February 6, 2026
Proj. No. 34022-24

Dawn McNab
McCulloch-Watson Funeral Home
166 Bruce Street North
Durham, ON, N0G 1R0

Re: Stormwater Management Report
Proposed Parking Lot Expansion
166 Bruce Street North, Durham

1.0 Introduction

Van Harten Surveying Inc. (Van Harten) is pleased to submit this Stormwater Management Report in support of the proposed parking lot expansion at 166 Bruce Street North in the Town of Durham.

The purpose of this Stormwater Management Report is to outline the proposed stormwater servicing strategy for the development. The report has been prepared with reference to the following guidelines and background information, which were used to inform the analysis and supporting design calculations:

- Ministry of the Environment - Stormwater Management Planning and Design Manual (March 2003)
- Minitry of Transportation IDF Lookup Tool (accessed January 30, 2026)

2.0 Existing Site Conditions

The subject site encompasses approximately 0.24 hectares and currently contains an existing funeral home, associated asphalt surface parking lot, and landscaped areas. The site is bounded by residential properties to the north and south, commercial/industrial properties to the west, and Bruce Street North to the east. Based on available information, there are no existing stormwater management controls on the property.

3.0 Proposed Development Conditions

Based on the Site Plan prepared by Van Harten, the proposal includes a lot line adjustment at 148 Bruce Street to facilitate the expansion of the existing parking lot within the rear yard of that property. Following the lot line adjustment, the site at 166 Bruce Street will encompass approximately 0.38 hectares. Access to the proposed development will continue to be provided via two existing entrances from Bruce Street North.

4.0 Stormwater Management

4.1 Stormwater Management Criteria

The Ministry of the Environment's Stormwater Management Planning and Design Manual (March 2003) was referenced to establish stormwater management criteria for the proposed development. In accordance with the manual's guidance, the following criteria apply:

- **Stormwater Quantity Control** – Post-development peak flows shall be controlled to pre-development levels for the 2-year through 100-year design storm events.

4.2 Existing Drainage Patterns

A Pre-Development Drainage Plan has been prepared for the site. Drainage from the property occurs predominantly as sheet flow in an east-to-west direction, after which flows are directed south toward the neighbouring residential properties along Lambton Street West. The site exhibits a total topographic relief of approximately 1.0 m, resulting in an average slope of about 1.0%.

Under pre-development conditions, three drainage catchments were identified, reflecting a split drainage pattern. The property frontage drains toward Bruce Street North (Catchment 103), while the rear portion drains south toward the residential properties along Lambton Street West (Catchment 102) and north toward the rear yard of 419 George Street West (Catchment 101).

Table 1 summarizes the pre-development drainage areas and associated hydrologic design parameters. The Pre-Development Drainage Plan is provided in Appendix A.

Table 1: Pre-Development Catchments and Hydrologic Design Parameters

Hydrologic Parameter	Catchment 101[S]		Catchment 102[S]		Catchment 103[S]	
Catchment Area (ha)	0.114		0.208		0.060	
Percent Imperv (%)	72		29		91	
Initial Abstraction | Depression Storage (mm)	5.0	2.0	5.0	2.0	5.0	2.0
Slope (%) (Perv | Imperv)	1.8	1.0	1.5	1.3	0.8	0.8

S = Stanhyd

4.3 Proposed Drainage Patterns

A Post-Development Drainage Plan has been prepared based on the Site Grading Plan completed by Van Harten. To maintain consistency with pre-development drainage patterns, grading for the proposed development has been designed to continue directing the majority of stormwater runoff toward the neighbouring residential properties along Lambton Street West.

Under post-development conditions, four drainage catchments have been identified, with three outlets consistent with the pre-development drainage pattern. The property frontage will continue to drain uncontrolled toward Bruce Street North (Catchment 203), while the rear portion will drain south toward the residential properties along Lambton Street West (Catchments 202 and UNC1) and north toward the rear yard of 419 George Street West (Catchment 201). Stormwater management controls will be implemented for Catchment 202 to ensure runoff directed toward the neighbouring residential properties is reduced to pre-development flow rates for storm events up to and including the 100-year event.

The post-development catchment characteristics are summarized in Table 2. The Post-Development Drainage Plan is provided in Appendix A.

Table 2: Post-Development Catchments and Hydrologic Design Parameters

Hydrologic Parameter	Catchment 201^{S}		Catchment 202^{S}		Catchment 203^{S}		Catchment UNC1^{N}
Catchment Area (ha)	0.114		0.194		0.060		0.014
Percent Imperv (%) / Curve Number	72		67		95		69.00
Initial Abstraction | Depression Storage (mm)	5.0	2.0	5.0	2.0	5.0	2.0	5.0
Slope (%) (Perv | Imperv)	1.8	1.0	1.0	0.8	0.8	0.8	5.0
Time to Peak (hr)	-		-		-		0.03

*S = Stanhyd N = Nashyd

4.4 Water Quantity

The stormwater management quantity criteria for the site are based on the Ministry of the Environment Stormwater Management Planning and Design Manual (March 2003). In accordance with this manual, the stormwater management quantity control criteria require that post-development peak flows be controlled to match pre-development flow rates for the 2-year through 100-year storm events.

Hydrologic calculations were completed using Visual OTTHYMO and IDF parameters obtained from the MTO IDF Lookup Tool (accessed January 30, 2026). These calculations determined the peak flows for each return period (2-year through 100-year) under both pre-development and post-development conditions at each outlet, as well as the associated storage requirements which can be referenced in Tables 3 through 5. Visual OTTHYMO output files are provided in Appendix B.

Table 3: Peak Flow – Outlet to 419 George Street West (Catchment 101 and 201)

Storm Event (yr)	Pre-Development Peak Flow (m^3/s)	Post-Development Peak Flow (m^3/s)*	Flow Change (L/s)
	101	202	
2	0.009	0.009	0
5	0.018	0.018	0
10	0.023	0.023	0
25	0.029	0.029	0
50	0.034	0.034	0
100	0.040	0.040	0

Table 4: Peak Flow and Storage Requirements Summary - Lambton Street West (Catchment 202 and UNC1)

Storm Event (yr)	Pre-Development Peak Flow (m^3/s)	Post-Development Controlled Peak Flow (m^3/s)*	Required Storage (m^3)	Provided Storage (m^3)
	102	202+UNC1		
2	0.005	0.004	25	52
5	0.011	0.010	32	
10	0.016	0.014	36	
25	0.022	0.021	42	
50	0.027	0.026	47	
100	0.032	0.031	51	

*Catchment 202 overcontrolled to account for uncontrolled runoff from Catchment UC1.

Table 5: Peak Flow – Bruce Street North (Catchment 103 and 203)

Storm Event (yr)	Pre-Development Peak Flow (m^3/s)	Post-Development Peak Flow (m^3/s)*	Flow Change (L/s)
	101	202	
2	0.012	0.013	+1
5	0.017	0.017	0
10	0.019	0.020	+1
25	0.023	0.023	0
50	0.025	0.026	+1
100	0.028	0.029	+1

Quantity controls are proposed for Catchment 202 through the implementation of a depression storage area with an outlet control structure comprised of a multistage weir. The depression storage area will

provide 52 m³ of storage to meet the quantity control requirements. Additional details of the depression storage area and outlet structure design are provided in Appendix B.

Quantity controls have not been provided for Catchments 201 and 203, as post-development flows are expected to generally match pre-development flow rates due to minimal changes in these areas. Catchment 201 will continue to direct the same flows toward 419 George Street West, while Catchment 203 will experience a minor increase of 1 L/s directed to Bruce Street North, which is not anticipated to impact the receiving storm infrastructure.

4.5 Operation and Maintenance

Future property owners will be required to inspect the stormwater management features annually to ensure proper function. Maintenance requirements include:

- All downspouts, splash pads, and roof leaders must be kept in good working order at all times.
- Grass swales and the depression storage area should be maintained free of obstructions to function as intended. Property owners should routinely inspect for erosion, especially at outlet locations, and repair any gullies, rills, or bare spots.
- The depression storage outlet should be inspected for obstructions after every major rainfall event, and suspended solids should be removed when buildup is sufficient.

Maintenance and operation of all stormwater management features on the site are the sole responsibility of the property owners and should be performed as needed.

5.0 Erosion and Sediment Control

Temporary erosion and sediment controls have been incorporated into the Site Grading Plan to minimize the potential for sediment runoff onto neighbouring properties and the road allowance. These controls may be removed once construction and landscaping are complete and grass cover has been re-established over disturbed areas.

It should be noted that the erosion and sediment control plan is dynamic; adjustments and additions may be necessary to respond to site conditions during construction. Additional sediment and erosion control devices and materials should be kept on-site at all times.

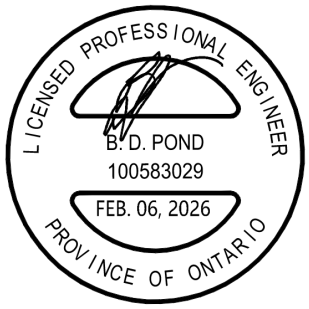
Construction of the depression storage area should be scheduled to ensure its integrity is maintained throughout subsequent construction activities. At the time of construction, a contact list, similar to the sample table provided below, should be maintained with key personnel to address any site issues promptly.

Contact	Phone Number
County of Grey	519-369-2200
Saugeen Valley Conservation Authority	519-364-1255
Ministry of Environment – Spills Reporting	1-800-268-6060
Owner	519-369-3837
Builder	TBD
Van Harten Surveying Inc.	519-821-2763

6.0 Closure

The completed Stormwater Management Report is specific to the site based on our knowledge of the proposed development. Please contact our office if you have any questions or require further consultation.

Respectfully submitted,



Brett Pond, P. Eng.
Project Manager

Encl. Appendix A – Drawings
Encl. Appendix B – Stormwater Management Calculations

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APPENDIX A
DRAWINGS

GENERAL NOTES

1. CONSTRUCTION FOR THIS PROJECT TO COMPLY WITH THE MOST CURRENT VERSION OF THE MUNICIPAL STANDARDS, THE ONTARIO BUILDING CODE, AND THE ONTARIO PROVINCIAL STANDARDS AND SPECIFICATIONS.
2. ALL CONSTRUCTION TO BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT, AND REGULATIONS FOR CONSTRUCTION PROJECTS.
3. A ROAD WORK PERMIT MUST BE OBTAINED FROM THE MUNICIPALITY PRIOR TO COMMENCING ANY WORKS WITHIN THE MUNICIPAL ROAD ALLOWANCE.
4. THE OWNER IS RESPONSIBLE FOR COORDINATION OF ALL REQUIRED UTILITIES.
5. CONTRACTOR TO BE RESPONSIBLE FOR PROVISION, MAINTENANCE AND RESTORATION OF THE CONSTRUCTION ACCESS.
6. DISTURBED AREAS TO BE MINIMIZED TO THE EXTENT POSSIBLE, AND TEMPORARILY OR PERMANENTLY STABILIZED OR RESTORED AS THE WORK PROGRESSES.
7. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR LOCATES, EXPOSING, SUPPORTING AND PROTECTING ALL UNDERGROUND AND OVERHEAD UTILITIES AND STRUCTURES EXISTING AT THE TIME OF CONSTRUCTION IN THE ARE OF THEIR WORK WHETHER SHOWN ON THE PLANS OR NOT AND FOR ALL REPAIRS AND CONSEQUENCES RELATING TO DAMAGE OF SAME.
8. THE CONTRACTOR(S) SHALL BE SOLELY RESPONSIBLE TO GIVE 72 HOURS WRITTEN NOTICE TO THE UTILITIES, FOR THE PURPOSES OF INSPECTION BY THE CONCERNED UTILITY. THIS INSPECTION WILL BE FOR THE DURATION OF CONSTRUCTION, WITH THE CONTRACTOR RESPONSIBLE FOR ALL COSTS ARISING FROM SUCH INSPECTION.
9. A GEOTECHNICAL CONSULTANT SHOULD BE RETAINED TO CARRY OUT NECESSARY INSPECTIONS AND TESTING DURING CONSTRUCTION TO ENSURE PROPER PLACEMENT OF MATERIAL AND ADEQUATE COMPACTION.
10. ANY ERRORS, OMISSIONS AND/OR CHANGE OF CONDITIONS ON SITE TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO PERFORMING THE RELATED WORK.
11. THIS IS NOT A PLAN OF SURVEY AND SHALL NOT BE USED FOR TRANSACTION OR MORTGAGE PURPOSES.

GRADING NOTES

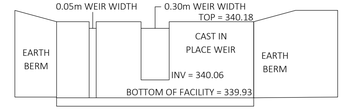
1. PROPOSED PARKING LOT SLOPES TO BE BETWEEN 0.8% MINIMUM AND 5% MAXIMUM.
2. ALL SLOPES NOT TO EXCEED 3H:1V UNLESS OTHERWISE NOTED.
3. DISTURBED LOT AREAS TO BE RESTORED WITH MINIMUM 150mm TOPSOIL AND EITHER SEED OR SOD, UNLESS OTHERWISE SPECIFIED ON PROJECT LANDSCAPE PLANS.
4. MATCH EXISTING GRADES AT ALL PROPERTY BOUNDARIES. GRADING NOT TO EXTEND ONTO ADJACENT PROPERTIES WITHOUT PRIOR WRITTEN PERMISSION OF THE AFFECTED PROPERTY OWNER(S). A COPY OF ANY SUCH AGREEMENT IS TO BE MADE AVAILABLE TO THE DIRECTOR OF ENGINEERING PRIOR TO ANY TOPSOIL STRIPPING OR GRADING.
5. ALL GRANULAR MATERIAL TO BE COMPACTED TO MINIMUM 100% AND OTHER MISCELLANEOUS FILL MATERIAL TO BE COMPACTED TO MINIMUM 95% STANDARD PROCTOR MAXIMUM DRY DENSITY (UNLESS OTHERWISE PRESCRIBED BY A QUALIFIED GEOTECHNICAL ENGINEER).
6. ALL EARTHWORKS ACTIVITIES TO BE UNDERTAKEN IN CONFORMANCE WITH O.Reg. 406/19 REGARDING ON-SITE AND EXCESS SOIL MANAGEMENT.

TEMPORARY EROSION AND SEDIMENT CONTROL NOTES

1. EROSION AND SEDIMENT CONTROL (ESC) MEASURES TO BE IMPLEMENTED PRIOR TO, AND MAINTAINED DURING THE CONSTRUCTION PHASES. ALL DAMAGED EROSION AND SEDIMENT CONTROLS SHOULD BE REPAIRED AND/OR REPLACED WITHIN 48 HOURS OF INSPECTION.
2. THE CONTRACTOR IS RESPONSIBLE TO ENSURE THAT TEMPORARY SEDIMENT CONTROLS ARE FUNCTIONING AS INTENDED.
3. ALL DISTURBED GROUND LEFT INACTIVE FOR 30 DAYS SHALL BE VEGETATED, SUBJECT TO WEATHER CONDITIONS.
2. DISTURBED AREAS TO BE MINIMIZED TO THE EXTENT POSSIBLE, AND TEMPORARILY OR PERMANENTLY STABILIZED OR RESTORED AS THE WORK PROGRESSES.
3. THE CONTRACTOR SHALL MONITOR THE WEATHER SEVERAL DAYS IN ADVANCE OF THE ONSET OF THE PROJECT TO ENSURE THAT THE WORKS WILL BE CONDUCTED DURING FAVOURABLE WEATHER CONDITIONS. SHOULD AN UNEXPECTED STORM ARISE, THE CONTRACTOR IS TO REMOVE ALL UNFIXED ITEMS FROM THE REGIONAL STORM FLOOD PLAIN THAT WOULD HAVE THE POTENTIAL TO CAUSE A SPILL OR AN OBSTRUCTION TO FLOW (e.g. FUEL TANKS, PORTA-POTTIES, MACHINERY, EQUIPMENT, CONSTRUCTION MATERIAL, etc.).
4. THE EROSION AND SEDIMENT CONTROL STRATEGIES 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 IDENTIFIED MEASURES ON THE PLAN ARE NOT EFFECTIVE IN PREVENTING THE RELEASE OF A DELETERIOUS SUBSTANCE, INCLUDING SEDIMENT, THEN ALTERNATIVE MEASURES MUST BE IMPLEMENTED IMMEDIATELY TO MINIMIZE POTENTIAL ECOLOGICAL IMPACTS. ADDITIONAL ESC MEASURES ARE TO BE KEPT ON SITE AND USED AS NECESSARY.
5. NO ALTERNATIVE METHODS OF EROSION PROTECTION SHALL BE PERMITTED UNLESS APPROVED BY THE DESIGN CONSULTANT AND THE TOWNSHIP OF WOOLWICH.
6. INSPECTION OF ESC MEASURES SHOULD OCCUR, AT MINIMUM:
   DURING PERIODS OF EARTHWORKS ACTIVITIES:
   - ON A WEEKLY BASIS;
   - AFTER EVERY RAINFALL EVENT;
   - AFTER SIGNIFICANT SNOWMELT EVENTS;
   - DAILY DURING PERIODS OF EXTENDED RAIN OR SNOWMELT.

   DURING INACTIVE PERIODS:
   - ONCE A MONTH;
   - AFTER SIGNIFICANT RAINFALL OR SNOWMELT EVENTS.
12. ALL ACTIVITIES, INCLUDING MAINTENANCE PROCEDURES, TO BE CONTROLLED TO PREVENT THE ENTRY OF PETROLEUM PRODUCTS, DEBRIS, RUBBLE, CONCRETE OR OTHER DELETERIOUS SUBSTANCES INTO SEWERS, WATER BODIES AND/OR DITCHES.
13. VEHICULAR REFUELING AND MAINTENANCE TO BE COMPLETED IN A DESIGNATED AREA.
14. CONTRACTOR TO BE RESPONSIBLE FOR PROVISIONS, MAINTENANCE AND RESTORATION OF THE CONSTRUCTION ACCESS.
15. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING MUNICIPAL ROADWAYS AND SIDEWALKS ARE CLEANED OF ALL SEDIMENTS FROM VEHICULAR TRACKING AT THE END OF EACH WORKING DAY. STREET SWEEPING TO BE UNDERTAKEN AS NEEDED.
16. NO CONSTRUCTION ACTIVITY OR MACHINERY SHALL BE ALLOWED BEYOND THE LIMIT OF THE TEMPORARY SEDIMENT CONTROL FENCE OR THE SITE WORKS.
17. THE CONTRACTOR SHALL TAKE CARE AND CONTROL SPILLS, FLUIDS AND MATERIALS DURING CONSTRUCTION TO MINIMIZE RISK TO THE ENVIRONMENT.
18. DEWATERING WILL NOT BE PERMITTED DURING CONSTRUCTION. SHOULD DEWATERING BE REQUIRED, A SEPARATE PLAN AND APPROVAL IS TO BE OBTAINED. NO PUMPING OF SEDIMENT LADEN RUNOFF FORM THE SITE IS PERMITTED AT ANY TIME.
19. THE CONTRACTOR IS RESPONSIBLE TO IMPLEMENT DUST CONTROL MEASURES AND CONSTRUCTION BEST PRACTICE GUIDELINES AS APPROVED BY THE TOWNSHIP AND/OR CONSERVATION AUTHORITY.
20. PRIOR TO SITE DISTURBANCE THE CONTRACTOR / PROPONENT SHOULD ENSURE THAT THE WORKS ARE IN CONFORMANCE WITH MIGRATORY BIRDS CONVENTION ACT. PLEASE NOTE THAT THE GENERAL BREEDING BIRD TIMING WINDOW FOR THIS AREA IS APRIL 1ST TO AUGUST 31ST, HOWEVER, BREEDING ACTIVITIES MIGHT INITIATE PRIOR TO AND CONTINUE PAST THIS PERIOD.
21. TOPSOIL AND TEMPORARY MATERIAL STOCKPILES TO BE ENCLOSED WITH SEDIMENT CONTROL FENCE. SEDIMENT CONTROL FENCE FOR STOCKPILES TO BE TERRAFIX TERRAFENCE OR APPROVED EQUIVALENT.
22. REMOVE TEMPORARY SEDIMENT CONTROLS FOLLOWING COMPLETION OF CONSTRUCTION AND SITE STABILIZATION.
23. ACCUMULATED SEDIMENT TO BE REMOVED FORM THE SEDIMENT BARRIER ONCE IT REACHES A DEPTH OF MAXIMUM 300mm. ALL ACCUMULATED SEDIMENT IS TO BE REMOVED PRIOR TO REMOVING THE TEMPORARY SEDIMENT CONTROL FENCING.
24. AN AFTER HOURS CONTACT LIST IS TO BE VISIBLY POSTED ON-SITE FOR EMERGENCIES. ALL THE PLANS SHOULD HAVE THE NAME AND CONTACT INFORMATION FOR THE PERSON RESPONSIBLE FOR MAINTENANCE OF ESC MEASURES.
25. ANY SEDIMENT OR OTHER SPILL FROM THE SITE IS TO BE REPORTED TO THE MINISTRY OF ENVIRONMENT (SPILL ACTION CENTRE) AT 1-800-268-6060.

PROPOSED CONTROL STRUCTURE DETAIL N.T.S.



*WEIR TO BE 0.3m THICK (MIN.) AND EXTENDED 0.6m BELOW GRADE.
CLEARSTONE/GRANULAR A TO BE PLACE AT BASE TO 1.2m BELOW GRADE.

DRAWING SCALE: 1:200

0 2.5 5 7.5 10 metres

VAN HARTEN SURVEYING INC.

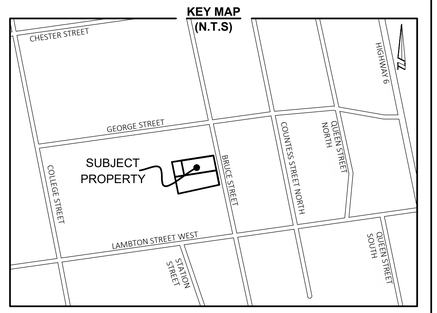
CALL BEFORE YOU DIG

THE LOCATION OF SERVICES ON THIS DRAWING ARE ONLY APPROXIMATE AND BASED ON SURFACE FEATURES LOCATED AT THE TIME OF THE TOPOGRAPHIC SURVEY. PRIOR TO ANY CONSTRUCTION IT IS THE RESPONSIBILITY OF THE CONTRACTOR/BUILDER TO ENSURE THE EXACT LOCATION OF ALL UTILITIES.

BOUNDARIES NOTE

BOUNDARIES SHOWN IN HEAVY OUTLINE ARE IN ACCORDANCE WITH PRIOR PLANS AND DEEDS. (INDIVIDUAL BEARINGS ROTATED TO A COMMON BASE AS REQUIRED)

NOT FOR CONSTRUCTION



LEGEND:

EX. TREE
EX. TREE TO BE REMOVED
EX. FENCE
EX. OVERHEAD HYDRO
EX. MANHOLE
EX. CATCHBASIN
EX. HYDRO METER (HM)
EX. LIGHT STANDARD (LS)
EX. GAS METER (GM)
EX. HYDRO POLE (HP)
EX. WATER VALVE
PROP. SILT FENCE
PROP. CONSTRUCTION LIMIT
EX. ELEVATION ×394.25
MATCH EX. GRADE ×(331.14)EX
PROP. GRADE ×(331.14)
PROP. SLOPE 2.0%
PROP. SWALE 2.0%
3H:1V MAX. SLOPE

METRIC:
DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

NO.	REVISION	BY	DATE
0	ISSUED FOR SUBMISSION	BP	FEB. 6, 2026

DRAWING REVISION SCHEDULE

Van Harten LAND SURVEYORS - ENGINEERS

Kitchener/Waterloo Ph: 519-742-8371 | Guelph Ph: 519-821-2763 | Orangeville Ph: 519-940-4110

www.vanharten.com info@vanharten.com

DRAWN BY: BH | DESIGN BY: BH/BP | CHECKED BY: BP

STAMP

LICENSED PROFESSIONAL ENGINEER
B.D. POND
100583029
FEB. 06, 2026
PROVINCE OF ONTARIO

STAMP

CAUTION:

- THIS IS NOT A PLAN OF SURVEY AND SHALL NOT BE USED FOR TRANSACTION OR MORTGAGE PURPOSES.
- SOIL BEARING CAPACITY SHOULD BE VERIFIED AT THE TIME OF CONSTRUCTION.
- THE BUILDER MUST ENSURE A MINIMUM OF 1.22m OF EARTH COVER OVER THE FOOTINGS FOR FROST PROTECTION.
- THIS SKETCH IS PROTECTED BY COPYRIGHT

CLIENT: DAWN McNAB

PROJECT No: 34022-24

PROJECT: 166 BRUCE STREET TOWN OF DURHAM

DRAWING TITLE: SITE GRADING PLAN

SHEET No:	DRAWING No:	REVISION:
1 OF 2	C01	0

DRAWING SCALE: 1:200

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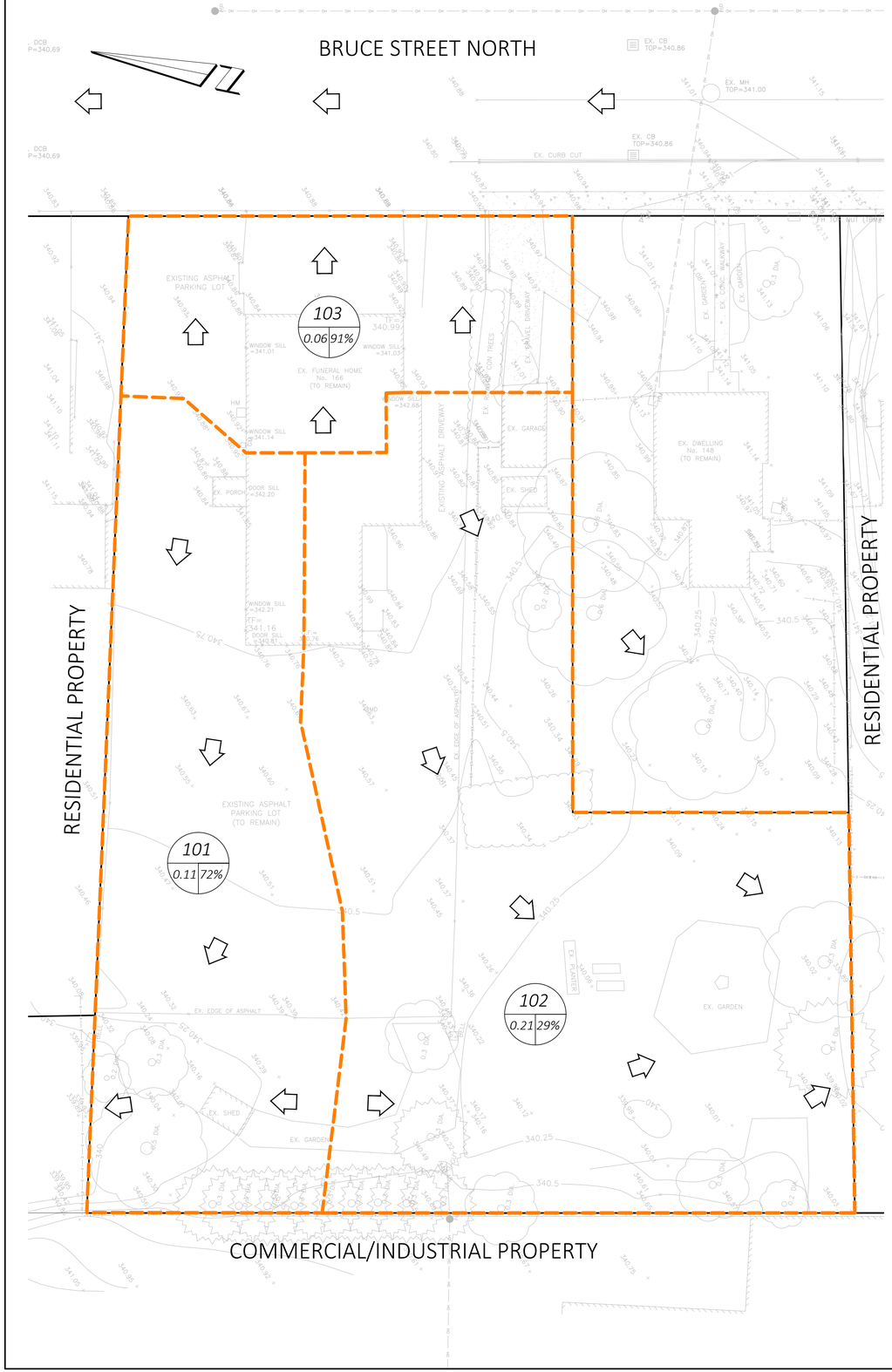
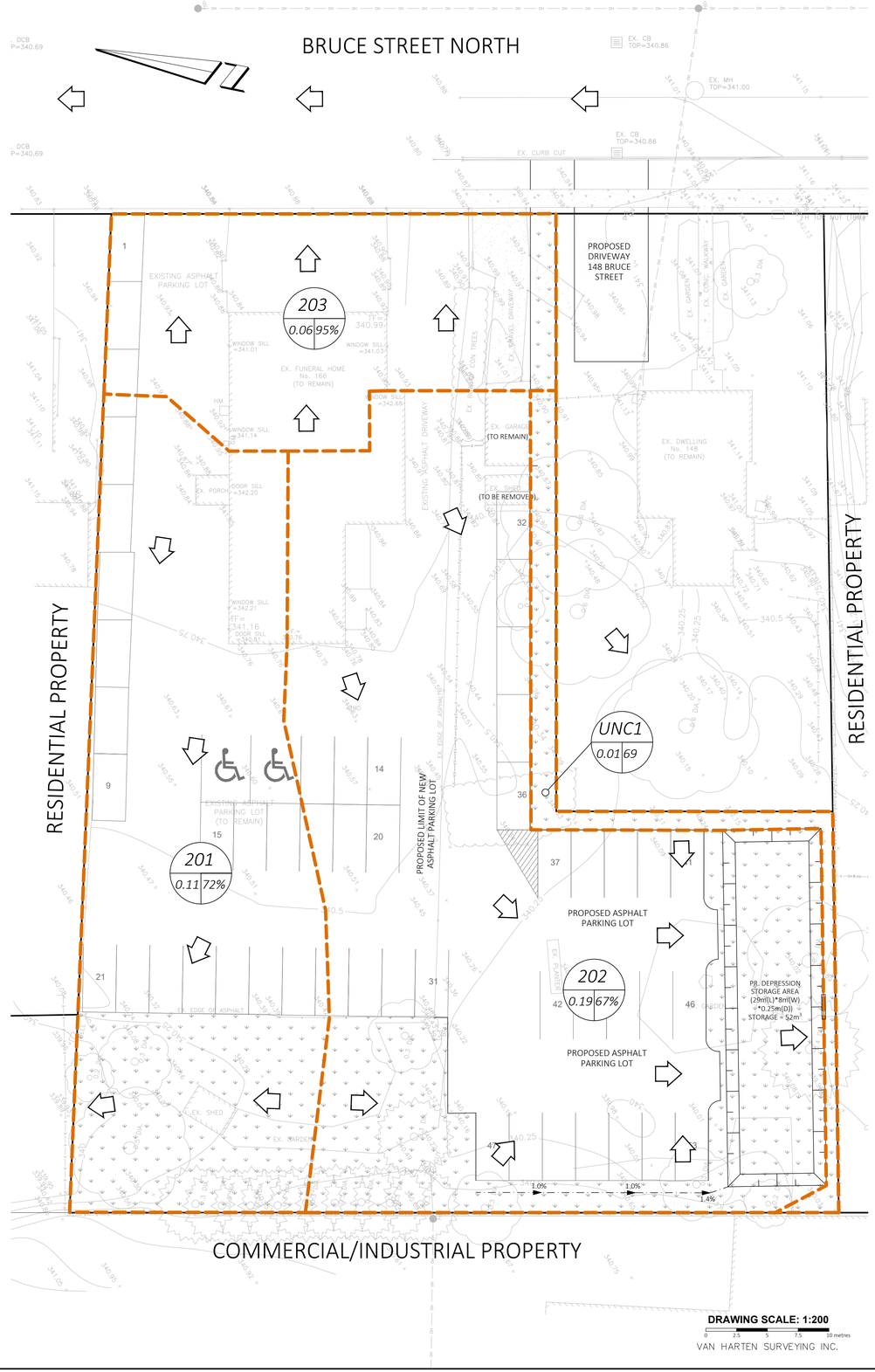
Plotted:Feb. 6, 26 11:27 AM

PRE-DEVELOPMENT DRAINAGE PLAN



POST-DEVELOPMENT DRAINAGE PLAN



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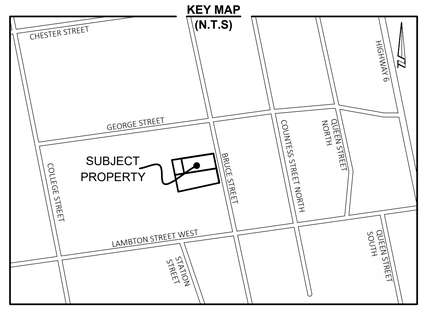
0 2.5 5 7.5 10 metres

VAN HARTEN SURVEYING INC.



LEGEND:

- EX. TREE
- EX. TREE TO BE REMOVED
- EX. FENCE
- EX. OVERHEAD HYDRO
- EX. MANHOLE
- EX. CATCHBASIN
- EX. HYDRO METER (HM)
- EX. LIGHT STANDARD (LS)
- EX. GAS METER (GM)
- EX. HYDRO POLE (HP)
- EX. WATER VALVE
- EX. ELEVATION (× 394.25)
- 3H:1V MAX. SLOPE
- OVERLAND FLOW
- 201 / 0.00 0.00 — CATCHMENT I.D. / AREA (HA) | PERCENT IMPERVIOUS/CURVE NUMBER
- EXISTING CATCHMENT AREA
- PROPOSED CATCHMENT AREA

METRIC:
DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

NO.	REVISION	BY	DATE
0	ISSUED FOR SUBMISSION	BP	FEB. 6, 2026

DRAWING REVISION SCHEDULE

Van Harten
LAND SURVEYORS - ENGINEERS

Kitchener/Waterloo Ph: 519-742-8371 | Guelph Ph: 519-821-2763 | Orangeville Ph: 519-940-4110

www.vanharten.com info@vanharten.com

DRAWN BY: BH | DESIGN BY: BH/BP | CHECKED BY: BP

STAMP

LICENSED PROFESSIONAL ENGINEER — STO. POND — 100583029 — FEB. 06, 2026 — PROVINCE OF ONTARIO

STAMP

CAUTION:

- THIS IS NOT A PLAN OF SURVEY AND SHALL NOT BE USED FOR TRANSACTION OR MORTGAGE PURPOSES
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CLIENT: DAWN McNAB

PROJECT No: 34022-24

PROJECT: 166 BRUCE STREET
TOWN OF DURHAM

DRAWING TITLE: SITE DRAINAGE PLAN

SHEET No:	DRAWING No:	REVISION:
2 OF 2	C02	0
DRAWING SCALE: 1:200		

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Plotted:Feb. 6, 26 11:29 AM

Van Harten
LAND SURVEYORS - ENGINEERS

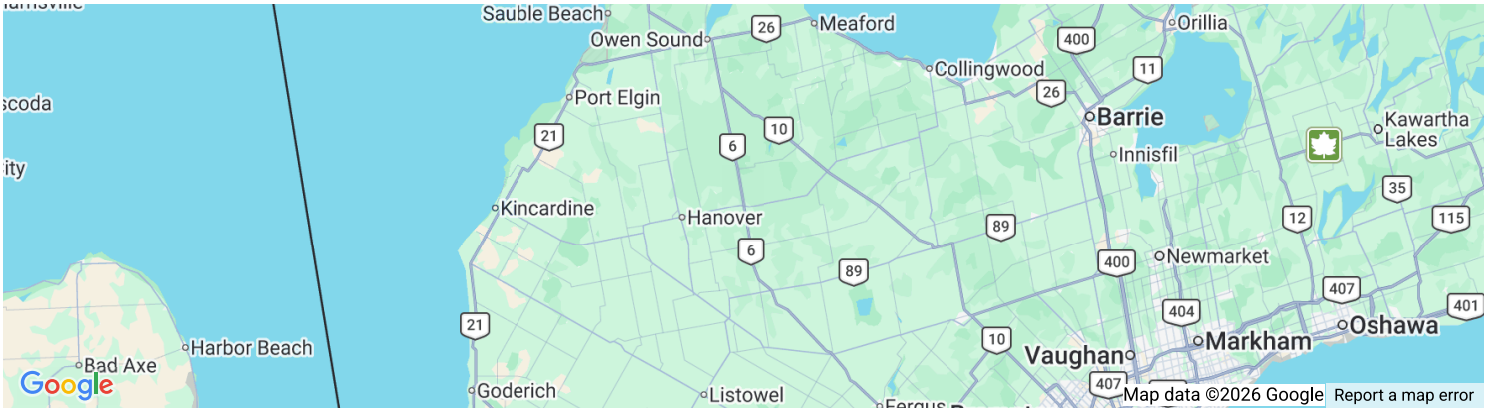
APPENDIX B
STORMWATER MANAGEMENT CALCULATIONS

Ontario IDF CURVE LOOKUP

Active coordinate

44° 10' 45" N, 80° 49' 14" W (44.179167,-80.820833)

Retrieved: Thu, 29 Jan 2026 18:02:39 GMT



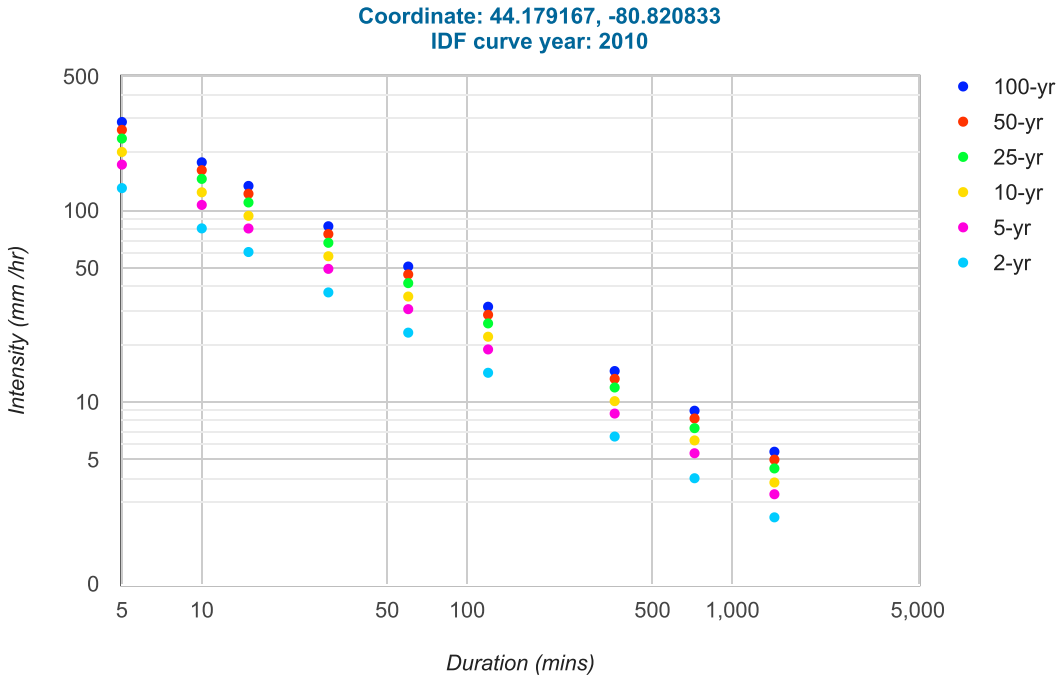
Location summary

These are the locations in the selection.

IDF Curve: 44° 10' 45" N, 80° 49' 14" W (44.179167,-80.820833)

Results

An IDF curve was found.



Coefficient summary

IDF Curve: 44° 10' 45" N, 80° 49' 14" W (44.179167,-80.820833)

Retrieved: Thu, 29 Jan 2026 18:02:39 GMT

Data year: 2010
IDF curve year: 2010

Return period	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
A	23.0	30.5	35.5	41.7	46.3	50.9
B	-0.699	-0.699	-0.699	-0.699	-0.699	-0.699

Statistics

Rainfall intensity (mm hr^{-1})

Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	130.6	80.5	60.6	37.3	23.0	14.2	6.6	4.0	2.5
5-yr	173.2	106.7	80.4	49.5	30.5	18.8	8.7	5.4	3.3
10-yr	201.6	124.2	93.6	57.6	35.5	21.9	10.1	6.3	3.8
25-yr	236.9	145.9	109.9	67.7	41.7	25.7	11.9	7.3	4.5
50-yr	263.0	162.0	122.0	75.2	46.3	28.5	13.2	8.2	5.0
100-yr	289.1	178.1	134.1	82.6	50.9	31.4	14.5	9.0	5.5

Rainfall depth (mm)

Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	10.9	13.4	15.2	18.7	23.0	28.3	39.4	48.6	59.9
5-yr	14.4	17.8	20.1	24.8	30.5	37.6	52.3	64.4	79.4
10-yr	16.8	20.7	23.4	28.8	35.5	43.7	60.9	75.0	92.4
25-yr	19.7	24.3	27.5	33.8	41.7	51.4	71.5	88.1	108.5
50-yr	21.9	27.0	30.5	37.6	46.3	57.0	79.4	97.8	120.5
100-yr	24.1	29.7	33.5	41.3	50.9	62.7	87.3	107.5	132.5

Terms of Use

Project No: 34022-24
Project Name: 166 Bruce Street
Project Location: Durham
Date: 2026-01-29
Update: 2026-02-03

STANHYD Hydraulic Parameter Sheet

Catchment Area: 0.114 ha

Pre-Development and Post- Development Catchment 101 and 201

On-site Soils:

Type	Classification
HARRISTON SILT LOAM	B

*Per Ontario Soil Mapping

Impervious Land Use:

Driveway/Building		Gravel		Concrete		SWM Facility		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
0.0818	98							0.082	98.00

*All areas are in Hectares.

Impervious Land Use VO Inputs:

Depression Storage (mm):	2.0
Slope (%):	1.0
Flow Length (m from model):	27.57
Total Indirectly Connected Impervious Area (ha):	0.082
Total Directly Connected Impervious Area (ha):	0.000
T IMP:	0.72
X IMP:	0.00

Pervious Land Use:

Lawn		Woodland		Cultivated		Wetland		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
0.03	69							0.032	69.00

*All areas are in Hectares.

Pervious Land Use VO Inputs:

Pervious Curve Number:	69.00
Initial Abstraction (mm):	5.00
Slope (%):	1.8
Flow Length (m):	22.0

Pervious Initial Abstraction:

Landuse	IA (mm)	Area
Lawn	5	0.032
Woodland	10	0
Cultivated	7	0
Wetland	16	0
Catchment Weighted	5.00	0.032

Project No: 34022-24
Project Name: 166 Bruce Street
Project Location: Durham
Date: 2026-01-29
Update: 2026-02-03

STANHYD Hydraulic Parameter Sheet
Pre-Development Catchment 102

Catchment Area: 0.208 ha

On-site Soils:

Type	Classification
HARRISTON SILT LOAM	B

*Per Ontario Soil Mapping

Impervious Land Use:

Driveway/Building		Gravel		Concrete		SWM Facility		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
0.0598	98							0.060	98.00

*All areas are in Hectares.

Impervious Land Use VO Inputs:

Depression Storage (mm):	2.0
Slope (%):	1.3
Flow Length (m from model):	37.24
Total Indirectly Connected Impervious Area (ha):	0.060
Total Directly Connected Impervious Area (ha):	0.000
T IMP:	0.29
X IMP:	0.00

Pervious Land Use:

Lawn		Woodland		Cultivated		Wetland		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
0.15	69							0.148	69.00

*All areas are in Hectares.

Pervious Land Use VO Inputs:

Pervious Curve Number:	69.00
Initial Abstraction (mm):	5.00
Slope (%):	1.5
Flow Length (m):	20.0

Pervious Initial Abstraction:

Landuse	IA (mm)	Area
Lawn	5	0.148
Woodland	10	0
Cultivated	7	0
Wetland	16	0
Catchment Weighted	5.00	0.148

Project No: 34022-24
Project Name: 166 Bruce Street
Project Location: Durham
Date: 2026-01-29
Update: 2026-02-03

STANHYD Hydraulic Parameter Sheet
Pre-Development Catchment 103

Catchment Area: 0.060 ha

On-site Soils:

Type	Classification
HARRISTON SILT LOAM	B

*Per Ontario Soil Mapping

Impervious Land Use:

Driveway/Building		Gravel		Concrete		SWM Facility		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
0.0545	98							0.055	98.00

*All areas are in Hectares.

Impervious Land Use VO Inputs:

Depression Storage (mm):	2.0
Slope (%):	0.8
Flow Length (m from model):	20.0
Total Indirectly Connected Impervious Area (ha):	0.000
Total Directly Connected Impervious Area (ha):	0.055
T IMP:	0.91
X IMP:	0.91

Pervious Land Use:

Lawn		Woodland		Cultivated		Wetland		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
0.005	69							0.005	69.00

*All areas are in Hectares.

Pervious Land Use VO Inputs:

Pervious Curve Number:	69.00
Initial Abstraction (mm):	5.00
Slope (%):	0.8
Flow Length (m):	8.0

Pervious Initial Abstraction:

Landuse	IA (mm)	Area
Lawn	5	0.005
Woodland	10	0
Cultivated	7	0
Wetland	16	0
Catchment Weighted	5.00	0.005

Project No: 34022-24
Project Name: 166 Bruce Street
Project Location: Durham
Date: 2026-01-29
Update: 2026-02-03

STANHYD Hydraulic Parameter Sheet
Post-Development Catchment 202

Catchment Area: 0.194 ha

On-site Soils:

Type	Classification
HARRISTON SILT LOAM	B

*Per Ontario Soil Mapping

Impervious Land Use:

Driveway/Building		Gravel		Concrete		SWM Facility		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
0.130	98							0.130	98.00

*All areas are in Hectares.

Impervious Land Use VO Inputs:

Depression Storage (mm):	2.0
Slope (%):	0.8
Flow Length (m from model):	35.96
Total Indirectly Connected Impervious Area (ha):	0.000
Total Directly Connected Impervious Area (ha):	0.130
T IMP:	0.67
X IMP:	0.67

Pervious Land Use:

Lawn		Woodland		Cultivated		Wetland		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
0.063	69							0.063	69.00

*All areas are in Hectares.

Pervious Land Use VO Inputs:

Pervious Curve Number:	69.00
Initial Abstraction (mm):	5.00
Slope (%):	1.0
Flow Length (m):	5.0

Pervious Initial Abstraction:

Landuse	IA (mm)	Area
Lawn	5	0.063
Woodland	10	0
Cultivated	7	0
Wetland	16	0
Catchment Weighted	5.00	0.063

Project No: 34022-24
Project Name: 166 Bruce Street
Project Location: Durham
Date: 2026-01-29
Update: 2026-02-03

STANHYD Hydraulic Parameter Sheet
Post-Development Catchment 203

Catchment Area: 0.060 ha

On-site Soils:

Type	Classification
HARRISTON SILT LOAM	B

*Per Ontario Soil Mapping

Impervious Land Use:

Driveway/Building		Gravel		Concrete		SWM Facility		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
0.0566	98							0.057	98.00

*All areas are in Hectares.

Impervious Land Use VO Inputs:

Depression Storage (mm):	2.0
Slope (%):	0.8
Flow Length (m from model):	20.0
Total Indirectly Connected Impervious Area (ha):	0.000
Total Directly Connected Impervious Area (ha):	0.057
T IMP:	0.95
X IMP:	0.95

Pervious Land Use:

Lawn		Woodland		Cultivated		Wetland		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
0.003	69							0.003	69.00

*All areas are in Hectares.

Pervious Land Use VO Inputs:

Pervious Curve Number:	69.00
Initial Abstraction (mm):	5.00
Slope (%):	0.8
Flow Length (m):	8.0

Pervious Initial Abstraction:

Landuse	IA (mm)	Area
Lawn	5	0.003
Woodland	10	0
Cultivated	7	0
Wetland	16	0
Catchment Weighted	5.00	0.003

Project No: 34022-24
Project Name: 166 Bruce Street
Project Location: Durham
Date: 2026-01-29
Update: 2026-02-03

NASHYD Hydraulic Parameter Sheet
Post-Development Catchment UNC1

Catchment Area: 0.014 ha

On-site Soils:

Type	Classification
Brantford Fine Sandy Loam	A

*Per Test Pit Logs (April 26, 2024) and Ontario Soil Mapping

Impervious Land Use:

Roadway/Building		Gravel		Sidewalk		SWM Facility		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
								0.00	0.00

*All areas are in Hectares.

Pervious Land Use:

Lawn		Woodland		Cultivated		Meadow		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
0.014	69							0.014	69.00

*All areas are in Hectares.

Composite Initial Abstraction:

Landuse	IA (mm)	Area
Lawn	5	0.014
Woodland	10	0
Cultivated	7	0
Meadow	8	0
Impervious	2	0
Catchment Weighted	5.00	0.014

Composite Runoff Coefficient:

Landuse	RC	Area
Lawn	0.25	0.014
Woodland		0
Cultivated		0
Meadow		0
Impervious		0
Catchment Weighted	0.25	0.014

Land Use VO Inputs:

Composite Curve Number:	69.00
Composite Initial Abstraction (mm):	5.00
Composite Runoff Coefficient:	0.25
Flow Length (m):	2.0
Slope (%):	5.0
Time to Concentration (hr):	0.04
Time to Peak (hr):	0.03

Project No: 34022-24
Project Name: 166 Bruce Street
Project Location: Durham
Date: 2026-01-29
Update: 2026-02-03

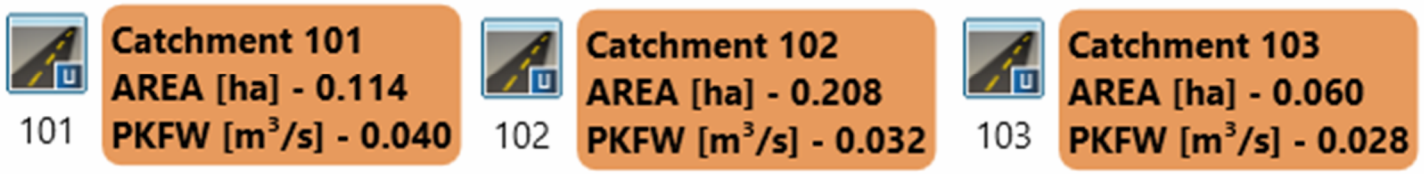
Storage and Control Structure Calculations

Rectangular Weir (High Flow): Length = 0.05 m
Invert Elevation = 339.93 m

Rectangular Weir (High Flow): Length = 0.3 m
Invert Elevation = 340.06 m

Elev. (m)	Storage Volume (m^3)	Rect Weir Discharge (m^3/s)	Rect Weir Discharge (m^3/s)	Total Discharge (m^3/s)	Storage (ha.m)
339.93	0.0	0.000	0.000	0.0000	0.0000
339.98	9.0	0.001	0.000	0.0010	0.0009
340.03	18.6	0.003	0.000	0.0029	0.0019
340.06	24.6	0.004	0.000	0.0043	0.0025
340.08	29.0	0.005	0.002	0.0069	0.0029
340.13	40.0	0.008	0.010	0.0185	0.0040
340.18	51.8	0.012	0.023	0.0344	0.0052

Pre-Development 100-Year VO Schematic



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================================================================================
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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2017)
       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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  Output  filename:
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e2d7f14-e305-4d05-8136-37aa90d88441\s
  Summary filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\49582112-93d4-4197-b69f-ac94a5b1f276\e
e2d7f14-e305-4d05-8136-37aa90d88441\s


DATE: 01-29-2026                          TIME: 01:55:44

USER:



COMMENTS: _____________________________________________________________


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

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 890.524
| Ptotal= 77.23 mm |                          B=   0.000
--------------------                          C=   0.699
```

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	6.49	1.00	30.73	2.00	12.84	3.00	7.48
0.17	7.26	1.17	178.09	2.17	11.34	3.17	7.04
0.33	8.28	1.33	37.71	2.33	10.21	3.33	6.67
0.50	9.75	1.50	23.78	2.50	9.31	3.50	6.33
0.67	12.08	1.67	18.13	2.67	8.59	3.67	6.04
0.83	16.52	1.83	14.94	2.83	7.99	3.83	5.77

CALIB
STANDHYD (0101)
ID= 1 DT= 5.0 min

Area (ha)= 0.11
Total Imp(%)= 72.00 Dir. Conn.(%)= 1.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	1.80
Length	(m)=	27.57	22.00
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	6.49	1.083	30.73	2.083	12.84	3.08	7.48
0.167	6.49	1.167	30.73	2.167	12.84	3.17	7.48
0.250	7.26	1.250	178.09	2.250	11.34	3.25	7.04
0.333	7.26	1.333	178.09	2.333	11.34	3.33	7.04
0.417	8.28	1.417	37.71	2.417	10.21	3.42	6.67
0.500	8.28	1.500	37.71	2.500	10.21	3.50	6.67
0.583	9.75	1.583	23.78	2.583	9.31	3.58	6.33
0.667	9.75	1.667	23.78	2.667	9.31	3.67	6.33
0.750	12.08	1.750	18.13	2.750	8.59	3.75	6.04
0.833	12.08	1.833	18.13	2.833	8.59	3.83	6.04
0.917	16.52	1.917	14.94	2.917	7.99	3.92	5.77
1.000	16.52	2.000	14.94	3.000	7.99	4.00	5.77

Max.Eff.Inten.(mm/hr)=		178.09	441.57
over (min)		5.00	5.00

Storage Coeff. (min)=	0.94 (ii)	3.75 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.34	0.25	
			TOTALS
PEAK FLOW (cms)=	0.00	0.04	0.040 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	75.23	53.18	53.39
TOTAL RAINFALL (mm)=	77.23	77.23	77.23
RUNOFF COEFFICIENT =	0.97	0.69	0.69

***** 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* = 69.0 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 (0102)	Area (ha)=	0.21	
ID= 1 DT= 5.0 min	Total Imp(%)=	29.00	Dir. Conn.(%)= 1.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.06	0.15
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.30	1.50
Length	(m)=	37.24	20.00
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	6.49	1.083	30.73	2.083	12.84	3.08	7.48
0.167	6.49	1.167	30.73	2.167	12.84	3.17	7.48
0.250	7.26	1.250	178.09	2.250	11.34	3.25	7.04
0.333	7.26	1.333	178.09	2.333	11.34	3.33	7.04
0.417	8.28	1.417	37.71	2.417	10.21	3.42	6.67
0.500	8.28	1.500	37.71	2.500	10.21	3.50	6.67
0.583	9.75	1.583	23.78	2.583	9.31	3.58	6.33
0.667	9.75	1.667	23.78	2.667	9.31	3.67	6.33
0.750	12.08	1.750	18.13	2.750	8.59	3.75	6.04
0.833	12.08	1.833	18.13	2.833	8.59	3.83	6.04
0.917	16.52	1.917	14.94	2.917	7.99	3.92	5.77

```
             1.000   16.52 | 2.000   14.94 | 3.000    7.99 |  4.00    5.77

     Max.Eff.Inten.(mm/hr)=     178.09       103.75
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      1.04 (ii)    6.04 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.34         0.15
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.00         0.03         0.032 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.42          1.42
     RUNOFF VOLUME    (mm)=     75.23        34.88         35.27
     TOTAL RAINFALL   (mm)=     77.23        77.23         77.23
     RUNOFF COEFFICIENT   =      0.97         0.45          0.46

***** 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*  =  69.0    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 (  0103)|   Area    (ha)=   0.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  91.00   Dir. Conn.(%)=  91.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.05         0.01
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       0.80         0.80
     Length            (m)=      20.00         8.00
     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    6.49 | 1.083   30.73 | 2.083   12.84 |  3.08    7.48
              0.167    6.49 | 1.167   30.73 | 2.167   12.84 |  3.17    7.48
              0.250    7.26 | 1.250  178.09 | 2.250   11.34 |  3.25    7.04
              0.333    7.26 | 1.333  178.09 | 2.333   11.34 |  3.33    7.04
              0.417    8.28 | 1.417   37.71 | 2.417   10.21 |  3.42    6.67
              0.500    8.28 | 1.500   37.71 | 2.500   10.21 |  3.50    6.67
              0.583    9.75 | 1.583   23.78 | 2.583    9.31 |  3.58    6.33
```

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               0.667    9.75 | 1.667   23.78 | 2.667    9.31 |  3.67    6.33
               0.750   12.08 | 1.750   18.13 | 2.750    8.59 |  3.75    6.04
               0.833   12.08 | 1.833   18.13 | 2.833    8.59 |  3.83    6.04
               0.917   16.52 | 1.917   14.94 | 2.917    7.99 |  3.92    5.77
               1.000   16.52 | 2.000   14.94 | 3.000    7.99 |  4.00    5.77

     Max.Eff.Inten.(mm/hr)=     178.09        56.92
               over (min)        5.00         5.00
     Storage Coeff.  (min)=      0.83 (ii)    1.94 (ii)
     Unit Hyd. Tpeak (min)=      5.00         5.00
     Unit Hyd. peak  (cms)=      0.34         0.31
                                                          *TOTALS*
     PEAK FLOW       (cms)=      0.03         0.00          0.028 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.33           1.33
     RUNOFF VOLUME    (mm)=     75.23        28.00          70.97
     TOTAL RAINFALL   (mm)=     77.23        77.23          77.23
     RUNOFF COEFFICIENT   =      0.97         0.36           0.92

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  69.0    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.

---------------------------------------------------------------------------

 FINISH
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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2017)
       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\brett.pond\AppData\Local\Civica\VH5\49582112-93d4-4197-b69f-ac94a5b1f276\fbc15bce-1605-487e-9c8f-c24b26a9de7c\s
Summary filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\49582112-93d4-4197-b69f-ac94a5b1f276\fbc15bce-1605-487e-9c8f-c24b26a9de7c\s

DATE: 01-29-2026 TIME: 01:55:44

USER:

COMMENTS: _____

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

| CHICAGO STORM |
| Ptotal= 53.86 mm |

IDF curve parameters: A= 621.092
B= 0.000
C= 0.699
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	4.53	1.00	21.43	2.00	8.95	3.00	5.22
0.17	5.06	1.17	124.21	2.17	7.91	3.17	4.91
0.33	5.78	1.33	26.30	2.33	7.12	3.33	4.65
0.50	6.80	1.50	16.58	2.50	6.49	3.50	4.42
0.67	8.42	1.67	12.65	2.67	5.99	3.67	4.21
0.83	11.52	1.83	10.42	2.83	5.57	3.83	4.03

```
| CALIB            |
| STANDHYD (  0101)|   Area    (ha)=   0.11
|ID= 1 DT= 5.0 min |   Total Imp(%)=  72.00   Dir. Conn.(%)=   1.00
--------------------
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	1.80
Length	(m)=	27.57	22.00
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	4.53	1.083	21.43	2.083	8.95	3.08	5.22
0.167	4.53	1.167	21.43	2.167	8.95	3.17	5.22
0.250	5.06	1.250	124.21	2.250	7.91	3.25	4.91
0.333	5.06	1.333	124.21	2.333	7.91	3.33	4.91
0.417	5.78	1.417	26.30	2.417	7.12	3.42	4.65
0.500	5.78	1.500	26.30	2.500	7.12	3.50	4.65
0.583	6.80	1.583	16.58	2.583	6.49	3.58	4.42
0.667	6.80	1.667	16.58	2.667	6.49	3.67	4.42
0.750	8.42	1.750	12.65	2.750	5.99	3.75	4.21
0.833	8.42	1.833	12.65	2.833	5.99	3.83	4.21
0.917	11.52	1.917	10.42	2.917	5.57	3.92	4.03
1.000	11.52	2.000	10.42	3.000	5.57	4.00	4.03

Max.Eff.Inten.(mm/hr)=		124.21	261.60	
over (min)		5.00	5.00	
Storage Coeff. (min)=		1.08 (ii)	4.55 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.34	0.23	
				TOTALS
PEAK FLOW	(cms)=	0.00	0.02	0.023 (iii)
TIME TO PEAK	(hrs)=	1.33	1.33	1.33
RUNOFF VOLUME	(mm)=	51.86	32.47	32.65
TOTAL RAINFALL	(mm)=	53.86	53.86	53.86
RUNOFF COEFFICIENT	=	0.96	0.60	0.61

***** 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* = 69.0 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 (0102)	Area (ha)=	0.21	
ID= 1 DT= 5.0 min	Total Imp(%)=	29.00	Dir. Conn.(%)= 1.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.06	0.15
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.30	1.50
Length	(m)=	37.24	20.00
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	4.53	1.083	21.43	2.083	8.95	3.08	5.22
0.167	4.53	1.167	21.43	2.167	8.95	3.17	5.22
0.250	5.06	1.250	124.21	2.250	7.91	3.25	4.91
0.333	5.06	1.333	124.21	2.333	7.91	3.33	4.91
0.417	5.78	1.417	26.30	2.417	7.12	3.42	4.65
0.500	5.78	1.500	26.30	2.500	7.12	3.50	4.65
0.583	6.80	1.583	16.58	2.583	6.49	3.58	4.42
0.667	6.80	1.667	16.58	2.667	6.49	3.67	4.42
0.750	8.42	1.750	12.65	2.750	5.99	3.75	4.21
0.833	8.42	1.833	12.65	2.833	5.99	3.83	4.21
0.917	11.52	1.917	10.42	2.917	5.57	3.92	4.03
1.000	11.52	2.000	10.42	3.000	5.57	4.00	4.03

Max.Eff.Inten.(mm/hr)=		124.21	54.00	
over (min)		5.00	10.00	
Storage Coeff. (min)=		1.20 (ii)	7.69 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.33	0.13	
				TOTALS
PEAK FLOW	(cms)=	0.00	0.02	0.016 (iii)
TIME TO PEAK	(hrs)=	1.33	1.42	1.42
RUNOFF VOLUME	(mm)=	51.86	19.13	19.43
TOTAL RAINFALL	(mm)=	53.86	53.86	53.86
RUNOFF COEFFICIENT	=	0.96	0.36	0.36

***** 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* = 69.0 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 (0103)	Area (ha)= 0.06
ID= 1 DT= 5.0 min	Total Imp(%)= 91.00 Dir. Conn.(%)= 91.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.05	0.01
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	0.80	0.80
Length	(m)=	20.00	8.00
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	4.53	1.083	21.43	2.083	8.95	3.08	5.22
0.167	4.53	1.167	21.43	2.167	8.95	3.17	5.22
0.250	5.06	1.250	124.21	2.250	7.91	3.25	4.91
0.333	5.06	1.333	124.21	2.333	7.91	3.33	4.91
0.417	5.78	1.417	26.30	2.417	7.12	3.42	4.65
0.500	5.78	1.500	26.30	2.500	7.12	3.50	4.65
0.583	6.80	1.583	16.58	2.583	6.49	3.58	4.42
0.667	6.80	1.667	16.58	2.667	6.49	3.67	4.42
0.750	8.42	1.750	12.65	2.750	5.99	3.75	4.21
0.833	8.42	1.833	12.65	2.833	5.99	3.83	4.21
0.917	11.52	1.917	10.42	2.917	5.57	3.92	4.03
1.000	11.52	2.000	10.42	3.000	5.57	4.00	4.03

Max.Eff.Inten.(mm/hr)=		124.21	27.97	
over (min)		5.00	5.00	
Storage Coeff. (min)=		0.95 (ii)	2.24 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.34	0.30	
				TOTALS
PEAK FLOW	(cms)=	0.02	0.00	0.019 (iii)
TIME TO PEAK	(hrs)=	1.33	1.33	1.33
RUNOFF VOLUME	(mm)=	51.86	14.65	48.51
TOTAL RAINFALL	(mm)=	53.86	53.86	53.86
RUNOFF COEFFICIENT	=	0.96	0.27	0.90

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 69.0 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 6.2.2017)
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\brett.pond\AppData\Local\Civica\VH5\49582112-93d4-4197-b69f-ac94a5b1f276\223a1c77-5248-498f-b9a7-3356fa69b3bd\s
Summary filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\49582112-93d4-4197-b69f-ac94a5b1f276\223a1c77-5248-498f-b9a7-3356fa69b3bd\s

DATE: 01-29-2026 TIME: 01:55:44

USER:

COMMENTS: _____

```
------------------------
  ********************************************
  ** SIMULATION : 25yr 4hr 10min Chicago        **
  ********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 729.565
| Ptotal= 63.27 mm |                          B=   0.000
--------------------                          C=   0.699
                         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	5.32	1.00	25.18	2.00	10.52	3.00	6.13
0.17	5.94	1.17	145.90	2.17	9.29	3.17	5.77
0.33	6.78	1.33	30.90	2.33	8.36	3.33	5.46
0.50	7.99	1.50	19.48	2.50	7.63	3.50	5.19
0.67	9.89	1.67	14.86	2.67	7.04	3.67	4.95
0.83	13.54	1.83	12.24	2.83	6.54	3.83	4.73

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0101)|   Area    (ha)=   0.11
|ID= 1 DT= 5.0 min |   Total Imp(%)=  72.00   Dir. Conn.(%)=   1.00
--------------------
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	1.80
Length	(m)=	27.57	22.00
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	5.32	1.083	25.18	2.083	10.52	3.08	6.13
0.167	5.32	1.167	25.18	2.167	10.52	3.17	6.13
0.250	5.94	1.250	145.90	2.250	9.29	3.25	5.77
0.333	5.94	1.333	145.90	2.333	9.29	3.33	5.77
0.417	6.78	1.417	30.90	2.417	8.36	3.42	5.46
0.500	6.78	1.500	30.90	2.500	8.36	3.50	5.46

```
               0.583    7.99 | 1.583   19.48 | 2.583    7.63 |  3.58    5.19
               0.667    7.99 | 1.667   19.48 | 2.667    7.63 |  3.67    5.19
               0.750    9.89 | 1.750   14.86 | 2.750    7.04 |  3.75    4.95
               0.833    9.89 | 1.833   14.86 | 2.833    7.04 |  3.83    4.95
               0.917   13.54 | 1.917   12.24 | 2.917    6.54 |  3.92    4.73
               1.000   13.54 | 2.000   12.24 | 3.000    6.54 |  4.00    4.73

     Max.Eff.Inten.(mm/hr)=     145.90       332.34
               over (min)        5.00         5.00
     Storage Coeff.  (min)=      1.01 (ii)    4.16 (ii)
     Unit Hyd. Tpeak (min)=      5.00         5.00
     Unit Hyd. peak  (cms)=      0.34         0.24
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.00         0.03         0.029 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.33          1.33
     RUNOFF VOLUME    (mm)=     61.27        40.65         40.84
     TOTAL RAINFALL   (mm)=     63.27        63.27         63.27
     RUNOFF COEFFICIENT   =      0.97         0.64          0.65

***** 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*  =  69.0    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 (  0102)|   Area    (ha)=   0.21
|ID= 1 DT= 5.0 min |   Total Imp(%)=  29.00   Dir. Conn.(%)=   1.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06         0.15
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.30         1.50
     Length            (m)=      37.24        20.00
     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    5.32 | 1.083   25.18 | 2.083   10.52 |  3.08    6.13
               0.167    5.32 | 1.167   25.18 | 2.167   10.52 |  3.17    6.13
```

0.250	5.94	1.250	145.90	2.250	9.29	3.25	5.77
0.333	5.94	1.333	145.90	2.333	9.29	3.33	5.77
0.417	6.78	1.417	30.90	2.417	8.36	3.42	5.46
0.500	6.78	1.500	30.90	2.500	8.36	3.50	5.46
0.583	7.99	1.583	19.48	2.583	7.63	3.58	5.19
0.667	7.99	1.667	19.48	2.667	7.63	3.67	5.19
0.750	9.89	1.750	14.86	2.750	7.04	3.75	4.95
0.833	9.89	1.833	14.86	2.833	7.04	3.83	4.95
0.917	13.54	1.917	12.24	2.917	6.54	3.92	4.73
1.000	13.54	2.000	12.24	3.000	6.54	4.00	4.73

			TOTALS
Max.Eff.Inten.(mm/hr)=	145.90	72.81	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.12 (ii)	6.89 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.34	0.14	
PEAK FLOW (cms)=	0.00	0.02	0.022 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.42
RUNOFF VOLUME (mm)=	61.27	25.17	25.51
TOTAL RAINFALL (mm)=	63.27	63.27	63.27
RUNOFF COEFFICIENT =	0.97	0.40	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* = 69.0 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 (0103)	Area (ha)= 0.06
ID= 1 DT= 5.0 min	Total Imp(%)= 91.00 Dir. Conn.(%)= 91.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.05	0.01
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	0.80	0.80
Length	(m)=	20.00	8.00
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	5.32	1.083	25.18	2.083	10.52	3.08	6.13
0.167	5.32	1.167	25.18	2.167	10.52	3.17	6.13
0.250	5.94	1.250	145.90	2.250	9.29	3.25	5.77
0.333	5.94	1.333	145.90	2.333	9.29	3.33	5.77
0.417	6.78	1.417	30.90	2.417	8.36	3.42	5.46
0.500	6.78	1.500	30.90	2.500	8.36	3.50	5.46
0.583	7.99	1.583	19.48	2.583	7.63	3.58	5.19
0.667	7.99	1.667	19.48	2.667	7.63	3.67	5.19
0.750	9.89	1.750	14.86	2.750	7.04	3.75	4.95
0.833	9.89	1.833	14.86	2.833	7.04	3.83	4.95
0.917	13.54	1.917	12.24	2.917	6.54	3.92	4.73
1.000	13.54	2.000	12.24	3.000	6.54	4.00	4.73

Max.Eff.Inten.(mm/hr)=	145.90	38.75		
over (min)	5.00	5.00		
Storage Coeff. (min)=	0.89 (ii)	2.10 (ii)		
Unit Hyd. Tpeak (min)=	5.00	5.00		
Unit Hyd. peak (cms)=	0.34	0.31		
			TOTALS	
PEAK FLOW (cms)=	0.02	0.00	0.023 (iii)	
TIME TO PEAK (hrs)=	1.33	1.33	1.33	
RUNOFF VOLUME (mm)=	61.27	19.70	57.52	
TOTAL RAINFALL (mm)=	63.27	63.27	63.27	
RUNOFF COEFFICIENT =	0.97	0.31	0.91	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 69.0 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 6.2.2017)
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 *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\49582112-93d4-4197-b69f-ac94a5b1f276\283c7eb5-de4e-45c7-8883-903923c64b40\s
Summary filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\49582112-93d4-4197-b69f-ac94a5b1f276\283c7eb5-de4e-45c7-8883-903923c64b40\s

DATE: 01-29-2026 TIME: 01:55:44

USER:

COMMENTS: _____

****
** SIMULATION : 2yr 4hr 10min Chicago **
****

| CHICAGO STORM |
| Ptotal= 34.90 mm |

IDF curve parameters: A= 402.398
B= 0.000
C= 0.699
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	2.93	1.00	13.89	2.00	5.80	3.00	3.38
0.17	3.28	1.17	80.47	2.17	5.12	3.17	3.18
0.33	3.74	1.33	17.04	2.33	4.61	3.33	3.01
0.50	4.41	1.50	10.74	2.50	4.21	3.50	2.86
0.67	5.46	1.67	8.19	2.67	3.88	3.67	2.73
0.83	7.47	1.83	6.75	2.83	3.61	3.83	2.61

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--------------------
| CALIB            |
| STANDHYD (  0101)|   Area    (ha)=   0.11
|ID= 1 DT= 5.0 min |   Total Imp(%)=  72.00   Dir. Conn.(%)=   1.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.08         0.03
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.80
     Length            (m)=      27.57        22.00
     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    2.93 | 1.083   13.89 | 2.083    5.80 |  3.08    3.38
               0.167    2.93 | 1.167   13.89 | 2.167    5.80 |  3.17    3.38
               0.250    3.28 | 1.250   80.47 | 2.250    5.12 |  3.25    3.18
               0.333    3.28 | 1.333   80.47 | 2.333    5.12 |  3.33    3.18
               0.417    3.74 | 1.417   17.04 | 2.417    4.61 |  3.42    3.01
               0.500    3.74 | 1.500   17.04 | 2.500    4.61 |  3.50    3.01
               0.583    4.41 | 1.583   10.74 | 2.583    4.21 |  3.58    2.86
               0.667    4.41 | 1.667   10.74 | 2.667    4.21 |  3.67    2.86
               0.750    5.46 | 1.750    8.19 | 2.750    3.88 |  3.75    2.73
               0.833    5.46 | 1.833    8.19 | 2.833    3.88 |  3.83    2.73
               0.917    7.47 | 1.917    6.75 | 2.917    3.61 |  3.92    2.61
               1.000    7.47 | 2.000    6.75 | 3.000    3.61 |  4.00    2.61

     Max.Eff.Inten.(mm/hr)=      80.47       130.88
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.29 (ii)    5.86 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.15
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.01          0.009 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42           1.42
     RUNOFF VOLUME    (mm)=      32.90        17.05          17.17
     TOTAL RAINFALL   (mm)=      34.90        34.90          34.90
     RUNOFF COEFFICIENT   =       0.94         0.49           0.49

***** 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* = 69.0 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 (0102)	Area (ha)= 0.21
ID= 1 DT= 5.0 min	Total Imp(%)= 29.00 Dir. Conn.(%)= 1.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.06	0.15
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.30	1.50
Length	(m)=	37.24	20.00
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	2.93	1.083	13.89	2.083	5.80	3.08	3.38
0.167	2.93	1.167	13.89	2.167	5.80	3.17	3.38
0.250	3.28	1.250	80.47	2.250	5.12	3.25	3.18
0.333	3.28	1.333	80.47	2.333	5.12	3.33	3.18
0.417	3.74	1.417	17.04	2.417	4.61	3.42	3.01
0.500	3.74	1.500	17.04	2.500	4.61	3.50	3.01
0.583	4.41	1.583	10.74	2.583	4.21	3.58	2.86
0.667	4.41	1.667	10.74	2.667	4.21	3.67	2.86
0.750	5.46	1.750	8.19	2.750	3.88	3.75	2.73
0.833	5.46	1.833	8.19	2.833	3.88	3.83	2.73
0.917	7.47	1.917	6.75	2.917	3.61	3.92	2.61
1.000	7.47	2.000	6.75	3.000	3.61	4.00	2.61

Max.Eff.Inten.(mm/hr)=	80.47	22.59		
over (min)	5.00	15.00		
Storage Coeff. (min)=	1.42 (ii)	10.63 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	0.33	0.09		
			TOTALS	
PEAK FLOW (cms)=	0.00	0.01	0.005 (iii)	
TIME TO PEAK (hrs)=	1.33	1.50	1.50	
RUNOFF VOLUME (mm)=	32.90	8.66	8.88	
TOTAL RAINFALL (mm)=	34.90	34.90	34.90	
RUNOFF COEFFICIENT =	0.94	0.25	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* = 69.0 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 (0103)	Area (ha)= 0.06
ID= 1 DT= 5.0 min	Total Imp(%)= 91.00 Dir. Conn.(%)= 91.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.05	0.01
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	0.80	0.80
Length	(m)=	20.00	8.00
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	2.93	1.083	13.89	2.083	5.80	3.08	3.38
0.167	2.93	1.167	13.89	2.167	5.80	3.17	3.38
0.250	3.28	1.250	80.47	2.250	5.12	3.25	3.18
0.333	3.28	1.333	80.47	2.333	5.12	3.33	3.18
0.417	3.74	1.417	17.04	2.417	4.61	3.42	3.01
0.500	3.74	1.500	17.04	2.500	4.61	3.50	3.01
0.583	4.41	1.583	10.74	2.583	4.21	3.58	2.86
0.667	4.41	1.667	10.74	2.667	4.21	3.67	2.86
0.750	5.46	1.750	8.19	2.750	3.88	3.75	2.73
0.833	5.46	1.833	8.19	2.833	3.88	3.83	2.73
0.917	7.47	1.917	6.75	2.917	3.61	3.92	2.61
1.000	7.47	2.000	6.75	3.000	3.61	4.00	2.61

Max.Eff.Inten.(mm/hr)=		80.47	10.64	
	over (min)	5.00	5.00	
Storage Coeff.	(min)=	1.13 (ii)	2.66 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	5.00	
Unit Hyd. peak	(cms)=	0.34	0.29	
				TOTALS
PEAK FLOW	(cms)=	0.01	0.00	0.012 (iii)
TIME TO PEAK	(hrs)=	1.33	1.33	1.33

```
     RUNOFF VOLUME    (mm)=      32.90         6.21          30.49
     TOTAL RAINFALL   (mm)=      34.90        34.90          34.90
     RUNOFF COEFFICIENT   =       0.94         0.18           0.87

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  69.0    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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================================================================================
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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2017)
       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:
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d9f3446-6816-4e6a-a4ab-034f5bdd15e5\s
  Summary filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\49582112-93d4-4197-b69f-ac94a5b1f276\a
d9f3446-6816-4e6a-a4ab-034f5bdd15e5\s


DATE: 01-29-2026                          TIME: 01:55:44

USER:
```

COMMENTS: _____

****
** SIMULATION : 50yr 4hr 10min Chicago **
****

| CHICAGO STORM |
| Ptotal= 70.25 mm |

IDF curve parameters: A= 810.044
B= 0.000
C= 0.699
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	5.91	1.00	27.95	2.00	11.68	3.00	6.80
0.17	6.60	1.17	162.00	2.17	10.31	3.17	6.41
0.33	7.53	1.33	34.30	2.33	9.28	3.33	6.06
0.50	8.87	1.50	21.63	2.50	8.47	3.50	5.76
0.67	10.99	1.67	16.49	2.67	7.81	3.67	5.49
0.83	15.03	1.83	13.59	2.83	7.27	3.83	5.25

| CALIB |
| STANDHYD (0101)|
|ID= 1 DT= 5.0 min |

Area (ha)= 0.11
Total Imp(%)= 72.00 Dir. Conn.(%)= 1.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	1.80
Length	(m)=	27.57	22.00
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	5.91	1.083	27.95	2.083	11.68	3.08	6.80
0.167	5.91	1.167	27.95	2.167	11.68	3.17	6.80

0.250	6.60	1.250	162.00	2.250	10.31	3.25	6.41
0.333	6.60	1.333	162.00	2.333	10.31	3.33	6.41
0.417	7.53	1.417	34.30	2.417	9.28	3.42	6.06
0.500	7.53	1.500	34.30	2.500	9.28	3.50	6.06
0.583	8.87	1.583	21.63	2.583	8.47	3.58	5.76
0.667	8.87	1.667	21.63	2.667	8.47	3.67	5.76
0.750	10.99	1.750	16.49	2.750	7.81	3.75	5.49
0.833	10.99	1.833	16.49	2.833	7.81	3.83	5.49
0.917	15.03	1.917	13.59	2.917	7.27	3.92	5.25
1.000	15.03	2.000	13.59	3.000	7.27	4.00	5.25

Max.Eff.Inten.(mm/hr)=	162.00	386.43	
over (min)	5.00	5.00	
Storage Coeff. (min)=	0.97 (ii)	3.94 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.34	0.24	
			TOTALS
PEAK FLOW (cms)=	0.00	0.03	0.034 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	68.25	46.86	47.06
TOTAL RAINFALL (mm)=	70.25	70.25	70.25
RUNOFF COEFFICIENT =	0.97	0.67	0.67

***** 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* = 69.0 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 (0102)	Area (ha)= 0.21
ID= 1 DT= 5.0 min	Total Imp(%)= 29.00 Dir. Conn.(%)= 1.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.06	0.15
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.30	1.50
Length	(m)=	37.24	20.00
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	5.91	1.083	27.95	2.083	11.68	3.08	6.80
0.167	5.91	1.167	27.95	2.167	11.68	3.17	6.80
0.250	6.60	1.250	162.00	2.250	10.31	3.25	6.41
0.333	6.60	1.333	162.00	2.333	10.31	3.33	6.41
0.417	7.53	1.417	34.30	2.417	9.28	3.42	6.06
0.500	7.53	1.500	34.30	2.500	9.28	3.50	6.06
0.583	8.87	1.583	21.63	2.583	8.47	3.58	5.76
0.667	8.87	1.667	21.63	2.667	8.47	3.67	5.76
0.750	10.99	1.750	16.49	2.750	7.81	3.75	5.49
0.833	10.99	1.833	16.49	2.833	7.81	3.83	5.49
0.917	15.03	1.917	13.59	2.917	7.27	3.92	5.25
1.000	15.03	2.000	13.59	3.000	7.27	4.00	5.25

Max.Eff.Inten.(mm/hr)=	162.00	87.87		
over (min)	5.00	10.00		
Storage Coeff. (min)=	1.08 (ii)	6.42 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.34	0.14		
			TOTALS	
PEAK FLOW (cms)=	0.00	0.03	0.027 (iii)	
TIME TO PEAK (hrs)=	1.33	1.42	1.42	
RUNOFF VOLUME (mm)=	68.25	29.93	30.29	
TOTAL RAINFALL (mm)=	70.25	70.25	70.25	
RUNOFF COEFFICIENT =	0.97	0.43	0.43	

***** 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* = 69.0 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 (0103) ID= 1 DT= 5.0 min	Area (ha)= 0.06 Total Imp(%)= 91.00 Dir. Conn.(%)= 91.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.05	0.01
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	0.80	0.80
Length	(m)=	20.00	8.00
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	5.91	1.083	27.95	2.083	11.68	3.08	6.80
0.167	5.91	1.167	27.95	2.167	11.68	3.17	6.80
0.250	6.60	1.250	162.00	2.250	10.31	3.25	6.41
0.333	6.60	1.333	162.00	2.333	10.31	3.33	6.41
0.417	7.53	1.417	34.30	2.417	9.28	3.42	6.06
0.500	7.53	1.500	34.30	2.500	9.28	3.50	6.06
0.583	8.87	1.583	21.63	2.583	8.47	3.58	5.76
0.667	8.87	1.667	21.63	2.667	8.47	3.67	5.76
0.750	10.99	1.750	16.49	2.750	7.81	3.75	5.49
0.833	10.99	1.833	16.49	2.833	7.81	3.83	5.49
0.917	15.03	1.917	13.59	2.917	7.27	3.92	5.25
1.000	15.03	2.000	13.59	3.000	7.27	4.00	5.25

			TOTALS
Max.Eff.Inten.(mm/hr)=	162.00	47.53	
over (min)	5.00	5.00	
Storage Coeff. (min)=	0.86 (ii)	2.01 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.34	0.31	
PEAK FLOW (cms)=	0.02	0.00	0.025 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	68.25	23.74	64.24
TOTAL RAINFALL (mm)=	70.25	70.25	70.25
RUNOFF COEFFICIENT =	0.97	0.34	0.91

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 69.0 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 6.2.2017)
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:
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Summary filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\49582112-93d4-4197-b69f-ac94a5b1f276\b6fec77f-38e0-41ea-818f-d55fcb2be1fb\s

DATE: 01-29-2026 TIME: 01:55:44

USER:

COMMENTS: _____

****
** SIMULATION : 5yr 4hr 10min Chicago **
****

| CHICAGO STORM |
| Ptotal= 46.28 mm |

IDF curve parameters: A= 533.614
B= 0.000
C= 0.699
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	3.89	1.00	18.41	2.00	7.69	3.00	4.48
0.17	4.35	1.17	106.72	2.17	6.79	3.17	4.22

0.33	4.96	1.33	22.60	2.33	6.12	3.33	3.99
0.50	5.84	1.50	14.25	2.50	5.58	3.50	3.80
0.67	7.24	1.67	10.87	2.67	5.15	3.67	3.62
0.83	9.90	1.83	8.95	2.83	4.79	3.83	3.46

CALIB STANDHYD (0101) ID= 1 DT= 5.0 min	Area (ha)= 0.11 Total Imp(%)= 72.00 Dir. Conn.(%)= 1.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	1.80
Length	(m)=	27.57	22.00
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	3.89	1.083	18.41	2.083	7.69	3.08	4.48
0.167	3.89	1.167	18.41	2.167	7.69	3.17	4.48
0.250	4.35	1.250	106.72	2.250	6.79	3.25	4.22
0.333	4.35	1.333	106.72	2.333	6.79	3.33	4.22
0.417	4.96	1.417	22.60	2.417	6.12	3.42	3.99
0.500	4.96	1.500	22.60	2.500	6.12	3.50	3.99
0.583	5.84	1.583	14.25	2.583	5.58	3.58	3.80
0.667	5.84	1.667	14.25	2.667	5.58	3.67	3.80
0.750	7.24	1.750	10.87	2.750	5.15	3.75	3.62
0.833	7.24	1.833	10.87	2.833	5.15	3.83	3.62
0.917	9.90	1.917	8.95	2.917	4.79	3.92	3.46
1.000	9.90	2.000	8.95	3.000	4.79	4.00	3.46

Max.Eff.Inten.(mm/hr)=		106.72	206.98	
over (min)		5.00	5.00	
Storage Coeff. (min)=		1.15 (ii)	4.95 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.34	0.22	
				TOTALS
PEAK FLOW	(cms)=	0.00	0.02	0.018 (iii)
TIME TO PEAK	(hrs)=	1.33	1.33	1.33
RUNOFF VOLUME	(mm)=	44.28	26.09	26.26
TOTAL RAINFALL	(mm)=	46.28	46.28	46.28
RUNOFF COEFFICIENT	=	0.96	0.56	0.57

***** 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* = 69.0 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 (0102)	Area (ha)= 0.21
ID= 1 DT= 5.0 min	Total Imp(%)= 29.00 Dir. Conn.(%)= 1.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.06	0.15
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.30	1.50
Length	(m)=	37.24	20.00
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	3.89	1.083	18.41	2.083	7.69	3.08	4.48
0.167	3.89	1.167	18.41	2.167	7.69	3.17	4.48
0.250	4.35	1.250	106.72	2.250	6.79	3.25	4.22
0.333	4.35	1.333	106.72	2.333	6.79	3.33	4.22
0.417	4.96	1.417	22.60	2.417	6.12	3.42	3.99
0.500	4.96	1.500	22.60	2.500	6.12	3.50	3.99
0.583	5.84	1.583	14.25	2.583	5.58	3.58	3.80
0.667	5.84	1.667	14.25	2.667	5.58	3.67	3.80
0.750	7.24	1.750	10.87	2.750	5.15	3.75	3.62
0.833	7.24	1.833	10.87	2.833	5.15	3.83	3.62
0.917	9.90	1.917	8.95	2.917	4.79	3.92	3.46
1.000	9.90	2.000	8.95	3.000	4.79	4.00	3.46

Max.Eff.Inten.(mm/hr)=		106.72	40.28	
over (min)		5.00	10.00	
Storage Coeff. (min)=		1.27 (ii)	8.57 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.33	0.12	
				TOTALS
PEAK FLOW	(cms)=	0.00	0.01	0.011 (iii)
TIME TO PEAK	(hrs)=	1.33	1.42	1.42

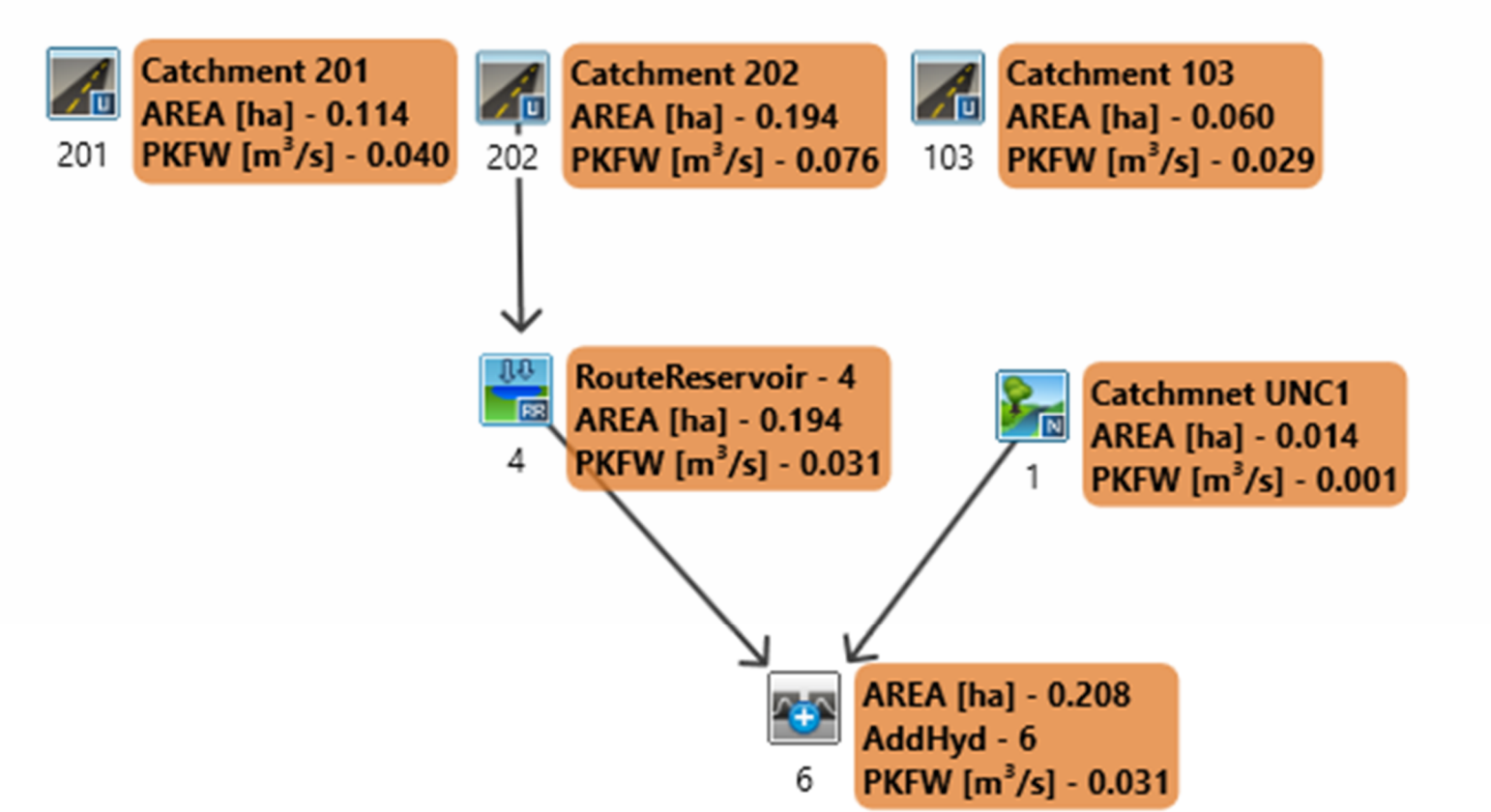
```
     RUNOFF VOLUME    (mm)=      44.28        14.63          14.90
     TOTAL RAINFALL   (mm)=      46.28        46.28          46.28
     RUNOFF COEFFICIENT   =       0.96         0.32           0.32

***** 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*  =  69.0    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 (  0103)|   Area    (ha)=   0.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  91.00   Dir. Conn.(%)=  91.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.05         0.01
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       0.80         0.80
     Length            (m)=      20.00         8.00
     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    3.89 | 1.083   18.41 | 2.083    7.69 |  3.08    4.48
              0.167    3.89 | 1.167   18.41 | 2.167    7.69 |  3.17    4.48
              0.250    4.35 | 1.250  106.72 | 2.250    6.79 |  3.25    4.22
              0.333    4.35 | 1.333  106.72 | 2.333    6.79 |  3.33    4.22
              0.417    4.96 | 1.417   22.60 | 2.417    6.12 |  3.42    3.99
              0.500    4.96 | 1.500   22.60 | 2.500    6.12 |  3.50    3.99
              0.583    5.84 | 1.583   14.25 | 2.583    5.58 |  3.58    3.80
              0.667    5.84 | 1.667   14.25 | 2.667    5.58 |  3.67    3.80
              0.750    7.24 | 1.750   10.87 | 2.750    5.15 |  3.75    3.62
              0.833    7.24 | 1.833   10.87 | 2.833    5.15 |  3.83    3.62
              0.917    9.90 | 1.917    8.95 | 2.917    4.79 |  3.92    3.46
              1.000    9.90 | 2.000    8.95 | 3.000    4.79 |  4.00    3.46

     Max.Eff.Inten.(mm/hr)=     106.72        20.28
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.01 (ii)    2.38 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
```

Unit Hyd. peak (cms)=	0.34	0.30		
			TOTALS	
PEAK FLOW (cms)=	0.02	0.00	0.017	(iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33	
RUNOFF VOLUME (mm)=	44.28	10.96	41.27	
TOTAL RAINFALL (mm)=	46.28	46.28	46.28	
RUNOFF COEFFICIENT =	0.96	0.24	0.89	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 69.0 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.

Post-Development 100-Year VO Schematic



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================================================================================
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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2017)
       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:
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  Summary filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\49582112-93d4-4197-b69f-ac94a5b1f276\8
7176794-488f-4e1e-8891-871d35496dad\s


DATE: 01-30-2026                          TIME: 02:41:10

USER:



COMMENTS: _____________________________________________________________


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

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 890.524
| Ptotal= 77.23 mm |                          B=   0.000
--------------------                          C=   0.699
```

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	6.49	1.00	30.73	2.00	12.84	3.00	7.48
0.17	7.26	1.17	178.09	2.17	11.34	3.17	7.04
0.33	8.28	1.33	37.71	2.33	10.21	3.33	6.67
0.50	9.75	1.50	23.78	2.50	9.31	3.50	6.33
0.67	12.08	1.67	18.13	2.67	8.59	3.67	6.04
0.83	16.52	1.83	14.94	2.83	7.99	3.83	5.77

CALIB
STANDHYD (0201)
ID= 1 DT= 5.0 min

Area (ha)= 0.11
Total Imp(%)= 72.00 Dir. Conn.(%)= 1.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	1.80
Length	(m)=	27.57	22.00
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	6.49	1.083	30.73	2.083	12.84	3.08	7.48
0.167	6.49	1.167	30.73	2.167	12.84	3.17	7.48
0.250	7.26	1.250	178.09	2.250	11.34	3.25	7.04
0.333	7.26	1.333	178.09	2.333	11.34	3.33	7.04
0.417	8.28	1.417	37.71	2.417	10.21	3.42	6.67
0.500	8.28	1.500	37.71	2.500	10.21	3.50	6.67
0.583	9.75	1.583	23.78	2.583	9.31	3.58	6.33
0.667	9.75	1.667	23.78	2.667	9.31	3.67	6.33
0.750	12.08	1.750	18.13	2.750	8.59	3.75	6.04
0.833	12.08	1.833	18.13	2.833	8.59	3.83	6.04
0.917	16.52	1.917	14.94	2.917	7.99	3.92	5.77
1.000	16.52	2.000	14.94	3.000	7.99	4.00	5.77

Max.Eff.Inten.(mm/hr)=		178.09	441.57
over (min)		5.00	5.00

Storage Coeff. (min)=	0.94 (ii)	3.75 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.34	0.25	
			TOTALS
PEAK FLOW (cms)=	0.00	0.04	0.040 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	75.23	53.18	53.39
TOTAL RAINFALL (mm)=	77.23	77.23	77.23
RUNOFF COEFFICIENT =	0.97	0.69	0.69

***** 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* = 69.0 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 (0103)	Area (ha)=	0.06	
ID= 1 DT= 5.0 min	Total Imp(%)=	95.00	Dir. Conn.(%)= 95.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.06	0.00
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	0.80	0.80
Length	(m)=	20.00	8.00
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	6.49	1.083	30.73	2.083	12.84	3.08	7.48
0.167	6.49	1.167	30.73	2.167	12.84	3.17	7.48
0.250	7.26	1.250	178.09	2.250	11.34	3.25	7.04
0.333	7.26	1.333	178.09	2.333	11.34	3.33	7.04
0.417	8.28	1.417	37.71	2.417	10.21	3.42	6.67
0.500	8.28	1.500	37.71	2.500	10.21	3.50	6.67
0.583	9.75	1.583	23.78	2.583	9.31	3.58	6.33
0.667	9.75	1.667	23.78	2.667	9.31	3.67	6.33
0.750	12.08	1.750	18.13	2.750	8.59	3.75	6.04
0.833	12.08	1.833	18.13	2.833	8.59	3.83	6.04
0.917	16.52	1.917	14.94	2.917	7.99	3.92	5.77

```
            1.000   16.52 | 2.000   14.94 | 3.000    7.99 |  4.00    5.77

     Max.Eff.Inten.(mm/hr)=     178.09        56.92
               over (min)        5.00         5.00
     Storage Coeff.  (min)=      0.83 (ii)    1.69 (ii)
     Unit Hyd. Tpeak (min)=      5.00         5.00
     Unit Hyd. peak  (cms)=      0.34         0.32
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.03         0.00          0.029 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.33           1.33
     RUNOFF VOLUME    (mm)=     75.23        28.00          72.87
     TOTAL RAINFALL   (mm)=     77.23        77.23          77.23
     RUNOFF COEFFICIENT   =      0.97         0.36           0.94

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  69.0    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            |
| NASHYD   (  0001)|   Area    (ha)=   0.01   Curve Number   (CN)= 69.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.03

         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    6.49 | 1.083   30.73 | 2.083   12.84 |  3.08    7.48
              0.167    6.49 | 1.167   30.73 | 2.167   12.84 |  3.17    7.48
              0.250    7.26 | 1.250  178.09 | 2.250   11.34 |  3.25    7.04
              0.333    7.26 | 1.333  178.09 | 2.333   11.34 |  3.33    7.04
              0.417    8.28 | 1.417   37.71 | 2.417   10.21 |  3.42    6.67
              0.500    8.28 | 1.500   37.71 | 2.500   10.21 |  3.50    6.67
              0.583    9.75 | 1.583   23.78 | 2.583    9.31 |  3.58    6.33
              0.667    9.75 | 1.667   23.78 | 2.667    9.31 |  3.67    6.33
              0.750   12.08 | 1.750   18.13 | 2.750    8.59 |  3.75    6.04
              0.833   12.08 | 1.833   18.13 | 2.833    8.59 |  3.83    6.04
              0.917   16.52 | 1.917   14.94 | 2.917    7.99 |  3.92    5.77
              1.000   16.52 | 2.000   14.94 | 3.000    7.99 |  4.00    5.77

     Unit Hyd Qpeak  (cms)=   0.018
```

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     PEAK FLOW       (cms)=   0.001 (i)
     TIME TO PEAK    (hrs)=   1.333
     RUNOFF VOLUME    (mm)=   9.422
     TOTAL RAINFALL   (mm)=  77.229
     RUNOFF COEFFICIENT   =   0.122

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0202)|   Area    (ha)=   0.19
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  67.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.13         0.06
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       0.80         1.00
     Length            (m)=      35.96         5.00
     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    6.49 | 1.083   30.73 | 2.083   12.84 |  3.08    7.48
              0.167    6.49 | 1.167   30.73 | 2.167   12.84 |  3.17    7.48
              0.250    7.26 | 1.250  178.09 | 2.250   11.34 |  3.25    7.04
              0.333    7.26 | 1.333  178.09 | 2.333   11.34 |  3.33    7.04
              0.417    8.28 | 1.417   37.71 | 2.417   10.21 |  3.42    6.67
              0.500    8.28 | 1.500   37.71 | 2.500   10.21 |  3.50    6.67
              0.583    9.75 | 1.583   23.78 | 2.583    9.31 |  3.58    6.33
              0.667    9.75 | 1.667   23.78 | 2.667    9.31 |  3.67    6.33
              0.750   12.08 | 1.750   18.13 | 2.750    8.59 |  3.75    6.04
              0.833   12.08 | 1.833   18.13 | 2.833    8.59 |  3.83    6.04
              0.917   16.52 | 1.917   14.94 | 2.917    7.99 |  3.92    5.77
              1.000   16.52 | 2.000   14.94 | 3.000    7.99 |  4.00    5.77

     Max.Eff.Inten.(mm/hr)=     178.09        56.92
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.17 (ii)    2.67 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.29
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.06         0.01          0.076 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33           1.33
     RUNOFF VOLUME    (mm)=      75.23        28.00          59.64
     TOTAL RAINFALL   (mm)=      77.23        77.23          77.23
```

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     RUNOFF COEFFICIENT   =       0.97         0.36          0.77

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  69.0    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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--------------------
| RESERVOIR(  0004)|     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   |    0.0069      0.0029
                           0.0010      0.0009   |    0.0185      0.0040
                           0.0029      0.0019   |    0.0344      0.0052
                           0.0043      0.0025   |    0.0000      0.0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0202)      0.194      0.076      1.33      59.64
   OUTFLOW: ID= 1 (  0004)      0.194      0.031      1.42      58.50

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 40.65
                  TIME SHIFT OF PEAK FLOW         (min)=  5.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0051

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0001):     0.01   0.001     1.33     9.42
     + ID2= 2 (  0004):     0.19   0.031     1.42    58.50
       ================================================
       ID = 3 (  0006):     0.21   0.031     1.42    55.20

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

       V    V   I    SSSSS  U   U    A    L             (v 6.2.2017)
       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
```


***** 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\brett.pond\AppData\Local\Civica\VH5\49582112-93d4-4197-b69f-ac94a5b1f276\d78ae630-80b4-4ed1-9c27-ffe7d0f52004\s
Summary filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\49582112-93d4-4197-b69f-ac94a5b1f276\d78ae630-80b4-4ed1-9c27-ffe7d0f52004\s

DATE: 01-30-2026 TIME: 02:41:11

USER:

COMMENTS: _____

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

| CHICAGO STORM |
| Ptotal= 53.86 mm |

IDF curve parameters: A= 621.092
B= 0.000
C= 0.699
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	4.53	1.00	21.43	2.00	8.95	3.00	5.22
0.17	5.06	1.17	124.21	2.17	7.91	3.17	4.91
0.33	5.78	1.33	26.30	2.33	7.12	3.33	4.65
0.50	6.80	1.50	16.58	2.50	6.49	3.50	4.42
0.67	8.42	1.67	12.65	2.67	5.99	3.67	4.21
0.83	11.52	1.83	10.42	2.83	5.57	3.83	4.03

CALIB STANDHYD (0201) ID= 1 DT= 5.0 min	Area (ha)= 0.11 Total Imp(%)= 72.00 Dir. Conn.(%)= 1.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	1.80
Length	(m)=	27.57	22.00
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	4.53	1.083	21.43	2.083	8.95	3.08	5.22
0.167	4.53	1.167	21.43	2.167	8.95	3.17	5.22
0.250	5.06	1.250	124.21	2.250	7.91	3.25	4.91
0.333	5.06	1.333	124.21	2.333	7.91	3.33	4.91
0.417	5.78	1.417	26.30	2.417	7.12	3.42	4.65
0.500	5.78	1.500	26.30	2.500	7.12	3.50	4.65
0.583	6.80	1.583	16.58	2.583	6.49	3.58	4.42
0.667	6.80	1.667	16.58	2.667	6.49	3.67	4.42
0.750	8.42	1.750	12.65	2.750	5.99	3.75	4.21
0.833	8.42	1.833	12.65	2.833	5.99	3.83	4.21
0.917	11.52	1.917	10.42	2.917	5.57	3.92	4.03
1.000	11.52	2.000	10.42	3.000	5.57	4.00	4.03

Max.Eff.Inten.(mm/hr)=		124.21	261.60	
over (min)		5.00	5.00	
Storage Coeff. (min)=		1.08 (ii)	4.55 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.34	0.23	
				TOTALS
PEAK FLOW	(cms)=	0.00	0.02	0.023 (iii)
TIME TO PEAK	(hrs)=	1.33	1.33	1.33
RUNOFF VOLUME	(mm)=	51.86	32.47	32.65

```
     TOTAL RAINFALL   (mm)=      53.86        53.86          53.86
     RUNOFF COEFFICIENT   =       0.96         0.60           0.61

***** 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*  =  69.0    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 (  0103)|   Area    (ha)=   0.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  95.00   Dir. Conn.(%)=  95.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06         0.00
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       0.80         0.80
     Length            (m)=      20.00         8.00
     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    4.53 | 1.083   21.43 | 2.083    8.95 |  3.08    5.22
              0.167    4.53 | 1.167   21.43 | 2.167    8.95 |  3.17    5.22
              0.250    5.06 | 1.250  124.21 | 2.250    7.91 |  3.25    4.91
              0.333    5.06 | 1.333  124.21 | 2.333    7.91 |  3.33    4.91
              0.417    5.78 | 1.417   26.30 | 2.417    7.12 |  3.42    4.65
              0.500    5.78 | 1.500   26.30 | 2.500    7.12 |  3.50    4.65
              0.583    6.80 | 1.583   16.58 | 2.583    6.49 |  3.58    4.42
              0.667    6.80 | 1.667   16.58 | 2.667    6.49 |  3.67    4.42
              0.750    8.42 | 1.750   12.65 | 2.750    5.99 |  3.75    4.21
              0.833    8.42 | 1.833   12.65 | 2.833    5.99 |  3.83    4.21
              0.917   11.52 | 1.917   10.42 | 2.917    5.57 |  3.92    4.03
              1.000   11.52 | 2.000   10.42 | 3.000    5.57 |  4.00    4.03

     Max.Eff.Inten.(mm/hr)=     124.21        27.97
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       0.95 (ii)    1.95 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.31
```

			TOTALS
PEAK FLOW (cms)=	0.02	0.00	0.020 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	51.86	14.65	50.00
TOTAL RAINFALL (mm)=	53.86	53.86	53.86
RUNOFF COEFFICIENT =	0.96	0.27	0.93

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 69.0 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			
NASHYD (0001)	Area (ha)=	0.01	Curve Number (CN)= 69.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.03	

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	4.53	1.083	21.43	2.083	8.95	3.08	5.22
0.167	4.53	1.167	21.43	2.167	8.95	3.17	5.22
0.250	5.06	1.250	124.21	2.250	7.91	3.25	4.91
0.333	5.06	1.333	124.21	2.333	7.91	3.33	4.91
0.417	5.78	1.417	26.30	2.417	7.12	3.42	4.65
0.500	5.78	1.500	26.30	2.500	7.12	3.50	4.65
0.583	6.80	1.583	16.58	2.583	6.49	3.58	4.42
0.667	6.80	1.667	16.58	2.667	6.49	3.67	4.42
0.750	8.42	1.750	12.65	2.750	5.99	3.75	4.21
0.833	8.42	1.833	12.65	2.833	5.99	3.83	4.21
0.917	11.52	1.917	10.42	2.917	5.57	3.92	4.03
1.000	11.52	2.000	10.42	3.000	5.57	4.00	4.03

Unit Hyd Qpeak (cms)= 0.018

PEAK FLOW (cms)= 0.000 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 4.930
TOTAL RAINFALL (mm)= 53.863
RUNOFF COEFFICIENT = 0.092

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0202)|   Area    (ha)=   0.19
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  67.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.13         0.06
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       0.80         1.00
     Length            (m)=      35.96         5.00
     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    4.53 | 1.083   21.43 | 2.083    8.95 |  3.08    5.22
               0.167    4.53 | 1.167   21.43 | 2.167    8.95 |  3.17    5.22
               0.250    5.06 | 1.250  124.21 | 2.250    7.91 |  3.25    4.91
               0.333    5.06 | 1.333  124.21 | 2.333    7.91 |  3.33    4.91
               0.417    5.78 | 1.417   26.30 | 2.417    7.12 |  3.42    4.65
               0.500    5.78 | 1.500   26.30 | 2.500    7.12 |  3.50    4.65
               0.583    6.80 | 1.583   16.58 | 2.583    6.49 |  3.58    4.42
               0.667    6.80 | 1.667   16.58 | 2.667    6.49 |  3.67    4.42
               0.750    8.42 | 1.750   12.65 | 2.750    5.99 |  3.75    4.21
               0.833    8.42 | 1.833   12.65 | 2.833    5.99 |  3.83    4.21
               0.917   11.52 | 1.917   10.42 | 2.917    5.57 |  3.92    4.03
               1.000   11.52 | 2.000   10.42 | 3.000    5.57 |  4.00    4.03

     Max.Eff.Inten.(mm/hr)=     124.21        27.97
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.36 (ii)    3.08 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.33         0.27
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.04         0.01          0.050 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33           1.33
     RUNOFF VOLUME    (mm)=      51.86        14.65          39.58
     TOTAL RAINFALL   (mm)=      53.86        53.86          53.86
     RUNOFF COEFFICIENT   =       0.96         0.27           0.73

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  69.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0004)|     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   |    0.0069      0.0029
                           0.0010      0.0009   |    0.0185      0.0040
                           0.0029      0.0019   |    0.0344      0.0052
                           0.0043      0.0025   |    0.0000      0.0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0202)      0.194      0.050      1.33      39.58
   OUTFLOW: ID= 1 (  0004)      0.194      0.014      1.42      38.43

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 28.31
                  TIME SHIFT OF PEAK FLOW         (min)=  5.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0036

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):     0.01   0.000     1.33     4.93
      + ID2= 2 (  0004):     0.19   0.014     1.42    38.43
        ================================================
        ID = 3 (  0006):     0.21   0.014     1.42    36.18

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

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2017)
       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 *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\49582112-93d4-4197-b69f-ac94a5b1f276\d4f7a4a9-b390-4471-8a26-b5390d1235e3\s
Summary filename:
C:\Users\brett.pond\AppData\Local\Civica\VH5\49582112-93d4-4197-b69f-ac94a5b1f276\d4f7a4a9-b390-4471-8a26-b5390d1235e3\s

DATE: 01-30-2026 TIME: 02:41:11

USER:

COMMENTS: _____

****
** SIMULATION : 25yr 4hr 10min Chicago **
****

| CHICAGO STORM |
| Ptotal= 63.27 mm |

IDF curve parameters: A= 729.565
B= 0.000
C= 0.699
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	5.32	1.00	25.18	2.00	10.52	3.00	6.13
0.17	5.94	1.17	145.90	2.17	9.29	3.17	5.77
0.33	6.78	1.33	30.90	2.33	8.36	3.33	5.46
0.50	7.99	1.50	19.48	2.50	7.63	3.50	5.19
0.67	9.89	1.67	14.86	2.67	7.04	3.67	4.95
0.83	13.54	1.83	12.24	2.83	6.54	3.83	4.73

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   0.11
|ID= 1 DT= 5.0 min |   Total Imp(%)=  72.00   Dir. Conn.(%)=   1.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.08         0.03
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         1.80
     Length            (m)=      27.57        22.00
     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    5.32 | 1.083   25.18 | 2.083   10.52 |  3.08    6.13
               0.167    5.32 | 1.167   25.18 | 2.167   10.52 |  3.17    6.13
               0.250    5.94 | 1.250  145.90 | 2.250    9.29 |  3.25    5.77
               0.333    5.94 | 1.333  145.90 | 2.333    9.29 |  3.33    5.77
               0.417    6.78 | 1.417   30.90 | 2.417    8.36 |  3.42    5.46
               0.500    6.78 | 1.500   30.90 | 2.500    8.36 |  3.50    5.46
               0.583    7.99 | 1.583   19.48 | 2.583    7.63 |  3.58    5.19
               0.667    7.99 | 1.667   19.48 | 2.667    7.63 |  3.67    5.19
               0.750    9.89 | 1.750   14.86 | 2.750    7.04 |  3.75    4.95
               0.833    9.89 | 1.833   14.86 | 2.833    7.04 |  3.83    4.95
               0.917   13.54 | 1.917   12.24 | 2.917    6.54 |  3.92    4.73
               1.000   13.54 | 2.000   12.24 | 3.000    6.54 |  4.00    4.73

     Max.Eff.Inten.(mm/hr)=     145.90       332.34
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.01 (ii)    4.16 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.24
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.03          0.029 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33           1.33
     RUNOFF VOLUME    (mm)=      61.27        40.65          40.84
     TOTAL RAINFALL   (mm)=      63.27        63.27          63.27
     RUNOFF COEFFICIENT   =       0.97         0.64           0.65

***** 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* = 69.0 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 (0103)	Area (ha)= 0.06
ID= 1 DT= 5.0 min	Total Imp(%)= 95.00 Dir. Conn.(%)= 95.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.06	0.00
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	0.80	0.80
Length	(m)=	20.00	8.00
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	5.32	1.083	25.18	2.083	10.52	3.08	6.13
0.167	5.32	1.167	25.18	2.167	10.52	3.17	6.13
0.250	5.94	1.250	145.90	2.250	9.29	3.25	5.77
0.333	5.94	1.333	145.90	2.333	9.29	3.33	5.77
0.417	6.78	1.417	30.90	2.417	8.36	3.42	5.46
0.500	6.78	1.500	30.90	2.500	8.36	3.50	5.46
0.583	7.99	1.583	19.48	2.583	7.63	3.58	5.19
0.667	7.99	1.667	19.48	2.667	7.63	3.67	5.19
0.750	9.89	1.750	14.86	2.750	7.04	3.75	4.95
0.833	9.89	1.833	14.86	2.833	7.04	3.83	4.95
0.917	13.54	1.917	12.24	2.917	6.54	3.92	4.73
1.000	13.54	2.000	12.24	3.000	6.54	4.00	4.73

				TOTALS
Max.Eff.Inten.(mm/hr)=		145.90	38.75	
over (min)		5.00	5.00	
Storage Coeff. (min)=		0.89 (ii)	1.83 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.34	0.32	
PEAK FLOW	(cms)=	0.02	0.00	0.023 (iii)
TIME TO PEAK	(hrs)=	1.33	1.33	1.33
RUNOFF VOLUME	(mm)=	61.27	19.70	59.19
TOTAL RAINFALL	(mm)=	63.27	63.27	63.27
RUNOFF COEFFICIENT	=	0.97	0.31	0.94

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 69.0 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			
NASHYD (0001)	Area (ha)=	0.01	Curve Number (CN)= 69.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.03	

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	5.32	1.083	25.18	2.083	10.52	3.08	6.13
0.167	5.32	1.167	25.18	2.167	10.52	3.17	6.13
0.250	5.94	1.250	145.90	2.250	9.29	3.25	5.77
0.333	5.94	1.333	145.90	2.333	9.29	3.33	5.77
0.417	6.78	1.417	30.90	2.417	8.36	3.42	5.46
0.500	6.78	1.500	30.90	2.500	8.36	3.50	5.46
0.583	7.99	1.583	19.48	2.583	7.63	3.58	5.19
0.667	7.99	1.667	19.48	2.667	7.63	3.67	5.19
0.750	9.89	1.750	14.86	2.750	7.04	3.75	4.95
0.833	9.89	1.833	14.86	2.833	7.04	3.83	4.95
0.917	13.54	1.917	12.24	2.917	6.54	3.92	4.73
1.000	13.54	2.000	12.24	3.000	6.54	4.00	4.73

Unit Hyd Qpeak (cms)= 0.018

PEAK FLOW (cms)= 0.001 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 6.629
TOTAL RAINFALL (mm)= 63.270
RUNOFF COEFFICIENT = 0.105

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0202)	Area (ha)=	0.19	
ID= 1 DT= 5.0 min	Total Imp(%)=	67.00	Dir. Conn.(%)= 67.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.13	0.06
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	0.80	1.00
Length	(m)=	35.96	5.00
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	5.32	1.083	25.18	2.083	10.52	3.08	6.13
0.167	5.32	1.167	25.18	2.167	10.52	3.17	6.13
0.250	5.94	1.250	145.90	2.250	9.29	3.25	5.77
0.333	5.94	1.333	145.90	2.333	9.29	3.33	5.77
0.417	6.78	1.417	30.90	2.417	8.36	3.42	5.46
0.500	6.78	1.500	30.90	2.500	8.36	3.50	5.46
0.583	7.99	1.583	19.48	2.583	7.63	3.58	5.19
0.667	7.99	1.667	19.48	2.667	7.63	3.67	5.19
0.750	9.89	1.750	14.86	2.750	7.04	3.75	4.95
0.833	9.89	1.833	14.86	2.833	7.04	3.83	4.95
0.917	13.54	1.917	12.24	2.917	6.54	3.92	4.73
1.000	13.54	2.000	12.24	3.000	6.54	4.00	4.73

Max.Eff.Inten.(mm/hr)=		145.90	38.75	
over (min)		5.00	5.00	
Storage Coeff. (min)=		1.27 (ii)	2.89 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.33	0.28	
				TOTALS
PEAK FLOW	(cms)=	0.05	0.01	0.061 (iii)
TIME TO PEAK	(hrs)=	1.33	1.33	1.33
RUNOFF VOLUME	(mm)=	61.27	19.70	47.55
TOTAL RAINFALL	(mm)=	63.27	63.27	63.27
RUNOFF COEFFICIENT	=	0.97	0.31	0.75

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 69.0 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.

| RESERVOIR(0004)| 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  |    0.0069      0.0029
                          0.0010      0.0009  |    0.0185      0.0040
                          0.0029      0.0019  |    0.0344      0.0052
                          0.0043      0.0025  |    0.0000      0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0202)      0.194      0.061      1.33       47.55
   OUTFLOW: ID= 1 (  0004)      0.194      0.020      1.42       46.41

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 33.79
                  TIME SHIFT OF PEAK FLOW         (min)=  5.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0042

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):     0.01   0.001     1.33     6.63
      + ID2= 2 (  0004):     0.19   0.020     1.42    46.41
        ====================================================
        ID = 3 (  0006):     0.21   0.021     1.42    43.73

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2017)
       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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5c4fb77-f960-4451-b610-490b6a10aba5\s


DATE: 01-30-2026                          TIME: 02:41:10

USER:



COMMENTS: _____________________________________________________________


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  ***********************************************
  ** SIMULATION : 2yr 4hr 10min Chicago         **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 402.398
| Ptotal= 34.90 mm |                          B=   0.000
--------------------                          C=   0.699
                       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    2.93 |  1.00   13.89 |  2.00    5.80 |  3.00    3.38
                0.17    3.28 |  1.17   80.47 |  2.17    5.12 |  3.17    3.18
                0.33    3.74 |  1.33   17.04 |  2.33    4.61 |  3.33    3.01
                0.50    4.41 |  1.50   10.74 |  2.50    4.21 |  3.50    2.86
                0.67    5.46 |  1.67    8.19 |  2.67    3.88 |  3.67    2.73
                0.83    7.47 |  1.83    6.75 |  2.83    3.61 |  3.83    2.61


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--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   0.11
|ID= 1 DT= 5.0 min |   Total Imp(%)=  72.00   Dir. Conn.(%)=   1.00
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	1.80
Length	(m)=	27.57	22.00
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	2.93	1.083	13.89	2.083	5.80	3.08	3.38
0.167	2.93	1.167	13.89	2.167	5.80	3.17	3.38
0.250	3.28	1.250	80.47	2.250	5.12	3.25	3.18
0.333	3.28	1.333	80.47	2.333	5.12	3.33	3.18
0.417	3.74	1.417	17.04	2.417	4.61	3.42	3.01
0.500	3.74	1.500	17.04	2.500	4.61	3.50	3.01
0.583	4.41	1.583	10.74	2.583	4.21	3.58	2.86
0.667	4.41	1.667	10.74	2.667	4.21	3.67	2.86
0.750	5.46	1.750	8.19	2.750	3.88	3.75	2.73
0.833	5.46	1.833	8.19	2.833	3.88	3.83	2.73
0.917	7.47	1.917	6.75	2.917	3.61	3.92	2.61
1.000	7.47	2.000	6.75	3.000	3.61	4.00	2.61

Max.Eff.Inten.(mm/hr)=		80.47	130.88	
over (min)		5.00	10.00	
Storage Coeff. (min)=		1.29 (ii)	5.86 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.33	0.15	
				TOTALS
PEAK FLOW	(cms)=	0.00	0.01	0.009 (iii)
TIME TO PEAK	(hrs)=	1.33	1.42	1.42
RUNOFF VOLUME	(mm)=	32.90	17.05	17.17
TOTAL RAINFALL	(mm)=	34.90	34.90	34.90
RUNOFF COEFFICIENT	=	0.94	0.49	0.49

***** 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* = 69.0 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 (  0103)|   Area    (ha)=   0.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  95.00   Dir. Conn.(%)=  95.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06         0.00
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       0.80         0.80
     Length            (m)=      20.00         8.00
     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    2.93 | 1.083   13.89 | 2.083    5.80 |  3.08    3.38
              0.167    2.93 | 1.167   13.89 | 2.167    5.80 |  3.17    3.38
              0.250    3.28 | 1.250   80.47 | 2.250    5.12 |  3.25    3.18
              0.333    3.28 | 1.333   80.47 | 2.333    5.12 |  3.33    3.18
              0.417    3.74 | 1.417   17.04 | 2.417    4.61 |  3.42    3.01
              0.500    3.74 | 1.500   17.04 | 2.500    4.61 |  3.50    3.01
              0.583    4.41 | 1.583   10.74 | 2.583    4.21 |  3.58    2.86
              0.667    4.41 | 1.667   10.74 | 2.667    4.21 |  3.67    2.86
              0.750    5.46 | 1.750    8.19 | 2.750    3.88 |  3.75    2.73
              0.833    5.46 | 1.833    8.19 | 2.833    3.88 |  3.83    2.73
              0.917    7.47 | 1.917    6.75 | 2.917    3.61 |  3.92    2.61
              1.000    7.47 | 2.000    6.75 | 3.000    3.61 |  4.00    2.61

     Max.Eff.Inten.(mm/hr)=      80.47        10.64
               over (min)         5.00         5.00
     Storage Coeff.  (min)=       1.13 (ii)    2.32 (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          0.013 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33           1.33
     RUNOFF VOLUME    (mm)=      32.90         6.21          31.56
     TOTAL RAINFALL   (mm)=      34.90        34.90          34.90
     RUNOFF COEFFICIENT   =       0.94         0.18           0.90

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  69.0    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            |
| NASHYD   (  0001)|   Area    (ha)=   0.01   Curve Number   (CN)= 69.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.03

         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	2.93	1.083	13.89	2.083	5.80	3.08	3.38
0.167	2.93	1.167	13.89	2.167	5.80	3.17	3.38
0.250	3.28	1.250	80.47	2.250	5.12	3.25	3.18
0.333	3.28	1.333	80.47	2.333	5.12	3.33	3.18
0.417	3.74	1.417	17.04	2.417	4.61	3.42	3.01
0.500	3.74	1.500	17.04	2.500	4.61	3.50	3.01
0.583	4.41	1.583	10.74	2.583	4.21	3.58	2.86
0.667	4.41	1.667	10.74	2.667	4.21	3.67	2.86
0.750	5.46	1.750	8.19	2.750	3.88	3.75	2.73
0.833	5.46	1.833	8.19	2.833	3.88	3.83	2.73
0.917	7.47	1.917	6.75	2.917	3.61	3.92	2.61
1.000	7.47	2.000	6.75	3.000	3.61	4.00	2.61

```
     Unit Hyd Qpeak  (cms)=   0.018

     PEAK FLOW       (cms)=   0.000 (i)
     TIME TO PEAK    (hrs)=   1.333
     RUNOFF VOLUME    (mm)=   2.089
     TOTAL RAINFALL   (mm)=  34.897
     RUNOFF COEFFICIENT   =   0.060

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0202)|   Area    (ha)=   0.19
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  67.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.13         0.06
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       0.80         1.00
     Length            (m)=      35.96         5.00
     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	2.93	1.083	13.89	2.083	5.80	3.08	3.38
0.167	2.93	1.167	13.89	2.167	5.80	3.17	3.38
0.250	3.28	1.250	80.47	2.250	5.12	3.25	3.18
0.333	3.28	1.333	80.47	2.333	5.12	3.33	3.18
0.417	3.74	1.417	17.04	2.417	4.61	3.42	3.01
0.500	3.74	1.500	17.04	2.500	4.61	3.50	3.01
0.583	4.41	1.583	10.74	2.583	4.21	3.58	2.86
0.667	4.41	1.667	10.74	2.667	4.21	3.67	2.86
0.750	5.46	1.750	8.19	2.750	3.88	3.75	2.73
0.833	5.46	1.833	8.19	2.833	3.88	3.83	2.73
0.917	7.47	1.917	6.75	2.917	3.61	3.92	2.61
1.000	7.47	2.000	6.75	3.000	3.61	4.00	2.61

Max.Eff.Inten.(mm/hr)=	80.47	10.64		
over (min)	5.00	5.00		
Storage Coeff. (min)=	1.61 (ii)	3.66 (ii)		
Unit Hyd. Tpeak (min)=	5.00	5.00		
Unit Hyd. peak (cms)=	0.32	0.25		
			TOTALS	
PEAK FLOW (cms)=	0.03	0.00	0.031 (iii)	
TIME TO PEAK (hrs)=	1.33	1.33	1.33	
RUNOFF VOLUME (mm)=	32.90	6.21	24.07	
TOTAL RAINFALL (mm)=	34.90	34.90	34.90	
RUNOFF COEFFICIENT =	0.94	0.18	0.69	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 69.0 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.

RESERVOIR(0004) / IN= 2---> OUT= 1 / DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0069	0.0029
	0.0010	0.0009	0.0185	0.0040
	0.0029	0.0019	0.0344	0.0052
	0.0043	0.0025	0.0000	0.0000

```
                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0202)      0.194      0.031      1.33      24.07
   OUTFLOW: ID= 1 (  0004)      0.194      0.004      1.67      22.92

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 13.70
                  TIME SHIFT OF PEAK FLOW         (min)= 20.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0025

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):     0.01   0.000     1.33     2.09
      + ID2= 2 (  0004):     0.19   0.004     1.67    22.92
        ====================================================
        ID = 3 (  0006):     0.21   0.004     1.67    21.51

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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================================================================================
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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2017)
       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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```

53037e3-bf00-4a67-929a-f998af33b983\s

DATE: 01-30-2026 TIME: 02:41:10

USER:

COMMENTS: _____

****
** SIMULATION : 50yr 4hr 10min Chicago **
****

CHICAGO STORM
Ptotal= 70.25 mm

IDF curve parameters: A= 810.044
B= 0.000
C= 0.699
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	5.91	1.00	27.95	2.00	11.68	3.00	6.80
0.17	6.60	1.17	162.00	2.17	10.31	3.17	6.41
0.33	7.53	1.33	34.30	2.33	9.28	3.33	6.06
0.50	8.87	1.50	21.63	2.50	8.47	3.50	5.76
0.67	10.99	1.67	16.49	2.67	7.81	3.67	5.49
0.83	15.03	1.83	13.59	2.83	7.27	3.83	5.25

CALIB
STANDHYD (0201)
ID= 1 DT= 5.0 min

Area (ha)= 0.11
Total Imp(%)= 72.00 Dir. Conn.(%)= 1.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	1.80
Length	(m)=	27.57	22.00
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	5.91	1.083	27.95	2.083	11.68	3.08	6.80
0.167	5.91	1.167	27.95	2.167	11.68	3.17	6.80
0.250	6.60	1.250	162.00	2.250	10.31	3.25	6.41
0.333	6.60	1.333	162.00	2.333	10.31	3.33	6.41
0.417	7.53	1.417	34.30	2.417	9.28	3.42	6.06
0.500	7.53	1.500	34.30	2.500	9.28	3.50	6.06
0.583	8.87	1.583	21.63	2.583	8.47	3.58	5.76
0.667	8.87	1.667	21.63	2.667	8.47	3.67	5.76
0.750	10.99	1.750	16.49	2.750	7.81	3.75	5.49
0.833	10.99	1.833	16.49	2.833	7.81	3.83	5.49
0.917	15.03	1.917	13.59	2.917	7.27	3.92	5.25
1.000	15.03	2.000	13.59	3.000	7.27	4.00	5.25

Max.Eff.Inten.(mm/hr)=	162.00	386.43	
over (min)	5.00	5.00	
Storage Coeff. (min)=	0.97 (ii)	3.94 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.34	0.24	
			TOTALS
PEAK FLOW (cms)=	0.00	0.03	0.034 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	68.25	46.86	47.06
TOTAL RAINFALL (mm)=	70.25	70.25	70.25
RUNOFF COEFFICIENT =	0.97	0.67	0.67

***** 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* = 69.0   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 (0103) ID= 1 DT= 5.0 min	Area (ha)= 0.06 Total Imp(%)= 95.00 Dir. Conn.(%)= 95.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.06	0.00

Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	0.80	0.80
Length	(m)=	20.00	8.00
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	5.91	1.083	27.95	2.083	11.68	3.08	6.80
0.167	5.91	1.167	27.95	2.167	11.68	3.17	6.80
0.250	6.60	1.250	162.00	2.250	10.31	3.25	6.41
0.333	6.60	1.333	162.00	2.333	10.31	3.33	6.41
0.417	7.53	1.417	34.30	2.417	9.28	3.42	6.06
0.500	7.53	1.500	34.30	2.500	9.28	3.50	6.06
0.583	8.87	1.583	21.63	2.583	8.47	3.58	5.76
0.667	8.87	1.667	21.63	2.667	8.47	3.67	5.76
0.750	10.99	1.750	16.49	2.750	7.81	3.75	5.49
0.833	10.99	1.833	16.49	2.833	7.81	3.83	5.49
0.917	15.03	1.917	13.59	2.917	7.27	3.92	5.25
1.000	15.03	2.000	13.59	3.000	7.27	4.00	5.25

Max.Eff.Inten.(mm/hr)=		162.00	47.53	
over (min)		5.00	5.00	
Storage Coeff. (min)=		0.86 (ii)	1.76 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.34	0.32	
				TOTALS
PEAK FLOW	(cms)=	0.03	0.00	0.026 (iii)
TIME TO PEAK	(hrs)=	1.33	1.33	1.33
RUNOFF VOLUME	(mm)=	68.25	23.74	66.02
TOTAL RAINFALL	(mm)=	70.25	70.25	70.25
RUNOFF COEFFICIENT	=	0.97	0.34	0.94

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 69.0 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 NASHYD (0001) ID= 1 DT= 5.0 min	Area (ha)=	0.01	Curve Number (CN)= 69.0
	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.03	

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	5.91	1.083	27.95	2.083	11.68	3.08	6.80
0.167	5.91	1.167	27.95	2.167	11.68	3.17	6.80
0.250	6.60	1.250	162.00	2.250	10.31	3.25	6.41
0.333	6.60	1.333	162.00	2.333	10.31	3.33	6.41
0.417	7.53	1.417	34.30	2.417	9.28	3.42	6.06
0.500	7.53	1.500	34.30	2.500	9.28	3.50	6.06
0.583	8.87	1.583	21.63	2.583	8.47	3.58	5.76
0.667	8.87	1.667	21.63	2.667	8.47	3.67	5.76
0.750	10.99	1.750	16.49	2.750	7.81	3.75	5.49
0.833	10.99	1.833	16.49	2.833	7.81	3.83	5.49
0.917	15.03	1.917	13.59	2.917	7.27	3.92	5.25
1.000	15.03	2.000	13.59	3.000	7.27	4.00	5.25

Unit Hyd Qpeak (cms)=   0.018

PEAK FLOW   (cms)=   0.001 (i)
TIME TO PEAK   (hrs)=   1.333
RUNOFF VOLUME   (mm)=   7.989
TOTAL RAINFALL   (mm)= 70.249
RUNOFF COEFFICIENT   =   0.114

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0202)
ID= 1 DT= 5.0 min

Area   (ha)=   0.19
Total Imp(%)= 67.00   Dir. Conn.(%)= 67.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.13	0.06
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	0.80	1.00
Length	(m)=	35.96	5.00
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	5.91	1.083	27.95	2.083	11.68	3.08	6.80

0.167	5.91	1.167	27.95	2.167	11.68	3.17	6.80
0.250	6.60	1.250	162.00	2.250	10.31	3.25	6.41
0.333	6.60	1.333	162.00	2.333	10.31	3.33	6.41
0.417	7.53	1.417	34.30	2.417	9.28	3.42	6.06
0.500	7.53	1.500	34.30	2.500	9.28	3.50	6.06
0.583	8.87	1.583	21.63	2.583	8.47	3.58	5.76
0.667	8.87	1.667	21.63	2.667	8.47	3.67	5.76
0.750	10.99	1.750	16.49	2.750	7.81	3.75	5.49
0.833	10.99	1.833	16.49	2.833	7.81	3.83	5.49
0.917	15.03	1.917	13.59	2.917	7.27	3.92	5.25
1.000	15.03	2.000	13.59	3.000	7.27	4.00	5.25

Max.Eff.Inten.(mm/hr)=	162.00	47.53	
over (min)	5.00	5.00	
Storage Coeff. (min)=	1.22 (ii)	2.77 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.33	0.28	
			TOTALS
PEAK FLOW (cms)=	0.06	0.01	0.068 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	68.25	23.74	53.56
TOTAL RAINFALL (mm)=	70.25	70.25	70.25
RUNOFF COEFFICIENT =	0.97	0.34	0.76

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 69.0 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.

RESERVOIR(0004)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0069	0.0029
	0.0010	0.0009	0.0185	0.0040
	0.0029	0.0019	0.0344	0.0052
	0.0043	0.0025	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0202)	0.194	0.068	1.33	53.56
OUTFLOW: ID= 1 (0004)	0.194	0.026	1.42	52.42

PEAK FLOW REDUCTION [Qout/Qin](%)= 37.79
TIME SHIFT OF PEAK FLOW (min)= 5.00

```
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0047

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):     0.01   0.001     1.33     7.99
      + ID2= 2 (  0004):     0.19   0.026     1.42    52.42
        ====================================================
        ID = 3 (  0006):     0.21   0.026     1.42    49.43

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

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2017)
       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:
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  Summary filename:
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e96cd17-e49e-48ae-aa80-8d9c9b853454\s


DATE: 01-30-2026                          TIME: 02:41:11

USER:
```

COMMENTS: _____

****
** SIMULATION : 5yr 4hr 10min Chicago **
****

CHICAGO STORM	Ptotal= 46.28 mm

IDF curve parameters: A= 533.614
B= 0.000
C= 0.699
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	3.89	1.00	18.41	2.00	7.69	3.00	4.48
0.17	4.35	1.17	106.72	2.17	6.79	3.17	4.22
0.33	4.96	1.33	22.60	2.33	6.12	3.33	3.99
0.50	5.84	1.50	14.25	2.50	5.58	3.50	3.80
0.67	7.24	1.67	10.87	2.67	5.15	3.67	3.62
0.83	9.90	1.83	8.95	2.83	4.79	3.83	3.46

CALIB STANDHYD (0201)	ID= 1 DT= 5.0 min

Area (ha)= 0.11
Total Imp(%)= 72.00 Dir. Conn.(%)= 1.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	1.80
Length	(m)=	27.57	22.00
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	3.89	1.083	18.41	2.083	7.69	3.08	4.48
0.167	3.89	1.167	18.41	2.167	7.69	3.17	4.48
0.250	4.35	1.250	106.72	2.250	6.79	3.25	4.22
0.333	4.35	1.333	106.72	2.333	6.79	3.33	4.22
0.417	4.96	1.417	22.60	2.417	6.12	3.42	3.99
0.500	4.96	1.500	22.60	2.500	6.12	3.50	3.99
0.583	5.84	1.583	14.25	2.583	5.58	3.58	3.80
0.667	5.84	1.667	14.25	2.667	5.58	3.67	3.80
0.750	7.24	1.750	10.87	2.750	5.15	3.75	3.62
0.833	7.24	1.833	10.87	2.833	5.15	3.83	3.62
0.917	9.90	1.917	8.95	2.917	4.79	3.92	3.46
1.000	9.90	2.000	8.95	3.000	4.79	4.00	3.46

Max.Eff.Inten.(mm/hr)=	106.72	206.98		
over (min)	5.00	5.00		
Storage Coeff. (min)=	1.15 (ii)	4.95 (ii)		
Unit Hyd. Tpeak (min)=	5.00	5.00		
Unit Hyd. peak (cms)=	0.34	0.22		
			TOTALS	
PEAK FLOW (cms)=	0.00	0.02	0.018 (iii)	
TIME TO PEAK (hrs)=	1.33	1.33	1.33	
RUNOFF VOLUME (mm)=	44.28	26.09	26.26	
TOTAL RAINFALL (mm)=	46.28	46.28	46.28	
RUNOFF COEFFICIENT =	0.96	0.56	0.57	

***** 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* = 69.0 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 (0103)	Area (ha)=	0.06	
ID= 1 DT= 5.0 min	Total Imp(%)=	95.00	Dir. Conn.(%)= 95.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.06	0.00
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	0.80	0.80
Length	(m)=	20.00	8.00
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	3.89	1.083	18.41	2.083	7.69	3.08	4.48
0.167	3.89	1.167	18.41	2.167	7.69	3.17	4.48
0.250	4.35	1.250	106.72	2.250	6.79	3.25	4.22
0.333	4.35	1.333	106.72	2.333	6.79	3.33	4.22
0.417	4.96	1.417	22.60	2.417	6.12	3.42	3.99
0.500	4.96	1.500	22.60	2.500	6.12	3.50	3.99
0.583	5.84	1.583	14.25	2.583	5.58	3.58	3.80
0.667	5.84	1.667	14.25	2.667	5.58	3.67	3.80
0.750	7.24	1.750	10.87	2.750	5.15	3.75	3.62
0.833	7.24	1.833	10.87	2.833	5.15	3.83	3.62
0.917	9.90	1.917	8.95	2.917	4.79	3.92	3.46
1.000	9.90	2.000	8.95	3.000	4.79	4.00	3.46

			TOTALS
Max.Eff.Inten.(mm/hr)=	106.72	20.28	
over (min)	5.00	5.00	
Storage Coeff. (min)=	1.01 (ii)	2.07 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.34	0.31	
PEAK FLOW (cms)=	0.02	0.00	0.017 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	44.28	10.96	42.61
TOTAL RAINFALL (mm)=	46.28	46.28	46.28
RUNOFF COEFFICIENT =	0.96	0.24	0.92

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 69.0 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			
NASHYD (0001)	Area (ha)=	0.01	Curve Number (CN)= 69.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.03	

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	3.89	1.083	18.41	2.083	7.69	3.08	4.48
0.167	3.89	1.167	18.41	2.167	7.69	3.17	4.48
0.250	4.35	1.250	106.72	2.250	6.79	3.25	4.22
0.333	4.35	1.333	106.72	2.333	6.79	3.33	4.22
0.417	4.96	1.417	22.60	2.417	6.12	3.42	3.99
0.500	4.96	1.500	22.60	2.500	6.12	3.50	3.99
0.583	5.84	1.583	14.25	2.583	5.58	3.58	3.80
0.667	5.84	1.667	14.25	2.667	5.58	3.67	3.80
0.750	7.24	1.750	10.87	2.750	5.15	3.75	3.62
0.833	7.24	1.833	10.87	2.833	5.15	3.83	3.62
0.917	9.90	1.917	8.95	2.917	4.79	3.92	3.46
1.000	9.90	2.000	8.95	3.000	4.79	4.00	3.46

Unit Hyd Qpeak (cms)= 0.018

PEAK FLOW (cms)= 0.000 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 3.689
TOTAL RAINFALL (mm)= 46.276
RUNOFF COEFFICIENT = 0.080

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB STANDHYD (0202) ID= 1 DT= 5.0 min	Area (ha)= 0.19 Total Imp(%)= 67.00 Dir. Conn.(%)= 67.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.13	0.06
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	0.80	1.00
Length	(m)=	35.96	5.00
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	3.89	1.083	18.41	2.083	7.69	3.08	4.48
0.167	3.89	1.167	18.41	2.167	7.69	3.17	4.48
0.250	4.35	1.250	106.72	2.250	6.79	3.25	4.22
0.333	4.35	1.333	106.72	2.333	6.79	3.33	4.22
0.417	4.96	1.417	22.60	2.417	6.12	3.42	3.99
0.500	4.96	1.500	22.60	2.500	6.12	3.50	3.99
0.583	5.84	1.583	14.25	2.583	5.58	3.58	3.80
0.667	5.84	1.667	14.25	2.667	5.58	3.67	3.80

```
                0.750    7.24 | 1.750   10.87 | 2.750    5.15 |  3.75    3.62
                0.833    7.24 | 1.833   10.87 | 2.833    5.15 |  3.83    3.62
                0.917    9.90 | 1.917    8.95 | 2.917    4.79 |  3.92    3.46
                1.000    9.90 | 2.000    8.95 | 3.000    4.79 |  4.00    3.46

     Max.Eff.Inten.(mm/hr)=     106.72        20.28
               over (min)        5.00         5.00
     Storage Coeff.  (min)=      1.44 (ii)    3.27 (ii)
     Unit Hyd. Tpeak (min)=      5.00         5.00
     Unit Hyd. peak  (cms)=      0.33         0.27
                                                          *TOTALS*
     PEAK FLOW       (cms)=      0.04         0.00          0.043 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.33           1.33
     RUNOFF VOLUME    (mm)=     44.28        10.96          33.28
     TOTAL RAINFALL   (mm)=     46.28        46.28          46.28
     RUNOFF COEFFICIENT   =      0.96         0.24           0.72

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  69.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0004)|     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   |    0.0069      0.0029
                           0.0010      0.0009   |    0.0185      0.0040
                           0.0029      0.0019   |    0.0344      0.0052
                           0.0043      0.0025   |    0.0000      0.0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0202)      0.194      0.043      1.33      33.28
   OUTFLOW: ID= 1 (  0004)      0.194      0.010      1.50      32.13

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 22.50
                  TIME SHIFT OF PEAK FLOW         (min)= 10.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0032

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
```

```
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):     0.01   0.000     1.33     3.69
      + ID2= 2 (  0004):     0.19   0.010     1.50    32.13
        ================================================
        ID = 3 (  0006):     0.21   0.010     1.50    30.21

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

 FINISH
================================================================================
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```