05 |  1.00   18.21 |  2.00    5.10 |  3.00
2.46
                0.17    2.37 |  1.17   76.80 |  2.17    4.29 |  3.17
2.28
                0.33    2.81 |  1.33   24.08 |  2.33    3.72 |  3.33
2.12
                0.50    3.50 |  1.50   12.36 |  2.50    3.29 |  3.50
1.99
                0.67    4.69 |  1.67    8.32 |  2.67    2.95 |  3.67
1.87
                0.83    7.31 |  1.83    6.30 |  2.83    2.68 |  3.83
1.77

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--------------------
| CALIB            |
| STANDHYD (  0001)|   Area    (ha)=   0.12
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.11         0.01
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      28.17        40.00
     Mannings n             =      0.013        0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
                0.083    2.05 | 1.083   18.21 | 2.083    5.10 |  3.08
2.46
                0.167    2.05 | 1.167   18.21 | 2.167    5.10 |  3.17
2.46
                0.250    2.37 | 1.250   76.80 | 2.250    4.29 |  3.25
2.28
                0.333    2.37 | 1.333   76.80 | 2.333    4.29 |  3.33
2.28
                0.417    2.81 | 1.417   24.08 | 2.417    3.72 |  3.42
2.12
                0.500    2.81 | 1.500   24.08 | 2.500    3.72 |  3.50
2.12
                0.583    3.50 | 1.583   12.36 | 2.583    3.29 |  3.58
1.99
                0.667    3.50 | 1.667   12.36 | 2.667    3.29 |  3.67
1.99
                0.750    4.69 | 1.750    8.32 | 2.750    2.95 |  3.75
1.87
                0.833    4.69 | 1.833    8.32 | 2.833    2.95 |  3.83
1.87
                0.917    7.31 | 1.917    6.30 | 2.917    2.68 |  3.92
1.77
                1.000    7.31 | 2.000    6.30 | 3.000    2.68 |  4.00
1.77

     Max.Eff.Inten.(mm/hr)=      76.80        16.12
               over (min)        5.00         5.00
     Storage Coeff.  (min)=      1.33 (ii)    4.58 (ii)
     Unit Hyd. Tpeak (min)=      5.00         5.00
     Unit Hyd. peak  (cms)=      0.33         0.23
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.02         0.00         0.023 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.33         1.33
     RUNOFF VOLUME    (mm)=     32.89         9.03        30.50
     TOTAL RAINFALL   (mm)=     33.89        33.89        33.89
     RUNOFF COEFFICIENT   =      0.97         0.27         0.90

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0004)|   Area    (ha)=   0.05
|ID= 1 DT= 5.0 min |   Total Imp(%)=  83.00   Dir. Conn.(%)=  83.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.04         0.01
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      17.51        40.00
     Mannings n             =      0.013        0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
                0.083    2.05 |  1.083   18.21 | 2.083    5.10 |  3.08
2.46
                0.167    2.05 |  1.167   18.21 | 2.167    5.10 |  3.17
2.46
                0.250    2.37 |  1.250   76.80 | 2.250    4.29 |  3.25
2.28
                0.333    2.37 |  1.333   76.80 | 2.333    4.29 |  3.33
2.28
                0.417    2.81 |  1.417   24.08 | 2.417    3.72 |  3.42
2.12
                0.500    2.81 |  1.500   24.08 | 2.500    3.72 |  3.50
2.12
                0.583    3.50 |  1.583   12.36 | 2.583    3.29 |  3.58
1.99
                0.667    3.50 |  1.667   12.36 | 2.667    3.29 |  3.67
1.99
                0.750    4.69 |  1.750    8.32 | 2.750    2.95 |  3.75
1.87
                0.833    4.69 |  1.833    8.32 | 2.833    2.95 |  3.83
1.87
                0.917    7.31 |  1.917    6.30 | 2.917    2.68 |  3.92
1.77
                1.000    7.31 |  2.000    6.30 | 3.000    2.68 |  4.00
1.77

     Max.Eff.Inten.(mm/hr)=      76.80        16.12
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      1.00 (ii)    5.16 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.34         0.16
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.01         0.00         0.008 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.42         1.33
     RUNOFF VOLUME    (mm)=     32.89         9.03        28.82
     TOTAL RAINFALL   (mm)=     33.89        33.89        33.89
     RUNOFF COEFFICIENT   =      0.97         0.27         0.85

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| ADD HYD  (  0005)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
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      ID1= 1 (  0001):     0.12   0.023     1.33    30.50
    + ID2= 2 (  0004):     0.05   0.008     1.33    28.82
      ==================================================
      ID = 3 (  0005):     0.17   0.032     1.33    30.03

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| CALIB            |
| STANDHYD (  0008)|   Area    (ha)=   0.08
|ID= 1 DT= 5.0 min |   Total Imp(%)=   9.00   Dir. Conn.(%)=   9.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.01         0.07
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      23.09        40.00
     Mannings n            =      0.013        0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
              0.083    2.05 | 1.083   18.21 | 2.083    5.10 |  3.08
2.46
              0.167    2.05 | 1.167   18.21 | 2.167    5.10 |  3.17
2.46
              0.250    2.37 | 1.250   76.80 | 2.250    4.29 |  3.25
2.28
              0.333    2.37 | 1.333   76.80 | 2.333    4.29 |  3.33
2.28
              0.417    2.81 | 1.417   24.08 | 2.417    3.72 |  3.42
2.12
              0.500    2.81 | 1.500   24.08 | 2.500    3.72 |  3.50
2.12
              0.583    3.50 | 1.583   12.36 | 2.583    3.29 |  3.58
1.99
              0.667    3.50 | 1.667   12.36 | 2.667    3.29 |  3.67
1.99
              0.750    4.69 | 1.750    8.32 | 2.750    2.95 |  3.75
1.87
              0.833    4.69 | 1.833    8.32 | 2.833    2.95 |  3.83
1.87
              0.917    7.31 | 1.917    6.30 | 2.917    2.68 |  3.92
1.77
              1.000    7.31 | 2.000    6.30 | 3.000    2.68 |  4.00
1.77

     Max.Eff.Inten.(mm/hr)=      76.80        12.53
               over (min)        5.00        20.00
     Storage Coeff.  (min)=      1.18 (ii)   17.38 (ii)
     Unit Hyd. Tpeak (min)=      5.00        20.00
     Unit Hyd. peak  (cms)=      0.33         0.06
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.00         0.00       0.002 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.58       1.33
     RUNOFF VOLUME    (mm)=     32.89         9.03      11.06
     TOTAL RAINFALL   (mm)=     33.89        33.89      33.89
     RUNOFF COEFFICIENT   =      0.97         0.27       0.33

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
             YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO
6.2\VO2\voin.dat
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87a1-436c-84fa-29e684f29ce0\1086d16f-1f16-4187-b879-1fe8d5c41a2e\scenar
  Summary filename: C:\Users\KimJo\AppData\Local\Civica\VH5\5f9fa1fb-
87a1-436c-84fa-29e684f29ce0\1086d16f-1f16-4187-b879-1fe8d5c41a2e\scenar

DATE: 09/22/2025                          TIME: 02:22:22

USER:


COMMENTS: _____

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  ***********************************************
  ** SIMULATION : 005yr 4hr 10min Chicago Copy  **
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| CHICAGO STORM    |    IDF curve parameters: A= 998.070
| Ptotal= 45.16 mm |                          B=   6.050
--------------------                          C=   0.814
                         used in:   INTENSITY =  A / (t + B)^C

                         Duration of storm  =  4.00 hrs
                         Storm time step    = 10.00 min
                         Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
              0.00     2.68 |  1.00   24.17 |  2.00    6.69 |  3.00
3.22
              0.17     3.10 |  1.17  104.21 |  2.17    5.63 |  3.17
2.98
              0.33     3.68 |  1.33   32.03 |  2.33    4.87 |  3.33
2.77
              0.50     4.58 |  1.50   16.34 |  2.50    4.30 |  3.50
2.60
              0.67     6.15 |  1.67   10.96 |  2.67    3.86 |  3.67
2.44
              0.83     9.61 |  1.83    8.29 |  2.83    3.51 |  3.83
2.31

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--------------------
| CALIB            |
| STANDHYD (  0001)|   Area    (ha)=   0.12
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.11         0.01
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      28.17        40.00
     Mannings n            =      0.013        0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
              0.083    2.68 | 1.083   24.17 | 2.083    6.69 |  3.08
3.22
              0.167    2.68 | 1.167   24.17 | 2.167    6.69 |  3.17
3.22
              0.250    3.10 | 1.250  104.21 | 2.250    5.63 |  3.25
2.98
              0.333    3.10 | 1.333  104.21 | 2.333    5.63 |  3.33
2.98
              0.417    3.68 | 1.417   32.03 | 2.417    4.87 |  3.42
2.77
              0.500    3.68 | 1.500   32.03 | 2.500    4.87 |  3.50
2.77
              0.583    4.58 | 1.583   16.34 | 2.583    4.30 |  3.58
2.60
              0.667    4.58 | 1.667   16.34 | 2.667    4.30 |  3.67
2.60
              0.750    6.15 | 1.750   10.96 | 2.750    3.86 |  3.75
2.44
              0.833    6.15 | 1.833   10.96 | 2.833    3.86 |  3.83
2.44
              0.917    9.61 | 1.917    8.29 | 2.917    3.51 |  3.92
2.31
              1.000    9.61 | 2.000    8.29 | 3.000    3.51 |  4.00
2.31

     Max.Eff.Inten.(mm/hr)=     104.21        30.85
               over (min)        5.00         5.00
     Storage Coeff.  (min)=      1.18 (ii)    4.06 (ii)
     Unit Hyd. Tpeak (min)=      5.00         5.00
     Unit Hyd. peak  (cms)=      0.33         0.24
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.03         0.00       0.032 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.33       1.33
     RUNOFF VOLUME    (mm)=     44.16        15.56      41.30
     TOTAL RAINFALL   (mm)=     45.16        45.16      45.16
     RUNOFF COEFFICIENT   =      0.98         0.34       0.91

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
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     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB              |
| STANDHYD ( 0004)|   Area    (ha)=   0.05
|ID= 1 DT= 5.0 min |   Total Imp(%)=  83.00   Dir. Conn.(%)=  83.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.04         0.01
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      17.51        40.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                               ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
                0.083    2.68 | 1.083   24.17 | 2.083    6.69 |  3.08
3.22
                0.167    2.68 | 1.167   24.17 | 2.167    6.69 |  3.17
3.22
                0.250    3.10 | 1.250  104.21 | 2.250    5.63 |  3.25
2.98
                0.333    3.10 | 1.333  104.21 | 2.333    5.63 |  3.33
2.98
                0.417    3.68 | 1.417   32.03 | 2.417    4.87 |  3.42
2.77
                0.500    3.68 | 1.500   32.03 | 2.500    4.87 |  3.50
2.77
                0.583    4.58 | 1.583   16.34 | 2.583    4.30 |  3.58
2.60
                0.667    4.58 | 1.667   16.34 | 2.667    4.30 |  3.67
2.60
                0.750    6.15 | 1.750   10.96 | 2.750    3.86 |  3.75
2.44
                0.833    6.15 | 1.833   10.96 | 2.833    3.86 |  3.83
2.44
                0.917    9.61 | 1.917    8.29 | 2.917    3.51 |  3.92
2.31
                1.000    9.61 | 2.000    8.29 | 3.000    3.51 |  4.00
2.31

     Max.Eff.Inten.(mm/hr)=     104.21        30.85
                over (min)        5.00         5.00
     Storage Coeff.  (min)=       0.88 (ii)    4.57 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.23
                                                           *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.00          0.012 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33           1.33
     RUNOFF VOLUME    (mm)=      44.16        15.56          39.29
     TOTAL RAINFALL   (mm)=      45.16        45.16          45.16
     RUNOFF COEFFICIENT   =       0.98         0.34           0.87

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  ( 0005)|
|  1 + 2 = 3     |          AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 1 ( 0001):      0.12    0.032     1.33    41.30
     + ID2= 2 ( 0004):      0.05    0.012     1.33    39.29
       ==================================================
       ID = 3 ( 0005):      0.17    0.044     1.33    40.74

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| CALIB              |
| STANDHYD ( 0008)|   Area    (ha)=   0.08
|ID= 1 DT= 5.0 min |   Total Imp(%)=   9.00   Dir. Conn.(%)=   9.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.01         0.07
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      23.09        40.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                               ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
                0.083    2.68 | 1.083   24.17 | 2.083    6.69 |  3.08
3.22
                0.167    2.68 | 1.167   24.17 | 2.167    6.69 |  3.17
3.22
                0.250    3.10 | 1.250  104.21 | 2.250    5.63 |  3.25
2.98
                0.333    3.10 | 1.333  104.21 | 2.333    5.63 |  3.33
2.98
                0.417    3.68 | 1.417   32.03 | 2.417    4.87 |  3.42
2.77
                0.500    3.68 | 1.500   32.03 | 2.500    4.87 |  3.50
2.77
                0.583    4.58 | 1.583   16.34 | 2.583    4.30 |  3.58
2.60
                0.667    4.58 | 1.667   16.34 | 2.667    4.30 |  3.67
2.60
                0.750    6.15 | 1.750   10.96 | 2.750    3.86 |  3.75
2.44
                0.833    6.15 | 1.833   10.96 | 2.833    3.86 |  3.83
2.44
                0.917    9.61 | 1.917    8.29 | 2.917    3.51 |  3.92
2.31
                1.000    9.61 | 2.000    8.29 | 3.000    3.51 |  4.00
2.31

     Max.Eff.Inten.(mm/hr)=     104.21        25.45
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       1.04 (ii)   13.24 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.34         0.08
                                                           *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.00          0.004 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.50           1.50
     RUNOFF VOLUME    (mm)=      44.16        15.56          18.05
     TOTAL RAINFALL   (mm)=      45.16        45.16          45.16
     RUNOFF COEFFICIENT   =       0.98         0.34           0.40

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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      V    V   I   SSSSS  U   U    A    L                (v 6.2.2015)
      V    V   I   SS     U   U   A A   L
       V  V    I    SS    U   U  AAAAA  L
       V  V    I     SS   U   U  A   A  L
        VV     I   SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO     TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
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                   *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO
6.2\VO2\voin.dat
  Output  filename: C:\Users\KimJo\AppData\Local\Civica\VH5\5f9fa1fb-
87a1-436c-84fa-29e684f29ce0\efea7f53-fad1-4174-9dde-0e7e139c7424\scenar
  Summary filename: C:\Users\KimJo\AppData\Local\Civica\VH5\5f9fa1fb-
87a1-436c-84fa-29e684f29ce0\efea7f53-fad1-4174-9dde-0e7e139c7424\scenar


DATE: 09/22/2025                            TIME: 02:22:22

USER:



COMMENTS: ____________________________________________________________


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  **********************************************
  ** SIMULATION : 010yr 4hr 10min Chicago Copy  **
  **********************************************

--------------------
| CHICAGO STORM     |     IDF curve parameters: A=1174.184
| Ptotal= 52.56 mm |                           B=   6.010
--------------------                           C=   0.816
                          used in:   INTENSITY =  A / (t + B)^C

                          Duration of storm  =  4.00 hrs
                          Storm time step    = 10.00 min
                          Time to peak ratio =  0.33

                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
                  0.00    3.09 |  1.00   28.10 |  2.00    7.73 |  3.00
3.71
```

	0.17	3.57	1.17	122.17	2.17	6.50	3.17
3.43							
	0.33	4.25	1.33	37.28	2.33	5.62	3.33
3.20							
	0.50	5.29	1.50	18.95	2.50	4.97	3.50
2.99							
	0.67	7.11	1.67	12.70	2.67	4.46	3.67
2.81							
	0.83	11.13	1.83	9.59	2.83	4.05	3.83
2.66							

CALIB	
STANDHYD (0001)	Area (ha)= 0.12
ID= 1 DT= 5.0 min	Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.11	0.01
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	28.17	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	3.09	1.083	28.10	2.083	7.73	3.08	3.71
0.167	3.09	1.167	28.10	2.167	7.73	3.17	3.71
0.250	3.57	1.250	122.17	2.250	6.50	3.25	3.43
0.333	3.57	1.333	122.17	2.333	6.50	3.33	3.43
0.417	4.25	1.417	37.28	2.417	5.62	3.42	3.20
0.500	4.25	1.500	37.28	2.500	5.62	3.50	3.20
0.583	5.29	1.583	18.95	2.583	4.97	3.58	2.99
0.667	5.29	1.667	18.95	2.667	4.97	3.67	2.99
0.750	7.11	1.750	12.70	2.750	4.46	3.75	2.81
0.833	7.11	1.833	12.70	2.833	4.46	3.83	2.81
0.917	11.13	1.917	9.59	2.917	4.05	3.92	2.66
1.000	11.13	2.000	9.59	3.000	4.05	4.00	2.66

Max.Eff.Inten.(mm/hr)=		122.17	42.11	
over (min)		5.00	5.00	
Storage Coeff. (min)=		1.10 (ii)	3.81 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.34	0.25	
				TOTALS
PEAK FLOW	(cms)=	0.04	0.00	0.038 (iii)
TIME TO PEAK	(hrs)=	1.33	1.33	1.33
RUNOFF VOLUME	(mm)=	51.56	20.37	48.43
TOTAL RAINFALL	(mm)=	52.56	52.56	52.56
RUNOFF COEFFICIENT	=	0.98	0.39	0.92

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0004)	Area (ha)= 0.05
ID= 1 DT= 5.0 min	Total Imp(%)= 83.00 Dir. Conn.(%)= 83.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.04	0.01
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	17.51	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	3.09	1.083	28.10	2.083	7.73	3.08	3.71
0.167	3.09	1.167	28.10	2.167	7.73	3.17	3.71
0.250	3.57	1.250	122.17	2.250	6.50	3.25	3.43
0.333	3.57	1.333	122.17	2.333	6.50	3.33	3.43
0.417	4.25	1.417	37.28	2.417	5.62	3.42	3.20
0.500	4.25	1.500	37.28	2.500	5.62	3.50	3.20
0.583	5.29	1.583	18.95	2.583	4.97	3.58	2.99
0.667	5.29	1.667	18.95	2.667	4.97	3.67	2.99
0.750	7.11	1.750	12.70	2.750	4.46	3.75	2.81
0.833	7.11	1.833	12.70	2.833	4.46	3.83	2.81
0.917	11.13	1.917	9.59	2.917	4.05	3.92	2.66
1.000	11.13	2.000	9.59	3.000	4.05	4.00	2.66

Max.Eff.Inten.(mm/hr)=		122.17	42.11	
over (min)		5.00	5.00	
Storage Coeff. (min)=		0.83 (ii)	4.28 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.34	0.23	
				TOTALS
PEAK FLOW	(cms)=	0.01	0.00	0.014 (iii)
TIME TO PEAK	(hrs)=	1.33	1.33	1.33
RUNOFF VOLUME	(mm)=	51.56	20.37	46.24
TOTAL RAINFALL	(mm)=	52.56	52.56	52.56
RUNOFF COEFFICIENT	=	0.98	0.39	0.88

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0005)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	0.12	0.038	1.33	48.43
+ ID2= 2 (0004):	0.05	0.014	1.33	46.24
ID = 3 (0005):	0.17	0.052	1.33	47.82

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0008)	Area (ha)= 0.08
ID= 1 DT= 5.0 min	Total Imp(%)= 9.00 Dir. Conn.(%)= 9.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.01	0.07
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	23.09	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	3.09	1.083	28.10	2.083	7.73	3.08	3.71
0.167	3.09	1.167	28.10	2.167	7.73	3.17	3.71
0.250	3.57	1.250	122.17	2.250	6.50	3.25	3.43
0.333	3.57	1.333	122.17	2.333	6.50	3.33	3.43
0.417	4.25	1.417	37.28	2.417	5.62	3.42	3.20
0.500	4.25	1.500	37.28	2.500	5.62	3.50	3.20
0.583	5.29	1.583	18.95	2.583	4.97	3.58	2.99
0.667	5.29	1.667	18.95	2.667	4.97	3.67	2.99
0.750	7.11	1.750	12.70	2.750	4.46	3.75	2.81
0.833	7.11	1.833	12.70	2.833	4.46	3.83	2.81
0.917	11.13	1.917	9.59	2.917	4.05	3.92	2.66
1.000	11.13	2.000	9.59	3.000	4.05	4.00	2.66

Max.Eff.Inten.(mm/hr)=		122.17	42.11	
over (min)		5.00	15.00	
Storage Coeff. (min)=		0.98 (ii)	10.95 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.34	0.09	
				TOTALS
PEAK FLOW	(cms)=	0.00	0.01	0.006 (iii)
TIME TO PEAK	(hrs)=	1.33	1.50	1.50

```
     RUNOFF VOLUME     (mm)=       51.56         20.37          23.10
     TOTAL RAINFALL    (mm)=       52.56         52.56          52.56
     RUNOFF COEFFICIENT    =        0.98          0.39           0.44

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO
6.2\VO2\voin.dat
  Output  filename: C:\Users\KimJo\AppData\Local\Civica\VH5\5f9fa1fb-
87a1-436c-84fa-29e684f29ce0\9ac93451-0933-4936-99d5-17c12563a5d3\scenar
  Summary filename: C:\Users\KimJo\AppData\Local\Civica\VH5\5f9fa1fb-
87a1-436c-84fa-29e684f29ce0\9ac93451-0933-4936-99d5-17c12563a5d3\scenar


DATE: 09/22/2025                          TIME: 02:22:22

USER:


COMMENTS: _____


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  ********************************************
  ** SIMULATION : 025yr 4hr 10min Chicago Copy  **
  ********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1402.884
| Ptotal= 61.76 mm |                          B=   6.020
--------------------                          C=   0.819
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  4.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
               0.00    3.58 |  1.00   33.04 |  2.00    9.01 |  3.00
4.31
               0.17    4.14 |  1.17  144.68 |  2.17    7.57 |  3.17
3.98
               0.33    4.93 |  1.33   43.91 |  2.33    6.54 |  3.33
3.71
               0.50    6.15 |  1.50   22.23 |  2.50    5.78 |  3.50
3.47
               0.67    8.28 |  1.67   14.85 |  2.67    5.18 |  3.67
3.26
               0.83   13.01 |  1.83   11.19 |  2.83    4.70 |  3.83
3.08


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--------------------
| CALIB            |
| STANDHYD (  0001)|   Area    (ha)=   0.12
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.11          0.01
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=      28.17         40.00
     Mannings n             =    0.013         0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
               0.083    3.58 | 1.083   33.04 | 2.083    9.01 |  3.08
4.31
               0.167    3.58 | 1.167   33.04 | 2.167    9.01 |  3.17
4.31
               0.250    4.14 | 1.250  144.68 | 2.250    7.57 |  3.25
3.98
               0.333    4.14 | 1.333  144.68 | 2.333    7.57 |  3.33
3.98
               0.417    4.93 | 1.417   43.91 | 2.417    6.54 |  3.42
3.71
               0.500    4.93 | 1.500   43.91 | 2.500    6.54 |  3.50
3.71
               0.583    6.15 | 1.583   22.23 | 2.583    5.78 |  3.58
3.47
               0.667    6.15 | 1.667   22.23 | 2.667    5.78 |  3.67
3.47
               0.750    8.28 | 1.750   14.85 | 2.750    5.18 |  3.75
3.26
               0.833    8.28 | 1.833   14.85 | 2.833    5.18 |  3.83
3.26
               0.917   13.01 | 1.917   11.19 | 2.917    4.70 |  3.92
3.08
               1.000   13.01 | 2.000   11.19 | 3.000    4.70 |  4.00
3.08

     Max.Eff.Inten.(mm/hr)=     144.68         57.63
               over (min)          5.00          5.00
     Storage Coeff.  (min)=       1.03 (ii)     3.56 (ii)
     Unit Hyd. Tpeak (min)=       5.00          5.00
     Unit Hyd. peak  (cms)=       0.34          0.26
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.04          0.00          0.045 (iii)
     TIME TO PEAK    (hrs)=       1.33          1.33          1.33
     RUNOFF VOLUME    (mm)=      60.76         26.79         57.36
     TOTAL RAINFALL   (mm)=      61.76         61.76         61.76
     RUNOFF COEFFICIENT    =      0.98          0.43          0.93

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0004)|   Area    (ha)=   0.05
|ID= 1 DT= 5.0 min |   Total Imp(%)=  83.00   Dir. Conn.(%)=  83.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.04          0.01
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=      17.51         40.00
     Mannings n             =    0.013         0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
               0.083    3.58 | 1.083   33.04 | 2.083    9.01 |  3.08
4.31
               0.167    3.58 | 1.167   33.04 | 2.167    9.01 |  3.17
4.31
               0.250    4.14 | 1.250  144.68 | 2.250    7.57 |  3.25
3.98
               0.333    4.14 | 1.333  144.68 | 2.333    7.57 |  3.33
3.98
               0.417    4.93 | 1.417   43.91 | 2.417    6.54 |  3.42
3.71
               0.500    4.93 | 1.500   43.91 | 2.500    6.54 |  3.50
3.71
               0.583    6.15 | 1.583   22.23 | 2.583    5.78 |  3.58
3.47
               0.667    6.15 | 1.667   22.23 | 2.667    5.78 |  3.67
3.47
               0.750    8.28 | 1.750   14.85 | 2.750    5.18 |  3.75
3.26
               0.833    8.28 | 1.833   14.85 | 2.833    5.18 |  3.83
3.26
               0.917   13.01 | 1.917   11.19 | 2.917    4.70 |  3.92
3.08
               1.000   13.01 | 2.000   11.19 | 3.000    4.70 |  4.00
3.08

     Max.Eff.Inten.(mm/hr)=     144.68         57.63
               over (min)          5.00          5.00
     Storage Coeff.  (min)=       0.77 (ii)     4.00 (ii)
     Unit Hyd. Tpeak (min)=       5.00          5.00
     Unit Hyd. peak  (cms)=       0.34          0.24
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.02          0.00          0.017 (iii)
     TIME TO PEAK    (hrs)=       1.33          1.33          1.33
     RUNOFF VOLUME    (mm)=      60.76         26.79         54.98
     TOTAL RAINFALL   (mm)=      61.76         61.76         61.76
     RUNOFF COEFFICIENT    =      0.98          0.43          0.89
```

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0005)					
1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):		0.12	0.045	1.33	57.36
+ ID2= 2 (0004):		0.05	0.017	1.33	54.98
ID = 3 (0005):		0.17	0.062	1.33	56.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0008)		Area (ha)=	0.08
ID= 1 DT= 5.0 min		Total Imp(%)=	9.00 Dir. Conn.(%)= 9.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.01	0.07
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	23.09	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.58	1.083	33.04	2.083	9.01	3.08	4.31
0.167	3.58	1.167	33.04	2.167	9.01	3.17	4.31
0.250	4.14	1.250	144.68	2.250	7.57	3.25	3.98
0.333	4.14	1.333	144.68	2.333	7.57	3.33	3.98
0.417	4.93	1.417	43.91	2.417	6.54	3.42	3.71
0.500	4.93	1.500	43.91	2.500	6.54	3.50	3.71
0.583	6.15	1.583	22.23	2.583	5.78	3.58	3.47
0.667	6.15	1.667	22.23	2.667	5.78	3.67	3.47
0.750	8.28	1.750	14.85	2.750	5.18	3.75	3.26
0.833	8.28	1.833	14.85	2.833	5.18	3.83	3.26
0.917	13.01	1.917	11.19	2.917	4.70	3.92	3.08
1.000	13.01	2.000	11.19	3.000	4.70	4.00	3.08

Max.Eff.Inten.(mm/hr)=		144.68	57.63	
over (min)		5.00	10.00	
Storage Coeff. (min)=		0.91 (ii)	9.71 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.34	0.11	
				TOTALS
PEAK FLOW	(cms)=	0.00	0.01	0.009 (iii)
TIME TO PEAK	(hrs)=	1.33	1.42	1.33
RUNOFF VOLUME	(mm)=	60.76	26.79	29.77
TOTAL RAINFALL	(mm)=	61.76	61.76	61.76
RUNOFF COEFFICIENT	=	0.98	0.43	0.48

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

V V I SSSSS U U A L (v 6.2.2015)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

OOO TTTTT TTTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO
Developed and Distributed by Smart City Water Inc

***** D E T A I L E D O U T P U T *****

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Output filename: C:\Users\KimJo\AppData\Local\Civica\VH5\5f9fa1fb-87a1-436c-84fa-29e684f29ce0\75932167-5ae9-4d30-99a2-032d345df1f9\scenar
Summary filename: C:\Users\KimJo\AppData\Local\Civica\VH5\5f9fa1fb-87a1-436c-84fa-29e684f29ce0\75932167-5ae9-4d30-99a2-032d345df1f9\scenar

DATE: 09/22/2025 TIME: 02:22:22

USER:

COMMENTS: _____

** SIMULATION : 050yr 4hr 10min Chicago Copy **

CHICAGO STORM		IDF curve parameters: A=1569.580
Ptotal= 68.73 mm		B= 6.010
		C= 0.820

used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	3.97	1.00	36.76	2.00	10.00	3.00	4.77
0.17	4.59	1.17	161.50	2.17	8.40	3.17	4.41
0.33	5.47	1.33	48.87	2.33	7.26	3.33	4.10
0.50	6.82	1.50	24.70	2.50	6.40	3.50	3.84
0.67	9.19	1.67	16.49	2.67	5.74	3.67	3.61
0.83	14.44	1.83	12.42	2.83	5.21	3.83	3.41

CALIB			
STANDHYD (0001)		Area (ha)=	0.12
ID= 1 DT= 5.0 min		Total Imp(%)=	90.00 Dir. Conn.(%)= 90.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.11	0.01
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	28.17	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.97	1.083	36.76	2.083	10.00	3.08	4.77
0.167	3.97	1.167	36.76	2.167	10.00	3.17	4.77
0.250	4.59	1.250	161.50	2.250	8.40	3.25	4.41
0.333	4.59	1.333	161.50	2.333	8.40	3.33	4.41
0.417	5.47	1.417	48.87	2.417	7.26	3.42	4.10
0.500	5.47	1.500	48.87	2.500	7.26	3.50	4.10
0.583	6.82	1.583	24.70	2.583	6.40	3.58	3.84
0.667	6.82	1.667	24.70	2.667	6.40	3.67	3.84
0.750	9.19	1.750	16.49	2.750	5.74	3.75	3.61
0.833	9.19	1.833	16.49	2.833	5.74	3.83	3.61
0.917	14.44	1.917	12.42	2.917	5.21	3.92	3.41
1.000	14.44	2.000	12.42	3.000	5.21	4.00	3.41

Max.Eff.Inten.(mm/hr)=		161.50	70.15
over (min)		5.00	5.00

```
     Storage Coeff.  (min)=       0.99 (ii)    3.41 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.26
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.05         0.00          0.051 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33           1.33
     RUNOFF VOLUME    (mm)=      67.73        31.92          64.14
     TOTAL RAINFALL   (mm)=      68.73        68.73          68.73
     RUNOFF COEFFICIENT   =       0.99         0.46           0.93

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
| STANDHYD (  0004)|   Area    (ha)=   0.05
|ID= 1 DT= 5.0 min |   Total Imp(%)=  83.00   Dir. Conn.(%)=  83.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.04         0.01
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      17.51        40.00
     Mannings n            =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
               0.083    3.97 | 1.083   36.76 | 2.083   10.00 |  3.08
4.77
               0.167    3.97 | 1.167   36.76 | 2.167   10.00 |  3.17
4.77
               0.250    4.59 | 1.250  161.50 | 2.250    8.40 |  3.25
4.41
               0.333    4.59 | 1.333  161.50 | 2.333    8.40 |  3.33
4.41
               0.417    5.47 | 1.417   48.87 | 2.417    7.26 |  3.42
4.10
               0.500    5.47 | 1.500   48.87 | 2.500    7.26 |  3.50
4.10
               0.583    6.82 | 1.583   24.70 | 2.583    6.40 |  3.58
3.84
               0.667    6.82 | 1.667   24.70 | 2.667    6.40 |  3.67
3.84
               0.750    9.19 | 1.750   16.49 | 2.750    5.74 |  3.75
3.61
               0.833    9.19 | 1.833   16.49 | 2.833    5.74 |  3.83
3.61
               0.917   14.44 | 1.917   12.42 | 2.917    5.21 |  3.92
3.41
               1.000   14.44 | 2.000   12.42 | 3.000    5.21 |  4.00
3.41

     Max.Eff.Inten.(mm/hr)=     161.50        70.15
               over (min)          5.00         5.00
     Storage Coeff.  (min)=       0.74 (ii)    3.83 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.25
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.00          0.019 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33           1.33
     RUNOFF VOLUME    (mm)=      67.73        31.92          61.63
     TOTAL RAINFALL   (mm)=      68.73        68.73          68.73
     RUNOFF COEFFICIENT   =       0.99         0.46           0.90

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| ADD HYD  (  0005)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0001):      0.12    0.051     1.33    64.14
     + ID2= 2 (  0004):      0.05    0.019     1.33    61.63
       ========================================================
       ID = 3 (  0005):      0.17    0.069     1.33    63.44

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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| CALIB            |
| STANDHYD (  0008)|   Area    (ha)=   0.08
|ID= 1 DT= 5.0 min |   Total Imp(%)=   9.00   Dir. Conn.(%)=   9.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.01         0.07
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      23.09        40.00
     Mannings n            =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
               0.083    3.97 | 1.083   36.76 | 2.083   10.00 |  3.08
4.77
               0.167    3.97 | 1.167   36.76 | 2.167   10.00 |  3.17
4.77
               0.250    4.59 | 1.250  161.50 | 2.250    8.40 |  3.25
4.41
               0.333    4.59 | 1.333  161.50 | 2.333    8.40 |  3.33
4.41
               0.417    5.47 | 1.417   48.87 | 2.417    7.26 |  3.42
4.10
               0.500    5.47 | 1.500   48.87 | 2.500    7.26 |  3.50
4.10
               0.583    6.82 | 1.583   24.70 | 2.583    6.40 |  3.58
3.84
               0.667    6.82 | 1.667   24.70 | 2.667    6.40 |  3.67
3.84
               0.750    9.19 | 1.750   16.49 | 2.750    5.74 |  3.75
3.61
               0.833    9.19 | 1.833   16.49 | 2.833    5.74 |  3.83
3.61
               0.917   14.44 | 1.917   12.42 | 2.917    5.21 |  3.92
3.41
               1.000   14.44 | 2.000   12.42 | 3.000    5.21 |  4.00
3.41

     Max.Eff.Inten.(mm/hr)=     161.50        70.15
               over (min)          5.00         10.00
     Storage Coeff.  (min)=       0.88 (ii)    9.01 (ii)
     Unit Hyd. Tpeak (min)=       5.00         10.00
     Unit Hyd. peak  (cms)=       0.34         0.12
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.01          0.011 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42           1.33
     RUNOFF VOLUME    (mm)=      67.73        31.92          35.07
     TOTAL RAINFALL   (mm)=      68.73        68.73          68.73
     RUNOFF COEFFICIENT   =       0.99         0.46           0.51

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


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DATE: 09/22/2025                          TIME: 02:22:22

USER:


COMMENTS: _____

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  ************************************************
  ** SIMULATION : 100yr 4hr 10min Chicago Copy  **
  ************************************************

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| CHICAGO STORM | IDF curve parameters: A=1735.688
| Ptotal= 76.00 mm | B= 6.010
C= 0.820
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	4.39	1.00	40.65	2.00	11.06	3.00	5.28
0.17	5.07	1.17	178.60	2.17	9.28	3.17	4.88
0.33	6.05	1.33	54.04	2.33	8.02	3.33	4.54
0.50	7.54	1.50	27.31	2.50	7.08	3.50	4.25
0.67	10.16	1.67	18.24	2.67	6.35	3.67	3.99
0.83	15.97	1.83	13.74	2.83	5.76	3.83	3.77

CALIB	
STANDHYD (0001)	Area (ha)= 0.12
ID= 1 DT= 5.0 min	Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.11	0.01
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	28.17	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.39	1.083	40.65	2.083	11.06	3.08	5.28
0.167	4.39	1.167	40.65	2.167	11.06	3.17	5.28
0.250	5.07	1.250	178.60	2.250	9.28	3.25	4.88
0.333	5.07	1.333	178.60	2.333	9.28	3.33	4.88
0.417	6.05	1.417	54.04	2.417	8.02	3.42	4.54
0.500	6.05	1.500	54.04	2.500	8.02	3.50	4.54
0.583	7.54	1.583	27.31	2.583	7.08	3.58	4.25
0.667	7.54	1.667	27.31	2.667	7.08	3.67	4.25
0.750	10.16	1.750	18.24	2.750	6.35	3.75	3.99
0.833	10.16	1.833	18.24	2.833	6.35	3.83	3.99
0.917	15.97	1.917	13.74	2.917	5.76	3.92	3.77
1.000	15.97	2.000	13.74	3.000	5.76	4.00	3.77

Max.Eff.Inten.(mm/hr)=		178.60	83.65	
over (min)		5.00	5.00	
Storage Coeff. (min)=		0.95 (ii)	3.27 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.34	0.27	
				TOTALS
PEAK FLOW	(cms)=	0.05	0.00	0.056 (iii)
TIME TO PEAK	(hrs)=	1.33	1.33	1.33
RUNOFF VOLUME	(mm)=	75.00	37.48	71.24
TOTAL RAINFALL	(mm)=	76.00	76.00	76.00
RUNOFF COEFFICIENT	=	0.99	0.49	0.94

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0004)	Area (ha)= 0.05
ID= 1 DT= 5.0 min	Total Imp(%)= 83.00 Dir. Conn.(%)= 83.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.04	0.01
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	17.51	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.39	1.083	40.65	2.083	11.06	3.08	5.28
0.167	4.39	1.167	40.65	2.167	11.06	3.17	5.28
0.250	5.07	1.250	178.60	2.250	9.28	3.25	4.88
0.333	5.07	1.333	178.60	2.333	9.28	3.33	4.88
0.417	6.05	1.417	54.04	2.417	8.02	3.42	4.54
0.500	6.05	1.500	54.04	2.500	8.02	3.50	4.54
0.583	7.54	1.583	27.31	2.583	7.08	3.58	4.25
0.667	7.54	1.667	27.31	2.667	7.08	3.67	4.25
0.750	10.16	1.750	18.24	2.750	6.35	3.75	3.99
0.833	10.16	1.833	18.24	2.833	6.35	3.83	3.99
0.917	15.97	1.917	13.74	2.917	5.76	3.92	3.77
1.000	15.97	2.000	13.74	3.000	5.76	4.00	3.77

Max.Eff.Inten.(mm/hr)=		178.60	83.65	
over (min)		5.00	5.00	
Storage Coeff. (min)=		0.71 (ii)	3.68 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.34	0.25	
				TOTALS
PEAK FLOW	(cms)=	0.02	0.00	0.021 (iii)
TIME TO PEAK	(hrs)=	1.33	1.33	1.33
RUNOFF VOLUME	(mm)=	75.00	37.48	68.61
TOTAL RAINFALL	(mm)=	76.00	76.00	76.00
RUNOFF COEFFICIENT	=	0.99	0.49	0.90

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0005)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0001):	0.12	0.056	1.33	71.24
	+ ID2= 2 (0004):	0.05	0.021	1.33	68.61
	ID = 3 (0005):	0.17	0.077	1.33	70.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0008)	Area (ha)= 0.08
ID= 1 DT= 5.0 min	Total Imp(%)= 9.00 Dir. Conn.(%)= 9.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.01	0.07
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	23.09	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.39	1.083	40.65	2.083	11.06	3.08	5.28
0.167	4.39	1.167	40.65	2.167	11.06	3.17	5.28
0.250	5.07	1.250	178.60	2.250	9.28	3.25	4.88
0.333	5.07	1.333	178.60	2.333	9.28	3.33	4.88
0.417	6.05	1.417	54.04	2.417	8.02	3.42	4.54
0.500	6.05	1.500	54.04	2.500	8.02	3.50	4.54
0.583	7.54	1.583	27.31	2.583	7.08	3.58	4.25
0.667	7.54	1.667	27.31	2.667	7.08	3.67	4.25
0.750	10.16	1.750	18.24	2.750	6.35	3.75	3.99

0.833	10.16	1.833	18.24	2.833	6.35	3.83
3.99						
0.917	15.97	1.917	13.74	2.917	5.76	3.92
3.77						
1.000	15.97	2.000	13.74	3.000	5.76	4.00
3.77						

Max.Eff.Inten.(mm/hr)=	178.60	83.65	
over (min)	5.00	10.00	
Storage Coeff. (min)=	0.84 (ii)	8.42 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.34	0.12	
			TOTALS
PEAK FLOW (cms)=	0.00	0.01	0.013 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.42
RUNOFF VOLUME (mm)=	75.00	37.48	40.79
TOTAL RAINFALL (mm)=	76.00	76.00	76.00
RUNOFF COEFFICIENT =	0.99	0.49	0.54

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\KimJo\AppData\Local\Civica\VH5\5f9falfb-87a1-436c-84fa-29e684f29ce0\576f806c-09fb-438f-b67e-3a6b27cf3fd8\scenar
Summary filename: C:\Users\KimJo\AppData\Local\Civica\VH5\5f9falfb-87a1-436c-84fa-29e684f29ce0\576f806c-09fb-438f-b67e-3a6b27cf3fd8\scenar

DATE: 09/22/2025 TIME: 02:22:22

USER:

COMMENTS: _____

```
  ************************************************
  ** SIMULATION : 25mm 4hr Chicago (VO)         **
  ************************************************
```

READ STORM	Filename: C:\Users\KimJo\AppData\Local\Temp\39a79002-ddca-46ff-a3a1-0fecc8302c7a\234daf06
Ptotal= 25.00 mm	Comments: 25mm 4hr Chicago (VO)

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.07	1.00	5.70	2.00	5.19	3.00	2.80
0.17	2.27	1.17	10.78	2.17	4.47	3.17	2.62
0.33	2.52	1.33	50.21	2.33	3.95	3.33	2.48
0.50	2.88	1.50	13.37	2.50	3.56	3.50	2.35
0.67	3.38	1.67	8.29	2.67	3.25	3.67	2.23
0.83	4.18	1.83	6.30	2.83	3.01	3.83	2.14

CALIB	
STANDHYD (0001)	Area (ha)= 0.12
ID= 1 DT= 5.0 min	Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.11	0.01
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	28.17	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.07	1.083	5.70	2.083	5.19	3.08	2.80
0.167	2.07	1.167	5.70	2.167	5.19	3.17	2.80
0.250	2.27	1.250	10.78	2.250	4.47	3.25	2.62
0.333	2.27	1.333	10.78	2.333	4.47	3.33	2.62
0.417	2.52	1.417	50.21	2.417	3.95	3.42	2.48
0.500	2.52	1.500	50.21	2.500	3.95	3.50	2.48
0.583	2.88	1.583	13.37	2.583	3.56	3.58	2.35
0.667	2.88	1.667	13.37	2.667	3.56	3.67	2.35
0.750	3.38	1.750	8.29	2.750	3.25	3.75	2.23
0.833	3.38	1.833	8.29	2.833	3.25	3.83	2.23
0.917	4.17	1.917	6.30	2.917	3.01	3.92	2.14
1.000	4.18	2.000	6.29	3.000	3.01	4.00	2.14

Max.Eff.Inten.(mm/hr)=	50.21	6.66		
over (min)	5.00	10.00		
Storage Coeff. (min)=	1.57 (ii)	5.43 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.33	0.16		
				TOTALS
PEAK FLOW (cms)=	0.01	0.00		0.015 (iii)
TIME TO PEAK (hrs)=	1.50	1.58		1.50
RUNOFF VOLUME (mm)=	24.00	4.79		22.06
TOTAL RAINFALL (mm)=	25.00	25.00		25.00
RUNOFF COEFFICIENT =	0.96	0.19		0.88

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0004)	Area (ha)= 0.05
ID= 1 DT= 5.0 min	Total Imp(%)= 83.00 Dir. Conn.(%)= 83.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.04	0.01
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	17.51	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.07	1.083	5.70	2.083	5.19	3.08	2.80
0.167	2.07	1.167	5.70	2.167	5.19	3.17	2.80
0.250	2.27	1.250	10.78	2.250	4.47	3.25	2.62
0.333	2.27	1.333	10.78	2.333	4.47	3.33	2.62
0.417	2.52	1.417	50.21	2.417	3.95	3.42	2.48
0.500	2.52	1.500	50.21	2.500	3.95	3.50	2.48
0.583	2.88	1.583	13.37	2.583	3.56	3.58	2.35
0.667	2.88	1.667	13.37	2.667	3.56	3.67	2.35
0.750	3.38	1.750	8.29	2.750	3.25	3.75	2.23
0.833	3.38	1.833	8.29	2.833	3.25	3.83	2.23
0.917	4.17	1.917	6.30	2.917	3.01	3.92	2.14
1.000	4.18	2.000	6.29	3.000	3.01	4.00	2.14

```
     Max.Eff.Inten.(mm/hr)=      50.21          6.66
               over (min)         5.00         10.00
     Storage Coeff.  (min)=       1.18 (ii)     6.11 (ii)
     Unit Hyd. Tpeak (min)=       5.00         10.00
     Unit Hyd. peak  (cms)=       0.33          0.15
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.01          0.00          0.005 (iii)
     TIME TO PEAK    (hrs)=       1.50          1.58          1.50
     RUNOFF VOLUME    (mm)=      24.00          4.79         20.71
     TOTAL RAINFALL   (mm)=      25.00         25.00         25.00
     RUNOFF COEFFICIENT   =       0.96          0.19          0.83

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0005)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)     (cms)    (hrs)     (mm)
       ID1= 1 (  0001):     0.12   0.015     1.50    22.06
     + ID2= 2 (  0004):     0.05   0.005     1.50    20.71
       ================================================
       ID = 3 (  0005):     0.17   0.020     1.50    21.68

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| CALIB            |
| STANDHYD (  0008)|   Area    (ha)=   0.08
|ID= 1 DT= 5.0 min |   Total Imp(%)=   9.00   Dir. Conn.(%)=   9.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.01          0.07
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=      23.09         40.00
     Mannings n           =      0.013         0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
               0.083    2.07 | 1.083    5.70 | 2.083    5.19 |  3.08
2.80
               0.167    2.07 | 1.167    5.70 | 2.167    5.19 |  3.17
2.80
               0.250    2.27 | 1.250   10.78 | 2.250    4.47 |  3.25
2.62
               0.333    2.27 | 1.333   10.78 | 2.333    4.47 |  3.33
2.62
               0.417    2.52 | 1.417   50.21 | 2.417    3.95 |  3.42
2.48
               0.500    2.52 | 1.500   50.21 | 2.500    3.95 |  3.50
2.48
               0.583    2.88 | 1.583   13.37 | 2.583    3.56 |  3.58
2.35
               0.667    2.88 | 1.667   13.37 | 2.667    3.56 |  3.67
2.35
               0.750    3.38 | 1.750    8.29 | 2.750    3.25 |  3.75
2.23
               0.833    3.38 | 1.833    8.29 | 2.833    3.25 |  3.83
2.23
               0.917    4.17 | 1.917    6.30 | 2.917    3.01 |  3.92
2.14
               1.000    4.18 | 2.000    6.29 | 3.000    3.01 |  4.00
2.14

     Max.Eff.Inten.(mm/hr)=      50.21          4.50
               over (min)         5.00         30.00
     Storage Coeff.  (min)=       1.40 (ii)    25.79 (ii)
     Unit Hyd. Tpeak (min)=       5.00         30.00
     Unit Hyd. peak  (cms)=       0.33          0.04
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.00          0.00          0.001 (iii)
     TIME TO PEAK    (hrs)=       1.50          2.00          1.50
     RUNOFF VOLUME    (mm)=      24.00          4.79          6.32
     TOTAL RAINFALL   (mm)=      25.00         25.00         25.00
     RUNOFF COEFFICIENT   =       0.96          0.19          0.25

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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 FINISH
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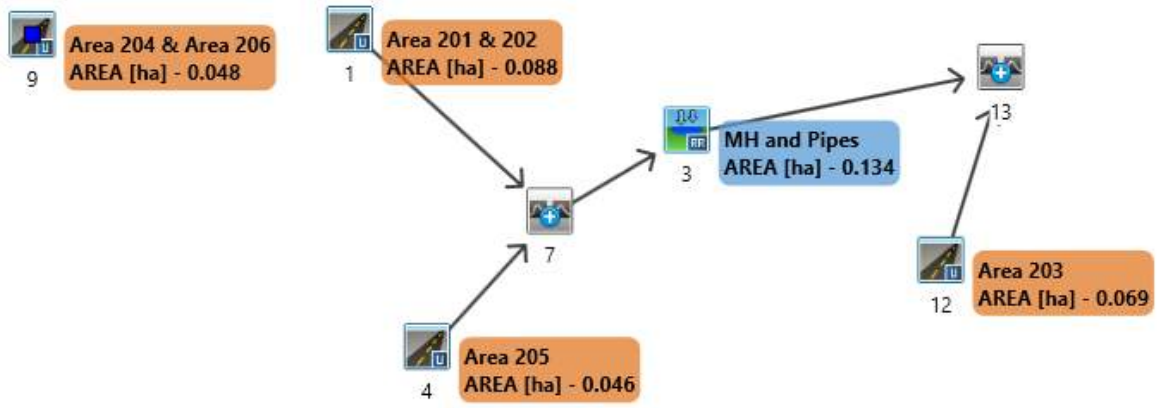
Post-Development VOH Model Schematic



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================================================================================
==================================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO
6.2\VO2\voin.dat
  Output  filename: C:\Users\KimJo\AppData\Local\Civica\VH5\5f9fa1fb-
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  Summary filename: C:\Users\KimJo\AppData\Local\Civica\VH5\5f9fa1fb-
87a1-436c-84fa-29e684f29ce0\cff1e640-e193-465e-b0fc-241bf70b6776\scenar


DATE: 09/22/2025                          TIME: 02:46:33

USER:


COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------
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  ***********************************************
  ** SIMULATION : 002yr 4hr 10min Chicago Copy  **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 732.951
| Ptotal= 33.89 mm |                          B=   6.200
--------------------                          C=   0.810
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  4.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33

                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
                 0.00    2.05 |  1.00   18.21 |  2.00    5.10 |  3.00
2.46
                 0.17    2.37 |  1.17   76.80 |  2.17    4.29 |  3.17
2.28
                 0.33    2.81 |  1.33   24.08 |  2.33    3.72 |  3.33
2.12
                 0.50    3.50 |  1.50   12.36 |  2.50    3.29 |  3.50
1.99
                 0.67    4.69 |  1.67    8.32 |  2.67    2.95 |  3.67
1.87
                 0.83    7.31 |  1.83    6.30 |  2.83    2.68 |  3.83
1.77


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--------------------
| CALIB            |
| STANDHYD (  0009)|   Area     (ha)=   0.05
|ID= 1 DT= 5.0 min |   Total Imp(%)=  27.00   Dir. Conn.(%)=  27.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.01          0.04
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=      17.89         40.00
     Mannings n           =      0.013         0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                             ---- TRANSFORMED HYETOGRAPH ----
                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
                0.083    2.05 | 1.083   18.21 | 2.083    5.10 |  3.08
2.46
                0.167    2.05 | 1.167   18.21 | 2.167    5.10 |  3.17
2.46
                0.250    2.37 | 1.250   76.80 | 2.250    4.29 |  3.25
2.28
                0.333    2.37 | 1.333   76.80 | 2.333    4.29 |  3.33
2.28
                0.417    2.81 | 1.417   24.08 | 2.417    3.72 |  3.42
2.12
                0.500    2.81 | 1.500   24.08 | 2.500    3.72 |  3.50
2.12
                0.583    3.50 | 1.583   12.36 | 2.583    3.29 |  3.58
1.99
                0.667    3.50 | 1.667   12.36 | 2.667    3.29 |  3.67
1.99
                0.750    4.69 | 1.750    8.32 | 2.750    2.95 |  3.75
1.87
                0.833    4.69 | 1.833    8.32 | 2.833    2.95 |  3.83
1.87
                0.917    7.31 | 1.917    6.30 | 2.917    2.68 |  3.92
1.77
                1.000    7.31 | 2.000    6.30 | 3.000    2.68 |  4.00
1.77

     Max.Eff.Inten.(mm/hr)=      76.80         12.53
               over (min)        5.00         20.00
     Storage Coeff.  (min)=      1.01 (ii)    17.21 (ii)
     Unit Hyd. Tpeak (min)=      5.00         20.00
     Unit Hyd. peak  (cms)=      0.34          0.06
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.00          0.00      0.003 (iii)
     TIME TO PEAK    (hrs)=      1.33          1.58      1.33
     RUNOFF VOLUME    (mm)=     32.89          9.03     15.19
     TOTAL RAINFALL   (mm)=     33.89         33.89     33.89
     RUNOFF COEFFICIENT   =      0.97          0.27      0.45

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0012)|   Area     (ha)=   0.07
|ID= 1 DT= 5.0 min |   Total Imp(%)=  75.00   Dir. Conn.(%)=  75.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.05          0.02
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=      21.45         40.00
     Mannings n           =      0.013         0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                             ---- TRANSFORMED HYETOGRAPH ----
                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
                0.083    2.05 | 1.083   18.21 | 2.083    5.10 |  3.08
2.46
                0.167    2.05 | 1.167   18.21 | 2.167    5.10 |  3.17
2.46
                0.250    2.37 | 1.250   76.80 | 2.250    4.29 |  3.25
2.28
                0.333    2.37 | 1.333   76.80 | 2.333    4.29 |  3.33
2.28
                0.417    2.81 | 1.417   24.08 | 2.417    3.72 |  3.42
2.12
                0.500    2.81 | 1.500   24.08 | 2.500    3.72 |  3.50
2.12
                0.583    3.50 | 1.583   12.36 | 2.583    3.29 |  3.58
1.99
                0.667    3.50 | 1.667   12.36 | 2.667    3.29 |  3.67
1.99
                0.750    4.69 | 1.750    8.32 | 2.750    2.95 |  3.75
1.87
                0.833    4.69 | 1.833    8.32 | 2.833    2.95 |  3.83
1.87
                0.917    7.31 | 1.917    6.30 | 2.917    2.68 |  3.92
1.77
                1.000    7.31 | 2.000    6.30 | 3.000    2.68 |  4.00
1.77

     Max.Eff.Inten.(mm/hr)=      76.80         12.53
               over (min)        5.00         20.00
     Storage Coeff.  (min)=      1.13 (ii)    17.32 (ii)
     Unit Hyd. Tpeak (min)=      5.00         20.00
     Unit Hyd. peak  (cms)=      0.34          0.06
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.01          0.00      0.011 (iii)
     TIME TO PEAK    (hrs)=      1.33          1.58      1.33
     RUNOFF VOLUME    (mm)=     32.89          9.03     26.82
     TOTAL RAINFALL   (mm)=     33.89         33.89     33.89
     RUNOFF COEFFICIENT   =      0.97          0.27      0.79

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0001)|   Area     (ha)=   0.09
|ID= 1 DT= 5.0 min |   Total Imp(%)=  97.00   Dir. Conn.(%)=  97.00
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```
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.09         0.00
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      24.22        40.00
     Mannings n           =      0.013        0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
               0.083    2.05 | 1.083   18.21 | 2.083    5.10 |  3.08
2.46
               0.167    2.05 | 1.167   18.21 | 2.167    5.10 |  3.17
2.46
               0.250    2.37 | 1.250   76.80 | 2.250    4.29 |  3.25
2.28
               0.333    2.37 | 1.333   76.80 | 2.333    4.29 |  3.33
2.28
               0.417    2.81 | 1.417   24.08 | 2.417    3.72 |  3.42
2.12
               0.500    2.81 | 1.500   24.08 | 2.500    3.72 |  3.50
2.12
               0.583    3.50 | 1.583   12.36 | 2.583    3.29 |  3.58
1.99
               0.667    3.50 | 1.667   12.36 | 2.667    3.29 |  3.67
1.99
               0.750    4.69 | 1.750    8.32 | 2.750    2.95 |  3.75
1.87
               0.833    4.69 | 1.833    8.32 | 2.833    2.95 |  3.83
1.87
               0.917    7.31 | 1.917    6.30 | 2.917    2.68 |  3.92
1.77
               1.000    7.31 | 2.000    6.30 | 3.000    2.68 |  4.00
1.77

     Max.Eff.Inten.(mm/hr)=      76.80        16.12
               over (min)        5.00         5.00
     Storage Coeff.  (min)=      1.21 (ii)    3.17 (ii)
     Unit Hyd. Tpeak (min)=      5.00         5.00
     Unit Hyd. peak  (cms)=      0.33         0.27
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.02         0.00      0.018 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.33       1.33
     RUNOFF VOLUME    (mm)=     32.89         9.03      32.17
     TOTAL RAINFALL   (mm)=     33.89        33.89      33.89
     RUNOFF COEFFICIENT   =      0.97         0.27       0.95

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0004)|   Area    (ha)=   0.05
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.05         0.00
     Dep. Storage     (mm)=       1.00         1.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      17.59        40.00
     Mannings n           =      0.013        0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
               0.083    2.05 | 1.083   18.21 | 2.083    5.10 |  3.08
2.46
               0.167    2.05 | 1.167   18.21 | 2.167    5.10 |  3.17
2.46
               0.250    2.37 | 1.250   76.80 | 2.250    4.29 |  3.25
2.28
               0.333    2.37 | 1.333   76.80 | 2.333    4.29 |  3.33
2.28
               0.417    2.81 | 1.417   24.08 | 2.417    3.72 |  3.42
2.12
               0.500    2.81 | 1.500   24.08 | 2.500    3.72 |  3.50
2.12
               0.583    3.50 | 1.583   12.36 | 2.583    3.29 |  3.58
1.99
               0.667    3.50 | 1.667   12.36 | 2.667    3.29 |  3.67
1.99
               0.750    4.69 | 1.750    8.32 | 2.750    2.95 |  3.75
1.87
               0.833    4.69 | 1.833    8.32 | 2.833    2.95 |  3.83
1.87
               0.917    7.31 | 1.917    6.30 | 2.917    2.68 |  3.92
1.77
               1.000    7.31 | 2.000    6.30 | 3.000    2.68 |  4.00
1.77

     Max.Eff.Inten.(mm/hr)=      76.80        73.96
               over (min)        5.00         5.00
     Storage Coeff.  (min)=      1.00 (ii)    2.25 (ii)
     Unit Hyd. Tpeak (min)=      5.00         5.00
     Unit Hyd. peak  (cms)=      0.34         0.30
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.01         0.00      0.010 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.33       1.33
     RUNOFF VOLUME    (mm)=     32.89        30.51      32.86
     TOTAL RAINFALL   (mm)=     33.89        33.89      33.89
     RUNOFF COEFFICIENT   =      0.97         0.90       0.97

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  99.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0007)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0001):      0.09    0.018     1.33    32.17
     + ID2= 2 (  0004):      0.05    0.010     1.33    32.86
       ================================================
       ID = 3 (  0007):      0.13    0.028     1.33    32.41

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| RESERVOIR(  0003)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000    |  0.0374      0.0016
                         0.0363     0.0009    |  0.0380      0.0025
                         0.0369     0.0010    |  0.0000      0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0007)    0.134     0.028     1.33       32.41
   OUTFLOW: ID= 1 (  0003)    0.134     0.025     1.33       32.40

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 87.55
                  TIME SHIFT OF PEAK FLOW          (min)=  0.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0007

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--------------------
| ADD HYD  (  0013)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0012):      0.07    0.011     1.33    26.82
     + ID2= 2 (  0003):      0.13    0.025     1.33    32.40
       ================================================
       ID = 3 (  0013):      0.20    0.036     1.33    30.51

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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       V    V   I    SSSSS  U   U    A    L                (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO
6.2\VO2\voin.dat
  Output  filename: C:\Users\KimJo\AppData\Local\Civica\VH5\5f9fa1fb-
87a1-436c-84fa-29e684f29ce0\049358d6-4baa-4291-9018-f01193c4ae89\scenar
  Summary filename: C:\Users\KimJo\AppData\Local\Civica\VH5\5f9fa1fb-
87a1-436c-84fa-29e684f29ce0\049358d6-4baa-4291-9018-f01193c4ae89\scenar


DATE: 09/22/2025                          TIME: 02:46:33

USER:


COMMENTS: _____
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  ************************************************
  ** SIMULATION : 005yr 4hr 10min Chicago Copy  **
  ************************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 998.070
| Ptotal= 45.16 mm |                          B=   6.050
--------------------                          C=   0.814
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  4.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33

                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
                 0.00    2.68 |  1.00   24.17 |  2.00    6.69 |  3.00
3.22
                 0.17    3.10 |  1.17  104.21 |  2.17    5.63 |  3.17
2.98
                 0.33    3.68 |  1.33   32.03 |  2.33    4.87 |  3.33
2.77
                 0.50    4.58 |  1.50   16.34 |  2.50    4.30 |  3.50
2.60
                 0.67    6.15 |  1.67   10.96 |  2.67    3.86 |  3.67
2.44
                 0.83    9.61 |  1.83    8.29 |  2.83    3.51 |  3.83
2.31


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--------------------
| CALIB            |
| STANDHYD (  0009)|   Area    (ha)=   0.05
|ID= 1 DT= 5.0 min |   Total Imp(%)=  27.00   Dir. Conn.(%)=  27.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.01         0.04
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      17.89        40.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                                ---- TRANSFORMED HYETOGRAPH ----
                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
                 0.083    2.68 | 1.083   24.17 | 2.083    6.69 |  3.08
3.22
                 0.167    2.68 | 1.167   24.17 | 2.167    6.69 |  3.17
3.22
                 0.250    3.10 | 1.250  104.21 | 2.250    5.63 |  3.25
2.98
                 0.333    3.10 | 1.333  104.21 | 2.333    5.63 |  3.33
2.98
                 0.417    3.68 | 1.417   32.03 | 2.417    4.87 |  3.42
2.77
                 0.500    3.68 | 1.500   32.03 | 2.500    4.87 |  3.50
2.77
                 0.583    4.58 | 1.583   16.34 | 2.583    4.30 |  3.58
2.60
                 0.667    4.58 | 1.667   16.34 | 2.667    4.30 |  3.67
2.60
                 0.750    6.15 | 1.750   10.96 | 2.750    3.86 |  3.75
2.44
                 0.833    6.15 | 1.833   10.96 | 2.833    3.86 |  3.83
2.44
                 0.917    9.61 | 1.917    8.29 | 2.917    3.51 |  3.92
2.31
                 1.000    9.61 | 2.000    8.29 | 3.000    3.51 |  4.00
2.31

     Max.Eff.Inten.(mm/hr)=     104.21        25.45
               over (min)          5.00        15.00
     Storage Coeff.  (min)=       0.89 (ii)   13.10 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.34         0.08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.00          0.004 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.50          1.33
     RUNOFF VOLUME    (mm)=      44.16        15.56         23.13
     TOTAL RAINFALL   (mm)=      45.16        45.16         45.16
     RUNOFF COEFFICIENT   =       0.98         0.34          0.51

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0012)|   Area    (ha)=   0.07
|ID= 1 DT= 5.0 min |   Total Imp(%)=  75.00   Dir. Conn.(%)=  75.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.05         0.02
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      21.45        40.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                                ---- TRANSFORMED HYETOGRAPH ----
                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
                 0.083    2.68 | 1.083   24.17 | 2.083    6.69 |  3.08
3.22
                 0.167    2.68 | 1.167   24.17 | 2.167    6.69 |  3.17
3.22
                 0.250    3.10 | 1.250  104.21 | 2.250    5.63 |  3.25
2.98
                 0.333    3.10 | 1.333  104.21 | 2.333    5.63 |  3.33
2.98
                 0.417    3.68 | 1.417   32.03 | 2.417    4.87 |  3.42
2.77
                 0.500    3.68 | 1.500   32.03 | 2.500    4.87 |  3.50
2.77
                 0.583    4.58 | 1.583   16.34 | 2.583    4.30 |  3.58
2.60
                 0.667    4.58 | 1.667   16.34 | 2.667    4.30 |  3.67
2.60
                 0.750    6.15 | 1.750   10.96 | 2.750    3.86 |  3.75
2.44
                 0.833    6.15 | 1.833   10.96 | 2.833    3.86 |  3.83
2.44
                 0.917    9.61 | 1.917    8.29 | 2.917    3.51 |  3.92
2.31
                 1.000    9.61 | 2.000    8.29 | 3.000    3.51 |  4.00
2.31

     Max.Eff.Inten.(mm/hr)=     104.21        30.85
               over (min)          5.00        10.00
     Storage Coeff.  (min)=       1.00 (ii)    5.47 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.34         0.16
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.00          0.016 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42          1.33
     RUNOFF VOLUME    (mm)=      44.16        15.56         36.97
     TOTAL RAINFALL   (mm)=      45.16        45.16         45.16
     RUNOFF COEFFICIENT   =       0.98         0.34          0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0001)|   Area    (ha)=   0.09
|ID= 1 DT= 5.0 min |   Total Imp(%)=  97.00   Dir. Conn.(%)=  97.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.09         0.00
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      24.22        40.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                                ---- TRANSFORMED HYETOGRAPH ----
                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
                 0.083    2.68 | 1.083   24.17 | 2.083    6.69 |  3.08
3.22
                 0.167    2.68 | 1.167   24.17 | 2.167    6.69 |  3.17
3.22
                 0.250    3.10 | 1.250  104.21 | 2.250    5.63 |  3.25
2.98
                 0.333    3.10 | 1.333  104.21 | 2.333    5.63 |  3.33
2.98
                 0.417    3.68 | 1.417   32.03 | 2.417    4.87 |  3.42
2.77
                 0.500    3.68 | 1.500   32.03 | 2.500    4.87 |  3.50
2.77
                 0.583    4.58 | 1.583   16.34 | 2.583    4.30 |  3.58
2.60
                 0.667    4.58 | 1.667   16.34 | 2.667    4.30 |  3.67
2.60
                 0.750    6.15 | 1.750   10.96 | 2.750    3.86 |  3.75
2.44
                 0.833    6.15 | 1.833   10.96 | 2.833    3.86 |  3.83
2.44
                 0.917    9.61 | 1.917    8.29 | 2.917    3.51 |  3.92
2.31
                 1.000    9.61 | 2.000    8.29 | 3.000    3.51 |  4.00
2.31
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     Max.Eff.Inten.(mm/hr)=     104.21        30.85
               over (min)         5.00         5.00
     Storage Coeff.  (min)=       1.07 (ii)    2.80 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.28
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.00          0.025 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33          1.33
     RUNOFF VOLUME    (mm)=      44.16        15.56         43.30
     TOTAL RAINFALL   (mm)=      45.16        45.16         45.16
     RUNOFF COEFFICIENT   =       0.98         0.34          0.96

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------
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--------------------
| CALIB            |
| STANDHYD (  0004)|   Area    (ha)=   0.05
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.05         0.00
     Dep. Storage     (mm)=       1.00         1.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      17.59        40.00
     Mannings n            =      0.013        0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
              0.083    2.68 | 1.083   24.17 | 2.083    6.69 |  3.08
3.22
              0.167    2.68 | 1.167   24.17 | 2.167    6.69 |  3.17
3.22
              0.250    3.10 | 1.250  104.21 | 2.250    5.63 |  3.25
2.98
              0.333    3.10 | 1.333  104.21 | 2.333    5.63 |  3.33
2.98
              0.417    3.68 | 1.417   32.03 | 2.417    4.87 |  3.42
2.77
              0.500    3.68 | 1.500   32.03 | 2.500    4.87 |  3.50
2.77
              0.583    4.58 | 1.583   16.34 | 2.583    4.30 |  3.58
2.60
              0.667    4.58 | 1.667   16.34 | 2.667    4.30 |  3.67
2.60
              0.750    6.15 | 1.750   10.96 | 2.750    3.86 |  3.75
2.44
              0.833    6.15 | 1.833   10.96 | 2.833    3.86 |  3.83
2.44
              0.917    9.61 | 1.917    8.29 | 2.917    3.51 |  3.92
2.31
              1.000    9.61 | 2.000    8.29 | 3.000    3.51 |  4.00
2.31

     Max.Eff.Inten.(mm/hr)=     104.21       101.88
               over (min)         5.00         5.00
     Storage Coeff.  (min)=       0.89 (ii)    1.99 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.31
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.00          0.013 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33          1.33
     RUNOFF VOLUME    (mm)=      44.16        41.74         44.14
     TOTAL RAINFALL   (mm)=      45.16        45.16         45.16
     RUNOFF COEFFICIENT   =       0.98         0.92          0.98

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  99.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0007)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0001):     0.09   0.025     1.33    43.30
     + ID2= 2 (  0004):     0.05   0.013     1.33    44.14
       ================================================
       ID = 3 (  0007):     0.13   0.038     1.33    43.59

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| RESERVOIR(  0003)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)      (ha.m.)   |   (cms)      (ha.m.)
                          0.0000     0.0000    |   0.0374     0.0016
                          0.0363     0.0009    |   0.0380     0.0025
                          0.0369     0.0010    |   0.0000     0.0000

                                AREA     QPEAK     TPEAK      R.V.
                                (ha)     (cms)     (hrs)      (mm)
   INFLOW : ID= 2 (  0007)      0.134     0.038      1.33     43.59
   OUTFLOW: ID= 1 (  0003)      0.134     0.034      1.33     43.58

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 87.64
                  TIME SHIFT OF PEAK FLOW          (min)=  0.00
                  MAXIMUM  STORAGE   USED        (ha.m.)=  0.0009

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--------------------
| ADD HYD  (  0013)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0012):     0.07   0.016     1.33    36.97
     + ID2= 2 (  0003):     0.13   0.034     1.33    43.58
       ================================================
       ID = 3 (  0013):     0.20   0.050     1.33    41.34

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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==========================================================================
====================================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO
6.2\VO2\voin.dat
  Output  filename: C:\Users\KimJo\AppData\Local\Civica\VH5\5f9fa1fb-
87a1-436c-84fa-29e684f29ce0\3fd6a161-95ac-4054-9761-a718d909a9d2\scenar
  Summary filename: C:\Users\KimJo\AppData\Local\Civica\VH5\5f9fa1fb-
87a1-436c-84fa-29e684f29ce0\3fd6a161-95ac-4054-9761-a718d909a9d2\scenar


DATE: 09/22/2025                          TIME: 02:46:33

USER:


COMMENTS: _____

--------------------------------------------------------------------------
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  ************************************************
  ** SIMULATION : 010yr 4hr 10min Chicago Copy  **
  ************************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1174.184
| Ptotal= 52.56 mm |                          B=   6.010
--------------------                          C=   0.816
                        used in:   INTENSITY =  A / (t + B)^C

                        Duration of storm  =  4.00 hrs
                        Storm time step    = 10.00 min
                        Time to peak ratio =  0.33

               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
              0.00    3.09 |  1.00   28.10 |  2.00    7.73 |  3.00
3.71
              0.17    3.57 |  1.17  122.17 |  2.17    6.50 |  3.17
3.43
              0.33    4.25 |  1.33   37.28 |  2.33    5.62 |  3.33
3.20
              0.50    5.29 |  1.50   18.95 |  2.50    4.97 |  3.50
2.99
              0.67    7.11 |  1.67   12.70 |  2.67    4.46 |  3.67
2.81
              0.83   11.13 |  1.83    9.59 |  2.83    4.05 |  3.83
2.66

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--------------------
| CALIB            |
| STANDHYD (  0009)|   Area    (ha)=   0.05
|ID= 1 DT= 5.0 min |   Total Imp(%)=  27.00   Dir. Conn.(%)=  27.00
```

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--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.01         0.04
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      17.89        40.00
     Mannings n             =    0.013        0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
               0.083    3.09 | 1.083   28.10 | 2.083    7.73 |  3.08
3.71
               0.167    3.09 | 1.167   28.10 | 2.167    7.73 |  3.17
3.71
               0.250    3.57 | 1.250  122.17 | 2.250    6.50 |  3.25
3.43
               0.333    3.57 | 1.333  122.17 | 2.333    6.50 |  3.33
3.43
               0.417    4.25 | 1.417   37.28 | 2.417    5.62 |  3.42
3.20
               0.500    4.25 | 1.500   37.28 | 2.500    5.62 |  3.50
3.20
               0.583    5.29 | 1.583   18.95 | 2.583    4.97 |  3.58
2.99
               0.667    5.29 | 1.667   18.95 | 2.667    4.97 |  3.67
2.99
               0.750    7.11 | 1.750   12.70 | 2.750    4.46 |  3.75
2.81
               0.833    7.11 | 1.833   12.70 | 2.833    4.46 |  3.83
2.81
               0.917   11.13 | 1.917    9.59 | 2.917    4.05 |  3.92
2.66
               1.000   11.13 | 2.000    9.59 | 3.000    4.05 |  4.00
2.66

     Max.Eff.Inten.(mm/hr)=     122.17        42.11
               over (min)        5.00        15.00
     Storage Coeff.  (min)=     0.84 (ii)   10.81 (ii)
     Unit Hyd. Tpeak (min)=     5.00        15.00
     Unit Hyd. peak  (cms)=     0.34         0.09
                                                      *TOTALS*
     PEAK FLOW       (cms)=     0.00         0.00       0.006 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.50       1.33
     RUNOFF VOLUME    (mm)=    51.56        20.37      28.65
     TOTAL RAINFALL   (mm)=    52.56        52.56      52.56
     RUNOFF COEFFICIENT   =     0.98         0.39       0.55

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------
-------
--------------------
| CALIB            |
| STANDHYD (  0012)|   Area    (ha)=   0.07
|ID= 1 DT= 5.0 min |   Total Imp(%)=  75.00   Dir. Conn.(%)=  75.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.05         0.02
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      21.45        40.00
     Mannings n             =    0.013        0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
               0.083    3.09 | 1.083   28.10 | 2.083    7.73 |  3.08
3.71
               0.167    3.09 | 1.167   28.10 | 2.167    7.73 |  3.17
3.71
               0.250    3.57 | 1.250  122.17 | 2.250    6.50 |  3.25
3.43
               0.333    3.57 | 1.333  122.17 | 2.333    6.50 |  3.33
3.43
               0.417    4.25 | 1.417   37.28 | 2.417    5.62 |  3.42
3.20
               0.500    4.25 | 1.500   37.28 | 2.500    5.62 |  3.50
3.20
               0.583    5.29 | 1.583   18.95 | 2.583    4.97 |  3.58
2.99
               0.667    5.29 | 1.667   18.95 | 2.667    4.97 |  3.67
2.99
               0.750    7.11 | 1.750   12.70 | 2.750    4.46 |  3.75
2.81
               0.833    7.11 | 1.833   12.70 | 2.833    4.46 |  3.83
2.81
               0.917   11.13 | 1.917    9.59 | 2.917    4.05 |  3.92
2.66
               1.000   11.13 | 2.000    9.59 | 3.000    4.05 |  4.00
2.66

     Max.Eff.Inten.(mm/hr)=     122.17        42.11
               over (min)        5.00        10.00
     Storage Coeff.  (min)=     0.94 (ii)    5.13 (ii)
     Unit Hyd. Tpeak (min)=     5.00        10.00
     Unit Hyd. peak  (cms)=     0.34         0.16
                                                      *TOTALS*
     PEAK FLOW       (cms)=     0.02         0.00       0.019 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.42       1.33
     RUNOFF VOLUME    (mm)=    51.56        20.37      43.71
     TOTAL RAINFALL   (mm)=    52.56        52.56      52.56
     RUNOFF COEFFICIENT   =     0.98         0.39       0.83

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0001)|   Area    (ha)=   0.09
|ID= 1 DT= 5.0 min |   Total Imp(%)=  97.00   Dir. Conn.(%)=  97.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.09         0.00
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      24.22        40.00
     Mannings n             =    0.013        0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
               0.083    3.09 | 1.083   28.10 | 2.083    7.73 |  3.08
3.71
               0.167    3.09 | 1.167   28.10 | 2.167    7.73 |  3.17
3.71
               0.250    3.57 | 1.250  122.17 | 2.250    6.50 |  3.25
3.43
               0.333    3.57 | 1.333  122.17 | 2.333    6.50 |  3.33
3.43
               0.417    4.25 | 1.417   37.28 | 2.417    5.62 |  3.42
3.20
               0.500    4.25 | 1.500   37.28 | 2.500    5.62 |  3.50
3.20
               0.583    5.29 | 1.583   18.95 | 2.583    4.97 |  3.58
2.99
               0.667    5.29 | 1.667   18.95 | 2.667    4.97 |  3.67
2.99
               0.750    7.11 | 1.750   12.70 | 2.750    4.46 |  3.75
2.81
               0.833    7.11 | 1.833   12.70 | 2.833    4.46 |  3.83
2.81
               0.917   11.13 | 1.917    9.59 | 2.917    4.05 |  3.92
2.66
               1.000   11.13 | 2.000    9.59 | 3.000    4.05 |  4.00
2.66

     Max.Eff.Inten.(mm/hr)=     122.17        42.11
               over (min)        5.00         5.00
     Storage Coeff.  (min)=     1.01 (ii)    2.63 (ii)
     Unit Hyd. Tpeak (min)=     5.00         5.00
     Unit Hyd. peak  (cms)=     0.34         0.29
                                                      *TOTALS*
     PEAK FLOW       (cms)=     0.03         0.00       0.029 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.33       1.33
     RUNOFF VOLUME    (mm)=    51.56        20.37      50.62
     TOTAL RAINFALL   (mm)=    52.56        52.56      52.56
     RUNOFF COEFFICIENT   =     0.98         0.39       0.96

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-------
--------------------
| CALIB            |
| STANDHYD (  0004)|   Area    (ha)=   0.05
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.05         0.00
     Dep. Storage     (mm)=       1.00         1.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      17.59        40.00
     Mannings n             =    0.013        0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
```

```
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    3.09 | 1.083   28.10 | 2.083    7.73 |  3.08    3.71
               0.167    3.09 | 1.167   28.10 | 2.167    7.73 |  3.17    3.71
               0.250    3.57 | 1.250  122.17 | 2.250    6.50 |  3.25    3.43
               0.333    3.57 | 1.333  122.17 | 2.333    6.50 |  3.33    3.43
               0.417    4.25 | 1.417   37.28 | 2.417    5.62 |  3.42    3.20
               0.500    4.25 | 1.500   37.28 | 2.500    5.62 |  3.50    3.20
               0.583    5.29 | 1.583   18.95 | 2.583    4.97 |  3.58    2.99
               0.667    5.29 | 1.667   18.95 | 2.667    4.97 |  3.67    2.99
               0.750    7.11 | 1.750   12.70 | 2.750    4.46 |  3.75    2.81
               0.833    7.11 | 1.833   12.70 | 2.833    4.46 |  3.83    2.81
               0.917   11.13 | 1.917    9.59 | 2.917    4.05 |  3.92    2.66
               1.000   11.13 | 2.000    9.59 | 3.000    4.05 |  4.00    2.66

     Max.Eff.Inten.(mm/hr)=     122.17       120.09
               over (min)          5.00         5.00
     Storage Coeff.  (min)=       0.83 (ii)    1.87 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.32
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.00       0.016 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33        1.33
     RUNOFF VOLUME    (mm)=      51.56        49.11       51.53
     TOTAL RAINFALL   (mm)=      52.56        52.56       52.56
     RUNOFF COEFFICIENT   =       0.98         0.93        0.98

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  99.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0007)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)     (cms)    (hrs)     (mm)
       ID1= 1 (  0001):     0.09   0.029     1.33    50.62
     + ID2= 2 (  0004):     0.05   0.016     1.33    51.53
       ====================================================
       ID = 3 (  0007):     0.13   0.045     1.33    50.94

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------
--------------------
| RESERVOIR(  0003)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |  0.0374      0.0016
                          0.0363     0.0009   |  0.0380      0.0025
                          0.0369     0.0010   |  0.0000      0.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0007)     0.134     0.045      1.33      50.94
   OUTFLOW: ID= 1 (  0003)     0.134     0.037      1.33      50.92

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 81.69
                  TIME SHIFT OF PEAK FLOW          (min)=  0.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0011

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--------------------
| ADD HYD  (  0013)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)     (cms)    (hrs)     (mm)
       ID1= 1 (  0012):     0.07   0.019     1.33    43.71
     + ID2= 2 (  0003):     0.13   0.037     1.33    50.92
       ====================================================
       ID = 3 (  0013):     0.20   0.056     1.33    48.48

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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================================================================================
==================================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM

       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO
6.2\VO2\voin.dat
  Output  filename: C:\Users\KimJo\AppData\Local\Civica\VH5\5f9fa1fb-
87a1-436c-84fa-29e684f29ce0\32aaa68e-1688-4d17-94ad-e94a96a5aead\scenar
  Summary filename: C:\Users\KimJo\AppData\Local\Civica\VH5\5f9fa1fb-
87a1-436c-84fa-29e684f29ce0\32aaa68e-1688-4d17-94ad-e94a96a5aead\scenar

DATE: 09/22/2025                          TIME: 02:46:34

USER:


COMMENTS: _____

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  ***********************************************
  ** SIMULATION : 025yr 4hr 10min Chicago Copy  **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1402.884
| Ptotal= 61.76 mm |                          B=   6.020
--------------------                          C=   0.819
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  4.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.00    3.58 |  1.00   33.04 |  2.00    9.01 |  3.00    4.31
               0.17    4.14 |  1.17  144.68 |  2.17    7.57 |  3.17    3.98
               0.33    4.93 |  1.33   43.91 |  2.33    6.54 |  3.33    3.71
               0.50    6.15 |  1.50   22.23 |  2.50    5.78 |  3.50    3.47
               0.67    8.28 |  1.67   14.85 |  2.67    5.18 |  3.67    3.26
               0.83   13.01 |  1.83   11.19 |  2.83    4.70 |  3.83    3.08

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--------------------
| CALIB            |
| STANDHYD (  0009)|   Area     (ha)=   0.05
|ID= 1 DT= 5.0 min |   Total Imp(%)=  27.00   Dir. Conn.(%)=  27.00
--------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.01          0.04
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=      17.89         40.00
     Mannings n             =     0.013         0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                                  ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    3.58 | 1.083   33.04 | 2.083    9.01 |  3.08    4.31
               0.167    3.58 | 1.167   33.04 | 2.167    9.01 |  3.17    4.31
               0.250    4.14 | 1.250  144.68 | 2.250    7.57 |  3.25    3.98
               0.333    4.14 | 1.333  144.68 | 2.333    7.57 |  3.33    3.98
               0.417    4.93 | 1.417   43.91 | 2.417    6.54 |  3.42    3.71
               0.500    4.93 | 1.500   43.91 | 2.500    6.54 |  3.50    3.71
               0.583    6.15 | 1.583   22.23 | 2.583    5.78 |  3.58    3.47
               0.667    6.15 | 1.667   22.23 | 2.667    5.78 |  3.67    3.47
               0.750    8.28 | 1.750   14.85 | 2.750    5.18 |  3.75    3.26
               0.833    8.28 | 1.833   14.85 | 2.833    5.18 |  3.83    3.26
               0.917   13.01 | 1.917   11.19 | 2.917    4.70 |  3.92    3.08
```

```
              1.000   13.01 | 2.000   11.19 | 3.000    4.70 |  4.00
3.08

     Max.Eff.Inten.(mm/hr)=     144.68        57.63
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       0.78 (ii)    9.58 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.34         0.11
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.00          0.008 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42          1.33
     RUNOFF VOLUME    (mm)=      60.76        26.79         35.87
     TOTAL RAINFALL   (mm)=      61.76        61.76         61.76
     RUNOFF COEFFICIENT   =       0.98         0.43          0.58

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0012)|   Area    (ha)=   0.07
|ID= 1 DT= 5.0 min |   Total Imp(%)=  75.00   Dir. Conn.(%)=  75.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.05         0.02
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      21.45        40.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                        ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
               0.083    3.58 | 1.083   33.04 | 2.083    9.01 |  3.08
4.31
               0.167    3.58 | 1.167   33.04 | 2.167    9.01 |  3.17
4.31
               0.250    4.14 | 1.250  144.68 | 2.250    7.57 |  3.25
3.98
               0.333    4.14 | 1.333  144.68 | 2.333    7.57 |  3.33
3.98
               0.417    4.93 | 1.417   43.91 | 2.417    6.54 |  3.42
3.71
               0.500    4.93 | 1.500   43.91 | 2.500    6.54 |  3.50
3.71
               0.583    6.15 | 1.583   22.23 | 2.583    5.78 |  3.58
3.47
               0.667    6.15 | 1.667   22.23 | 2.667    5.78 |  3.67
3.47
               0.750    8.28 | 1.750   14.85 | 2.750    5.18 |  3.75
3.26
               0.833    8.28 | 1.833   14.85 | 2.833    5.18 |  3.83
3.26
               0.917   13.01 | 1.917   11.19 | 2.917    4.70 |  3.92
3.08
               1.000   13.01 | 2.000   11.19 | 3.000    4.70 |  4.00
3.08

     Max.Eff.Inten.(mm/hr)=     144.68        57.63
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       0.88 (ii)    4.80 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.22
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.00          0.023 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33          1.33
     RUNOFF VOLUME    (mm)=      60.76        26.79         52.25
     TOTAL RAINFALL   (mm)=      61.76        61.76         61.76
     RUNOFF COEFFICIENT   =       0.98         0.43          0.85

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0001)|   Area    (ha)=   0.09
|ID= 1 DT= 5.0 min |   Total Imp(%)=  97.00   Dir. Conn.(%)=  97.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.09         0.00
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      24.22        40.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                        ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
               0.083    3.58 | 1.083   33.04 | 2.083    9.01 |  3.08
4.31
               0.167    3.58 | 1.167   33.04 | 2.167    9.01 |  3.17
4.31
               0.250    4.14 | 1.250  144.68 | 2.250    7.57 |  3.25
3.98
               0.333    4.14 | 1.333  144.68 | 2.333    7.57 |  3.33
3.98
               0.417    4.93 | 1.417   43.91 | 2.417    6.54 |  3.42
3.71
               0.500    4.93 | 1.500   43.91 | 2.500    6.54 |  3.50
3.71
               0.583    6.15 | 1.583   22.23 | 2.583    5.78 |  3.58
3.47
               0.667    6.15 | 1.667   22.23 | 2.667    5.78 |  3.67
3.47
               0.750    8.28 | 1.750   14.85 | 2.750    5.18 |  3.75
3.26
               0.833    8.28 | 1.833   14.85 | 2.833    5.18 |  3.83
3.26
               0.917   13.01 | 1.917   11.19 | 2.917    4.70 |  3.92
3.08
               1.000   13.01 | 2.000   11.19 | 3.000    4.70 |  4.00
3.08

     Max.Eff.Inten.(mm/hr)=     144.68        57.63
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       0.94 (ii)    2.46 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.30
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.03         0.00          0.035 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33          1.33
     RUNOFF VOLUME    (mm)=      60.76        26.79         59.74
     TOTAL RAINFALL   (mm)=      61.76        61.76         61.76
     RUNOFF COEFFICIENT   =       0.98         0.43          0.97

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0004)|   Area    (ha)=   0.05
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.05         0.00
     Dep. Storage     (mm)=       1.00         1.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      17.59        40.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                        ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
               0.083    3.58 | 1.083   33.04 | 2.083    9.01 |  3.08
4.31
               0.167    3.58 | 1.167   33.04 | 2.167    9.01 |  3.17
4.31
               0.250    4.14 | 1.250  144.68 | 2.250    7.57 |  3.25
3.98
               0.333    4.14 | 1.333  144.68 | 2.333    7.57 |  3.33
3.98
               0.417    4.93 | 1.417   43.91 | 2.417    6.54 |  3.42
3.71
               0.500    4.93 | 1.500   43.91 | 2.500    6.54 |  3.50
3.71
               0.583    6.15 | 1.583   22.23 | 2.583    5.78 |  3.58
3.47
               0.667    6.15 | 1.667   22.23 | 2.667    5.78 |  3.67
3.47
               0.750    8.28 | 1.750   14.85 | 2.750    5.18 |  3.75
3.26
               0.833    8.28 | 1.833   14.85 | 2.833    5.18 |  3.83
3.26
               0.917   13.01 | 1.917   11.19 | 2.917    4.70 |  3.92
3.08
               1.000   13.01 | 2.000   11.19 | 3.000    4.70 |  4.00
3.08

     Max.Eff.Inten.(mm/hr)=     144.68       142.85
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       0.78 (ii)    1.75 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.32
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.00          0.019 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33          1.33
     RUNOFF VOLUME    (mm)=      60.76        58.30         60.74
     TOTAL RAINFALL   (mm)=      61.76        61.76         61.76
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     RUNOFF COEFFICIENT   =       0.98         0.94           0.98

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  99.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0007)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0001):     0.09   0.035     1.33    59.74
     + ID2= 2 (  0004):     0.05   0.019     1.33    60.74
       ====================================================
       ID = 3 (  0007):     0.13   0.053     1.33    60.09

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| RESERVOIR(  0003)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000    |  0.0374     0.0016
                         0.0363     0.0009    |  0.0380     0.0025
                         0.0369     0.0010    |  0.0000     0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0007)    0.134     0.053      1.33      60.09
   OUTFLOW: ID= 1 (  0003)    0.134     0.037      1.33      60.07

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 69.54
                  TIME SHIFT OF PEAK FLOW          (min)=  0.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0016

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--------------------
| ADD HYD  (  0013)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0012):     0.07   0.023     1.33    52.25
     + ID2= 2 (  0003):     0.13   0.037     1.33    60.07
       ====================================================
       ID = 3 (  0013):     0.20   0.061     1.33    57.42

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO
6.2\VO2\voin.dat
  Output  filename: C:\Users\KimJo\AppData\Local\Civica\VH5\5f9fa1fb-
87a1-436c-84fa-29e684f29ce0\ae9c6d1d-4146-4a3e-9e23-728e819f5d3c\scenar
  Summary filename: C:\Users\KimJo\AppData\Local\Civica\VH5\5f9fa1fb-
87a1-436c-84fa-29e684f29ce0\ae9c6d1d-4146-4a3e-9e23-728e819f5d3c\scenar


DATE: 09/22/2025                          TIME: 02:46:34

USER:


COMMENTS: _____

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  ********************************************
  ** SIMULATION : 050yr 4hr 10min Chicago Copy  **
  ********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1569.580
| Ptotal= 68.73 mm |                          B=   6.010
--------------------                          C=   0.820
                          used in:   INTENSITY =  A / (t + B)^C

                          Duration of storm  =  4.00 hrs
                          Storm time step    = 10.00 min
                          Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
                0.00    3.97 |  1.00   36.76 |  2.00   10.00 |  3.00
4.77
                0.17    4.59 |  1.17  161.50 |  2.17    8.40 |  3.17
4.41
                0.33    5.47 |  1.33   48.87 |  2.33    7.26 |  3.33
4.10
                0.50    6.82 |  1.50   24.70 |  2.50    6.40 |  3.50
3.84
                0.67    9.19 |  1.67   16.49 |  2.67    5.74 |  3.67
3.61
                0.83   14.44 |  1.83   12.42 |  2.83    5.21 |  3.83
3.41

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| CALIB            |
| STANDHYD (  0009)|   Area    (ha)=   0.05
|ID= 1 DT= 5.0 min |   Total Imp(%)=  27.00   Dir. Conn.(%)=  27.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.01          0.04
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=      17.89         40.00
     Mannings n            =      0.013         0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
               0.083    3.97 | 1.083   36.76 | 2.083   10.00 |  3.08
4.77
               0.167    3.97 | 1.167   36.76 | 2.167   10.00 |  3.17
4.77
               0.250    4.59 | 1.250  161.50 | 2.250    8.40 |  3.25
4.41
               0.333    4.59 | 1.333  161.50 | 2.333    8.40 |  3.33
4.41
               0.417    5.47 | 1.417   48.87 | 2.417    7.26 |  3.42
4.10
               0.500    5.47 | 1.500   48.87 | 2.500    7.26 |  3.50
4.10
               0.583    6.82 | 1.583   24.70 | 2.583    6.40 |  3.58
3.84
               0.667    6.82 | 1.667   24.70 | 2.667    6.40 |  3.67
3.84
               0.750    9.19 | 1.750   16.49 | 2.750    5.74 |  3.75
3.61
               0.833    9.19 | 1.833   16.49 | 2.833    5.74 |  3.83
3.61
               0.917   14.44 | 1.917   12.42 | 2.917    5.21 |  3.92
3.41
               1.000   14.44 | 2.000   12.42 | 3.000    5.21 |  4.00
3.41

     Max.Eff.Inten.(mm/hr)=     161.50        70.15
               over (min)          5.00        10.00
     Storage Coeff.  (min)=       0.75 (ii)    8.88 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.34         0.12
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.00          0.009 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42          1.33
     RUNOFF VOLUME    (mm)=      67.73        31.92         41.49
     TOTAL RAINFALL   (mm)=      68.73        68.73         68.73
     RUNOFF COEFFICIENT   =       0.99         0.46          0.60

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0012)|   Area    (ha)=   0.07
|ID= 1 DT= 5.0 min |   Total Imp(%)=  75.00   Dir. Conn.(%)=  75.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.05          0.02
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=      21.45         40.00
     Mannings n            =      0.013         0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.97	1.083	36.76	2.083	10.00	3.08	4.77
0.167	3.97	1.167	36.76	2.167	10.00	3.17	4.77
0.250	4.59	1.250	161.50	2.250	8.40	3.25	4.41
0.333	4.59	1.333	161.50	2.333	8.40	3.33	4.41
0.417	5.47	1.417	48.87	2.417	7.26	3.42	4.10
0.500	5.47	1.500	48.87	2.500	7.26	3.50	4.10
0.583	6.82	1.583	24.70	2.583	6.40	3.58	3.84
0.667	6.82	1.667	24.70	2.667	6.40	3.67	3.84
0.750	9.19	1.750	16.49	2.750	5.74	3.75	3.61
0.833	9.19	1.833	16.49	2.833	5.74	3.83	3.61
0.917	14.44	1.917	12.42	2.917	5.21	3.92	3.41
1.000	14.44	2.000	12.42	3.000	5.21	4.00	3.41

			TOTALS
Max.Eff.Inten.(mm/hr)=	161.50	70.15	
over (min)	5.00	5.00	
Storage Coeff. (min)=	0.84 (ii)	4.59 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.34	0.23	
PEAK FLOW (cms)=	0.02	0.00	0.027 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	67.73	31.92	58.75
TOTAL RAINFALL (mm)=	68.73	68.73	68.73
RUNOFF COEFFICIENT =	0.99	0.46	0.85

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0001) | Area (ha)= 0.09
ID= 1 DT= 5.0 min | Total Imp(%)= 97.00 Dir. Conn.(%)= 97.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.09	0.00
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	24.22	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.97	1.083	36.76	2.083	10.00	3.08	4.77
0.167	3.97	1.167	36.76	2.167	10.00	3.17	4.77
0.250	4.59	1.250	161.50	2.250	8.40	3.25	4.41
0.333	4.59	1.333	161.50	2.333	8.40	3.33	4.41
0.417	5.47	1.417	48.87	2.417	7.26	3.42	4.10
0.500	5.47	1.500	48.87	2.500	7.26	3.50	4.10
0.583	6.82	1.583	24.70	2.583	6.40	3.58	3.84
0.667	6.82	1.667	24.70	2.667	6.40	3.67	3.84
0.750	9.19	1.750	16.49	2.750	5.74	3.75	3.61
0.833	9.19	1.833	16.49	2.833	5.74	3.83	3.61
0.917	14.44	1.917	12.42	2.917	5.21	3.92	3.41
1.000	14.44	2.000	12.42	3.000	5.21	4.00	3.41

			TOTALS
Max.Eff.Inten.(mm/hr)=	161.50	70.15	
over (min)	5.00	5.00	
Storage Coeff. (min)=	0.90 (ii)	2.35 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.34	0.30	
PEAK FLOW (cms)=	0.04	0.00	0.039 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	67.73	31.92	66.65
TOTAL RAINFALL (mm)=	68.73	68.73	68.73
RUNOFF COEFFICIENT =	0.99	0.46	0.97

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0004) | Area (ha)= 0.05
ID= 1 DT= 5.0 min | Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.05	0.00
Dep. Storage	(mm)=	1.00	1.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	17.59	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.97	1.083	36.76	2.083	10.00	3.08	4.77
0.167	3.97	1.167	36.76	2.167	10.00	3.17	4.77
0.250	4.59	1.250	161.50	2.250	8.40	3.25	4.41
0.333	4.59	1.333	161.50	2.333	8.40	3.33	4.41
0.417	5.47	1.417	48.87	2.417	7.26	3.42	4.10
0.500	5.47	1.500	48.87	2.500	7.26	3.50	4.10
0.583	6.82	1.583	24.70	2.583	6.40	3.58	3.84
0.667	6.82	1.667	24.70	2.667	6.40	3.67	3.84
0.750	9.19	1.750	16.49	2.750	5.74	3.75	3.61
0.833	9.19	1.833	16.49	2.833	5.74	3.83	3.61
0.917	14.44	1.917	12.42	2.917	5.21	3.92	3.41
1.000	14.44	2.000	12.42	3.000	5.21	4.00	3.41

			TOTALS
Max.Eff.Inten.(mm/hr)=	161.50	159.83	
over (min)	5.00	5.00	
Storage Coeff. (min)=	0.74 (ii)	1.67 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.34	0.32	
PEAK FLOW (cms)=	0.02	0.00	0.021 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	67.73	65.25	67.70
TOTAL RAINFALL (mm)=	68.73	68.73	68.73
RUNOFF COEFFICIENT =	0.99	0.95	0.99

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 99.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0007) | 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	0.09	0.039	1.33	66.65
+ ID2= 2 (0004):	0.05	0.021	1.33	67.70
ID = 3 (0007):	0.13	0.060	1.33	67.01

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0003) | IN= 2---> OUT= 1 | DT= 5.0 min	OVERFLOW IS OFF				
OUTFLOW (cms)	STORAGE (ha.m.)		OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	|	0.0374	0.0016
0.0363	0.0009	|	0.0380	0.0025
0.0369	0.0010	|	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0007)	0.134	0.060	1.33	67.01
OUTFLOW: ID= 1 (0003)	0.134	0.037	1.42	67.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 62.67

```
                TIME SHIFT OF PEAK FLOW          (min)=  5.00
                MAXIMUM  STORAGE   USED        (ha.m.)=  0.0019

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--------------------
| ADD HYD  (  0013)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
       ID1= 1 (  0012):     0.07   0.027     1.33    58.75
     + ID2= 2 (  0003):     0.13   0.037     1.42    67.00
       ================================================
       ID = 3 (  0013):     0.20   0.064     1.33    64.20

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO
6.2\VO2\voin.dat
  Output  filename: C:\Users\KimJo\AppData\Local\Civica\VH5\5f9fa1fb-
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DATE: 09/22/2025                          TIME: 02:46:34

USER:


COMMENTS: _____

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  ***********************************************
  ** SIMULATION : 100yr 4hr 10min Chicago Copy  **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1735.688
| Ptotal= 76.00 mm |                          B=   6.010
--------------------                          C=   0.820
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  4.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33

                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
                  0.00    4.39 |  1.00   40.65 |  2.00   11.06 |  3.00
5.28
                  0.17    5.07 |  1.17  178.60 |  2.17    9.28 |  3.17
4.88
                  0.33    6.05 |  1.33   54.04 |  2.33    8.02 |  3.33
4.54
                  0.50    7.54 |  1.50   27.31 |  2.50    7.08 |  3.50
4.25
                  0.67   10.16 |  1.67   18.24 |  2.67    6.35 |  3.67
3.99
                  0.83   15.97 |  1.83   13.74 |  2.83    5.76 |  3.83
3.77

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--------------------
| CALIB            |
| STANDHYD (  0009)|   Area    (ha)=   0.05
|ID= 1 DT= 5.0 min |   Total Imp(%)=  27.00   Dir. Conn.(%)=  27.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.01          0.04
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=      17.89         40.00
     Mannings n            =      0.013         0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                        ---- TRANSFORMED HYETOGRAPH ----
                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
                 0.083    4.39 | 1.083   40.65 | 2.083   11.06 |  3.08
5.28
                 0.167    4.39 | 1.167   40.65 | 2.167   11.06 |  3.17
5.28
                 0.250    5.07 | 1.250  178.60 | 2.250    9.28 |  3.25
4.88
                 0.333    5.07 | 1.333  178.60 | 2.333    9.28 |  3.33
4.88
                 0.417    6.05 | 1.417   54.04 | 2.417    8.02 |  3.42
4.54
                 0.500    6.05 | 1.500   54.04 | 2.500    8.02 |  3.50
4.54
                 0.583    7.54 | 1.583   27.31 | 2.583    7.08 |  3.58
4.25
                 0.667    7.54 | 1.667   27.31 | 2.667    7.08 |  3.67
4.25
                 0.750   10.16 | 1.750   18.24 | 2.750    6.35 |  3.75
3.99
                 0.833   10.16 | 1.833   18.24 | 2.833    6.35 |  3.83
3.99
                 0.917   15.97 | 1.917   13.74 | 2.917    5.76 |  3.92
3.77
                 1.000   15.97 | 2.000   13.74 | 3.000    5.76 |  4.00
3.77

     Max.Eff.Inten.(mm/hr)=     178.60         83.65
               over (min)          5.00         10.00
     Storage Coeff.  (min)=       0.72 (ii)     8.30 (ii)
     Unit Hyd. Tpeak (min)=       5.00         10.00
     Unit Hyd. peak  (cms)=       0.34          0.13
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.01          0.01          0.011 (iii)
     TIME TO PEAK    (hrs)=       1.33          1.42          1.33
     RUNOFF VOLUME    (mm)=      75.00         37.48         47.51
     TOTAL RAINFALL   (mm)=      76.00         76.00         76.00
     RUNOFF COEFFICIENT   =       0.99          0.49          0.63

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0012)|   Area    (ha)=   0.07
|ID= 1 DT= 5.0 min |   Total Imp(%)=  75.00   Dir. Conn.(%)=  75.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.05          0.02
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=      21.45         40.00
     Mannings n            =      0.013         0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                        ---- TRANSFORMED HYETOGRAPH ----
                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
                 0.083    4.39 | 1.083   40.65 | 2.083   11.06 |  3.08
5.28
                 0.167    4.39 | 1.167   40.65 | 2.167   11.06 |  3.17
5.28
                 0.250    5.07 | 1.250  178.60 | 2.250    9.28 |  3.25
4.88
                 0.333    5.07 | 1.333  178.60 | 2.333    9.28 |  3.33
4.88
                 0.417    6.05 | 1.417   54.04 | 2.417    8.02 |  3.42
4.54
                 0.500    6.05 | 1.500   54.04 | 2.500    8.02 |  3.50
4.54
                 0.583    7.54 | 1.583   27.31 | 2.583    7.08 |  3.58
4.25
                 0.667    7.54 | 1.667   27.31 | 2.667    7.08 |  3.67
4.25
                 0.750   10.16 | 1.750   18.24 | 2.750    6.35 |  3.75
3.99
                 0.833   10.16 | 1.833   18.24 | 2.833    6.35 |  3.83
3.99
                 0.917   15.97 | 1.917   13.74 | 2.917    5.76 |  3.92
3.77
                 1.000   15.97 | 2.000   13.74 | 3.000    5.76 |  4.00
3.77

     Max.Eff.Inten.(mm/hr)=     178.60         83.65
               over (min)          5.00          5.00
     Storage Coeff.  (min)=       0.80 (ii)     4.41 (ii)
     Unit Hyd. Tpeak (min)=       5.00          5.00
     Unit Hyd. peak  (cms)=       0.34          0.23
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.03          0.00          0.030 (iii)
     TIME TO PEAK    (hrs)=       1.33          1.33          1.33
     RUNOFF VOLUME    (mm)=      75.00         37.48         65.59
     TOTAL RAINFALL   (mm)=      76.00         76.00         76.00
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     RUNOFF COEFFICIENT   =       0.99          0.49           0.86

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0001)|   Area    (ha)=   0.09
|ID= 1 DT= 5.0 min |   Total Imp(%)=  97.00   Dir. Conn.(%)=  97.00
--------------------

                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.09          0.00
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=      24.22         40.00
     Mannings n             =    0.013         0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
               0.083    4.39 | 1.083   40.65 | 2.083   11.06 |  3.08
5.28
               0.167    4.39 | 1.167   40.65 | 2.167   11.06 |  3.17
5.28
               0.250    5.07 | 1.250  178.60 | 2.250    9.28 |  3.25
4.88
               0.333    5.07 | 1.333  178.60 | 2.333    9.28 |  3.33
4.88
               0.417    6.05 | 1.417   54.04 | 2.417    8.02 |  3.42
4.54
               0.500    6.05 | 1.500   54.04 | 2.500    8.02 |  3.50
4.54
               0.583    7.54 | 1.583   27.31 | 2.583    7.08 |  3.58
4.25
               0.667    7.54 | 1.667   27.31 | 2.667    7.08 |  3.67
4.25
               0.750   10.16 | 1.750   18.24 | 2.750    6.35 |  3.75
3.99
               0.833   10.16 | 1.833   18.24 | 2.833    6.35 |  3.83
3.99
               0.917   15.97 | 1.917   13.74 | 2.917    5.76 |  3.92
3.77
               1.000   15.97 | 2.000   13.74 | 3.000    5.76 |  4.00
3.77

     Max.Eff.Inten.(mm/hr)=     178.60        83.65
               over (min)         5.00         5.00
     Storage Coeff.  (min)=       0.87 (ii)    2.26 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.30
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.04         0.00          0.043 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33           1.33
     RUNOFF VOLUME    (mm)=      75.00        37.48          73.87
     TOTAL RAINFALL   (mm)=      76.00        76.00          76.00
     RUNOFF COEFFICIENT   =       0.99         0.49           0.97

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0004)|   Area    (ha)=   0.05
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------

                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.05          0.00
     Dep. Storage     (mm)=       1.00          1.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=      17.59         40.00
     Mannings n             =    0.013         0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
               0.083    4.39 | 1.083   40.65 | 2.083   11.06 |  3.08
5.28
               0.167    4.39 | 1.167   40.65 | 2.167   11.06 |  3.17
5.28
               0.250    5.07 | 1.250  178.60 | 2.250    9.28 |  3.25
4.88
               0.333    5.07 | 1.333  178.60 | 2.333    9.28 |  3.33
4.88
               0.417    6.05 | 1.417   54.04 | 2.417    8.02 |  3.42
4.54
               0.500    6.05 | 1.500   54.04 | 2.500    8.02 |  3.50
4.54
               0.583    7.54 | 1.583   27.31 | 2.583    7.08 |  3.58
4.25
               0.667    7.54 | 1.667   27.31 | 2.667    7.08 |  3.67
4.25
               0.750   10.16 | 1.750   18.24 | 2.750    6.35 |  3.75
3.99
               0.833   10.16 | 1.833   18.24 | 2.833    6.35 |  3.83
3.99
               0.917   15.97 | 1.917   13.74 | 2.917    5.76 |  3.92
3.77
               1.000   15.97 | 2.000   13.74 | 3.000    5.76 |  4.00
3.77

     Max.Eff.Inten.(mm/hr)=     178.60       177.06
               over (min)         5.00         5.00
     Storage Coeff.  (min)=       0.71 (ii)    1.60 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.32
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.00          0.023 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33           1.33
     RUNOFF VOLUME    (mm)=      75.00        72.52          74.97
     TOTAL RAINFALL   (mm)=      76.00        76.00          76.00
     RUNOFF COEFFICIENT   =       0.99         0.95           0.99

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  99.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0007)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0001):      0.09    0.043     1.33    73.87
     + ID2= 2 (  0004):      0.05    0.023     1.33    74.97
       ==========================================================
       ID = 3 (  0007):      0.13    0.066     1.33    74.25

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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-------
--------------------
| RESERVOIR(  0003)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000    |  0.0374      0.0016
                         0.0363     0.0009    |  0.0380      0.0025
                         0.0369     0.0010    |  0.0000      0.0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0007)      0.134     0.066      1.33       74.25
   OUTFLOW: ID= 1 (  0003)      0.134     0.038      1.42       74.24

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 56.95
                  TIME SHIFT OF PEAK FLOW          (min)=  5.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0022

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--------------------
| ADD HYD  (  0013)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0012):      0.07    0.030     1.33    65.59
     + ID2= 2 (  0003):      0.13    0.038     1.42    74.24
       ==========================================================
       ID = 3 (  0013):      0.20    0.067     1.33    71.30

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****
```

```
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  Summary filename: C:\Users\KimJo\AppData\Local\Civica\VH5\5f9fa1fb-
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DATE: 09/22/2025                          TIME: 02:46:34

USER:


COMMENTS: _____

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  ************************************************
  ** SIMULATION : 25mm 4hr Chicago (VO)         **
  ************************************************


--------------------
|    READ STORM    |    Filename: C:\Users\KimJo\AppD
|                  |              ata\Local\Temp\
|                  |              ed2c3e3f-16cb-4cbc-9214-
ea362ed19395\234daf06
| Ptotal= 25.00 mm |    Comments: 25mm 4hr Chicago (VO)
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
               0.00    2.07 |  1.00    5.70 |  2.00    5.19 |  3.00
2.80
               0.17    2.27 |  1.17   10.78 |  2.17    4.47 |  3.17
2.62
               0.33    2.52 |  1.33   50.21 |  2.33    3.95 |  3.33
2.48
               0.50    2.88 |  1.50   13.37 |  2.50    3.56 |  3.50
2.35
               0.67    3.38 |  1.67    8.29 |  2.67    3.25 |  3.67
2.23
               0.83    4.18 |  1.83    6.30 |  2.83    3.01 |  3.83
2.14

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--------------------
| CALIB            |
| STANDHYD (  0009)|   Area    (ha)=   0.05
|ID= 1 DT= 5.0 min |   Total Imp(%)=  27.00   Dir. Conn.(%)=  27.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.01         0.04
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      17.89        40.00
     Mannings n           =      0.013        0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
               0.083    2.07 | 1.083    5.70 | 2.083    5.19 |  3.08
2.80
               0.167    2.07 | 1.167    5.70 | 2.167    5.19 |  3.17
2.80
               0.250    2.27 | 1.250   10.78 | 2.250    4.47 |  3.25
2.62
               0.333    2.27 | 1.333   10.78 | 2.333    4.47 |  3.33
2.62
               0.417    2.52 | 1.417   50.21 | 2.417    3.95 |  3.42
2.48
               0.500    2.52 | 1.500   50.21 | 2.500    3.95 |  3.50
2.48
               0.583    2.88 | 1.583   13.37 | 2.583    3.56 |  3.58
2.35
               0.667    2.88 | 1.667   13.37 | 2.667    3.56 |  3.67
2.35
               0.750    3.38 | 1.750    8.29 | 2.750    3.25 |  3.75
2.23
               0.833    3.38 | 1.833    8.29 | 2.833    3.25 |  3.83
2.23
               0.917    4.17 | 1.917    6.30 | 2.917    3.01 |  3.92
2.14
               1.000    4.18 | 2.000    6.29 | 3.000    3.01 |  4.00
2.14

     Max.Eff.Inten.(mm/hr)=      50.21         4.50
               over (min)        5.00        30.00
     Storage Coeff.  (min)=       1.20 (ii)   25.59 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=       0.33         0.04
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.00          0.002 (iii)
     TIME TO PEAK    (hrs)=       1.50         2.00          1.50
     RUNOFF VOLUME    (mm)=      24.00         4.79          9.52
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =       0.96         0.19          0.38

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0012)|   Area    (ha)=   0.07
|ID= 1 DT= 5.0 min |   Total Imp(%)=  75.00   Dir. Conn.(%)=  75.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.05         0.02
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      21.45        40.00
     Mannings n           =      0.013        0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
               0.083    2.07 | 1.083    5.70 | 2.083    5.19 |  3.08
2.80
               0.167    2.07 | 1.167    5.70 | 2.167    5.19 |  3.17
2.80
               0.250    2.27 | 1.250   10.78 | 2.250    4.47 |  3.25
2.62
               0.333    2.27 | 1.333   10.78 | 2.333    4.47 |  3.33
2.62
               0.417    2.52 | 1.417   50.21 | 2.417    3.95 |  3.42
2.48
               0.500    2.52 | 1.500   50.21 | 2.500    3.95 |  3.50
2.48
               0.583    2.88 | 1.583   13.37 | 2.583    3.56 |  3.58
2.35
               0.667    2.88 | 1.667   13.37 | 2.667    3.56 |  3.67
2.35
               0.750    3.38 | 1.750    8.29 | 2.750    3.25 |  3.75
2.23
               0.833    3.38 | 1.833    8.29 | 2.833    3.25 |  3.83
2.23
               0.917    4.17 | 1.917    6.30 | 2.917    3.01 |  3.92
2.14
               1.000    4.18 | 2.000    6.29 | 3.000    3.01 |  4.00
2.14

     Max.Eff.Inten.(mm/hr)=      50.21         4.50
               over (min)        5.00        30.00
     Storage Coeff.  (min)=       1.34 (ii)   25.73 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=       0.33         0.04
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.00          0.007 (iii)
     TIME TO PEAK    (hrs)=       1.50         2.00          1.50
     RUNOFF VOLUME    (mm)=      24.00         4.79         19.04
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =       0.96         0.19          0.76

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
| STANDHYD (  0001)|   Area    (ha)=   0.09
|ID= 1 DT= 5.0 min |   Total Imp(%)=  97.00   Dir. Conn.(%)=  97.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.09         0.00
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      24.22        40.00
     Mannings n           =      0.013        0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
               0.083    2.07 | 1.083    5.70 | 2.083    5.19 |  3.08
2.80
               0.167    2.07 | 1.167    5.70 | 2.167    5.19 |  3.17
2.80
               0.250    2.27 | 1.250   10.78 | 2.250    4.47 |  3.25
2.62
               0.333    2.27 | 1.333   10.78 | 2.333    4.47 |  3.33
2.62
```

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                0.417    2.52 | 1.417   50.21 | 2.417    3.95 |  3.42
2.48
                0.500    2.52 | 1.500   50.21 | 2.500    3.95 |  3.50
2.48
                0.583    2.88 | 1.583   13.37 | 2.583    3.56 |  3.58
2.35
                0.667    2.88 | 1.667   13.37 | 2.667    3.56 |  3.67
2.35
                0.750    3.38 | 1.750    8.29 | 2.750    3.25 |  3.75
2.23
                0.833    3.38 | 1.833    8.29 | 2.833    3.25 |  3.83
2.23
                0.917    4.17 | 1.917    6.30 | 2.917    3.01 |  3.92
2.14
                1.000    4.18 | 2.000    6.29 | 3.000    3.01 |  4.00
2.14

     Max.Eff.Inten.(mm/hr)=      50.21         6.66
               over (min)        5.00         5.00
     Storage Coeff.  (min)=      1.44 (ii)    3.75 (ii)
     Unit Hyd. Tpeak (min)=      5.00         5.00
     Unit Hyd. peak  (cms)=      0.33         0.25
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.01         0.00          0.012 (iii)
     TIME TO PEAK    (hrs)=      1.50         1.50          1.50
     RUNOFF VOLUME    (mm)=     24.00         4.79         23.41
     TOTAL RAINFALL   (mm)=     25.00        25.00         25.00
     RUNOFF COEFFICIENT   =      0.96         0.19          0.94

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
| STANDHYD (  0004)|   Area     (ha)=   0.05
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.05         0.00
     Dep. Storage     (mm)=      1.00         1.00
     Average Slope     (%)=      1.00         2.00
     Length            (m)=     17.59        40.00
     Mannings n            =     0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs
mm/hr
                0.083    2.07 | 1.083    5.70 | 2.083    5.19 |  3.08
2.80
                0.167    2.07 | 1.167    5.70 | 2.167    5.19 |  3.17
2.80
                0.250    2.27 | 1.250   10.78 | 2.250    4.47 |  3.25
2.62
                0.333    2.27 | 1.333   10.78 | 2.333    4.47 |  3.33
2.62
                0.417    2.52 | 1.417   50.21 | 2.417    3.95 |  3.42
2.48
                0.500    2.52 | 1.500   50.21 | 2.500    3.95 |  3.50
2.48
                0.583    2.88 | 1.583   13.37 | 2.583    3.56 |  3.58
2.35
                0.667    2.88 | 1.667   13.37 | 2.667    3.56 |  3.67
2.35
                0.750    3.38 | 1.750    8.29 | 2.750    3.25 |  3.75
2.23
                0.833    3.38 | 1.833    8.29 | 2.833    3.25 |  3.83
2.23
                0.917    4.17 | 1.917    6.30 | 2.917    3.01 |  3.92
2.14
                1.000    4.18 | 2.000    6.29 | 3.000    3.01 |  4.00
2.14

     Max.Eff.Inten.(mm/hr)=      50.21        47.26
               over (min)        5.00         5.00
     Storage Coeff.  (min)=      1.19 (ii)    2.67 (ii)
     Unit Hyd. Tpeak (min)=      5.00         5.00
     Unit Hyd. peak  (cms)=      0.33         0.29
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.01         0.00          0.006 (iii)
     TIME TO PEAK    (hrs)=      1.50         1.50          1.50
     RUNOFF VOLUME    (mm)=     24.00        21.68         23.97
     TOTAL RAINFALL   (mm)=     25.00        25.00         25.00
     RUNOFF COEFFICIENT   =      0.96         0.87          0.96

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  99.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0007)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0001):      0.09   0.012     1.50    23.41
     + ID2= 2 (  0004):      0.05   0.006     1.50    23.97
       ================================================
       ID = 3 (  0007):      0.13   0.018     1.50    23.61

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| RESERVOIR(  0003)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000    |  0.0374      0.0016
                         0.0363     0.0009    |  0.0380      0.0025
                         0.0369     0.0010    |  0.0000      0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0007)    0.134     0.018      1.50      23.61
   OUTFLOW: ID= 1 (  0003)    0.134     0.016      1.50      23.60

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 86.83
                  TIME SHIFT OF PEAK FLOW         (min)=  0.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0004

--------------------------------------------------------------------------
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--------------------
| ADD HYD  (  0013)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0012):      0.07   0.007     1.50    19.04
     + ID2= 2 (  0003):      0.13   0.016     1.50    23.60
       ================================================
       ID = 3 (  0013):      0.20   0.023     1.50    22.05

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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 FINISH
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Appendix E
Storm Water Management Calculation

PROJECT NO. : BRM-23002042-W0

Proposed Chick fil A, 1984 Baseline Road, Ottawa, ON

STORM SEWER DESIGN

Q=0.0028*C*I*A (cms)
C : RUNOFF COEFFICIENT
i : RAINFALL INTENSITY
IDF Eqn : i = A / (B +T) ^C
A : AREA (ha)

City of Ottawa	
IDF Parameter	5 yr
A =	998.071
B =	6.050
C =	0.814

Date October, 2025

See DWG SWM200 for Drainage Areas	MAINTENANCE HOLE		LENGTH	Total	Com. C	$C_c A_T$	TOTAL C_c A_T	FLOW TIME (min)		$I\ 10_{yr}$	TOTAL Q	S	D	Q FULL	V FULL	Sec. Time	Accum. Time	% Full
	FROM	TO	(m)	Area, A_T	C_c			TO	IN	(mm/h)	(cms)	(%)	(mm)	(cms)	(m/s)	(sec)	(sec)	
Area 201	CB01	CBMH01	37.0	0.047	0.87	0.041	0.041	10.00	0.51	104.21	0.012	1.00	250	0.059	1.21	0.51	10.51	20.06
Area 202	CBMH01	MH01	30.4	0.041	0.90	0.037	0.078	10.51	0.42	101.59	0.022	1.00	250	0.059	1.21	0.42	10.93	37.21
Area 205	Building	300mm STM to MH01	4.7	0.046	0.90	0.041	0.041	10.00	0.06	104.21	0.012	1.00	250	0.059	1.21	0.06	10.06	20.31
-	MH01	EFO4	3.0	0.000	0.00	0.000	0.119	10.93	0.04	99.55	0.033	1.00	250	0.059	1.21	0.04	10.97	55.87
-	EFO4	CBMH02	2.0	0.000	0.00	0.000	0.119	10.97	0.03	99.36	0.033	1.00	250	0.059	1.21	0.03	11.00	55.76

PROJECT NO. : BRM-23002042-W0
PROJECT NAME. : Proposed Chick fil A, 1984 Baseline Road, Ottawa, ON
Date: October 2025

PREDEVELOPMENT FLOWS & ALLOWABLE FLOWS

Area 101A

Area (A)=	0.119	ha
Runoff Coefficent (C)=	0.83	
Time of Concentration (tc)=	10	min
equiv % imp=	0.90	

Area 101B

Area (A)=	0.046	ha
Runoff Coefficent (C)=	0.78	
Time of Concentration (tc)=	10	min
equiv % imp=	0.83	

Area 102+103

Area (A)=	0.085	ha
Runoff Coefficent (C)=	0.26	
Time of Concentration (tc)=	10	min
equiv % imp=	0.09	

Yr Stm	A	B	C	I (mm/hr)
2	732.951	6.20	0.81	76.81
5	998.071	6.05	0.814	104.19
10	1174.184	6.01	0.816	122.14
25	1402.884	6.02	0.819	144.69
50	1569.58	6.01	0.82	161.47
100	1735.688	6.01	0.82	178.56

Q=2.78*CiA

Area 101A+ Area 101B

	Otthymo Peak Flow	
Yr Stm	cms	L/s
2	0.032	32.0
5	0.044	44.0
10	0.052	52.0
25	0.062	62.0
50	0.069	69.0
100	0.077	77.0
25mm 4hr	0.020	20.0

Area 102 + Area 103 (To ROW)

	Otthymo Peak Flow	
Yr Stm	cms	L/s
2	0.002	2.0
5	0.004	4.0
10	0.006	6.0
25	0.009	9.0
50	0.011	11.0
100	0.013	13.0
25mm 4hr	0.001	1.0

PROJECT NO. : BRM-23002042-W0
PROJECT NAME. : Proposed Chick fil A, 1984 Baseline Road, Ottawa, ON
Date: October 2025

Post-Development :

Controlled Catchment Area (Area 201 & 202)	0.088	ha
Percent Impervious	0.97	%

Controlled Catchment Area (Area 203)	0.069	ha
Percent Impervious	0.75	%

Roof Catchment Area (Area 205)	0.046	ha

TOTAL Catchment Area	0.134	ha

ICD Information

Location	STM MH01	
Type	Tube	
Coefficient	0.82	
Size	100	mm
Invert Elevation	84.68	m
Lowest Surface/Rim Elevation	86.35	m

Storage Information

	Volume in Pipe (m3)	Volume in Structures (m3)	Ponding Volume (m3)	**TOTAL Volume (m3)**
At Lowest Surface - 86.35m	4.42	4.63	0.00	**9.04**
0.05m above Surface - 86.40m	4.42	4.63	1.36	**10.40**
0.10m above Surface - 86.45m	4.42	4.63	6.49	**15.53**
0.15m above Surface - 86.50m	4.42	4.63	16.28	**25.32**

Stage Storage Discharge:

Stage	Elevation	Head	Discharge		Storage Volume	
ID	m	m	L/sec	m^3/s	m^3	ha-m
Orifice Centroid	84.73	0.00	0.00	**0.0000**	0.00	**0.00000**
Surface	86.35	1.62	36.31	**0.0363**	9.04	**0.00090**
0.05m above Surface	86.40	1.67	36.86	**0.0369**	10.40	**0.00104**
0.10m above Surface	86.45	1.72	37.41	**0.0374**	15.53	**0.00155**
0.15m above Surface	86.50	1.77	37.95	**0.0380**	25.32	**0.00253**

Allowable Flow	0.077	cms	(100-yr Predevelopment Flow)

Storage Requirements

Storm	Total Peak Flow Offsite		% Allowable	Storage Volume Used (Sewers and Surface)		Water Elevation	Water Depth Above Surface
Event	m^3/s	L/sec		ha-m	m^3	m	m
2 Year	0.036	**36**	**47%**	0.0007	**7**	85.98	0.00
5 Year	0.050	**50**	**65%**	0.0009	**9**	86.35	0.00
10 Year	0.056	**56**	**73%**	0.0011	**11**	86.41	0.06
25 Year	0.061	**61**	**79%**	0.0016	**16**	86.45	0.10
50 Year	0.064	**64**	**83%**	0.0019	**19**	86.47	0.12
100 Year	0.067	**67**	**87%**	0.0022	**22**	86.48	0.13
25mm 4hr	0.023	**23**	**30%**	0.0004	**4**	86.39	0.04

PROJECT NO. : BRM-23002042-W0
PROJECT NAME. : Proposed Chick fil A, 1984 Baseline Road, Ottawa, ON
Date: October 2025

POST DEVELOPMENT FLOW (TO ROW)

Area 204 & 206

Area (A)=	0.048	ha
Runoff Coefficent (C)=	0.39	
Time of Concentration (tc)=	10	min
equiv % imp=	0.27	

Yr Stm	A	B	C	I (mm/hr)
2	732.951	6.20	0.81	76.81
5	998.071	6.05	0.814	104.19
10	1174.184	6.01	0.816	122.14
25	1402.884	6.02	0.819	144.69
50	1569.58	6.01	0.82	161.47
100	1735.688	6.01	0.82	178.56

Q=2.78*CiA

Area 102 + Area 103 (To ROW)

	Otthymo Peak Flow	
Yr Stm	cms	L/s
2	0.003	3.0
5	0.004	4.0
10	0.006	6.0
25	0.008	8.0
50	0.009	9.0
100	0.011	11.0
25mm 4hr	0.002	2.0

PROJECT NO. : BRM-23002042-W0
PROJECT NAME. : Proposed Chick fil A, 1984 Baseline Road, Ottawa, ON
Date: October 2025

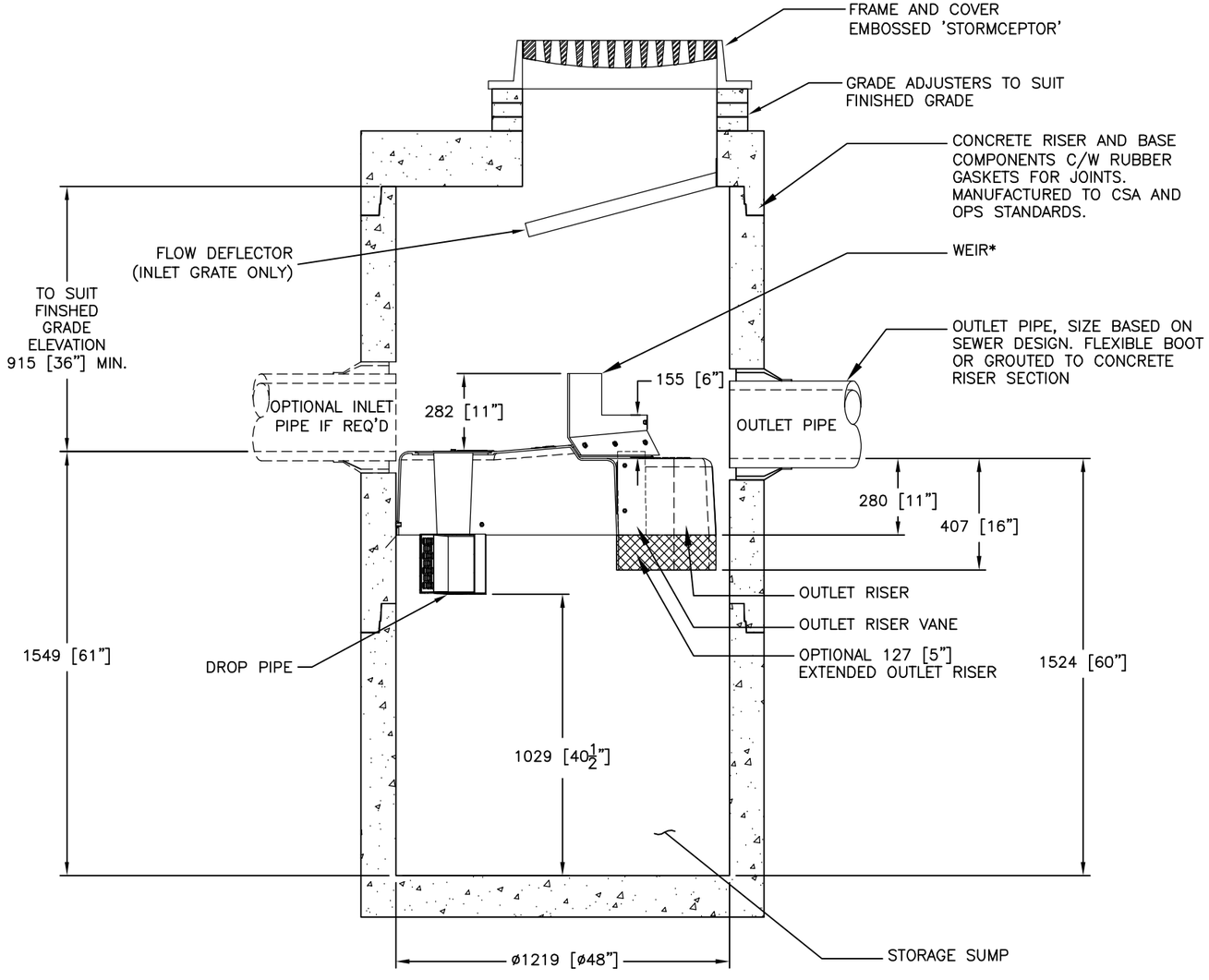
Site Quality Control - TSS Removal :

	Area (m2)	% of Site Area	Upstream TSS Removal Rate %	SWM Tank TSS Removal Rate %	OGS TSS Removal Rate %	TOTAL TSS Removal Rate* %	TSS Removal (% of Surface)
Roof (to OGS)*	464	35	80	50	50	95	32.9
Asphalt and Concrete (to OGS)*	853	64	0	50	50	75	47.8
Landscape (to OGS)*	21	2	80	50	50	95	1.5
TOTAL	**1338**	**100**					**82.2**

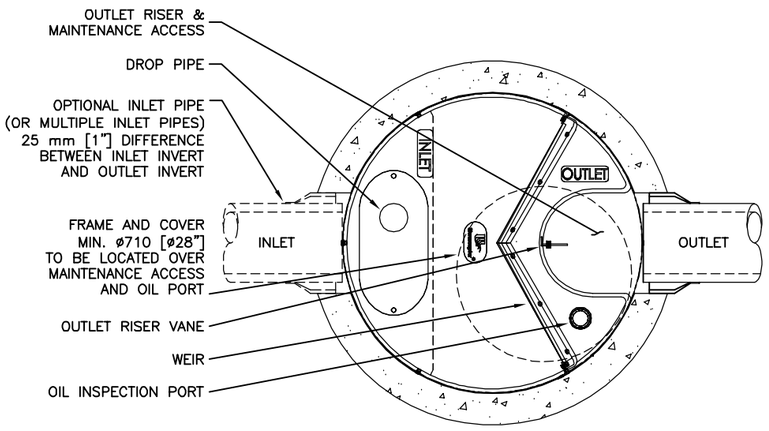
OGS - Stormceptor (or approved equivalent)

*Train Treatment = A + B -(AxB)/100 where A= % TSS Removal Upstream
B= % TSS Removal Downstream

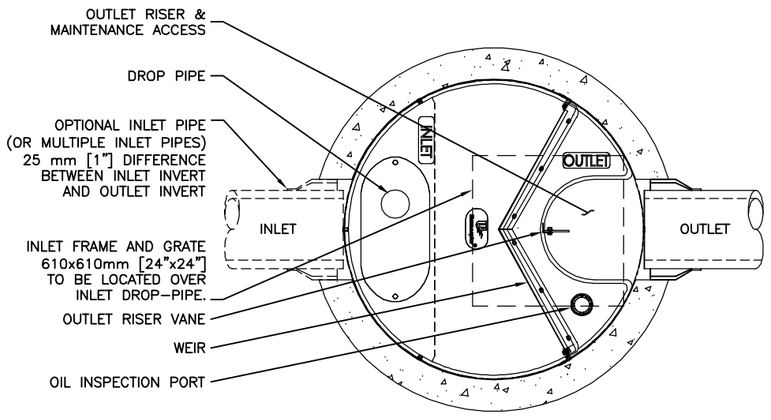
Appendix F
OGS Report



SECTION VIEW



PLAN VIEW (STANDARD)



PLAN VIEW (INLET TOP)

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

GENERAL NOTES:

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

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

INSTALLATION NOTES

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

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

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

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

* PER ENGINEER OF RECORD

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

Stormceptor® EF

SCALE = NTS

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

DATE: 10/13/2017

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

SHEET: 1 OF 1

Stormceptor® EF Sizing Report

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

09/16/2025

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

Site Name:	

Drainage Area (ha):	0.13
Runoff Coefficient 'c':	0.88

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

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	3.69
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	Yes
Upstream Orifice Control Flow Rate to Stormceptor (L/s):	38.00
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	166
Estimated Average Annual Sediment Volume (L/yr):	135

Project Name:	CFA College Square
Project Number:	BRM-23002042-W0
Designer Name:	Joo Ho Kim
Designer Company:	EXP
Designer Email:	jooho.kim@exp.com
Designer Phone:	416-992-9942
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	97
EFO5	98
EFO6	99
EFO8	100
EFO10	100
EFO12	100

Recommended Stormceptor EFO Model: EFO4

Estimated Net Annual Sediment (TSS) Load Reduction (%): 97

Water Quality Runoff Volume Capture (%): > 90

THIRD-PARTY TESTING AND VERIFICATION

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

PERFORMANCE

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

PARTICLE SIZE DISTRIBUTION (PSD)

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

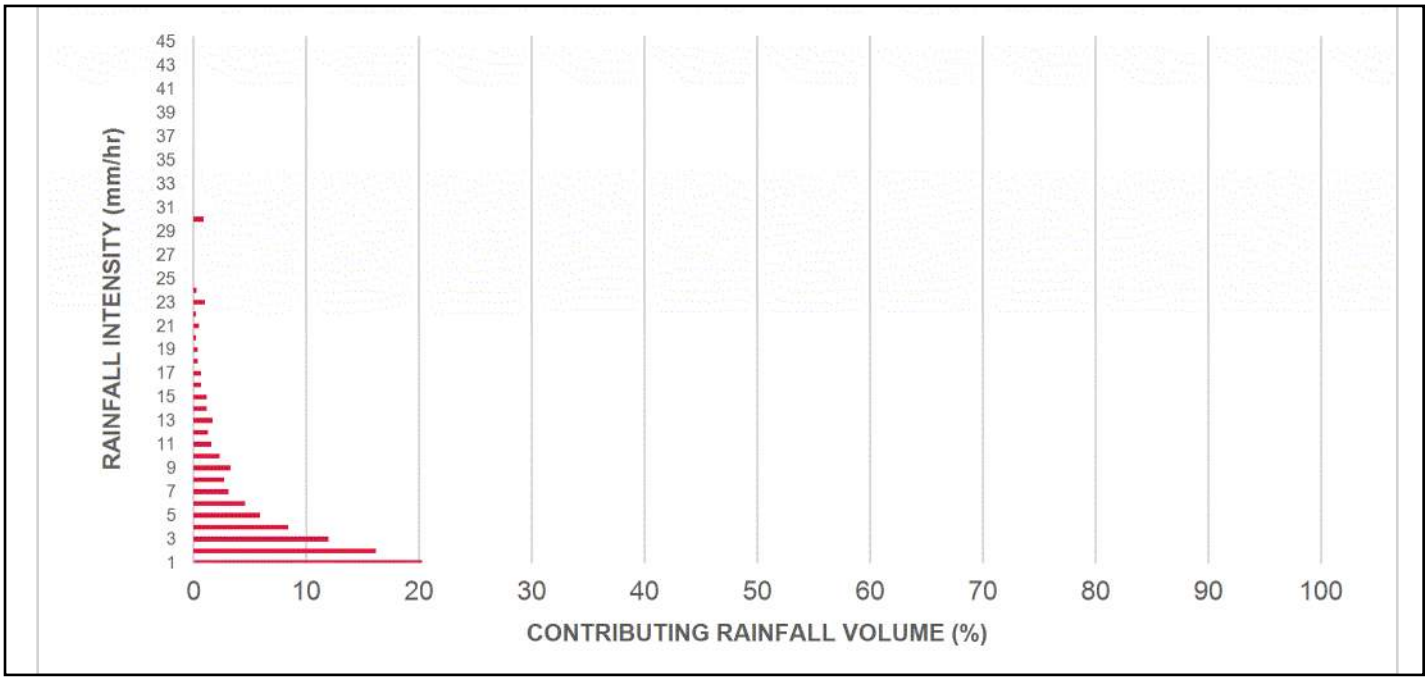
Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Upstream Flow Controlled Results

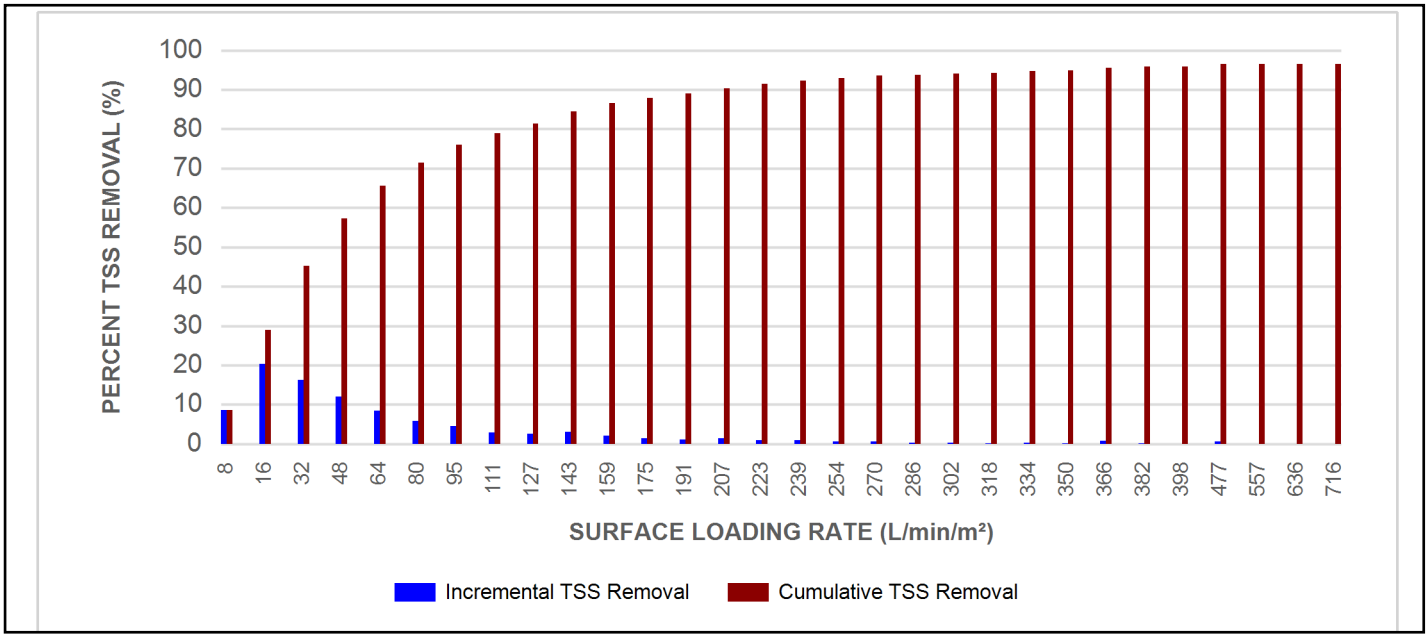
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.6	8.6	0.16	10.0	8.0	100	8.6	8.6
1.00	20.3	29.0	0.32	19.0	16.0	100	20.3	29.0
2.00	16.2	45.2	0.64	38.0	32.0	100	16.2	45.2
3.00	12.0	57.2	0.95	57.0	48.0	100	12.0	57.2
4.00	8.4	65.6	1.27	76.0	64.0	100	8.4	65.6
5.00	5.9	71.6	1.59	95.0	80.0	98	5.9	71.5
6.00	4.6	76.2	1.91	114.0	95.0	97	4.5	76.0
7.00	3.1	79.3	2.23	134.0	111.0	95	2.9	78.9
8.00	2.7	82.0	2.54	153.0	127.0	93	2.6	81.4
9.00	3.3	85.3	2.86	172.0	143.0	91	3.0	84.5
10.00	2.3	87.6	3.18	191.0	159.0	88	2.0	86.5
11.00	1.6	89.2	3.50	210.0	175.0	87	1.4	87.8
12.00	1.3	90.5	3.82	229.0	191.0	84	1.1	89.0
13.00	1.7	92.2	4.13	248.0	207.0	83	1.4	90.4
14.00	1.2	93.5	4.45	267.0	223.0	82	1.0	91.4
15.00	1.2	94.6	4.77	286.0	239.0	82	0.9	92.3
16.00	0.7	95.3	5.09	305.0	254.0	81	0.6	92.9
17.00	0.7	96.1	5.41	324.0	270.0	80	0.6	93.5
18.00	0.4	96.5	5.72	343.0	286.0	79	0.3	93.8
19.00	0.4	96.9	6.04	363.0	302.0	78	0.3	94.1
20.00	0.2	97.1	6.36	382.0	318.0	78	0.2	94.3
21.00	0.5	97.5	6.68	401.0	334.0	77	0.4	94.7
22.00	0.2	97.8	7.00	420.0	350.0	76	0.2	94.8
23.00	1.0	98.8	7.31	439.0	366.0	76	0.8	95.6
24.00	0.3	99.1	7.63	458.0	382.0	75	0.2	95.8
25.00	0.9	100.0	7.95	477.0	398.0	74	0.7	96.5
30.00	0.9	100.9	9.54	572.0	477.0	71	0.7	97.2
35.00	-0.9	100.0	11.13	668.0	557.0	67	N/A	96.5
40.00	0.0	100.0	12.72	763.0	636.0	64	0.0	96.5
45.00	0.0	100.0	14.31	859.0	716.0	64	0.0	96.5
Estimated Net Annual Sediment (TSS) Load Reduction =								**97 %**

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

RAINFALL DATA FROM OTTAWA CDA RCS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF5 / EFO5	1.5	5	90	762	30	762	30	710	25
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

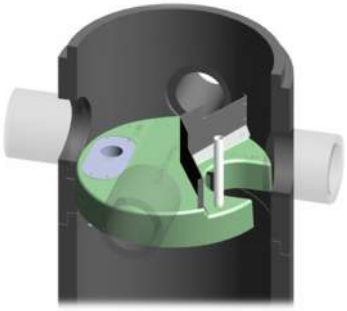
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test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

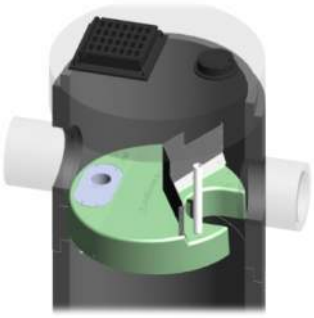
DESIGN FLEXIBILITY

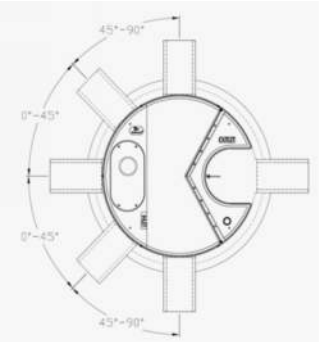
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend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

OIL CAPTURE AND RETENTION

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







INLET-TO-OUTLET DROP

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

HEAD LOSS

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

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF5 / EFO5	1.5	5	1.62	5.3	420	111	305	10	2124	75	2612	5758
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

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

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

STANDARD STORMCEPTOR EF/EFO DRAWINGS

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

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

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

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

PART 1 – GENERAL

1.1 WORK INCLUDED

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

1.2 REFERENCE STANDARDS & PROCEDURES

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

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

1.3 SUBMITTALS

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

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

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

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

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

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	5 ft (1524 mm) Diameter OGS Units:	1.95 m^3 sediment / 420 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

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

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

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

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

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

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

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

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

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

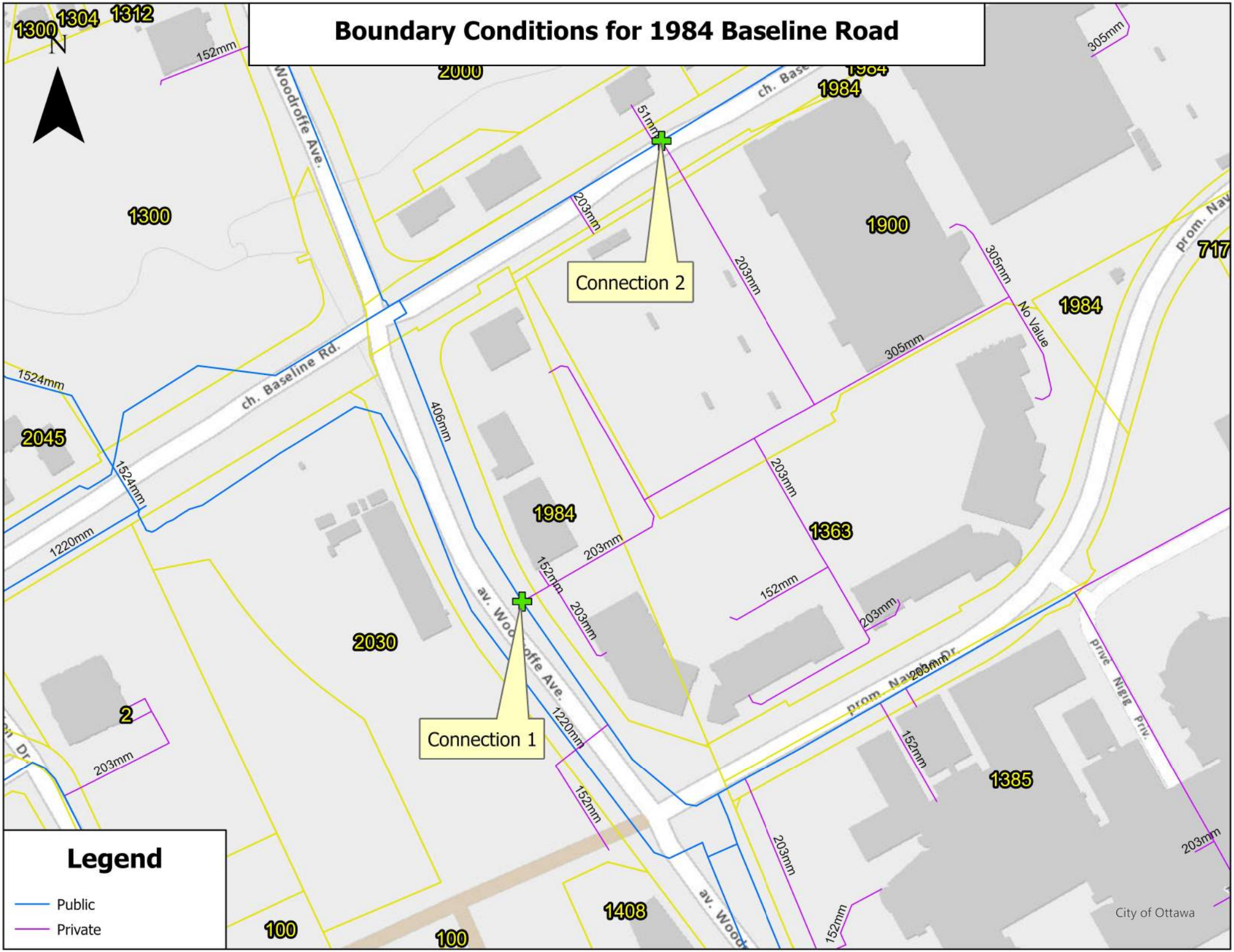
3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid

Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

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

Appendix G
Boundary Condition


Boundary Conditions for 1984 Baseline Road
Connection 1
Connection 2
Legend
Public
Private
ch. Baseline Rd.
Woodroffe Ave.
av. Woodroffe Ave.
prom. Navaho Dr.
1524mm
1220mm
406mm
305mm
203mm
152mm
51mm
No Value
1300
1304
1312
2000
1984
1900
717
2045
1363
2030
2
1385
1408
100
City of Ottawa

Hi Saifullah,

The following are boundary conditions, HGL, for hydraulic analysis at 1984 Baseline Road (zone 2W2C) assumed to be connected to the 406mm on Woodroffe Avenue, the 406mm on Baseline Road and internally looped (see attached PDF for location).

Connection 1- Woodroffe Ave:
Minimum HGL = 126.6 m
Maximum HGL = 132.6 m
Max Day + Fire Flow (100.0 L/s) = 126.3 m

Connection 2-Baseline Road:
Minimum HGL = 126.4 m
Maximum HGL = 132.5 m
Max Day + Fire Flow (100.0 L/s) = 126.1 m

These are for current conditions and are based on computer model simulation.

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.

"The IWSD has recently updated their water modelling software. Any significant difference between previously received BC results and newly received BC results could be attributed to this update."

Regards,
Jean-Miguel Roy
Project Manager, Infrastructure Approvals
Planning, Real Estate and Economic Development Department
Services de la planification, Direction générale de la planification, de l'immobilier et du développement économique
110 Laurier Avenue West | 110 avenue Laurier Ouest
City of Ottawa | Ville d'Ottawa

CFA College Square - Peak Hour Pressure - Private Watermain - PRESSURE LOSS CALCULATION

	Q = REQUIRED FLOW for FIRE PROTECTION (L/S)	Q = REQUIRED FLOW for DOMESTIC DEMAND (L/S)	D = NOMINAL PIPE DIAMETER (m)	L = LENGTH OF WATERMAIN (m)	TYPE	C VALUE	INSIDE DIAMETER (m)	WALL THICKNESS (m)	CROSS SECTIONAL AREA (m2)	V =FLOW VELOCITY (m/s)
Existing Private Watermain	n/a	0.3	0.050	34.6	n/a	100	0.046	0.003	0.002	0.19
Proposed Private Watermain	n/a	0.3	0.050	72.9	PEX	100	0.046	0.003	0.002	0.19

	START TOP OF PIPE ELEV (m)	END TOP OF PIPE ELEV (m)	STATIC HEAD (m)
Existing Private Watermain	84.74	84.20	0.54
Proposed Private Watermain	84.74	85.00	-0.26

	MINOR HEAD LOSSES					
	200 mm PVC			50mm PVC		
	Existing Private Watermain			Proposed Private Watermain		
	Number	K	Sub Total K	Number	K	Sub Total K
Inlet Anti Vortex Plate		1.00	0.00		1.00	0.00
Pipe Contraction		0.25	0.00		0.25	0.00
Pipe Expansion		0.25	0.00		0.25	0.00
Strainer/Reducer		0.50	0.00		0.50	0.00
Standard 90d Bend	1	0.90	0.90		0.90	0.00
Standard 45d Bend		0.45	0.00	0	0.45	0.00
Standard 22.5d Bend		0.23	0.00		0.23	0.00
Standard 11.25d Bend		0.10	0.00		0.10	0.00
Long Radius Bend, 45d / 90d		0.50	0.00		0.50	0.00
Tee - flow through run		0.60	0.00		0.60	0.00
Tee - flow through branch	1	1.80	1.80		1.80	0.00
Gate Valve	1	0.40	0.40		0.40	0.00
300mm to 400mm Pipe Expansion		0.20	0.00		0.20	0.00
Backflow Preventor		1.20	0.00	1	1.20	1.20
Meter		5.00	0.00	1	5.00	5.00
Drain Valve	1	0.40	0.40		0.40	0.00
Check Valve		4.00	0.00		4.00	0.00
Pipe Exit		1.00	0.00		1.00	0.00
K TOTALS			3.50			6.20

	H = STATIC HEAD = HIGHEST SYSTEM ELEV - PIPE CONNECTION ELEV (m)	HL1 = FITTINGS FRICTION HEAD LOSS = (K TOTAL) (V)**2/2G (m)		HL2 = PIPE WALL FRICTION HEAD LOSS = 6.78 (L)/(D)**1.1655 *(V/C)**1.85 (m)		HL3 = VELOCITY HEAD = (V)**2 / 2G (m)		H TOTAL = TOTAL DYNAMIC HEAD = H + HL1 + HL2 + HL3 (m)		SYSTEM PRESSURE LOSS (Kpa)	SYSTEM PRESSURE LOSS (psi)
Existing Private Watermain	0.54	0.007	n/a	0.08	n/a	0.00	n/a	0.63	n/a	6.17	0.89
Proposed Private Watermain	-0.26	0.012	n/a	0.17	n/a	0.00	n/a	-0.08	n/a	-0.75	-0.11

Provided Max Day + Fire Flow Pressure at Connection 1: 59.52 psi

Proposed Pressure at the Building: 58.74 psi

CFA College Square - Max Day + Fire Flow - Private Watermain - PRESSURE LOSS CALCULATION

	Q = REQUIRED FLOW for FIRE PROTECTION (L/S)	Q = REQUIRED FLOW for DOMESTIC DEMAND (L/S)	D = NOMINAL PIPE DIAMETER (m)	L = LENGTH OF WATERMAIN (m)	TYPE	C VALUE	INSIDE DIAMETER (m)	WALL THICKNESS (m)	CROSS SECTIONAL AREA (m2)	V =FLOW VELOCITY (m/s)
Existing Private Watermain	n/a	0.3	0.050	34.6	n/a	100	0.046	0.003	0.002	0.19
Proposed Private Watermain	n/a	0.3	0.050	72.9	PEX	100	0.046	0.003	0.002	0.19

	START TOP OF PIPE ELEV (m)	END TOP OF PIPE ELEV (m)	STATIC HEAD (m)
Existing Private Watermain	84.74	84.20	0.54
Proposed Private Watermain	84.74	85.00	-0.26

	MINOR HEAD LOSSES					
	200 mm PVC			50mm PVC		
	Existing Private Watermain			Proposed Private Watermain		
	Number	K	Sub Total K	Number	K	Sub Total K
Inlet Anti Vortex Plate		1.00	0.00		1.00	0.00
Pipe Contraction		0.25	0.00		0.25	0.00
Pipe Expansion		0.25	0.00		0.25	0.00
Strainer/Reducer		0.50	0.00		0.50	0.00
Standard 90d Bend	1	0.90	0.90		0.90	0.00
Standard 45d Bend		0.45	0.00	0	0.45	0.00
Standard 22.5d Bend		0.23	0.00		0.23	0.00
Standard 11.25d Bend		0.10	0.00		0.10	0.00
Long Radius Bend, 45d / 90d		0.50	0.00		0.50	0.00
Tee - flow through run		0.60	0.00		0.60	0.00
Tee - flow through branch	1	1.80	1.80		1.80	0.00
Gate Valve	1	0.40	0.40		0.40	0.00
300mm to 400mm Pipe Expansion		0.20	0.00		0.20	0.00
Backflow Preventor		1.20	0.00	1	1.20	1.20
Meter		5.00	0.00	1	5.00	5.00
Drain Valve	1	0.40	0.40		0.40	0.00
Check Valve		4.00	0.00		4.00	0.00
Pipe Exit		1.00	0.00		1.00	0.00
K TOTALS			3.50			6.20

	H = STATIC HEAD = HIGHEST SYSTEM ELEV - PIPE CONNECTION ELEV (m)	HL1 = FITTINGS FRICTION HEAD LOSS = (K TOTAL) (V)**2/2G (m)		HL2 = PIPE WALL FRICTION HEAD LOSS = 6.78 (L)/(D)**1.1655 *(V/C)**1.85 (m)		HL3 = VELOCITY HEAD = (V)**2 / 2G (m)		H TOTAL = TOTAL DYNAMIC HEAD = H + HL1 + HL2 + HL3 (m)		SYSTEM PRESSURE LOSS (Kpa)	SYSTEM PRESSURE LOSS (psi)
Existing Private Watermain	0.54	0.007	n/a	0.08	n/a	0.00	n/a	0.63	n/a	6.17	0.89
Proposed Private Watermain	-0.26	0.012	n/a	0.17	n/a	0.00	n/a	-0.08	n/a	-0.75	-0.11

Provided Max Day + Fire Flow Pressure at Connection 1: 59.10 psi

Proposed Pressure at the Building: 58.31 psi