



Enhancing our communities



772082 Highway 10 Dundalk

NATURAL HAZARDS ASSESSMENT

772082 Highway 10 Inc.

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1 Introduction

Tatham Engineering Limited (Tatham) has been retained to complete a riverine Natural Hazards Assessment (NHA) in support of a Settlement Area expansion, through an Official Plan Amendment (OPA) application for the subject property of 772082 Highway 10 in Dundalk, Ontario. This brief has been prepared to establish the existing floodplain limit across the subject property for the municipal drain, referred to as the James Foley Drain. The municipal drain is tributary to the Grand River.

1.1 STUDY AREA

The subject property is located at 772082 Highway 10 in Dundalk, Ontario. Which is shown in Figure 1: Site Location Plan enclosed for reference. The subject property is relatively flat, well-vegetated, located within the GRCA Regulation limits for floodplain and wetland, governed by O.Reg 41/24. An existing municipal drain referred to as the James Foley Drain traverses the southwest corner of the subject property from north to south. The study area includes the watershed extending north of Dufferin County Rd 2 to South of the Grey Country CP Rail Trail. The Grey Country CP Rail Trail culvert crossing was surveyed and included in the hydraulic analysis to assess any potential backwater impacts caused by the existing structure.

1.2 REFERENCE DOCUMENTS

The natural hazards assessment has been prepared in accordance with the following applicable guidelines and background documents:

- O.Reg. 41/24: Prohibited Activities, Exemptions and Permits;
- Ontario Regulation 41/24 (GRCA, May 24, 2024);
- Ontario Watershed Information Tool (OWIT) Ministry of Natural Resources;
- HEC-RAS Users Manual;
- Ministry of Ontario Soil Complex (Ontario GeoHub); and
- Ministry of Ontario IDF Curve Look-up.

1.3 OBJECTIVES

This report will provide the technical basis to demonstrate there is suitable area outside of the floodplain hazard which can be developed per the applicable hazard management policies and regulations in support of a Settlement Area expansion, through the OPA application.



2 Hydrologic Assessment

The existing condition hydrology was established using the available topographic survey (completed by Tatham April 2, 2025), open-source datasets, aerial images, and the Ontario Watershed Information Tool (OWIT). The municipal drain conveys drainage from residential and agricultural lands north of the subject property. The catchment area was delineated using OWIT and confirmed using the contours generated from the LiDAR DTM package extracted from the Ontario Digital Terrain Model GeoHub. The catchment area is illustrated in the existing condition Watershed Drainage Plan (Drawing WDP.1) enclosed for reference.

The existing drainage conditions from the surrounding area are categorized as follows:

- The total watershed area is approximately 533 ha;
- The watershed was subdivided into 7 catchments based on the topography and flow paths;
- The catchments are gradually sloped ($\geq 1\%$) and generally drain from north to south; and
- Dominant land uses consist of agricultural fields and treed swamp areas, with a moderate to low imperviousness across the 7 catchments.

The categories of soils that are viewed on each sub-catchment are provided in Appendix A. These soils were extracted from the Ontario Soil Complex GeoHub and were used to define the catchment parameters in the hydrologic assessment. Summary parameters for each sub-catchment are listed in Table 1 to further highlight the catchment area and imperviousness.

Table 1: Catchment Impervious Summaries

CATCHMENT	AREA (ha)	% IMPERVIOUSNESS	CN	IA (mm)	TP (hr)
101	45.85	4%	72.7	5.90	0.33
102	110.4	0%	69.7	7.18	0.35
103	79.4	2%	71.1	6.61	0.62
104	99.35	3%	77.1	6.27	0.26
105	56.33	10%	79.5	6.13	0.51
106	54.58	32%	0	0	-
107	61.28	0%	71.2	6.82	0.32



A Visual OTTHYMO hydrologic model was created for the watershed to estimate the regulatory peak flow. Runoff generated within each sub catchment was routed downstream using the route channel command in VO, simulating channelized flow paths between the subcatchments. IDF information from the MTO IDF Curve Lookup portal was used to generate the 4-hour Chicago and 24-hour SCS Type II storm distribution. The 24-Hour SCS Type II storm distribution generated the highest peak flows from the 1:100-Year return frequency design storm. Additionally, the Hazel Regional storm using AMC III conditions was run. The 1:100-Year and Regional (Hazel) storm peak flows are summarized in Table 2 for flows at the Grey Country CP Rail Trail crossing. Supporting calculations are included in Appendix A for reference.

Table 2: Storm Peak Flows Summary

STORM	PEAK FLOW (m ³ /s)
1:100-Year 24-Hour SCS Type II	29.75
Hazel (AMC III)	25.88



3 Floodplain Hazard Assessment

A hydraulic assessment was completed to map the existing floodplain hazard across the subject property. A 1D HEC-RAS hydraulic model was prepared for the hydraulic analysis with peak flows generated from the Visual OTTHYMO (VO) hydraulic model. The methodology and results of the hydraulic assessment are summarized as follows:

- Cross sections were spaced to reflect changes in topography, channel slope, and structures;
- Tighter spaced cross-sections were used through the subject property and near culverts;
- Manning's n values were selected using the HEC-RAS guidelines and ariel photo interpretation;
 - A main channel roughness of 0.03 was applied to all cross sections based on observed bed material and vegetation;
 - Overbank areas were assigned higher roughness values of 0.075 to represent dense brush;
- Ineffective flow areas were applied to cross sections bounding the Grey Country CP Rail Trail crossing downstream of the subject area;
- Energy loss coefficients were set to 0.3 (contraction) and 0.5 (expansion) near the crossing; and
- Design flows corresponding to the 1:100-Year return frequency design storm and the Hazel Regional Storm were used for hydraulic simulation.

3.1 DATUM COMPARISON

An elevation datum comparison between the topographic survey and the DTM was performed along the center line of the James Foley Drain. The comparison revealed an average difference of 0.05 meters between the data sets. The DTM was adjusted -0.05 meters to match the topographic survey. A merged surface file was generated using the survey, and the adjusted DTM. A supporting elevation datum comparison chart is provided in Appendix B for reference.

3.2 EXISTING CONDITIONS

An existing conditions 1D HEC-RAS hydraulic model was developed using topographic survey information through the subject property and supplemented with the LiDAR DTM package beyond the survey extents. Existing condition HEC-RAS model results are included in Appendix



C and the existing condition regulatory storm flood elevations and floodplain limits are illustrated on the Existing Floodplain Map (Drawing FM.1) enclosed for reference.

The hydraulic assessment identified a backwater condition affecting the floodplain limits across the subject property, in part caused by the limited hydraulic capacity of the Grey Country CP Rail Trail culvert crossing. The existing floodplain limits extend through a low-lying area near the center of the subject property. However, the majority of the site remains outside of the regulatory floodplain and is suitable for proposed development.

There may be opportunities to refine the floodplain limits through a proposed hydraulic assessment in the future. This could include the evaluation of proposed cut/fill compensation strategies, potential improvements to culvert hydraulic capacity, or a combination of both.



4 Erosion Hazard Assessment

As there is no discernible valley slope or bank that can be detected from the surrounding landscape, the municipal drain is considered an unconfined system. An erosion hazard assessment for the municipal drain is not required as the municipal drain is not a natural system, and the Drainage Act allows for channel clean outs, reshaping, etc. to re-establish a channel geometry and alignment before there is a real hazard to the public.



5 Summary

A natural hazards assessment was completed for the subject property, in support of the OPA application. The study included both hydrologic and hydraulic analysis to establish the floodplain limits across the subject property. Although an existing backwater condition impacts the subject property, the majority of the site remains outside of the regulatory floodplain limits and is therefore considered suitable for proposed development.

Opportunities to refine the floodplain limits and reduce the impacts of the backwater condition may be further refined through more detailed hydraulic assessment, which could include the evaluation of proposed cut/fill compensation strategies, potential improvements to culvert hydraulic capacity, or a combination of both. Any such refinements would be subject to the review and approval of the Grand River Conservation Authority (GRCA). It is recommended that first a pre-consultation with the GRCA be undertaken to confirm their support for the proposed approach.

An erosion hazard limit was considered not required for the municipal drain.





772082 Highway 10, Dundalk,
Municipality of Southgate

Legend

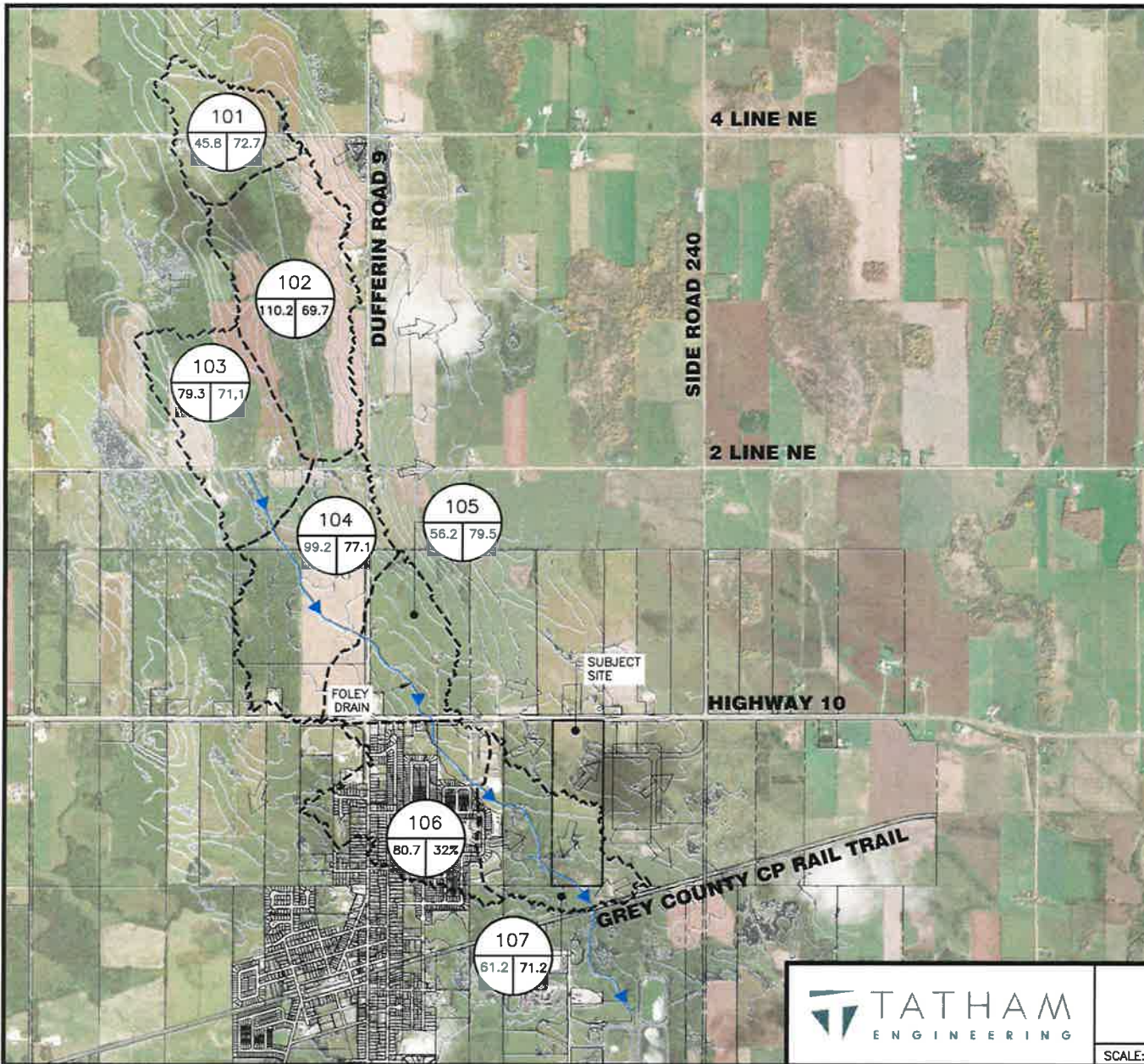
- Regulation Limit (GRCA)
- Floodplain (GRCA)**
 - Engineered
 - Estimated
 - Approximate
- Floodplain - Special Policy Area (GRCA)
- Slope Erosion (GRCA)**
 - Steep
 - Oversteep
 - Toe
- Slope Valley (GRCA)**
 - Steep
 - Oversteep
- Regulated Watercourse (GRCA)
- Regulated Waterbody (GRCA)
- Wetland (GRCA)
- Lake Erie Flood (GRCA)
- Lake Erie Shoreline Reach (GRCA)
- Lake Erie Dynamic Beach (GRCA)
- Lake Erie Erosion (GRCA)
- Parcel - Assessment (MPAC/MNRF)
- Site (31.3 ha)**








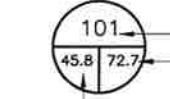
Copyright Grand River Conservation Authority, 2026.

Disclaimer: This map is for illustrative purposes only. Information contained herein is not a substitute for professional review or a site survey and is subject to change without notice. The Grand River Conservation Authority takes no responsibility for, nor guarantees, the accuracy of the information contained on this map. Any interpretations or conclusions drawn from this map are the sole responsibility of the user.

The source for each data layer is shown in parentheses in the map legend. See [Sources and Citations](#) for details.



LEGEND

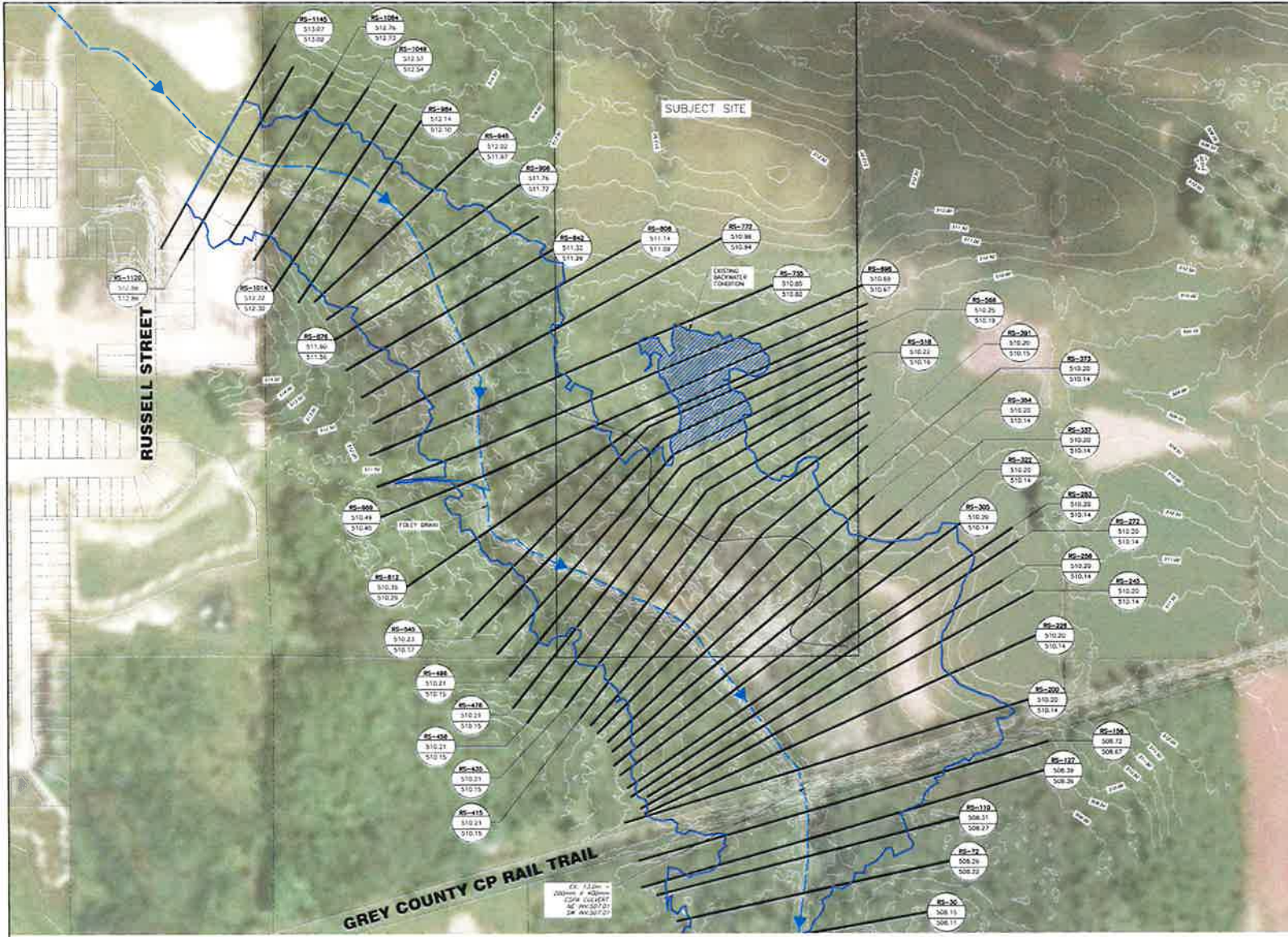
-  PROPOSED PROPERTY LINE
-  EXISTING CONTOUR
280.00
-  CATCHMENT BOUNDARY
-  EXISTING WATERCOURSE (FOLEY DRAIN)
-  OVERLAND FLOW DIRECTION
-  CATCHMENT ID
45.8 | 72.7
AREA (ha)



**772082 HIGHWAY 10
VILLAGE OF DUNDALK
WATERSHED DRAINAGE PLAN**

DWG. No.
WDP.1

SCALE: 1:25,000 | DRAWN: LQ | DATE: APR/25 | JOB NO. 425018



- LEGEND**
- PROPERTY LINE
 - ENVIRONMENTAL PROTECTION AREA
 - EXISTING CONTOUR
 - EXISTING WATERCOURSE (TOILEY DRAIN)
 - EXISTING REGULATORY FLOOD LIMITS
 - HEC-RAS CROSS SECTION
 - HEC-RAS RIVER STATION
 - 100-YEAR WATER ELEVATION
 - REGIONAL WATER ELEVATION

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BENCHMARKS

NOTES
 ALL LOAD CONTOURS SHOWN ON THIS DRAWING WERE OBTAINED FROM THE ONTARIO DIGITAL TERRAIN MODEL PRODUCED BY ONARIO GOVERNMENT.

No.	REVISION DESCRIPTION	DATE	ENGINEER STAMP
1.	132 SUBMISSION	MAR 11, 2018	

772082 HIGHWAY 10
VILLAGE OF DUNDALK

EXISTING FLOODPLAIN MAP

TATHAM ENGINEERING

DESIGN NO:	FILE:	425018	DWG:	FM.1
DRAWN BY:	DATE:	MAY 2015		
CHECK:	APP:	SCALE:	1:2,000	

Appendix A: Hydrologic Assessment



Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

Highway 10 - Dundalk	425018
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Data Sources

Detailed Soil Survey Reports for Ontario, MTO Drainage Management Manual (1997)
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Prepared By

Nick Roque	March 7, 2025
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Pre-Development Condition

Watershed:	Default MTO
Catchment ID:	101
Catchment Area (ha):	45.85
Impervious %:	4%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol	M				Hs								
Soil Series	Muck				Harriston								
Hydrologic Soils Group	B				BC								
Soil Texture	Muck				Sand Loam								
Runoff Coefficient Type	2				2								
Area (ha)	10.94				34.91								
Percentage of Catchment	24%				76%								
Land Cover Category	IA	A (ha)	CN	C	A (ha)	CN	C	A (ha)	CN	C	A (ha)	CN	C
Impervious	2	0.67	100	0.95	1.00	100	0.95						
Gravel	3		89	0.50		89	0.50						
Woodland	10		60	0.25		67	0.25						
Pasture/Lawns	5	2.56	69	0.28	27.30	74	0.28						
Meadows	8	6.03	65	0.27	1.49	71	0.27						
Cultivated	7	0.36	74	0.35	4.43	78	0.35						
Waterbody	12	1.32	50	0.05	0.70	50	0.05						
Average CN	66.56				74.64								
Average C	0.29				0.30								
Average IA	7.38				5.44								

Time to Peak Calculations

Max. Catchment Elev. (m):	534.00
Min. Catchment Elev. (m):	526.00
Catchment Length (m):	269.56
Catchment Slope (%):	2.97%
Method:	Airport Method
Time of Concentration (mins):	29.94

Summary

Catchment CN:	72.7
Catchment C:	0.30
Catchment IA (mm):	5.90
Time of Concentration (hrs):	0.50
Catchment Time to Peak (hrs):	0.33
Catchment Time Step (mins):	3.99

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

Highway 10 - Dundalk	425018
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Data Sources

Detailed Soil Survey Reports for Ontario, MTO Drainage Management Manual (1997)
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Prepared By

Nick Roque	March 7, 2025
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Pre-Development Condition

Watershed:	Default MTO
Catchment ID:	102
Catchment Area (ha):	110.40
Impervious %:	

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		Hs			Pal			M					
Soil Series		Harriston			Parkhill			Muck					
Hydrologic Soils Group		BC			BC			B					
Soil Texture		Sand Loam			Loam or Silt Loam			Muck					
Runoff Coefficient Type		2			2			2					
Area (ha)		42.93			5.42			62.05					
Percentage of Catchment		39%			5%			56%					
Land Cover Category	IA	A (ha)	CN	C	A (ha)	CN	C	A (ha)	CN	C	A (ha)	CN	C
Impervious	2		100	0.95		100	0.95		100	0.95			
Gravel	3		89	0.50		89	0.50		89	0.50			
Woodland	10	1.96	67	0.25		67	0.25		60	0.25			
Pasture/Lawns	5	16.55	74	0.28	4.32	74	0.28	5.22	69	0.28			
Meadows	8	4.56	71	0.27	1.10	71	0.27	48.03	65	0.27			
Cultivated	7	18.51	78	0.35		78	0.35	7.69	74	0.35			
Waterbody	12	1.34	50	0.05		50	0.05	1.11	50	0.05			
Average CN		74.34			73.39			66.18					
Average C		0.30			0.28			0.27					
Average IA		6.63			5.61			7.70					

Time to Peak Calculations

Max. Catchment Elev. (m):	536.00
Min. Catchment Elev. (m):	524.00
Catchment Length (m):	331.22
Catchment Slope (%):	3.62%
Method:	Airport Method
Time of Concentration (mins):	31.67

Summary

Catchment CN:	69.7
Catchment C:	0.28
Catchment IA (mm):	7.18
Time of Concentration (hrs):	0.53
Catchment Time to Peak (hrs):	0.35
Catchment Time Step (mins):	4.22

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

Highway 10 - Dundalk	425018
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Data Sources

Detailed Soil Survey Reports for Ontario, MTO Drainage Management Manual (1997)
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Prepared By

Nick Roque	March 7, 2025
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Pre-Development Condition

Watershed:	Default MTO
Catchment ID:	103
Catchment Area (ha):	79.40
Impervious %:	2%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol	Hs			Pal			M						
Soil Series	Harriston			Parkhill			Muck						
Hydrologic Soils Group	BC			BC			B						
Soil Texture	Sand Loam			Loam or Silt Loam			Muck						
Runoff Coefficient Type	2			2			2						
Area (ha)	41.20			4.91			33.28						
Percentage of Catchment	52%			6%			42%						
Land Cover Category	IA	A (ha)	CN	C	A (ha)	CN	C	A (ha)	CN	C	A (ha)	CN	C
Impervious	2	1.12	100	0.95		100	0.95	0.62	100	0.95			
Gravel	3		89	0.50		89	0.50		89	0.50			
Woodland	10		67	0.25		67	0.25		60	0.25			
Pasture/Lawns	5	23.21	74	0.28	3.65	74	0.28	6.58	69	0.28			
Meadows	8	0.67	71	0.27		71	0.27	22.23	65	0.27			
Cultivated	7	16.14	78	0.35	0.41	78	0.35	0.45	74	0.35			
Waterbody	12	0.08	50	0.05	0.85	50	0.05	3.41	50	0.05			
Average CN		76.18			70.16			65.03					
Average C		0.32			0.25			0.26					
Average IA		5.76			6.38			7.69					

Time to Peak Calculations

Max. Catchment Elev. (m):	535.00
Min. Catchment Elev. (m):	527.00
Catchment Length (m):	560.54
Catchment Slope (%):	1.43%
Method:	Airport Method
Time of Concentration (mins):	55.41

Summary

Catchment CN:	71.1
Catchment C:	0.29
Catchment IA (mm):	6.61
Time of Concentration (hrs):	0.92
Catchment Time to Peak (hrs):	0.62
Catchment Time Step (mins):	7.39

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

Highway 10 - Dundalk	425018
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Data Sources

Detailed Soil Survey Reports for Ontario, MTO Drainage Management Manual (1997)
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Prepared By

Nick Roque	March 7, 2025
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Pre-Development Condition

Watershed:	Default MTO
Catchment ID:	104
Catchment Area (ha):	99.35
Impervious %:	3%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol	Hs				Pal			M					
Soil Series	Harriston				Parkhill			Muck					
Hydrologic Soils Group	BC				BC			B					
Soil Texture	Sand Loam				Loam or Silt Loam			Muck					
Runoff Coefficient Type	2				2			2					
Area (ha)	80.09				18.15			1.12					
Percentage of Catchment	81%				18%			1%					
Land Cover Category	IA	A (ha)	CN	C	A (ha)	CN	C	A (ha)	CN	C	A (ha)	CN	C
Impervious	2	1.73	100	0.95	1.32	100	0.95		100	0.95			
Gravel	3	0.00	89	0.50		89	0.50		89	0.50			
Woodland	10		67	0.25		67	0.25		60	0.25			
Pasture/Lawns	5	26.02	74	0.28	3.77	74	0.28	0.59	69	0.28			
Meadows	8	2.38	71	0.27	0.88	71	0.27	0.03	65	0.27			
Cultivated	7	49.85	78	0.35	12.18	78	0.35	0.50	74	0.35			
Waterbody	12	0.11	50	0.05		50	0.05		50	0.05			
Average CN	76.93				78.43			71.12					
Average C	0.34				0.37			0.31					
Average IA	6.28				6.27			5.98					

Time to Peak Calculations

Max. Catchment Elev. (m):	530.00
Min. Catchment Elev. (m):	521.00
Catchment Length (m):	219.97
Catchment Slope (%):	4.09%
Method: Airport Method	
Time of Concentration (mins):	22.97

Summary

Catchment CN:	77.1
Catchment C:	0.34
Catchment IA (mm):	6.27
Time of Concentration (hrs):	0.38
Catchment Time to Peak (hrs):	0.26
Catchment Time Step (mins):	3.06

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

Highway 10 - Dundalk	425018
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Data Sources

Detailed Soil Survey Reports for Ontario, MTO Drainage Management Manual (1997)

Prepared By

Nick Roque	March 7, 2025
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Pre-Development Condition

Watershed:	Default MTO
Catchment ID:	105
Catchment Area (ha):	56.33
Impervious %:	10%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol	Hs				Pal								
Soil Series	Harriston				Parkhill								
Hydrologic Soils Group	BC				BC								
Soil Texture	Sand Loam				Loam or Silt Loam								
Runoff Coefficient Type	2				2								
Area (ha)	43.52				12.80								
Percentage of Catchment	77%				23%								
Land Cover Category	IA	A (ha)	CN	C	A (ha)	CN	C	A (ha)	CN	C	A (ha)	CN	C
Impervious	2	5.13	100	0.95	0.56	100	0.95						
Gravel	3	0.28	89	0.50		89	0.50						
Woodland	10	0.43	67	0.25		67	0.25						
Pasture/Lawns	5	8.22	74	0.28	2.10	74	0.28						
Meadows	8		71	0.27		71	0.27						
Cultivated	7	29.46	78	0.35	10.14	78	0.35						
Waterbody	12		50	0.05		50	0.05						
Average CN	79.80				78.30								
Average C	0.41				0.36								
Average IA	6.04				6.45								

Time to Peak Calculations

Max. Catchment Elev. (m):	527.00
Min. Catchment Elev. (m):	517.00
Catchment Length (m):	576.19
Catchment Slope (%):	1.74%
Method:	Airport Method
Time of Concentration (mins):	45.82

Summary

Catchment CN:	79.5
Catchment C:	0.40
Catchment IA (mm):	6.13
Time of Concentration (hrs):	0.76
Catchment Time to Peak (hrs):	0.51
Catchment Time Step (mins):	6.11

Visual OTTHYMO Model Parameter Calculations (StandHYD)

Project Details

Highway 10 - Dundalk	425018
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Data Sources

Detailed Soil Survey Reports for Ontario, MTO Drainage Management Manual (1997)
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Prepared By

Nick Roque	March 7, 2025
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Pre-Development Condition

Watershed:	Default MTO
Catchment ID:	106
Catchment Area (ha):	80.82
Impervious %:	32%
Pervious Area (ha):	54.58

Average Curve Number (CN) and Initial Abstraction (IA) for Pervious Area

Soil Symbol	Hs		Pal						
Soil Series	Harriston		Parkhill						
Hydrologic Soils Group	BC		BC						
Soil Texture	Sand Loam		Loam or Silt Loam						
Runoff Coefficient Type	2		2						
Area (ha)	47.34		7.24						
Percentage of Catchment	87%		13%						
Land Cover Category	IA	A (ha)	CN	A (ha)	CN	A (ha)	CN	A (ha)	CN
Impervious	2		100		100				
Gravel	3	1.01	89		89				
Woodland	10	0.07	67		67				
Pasture/Lawns	5	29.32	74	5.68	74				
Meadows	8	0.00	71		71				
Cultivated	7	16.94	78	1.56	78				
Waterbody	12		50		50				
Average CN		75.74		74.86					
Average IA		5.68		5.43					

Notes

CN and IA values have been calculated for the pervious area of the catchment only.
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Summary

Catchment CN:	75.6
Catchment IA (mm):	5.65

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

Highway 10 - Dundalk	425018
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Data Sources

Detailed Soil Survey Reports for Ontario, MTO Drainage Management Manual (1997)
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Prepared By

Nick Roque	March 7, 2025
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Pre-Development Condition

Watershed:	Default MTO
Catchment ID:	107
Catchment Area (ha):	61.28
Impervious %:	

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol	Pal				LI								
Soil Series	Parkhill				Lyons								
Hydrologic Soils Group	BC				B								
Soil Texture	Loam or Silt Loam				Loam or Silt Loam								
Runoff Coefficient Type	2				2								
Area (ha)	19.61				41.67								
Percentage of Catchment	32%				68%								
Land Cover Category	IA	A (ha)	CN	C	A (ha)	CN	C	A (ha)	CN	C	A (ha)	CN	C
Impervious	2		100	0.95		100	0.95						
Gravel	3		89	0.50		89	0.50						
Woodland	10		67	0.25	1.30	60	0.25						
Pasture/Lawns	5	2.91	74	0.28	14.31	69	0.28						
Meadows	8	13.43	71	0.27	6.10	65	0.27						
Cultivated	7	3.27	78	0.35	19.96	74	0.35						
Waterbody	12		50	0.05		50	0.05						
Average CN	72.61				70.53								
Average C	0.28				0.31								
Average IA	7.39				6.55								

Time to Peak Calculations

Max. Catchment Elev. (m):	521.00
Min. Catchment Elev. (m):	508.00
Catchment Length (m):	318.56
Catchment Slope (%):	4.08%
Method: Airport Method	
Time of Concentration (mins):	29.22

Summary

Catchment CN:	71.2
Catchment C:	0.30
Catchment IA (mm):	6.82
Time of Concentration (hrs):	0.49
Catchment Time to Peak (hrs):	0.32
Catchment Time Step (mins):	3.90

Active coordinate

44° 10' 15" N, 80° 23' 45" W (44.170833,-80.395833)

Retrieved: Tue, 29 Apr 2025 18:43:13 GMT



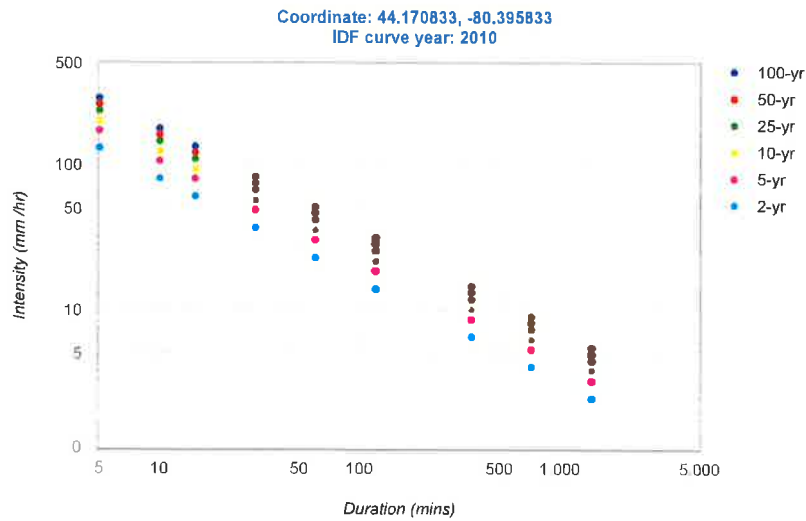
Location summary

These are the locations in the selection.

IDF Curve: 44° 10' 15" N, 80° 23' 45" W (44.170833,-80.395833)

Results

An IDF curve was found.



Coefficient summary

IDF Curve: 44° 10' 15" N, 80° 23' 45" W (44.170833,-80.395833)

Retrieved: Tue, 29 Apr 2025 18:43:13 GMT

Data year: 2010

IDF curve year: 2010

Return period	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
A	23.1	30.6	35.6	41.8	46.5	51.0
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	131.2	80.8	60.9	37.5	23.1	14.2	6.6	4.1	2.5
5-yr	173.8	107.1	80.6	49.7	30.6	18.8	8.7	5.4	3.3
10-yr	202.2	124.6	93.8	57.8	35.6	21.9	10.2	6.3	3.9
25-yr	237.4	146.3	110.2	67.9	41.8	25.7	11.9	7.4	4.5
50-yr	264.1	162.7	122.5	75.5	46.5	28.6	13.3	8.2	5.0
100-yr	289.7	178.4	134.4	82.8	51.0	31.4	14.6	9.0	5.5

Rainfall depth (mm)

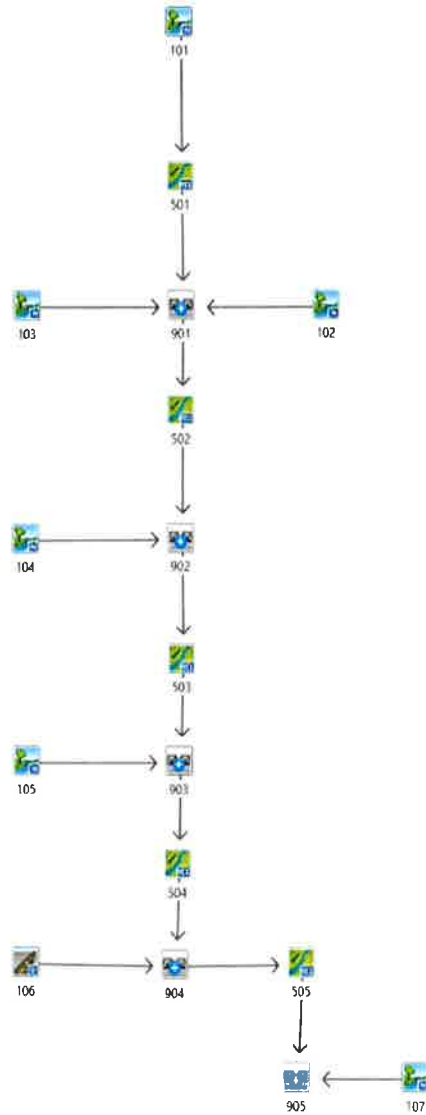
Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	10.9	13.5	15.2	18.8	23.1	28.5	39.6	48.8	60.1
5-yr	14.5	17.8	20.2	24.8	30.6	37.7	52.5	64.6	79.6
10-yr	16.9	20.8	23.5	28.9	35.6	43.9	61.0	75.2	92.7
25-yr	19.8	24.4	27.5	33.9	41.8	51.5	71.7	88.3	108.8
50-yr	22.0	27.1	30.6	37.7	46.5	57.3	79.7	98.2	121.0
100-yr	24.1	29.7	33.6	41.4	51.0	62.8	87.5	107.7	132.7

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Last Modified: September 2016



NASHYD



ROUTE PIPE



DUHYD



STANDHYD



ROUTE CHANNEL



DIVERT HYD



ADDHYD



ROUTE RESERVOIR

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=====
V V I SSSS U U A L (v 6.2.2019)
V V I SS U U A A L
V V I SS U U A A A A L
V V I SS U U A A L
VV I SSSS UUUU A A LLLLL

000 TTTT TTTT H H Y Y M M 000 TM
O O T T H H Y Y M M O O
O O T T H H Y M M O O
000 T T H H Y M M 000

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```

***** SUMMARY OUTPUT *****

```

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\vo2\voin.dat
Output filename: C:\Users\nroque\AppData\Local\Civica\vh5\01950ebc-4212-48cb-aff7-545337e793f1\c034f738-2d7
Summary filename: C:\Users\nroque\AppData\Local\Civica\vh5\01950ebc-4212-48cb-aff7-545337e793f1\c034f738-2d7

```

DATE: 05/13/2025 TIME: 01:27:17

USER:

COMMENTS: _____

```

*****
** SIMULATION : 100yr 12hr 15min SCS Type II **
*****

```

W/E COMMAND	HYD ID	DT min	AREA ha	Qpeak cms	Tpeak hrs	R.V. mm	R.C.	Qbase cms
START @ 0.00 hrs								
READ STORM [Ptot=108.00 mm] fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\90885aa5-b583-4f33-a8e5-27 remark: 100yr 12hr 15min SCS Type II (MTO)								
** CALIB NASHYD [CN=72.7] [N = 3.0:Tp 0.33]	0101	1	5.0	45.85	5.14	6.42	52.77 0.49	0.000
CHANNEL[2: 0101]	0501	1	5.0	45.85	4.68	6.58	52.77 n/a	0.000
READ STORM [Ptot=108.00 mm] fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\90885aa5-b583-4f33-a8e5-27 remark: 100yr 12hr 15min SCS Type II (MTO)								
** CALIB NASHYD [CN=69.7] [N = 3.0:Tp 0.35]	0102	1	5.0	110.40	10.74	6.50	48.11 0.45	0.000
READ STORM [Ptot=108.00 mm] fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\90885aa5-b583-4f33-a8e5-27 remark: 100yr 12hr 15min SCS Type II (MTO)								
** CALIB NASHYD [CN=71.1] [N = 3.0:Tp 0.62]	0103	1	5.0	79.40	5.40	6.75	50.23 0.47	0.000
ADD [0102+ 0103]	0901	3	5.0	189.80	15.31	6.50	49.00 n/a	0.000
ADD [0901+ 0501]	0901	1	5.0	235.65	19.87	6.58	49.73 n/a	0.000
CHANNEL[2: 0901]	0502	1	5.0	235.65	13.06	7.00	49.72 n/a	0.000
READ STORM [Ptot=108.00 mm] fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\90885aa5-b583-4f33-a8e5-27 remark: 100yr 12hr 15min SCS Type II (MTO)								
** CALIB NASHYD	0104	1	5.0	99.35	14.59	6.33	58.37 0.54	0.000

```

[CN=77.1]
[ N = 3.0:Tp 0.26]
*
ADD [ 0104+ 0502] 0902 3 5.0 335.00 20.80 6.50 52.29 n/a 0.000
*
CHANNEL[ 2: 0902] 0503 1 5.0 335.00 19.47 6.75 52.29 n/a 0.000
*
READ STORM 15.0
[ Ptot=108.00 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\90885aa5-b583-4f33-a8e5-27
remark: 100yr 12hr 15min SCS Type II (MTO)
**
CALIB NASHYD 0105 1 5.0 56.33 5.54 6.67 62.00 0.57 0.000
[CN=79.5]
[ N = 3.0:Tp 0.51]
*
ADD [ 0105+ 0503] 0903 3 5.0 391.33 24.98 6.67 53.69 n/a 0.000
*
CHANNEL[ 6: 0000] 1653 3 5.0 0.00 0.00 0.00 0.00 n/a 0.000
*
READ STORM 15.0
[ Ptot=108.00 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\90885aa5-b583-4f33-a8e5-27
remark: 100yr 12hr 15min SCS Type II (MTO)
*
CALIB STANDHYD 0106 1 5.0 80.82 20.78 6.25 89.96 0.83 0.000
[I%=35.0:S%= 2.00]
*
ADD [ 0106+ 0504] 0904 3 5.0 137.15 23.75 6.25 78.47 n/a 0.000
*
CHANNEL[ 2: 0904] 0505 1 5.0 137.15 19.71 6.42 78.47 n/a 0.000
*
READ STORM 15.0
[ Ptot=108.00 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\90885aa5-b583-4f33-a8e5-27
remark: 100yr 12hr 15min SCS Type II (MTO)
*
CALIB NASHYD 0107 1 5.0 61.28 6.68 6.42 50.19 0.46 0.000
[CN=71.2]
[ N = 3.0:Tp 0.32]
*
ADD [ 0107+ 0505] 0905 3 5.0 198.43 26.40 6.42 69.74 n/a 0.000

```

```

=====
V V I SSSS U U A L (v 6.2.2019)
V V I SS U U A A L
V V I SS U U A A A A L
V V I SS U U A A L
VV I SSSS UUUU A A LLLLL

000 TTTT TTTT H H Y Y M M 000 TM
O O T T H H Y Y M M O O
O O T T H H Y M M O O
000 T T H H Y M M 000

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```

***** SUMMARY OUTPUT *****

```

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\vo2\voin.dat
Output filename: C:\Users\nroque\AppData\Local\Civica\vh5\01950ebc-4212-48cb-aff7-545337e793f1\f6fc2f57-7bd
Summary filename: C:\Users\nroque\AppData\Local\Civica\vh5\01950ebc-4212-48cb-aff7-545337e793f1\f6fc2f57-7bd

```

DATE: 05/13/2025 TIME: 01:27:18

USER:

COMMENTS: _____

```

*****
** SIMULATION : 100yr 24hr 15min SCS Type II **
*****

```

W/E COMMAND	HYD ID	DT min	AREA ha	Qpeak cms	Tpeak hrs	R.V. mm	R.C.	Qbase cms
-------------	--------	--------	---------	-----------	-----------	---------	------	-----------

```

START @ 0.00 hrs
-----
READ STORM                15.0
[ Ptot=132.00 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\9d2c711e-ae89-48ac-b3b4-55
remark: 100yr 24hr 15min SCS Type II (MTO)
** CALIB NASHYD          0101 1 5.0 45.85 6.06 12.42 71.78 0.54 0.000
   [CN=72.7]
   [ N = 3.0:Tp 0.33]
CHANNEL[ 2: 0101] 0501 1 5.0 45.85 5.55 12.58 71.77 n/a 0.000
READ STORM                15.0
[ Ptot=132.00 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\9d2c711e-ae89-48ac-b3b4-55
remark: 100yr 24hr 15min SCS Type II (MTO)
** CALIB NASHYD          0102 1 5.0 110.40 12.78 12.50 66.22 0.50 0.000
   [CN=69.7]
   [ N = 3.0:Tp 0.35]
READ STORM                15.0
[ Ptot=132.00 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\9d2c711e-ae89-48ac-b3b4-55
remark: 100yr 24hr 15min SCS Type II (MTO)
** CALIB NASHYD          0103 1 5.0 79.40 6.33 12.75 68.77 0.52 0.000
   [CN=71.1]
   [ N = 3.0:Tp 0.62]
ADD [ 0102+ 0103] 0901 3 5.0 189.80 18.17 12.50 67.28 n/a 0.000
ADD [ 0901+ 0501] 0901 1 5.0 235.65 23.62 12.50 68.16 n/a 0.000
CHANNEL[ 2: 0901] 0502 1 5.0 235.65 15.16 13.00 68.15 n/a 0.000
READ STORM                15.0
[ Ptot=132.00 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\9d2c711e-ae89-48ac-b3b4-55
remark: 100yr 24hr 15min SCS Type II (MTO)
** CALIB NASHYD          0104 1 5.0 99.35 17.05 12.33 78.53 0.59 0.000
   [CN=77.1]
   [ N = 3.0:Tp 0.26]
ADD [ 0104+ 0502] 0902 3 5.0 335.00 24.35 12.50 71.23 n/a 0.000
CHANNEL[ 2: 0902] 0503 1 5.0 335.00 22.79 12.67 71.23 n/a 0.000
READ STORM                15.0
[ Ptot=132.00 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\9d2c711e-ae89-48ac-b3b4-55
remark: 100yr 24hr 15min SCS Type II (MTO)
** CALIB NASHYD          0105 1 5.0 56.33 6.33 12.67 82.79 0.63 0.000
   [CN=79.5]
   [ N = 3.0:Tp 0.51]
ADD [ 0105+ 0503] 0903 3 5.0 391.33 29.12 12.67 72.89 n/a 0.000
CHANNEL[ 6: 0000] 1653 3 5.0 0.00 0.00 0.00 0.00 n/a 0.000
READ STORM                15.0
[ Ptot=132.00 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\9d2c711e-ae89-48ac-b3b4-55
remark: 100yr 24hr 15min SCS Type II (MTO)
** CALIB STANDHYD       0106 1 5.0 80.82 23.50 12.25 113.16 0.86 0.000
   [IX=35.0:5%= 2.00]
ADD [ 0106+ 0504] 0904 3 5.0 137.15 26.84 12.25 100.69 n/a 0.000
CHANNEL[ 2: 0904] 0505 1 5.0 137.15 21.81 12.42 100.68 n/a 0.000
READ STORM                15.0
[ Ptot=132.00 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\9d2c711e-ae89-48ac-b3b4-55
remark: 100yr 24hr 15min SCS Type II (MTO)
** CALIB NASHYD          0107 1 5.0 61.28 7.93 12.42 68.73 0.52 0.000
   [CN=71.2]
   [ N = 3.0:Tp 0.32]

```

```

ADD [ 0107+ 0505] 0905 3 5.0 198.43 29.75 12.42 90.82 n/a 0.000
-----
V V I SSSS U U A L (v 6.2.2019)
V V I SS U U A A L
V V I SS U U A A L
V V I SSSS UUUU A A LLLL
OOO TTTT TTTT 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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```

```

***** SUMMARY OUTPUT *****
Input filename: C:\Program Files (x86)\visual\OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\nroque\AppData\Local\Civica\vh5\01950ebc-4212-48cb-aff7-545337e793f1\08fb8d93-d5c
Summary filename: C:\Users\nroque\AppData\Local\Civica\vh5\01950ebc-4212-48cb-aff7-545337e793f1\08fb8d93-d5c

```

```

DATE: 05/13/2025 TIME: 01:27:15
USER:
COMMENTS:

```

```

*****
** SIMULATION : 100yr 4hr 10min Chicago **
*****
W/E COMMAND          HYD ID  DT  AREA  *  Qpeak  Tpeak  R.V.  R.C.  Qbase
                    min    ha   cms   hrs   mm
START @ 0.00 hrs
-----
CHIC STORM                10.0
[ Ptot= 78.11 mm ]
** CALIB NASHYD          0101 1 5.0 45.85 3.08 1.67 31.11 0.40 0.000
   [CN=72.7]
   [ N = 3.0:Tp 0.33]
CHANNEL[ 2: 0101] 0501 1 5.0 45.85 2.76 1.83 31.10 n/a 0.000
CHIC STORM                10.0
[ Ptot= 78.11 mm ]
** CALIB NASHYD          0102 1 5.0 110.40 6.21 1.67 27.74 0.36 0.000
   [CN=69.7]
   [ N = 3.0:Tp 0.35]
CHIC STORM                10.0
[ Ptot= 78.11 mm ]
** CALIB NASHYD          0103 1 5.0 79.40 3.25 2.08 29.26 0.37 0.000
   [CN=71.1]
   [ N = 3.0:Tp 0.62]
ADD [ 0102+ 0103] 0901 3 5.0 189.80 8.87 1.75 28.37 n/a 0.000
ADD [ 0901+ 0501] 0901 1 5.0 235.65 11.60 1.75 28.90 n/a 0.000
CHANNEL[ 2: 0901] 0502 1 5.0 235.65 12.82 3.00 28.90 n/a 0.000
CHIC STORM                10.0
[ Ptot= 78.11 mm ]
** CALIB NASHYD          0104 1 5.0 99.35 8.94 1.58 35.02 0.45 0.000
   [CN=77.1]
   [ N = 3.0:Tp 0.26]
ADD [ 0104+ 0502] 0902 3 5.0 335.00 14.53 3.00 30.71 n/a 0.000
CHANNEL[ 2: 0902] 0503 1 5.0 335.00 12.82 3.08 30.71 n/a 0.000

```

```

CHIC STORM                10.0
[ Ptot= 78.11 mm ]
** CALIB NASHYD            0105 1 5.0  56.33  3.51  1.92  37.69  0.48  0.000
[CN=79.5
 [ N = 3.0:Tp 0.51]
ADD [ 0105+ 0503] 0903 3 5.0  391.33  14.22  3.08  31.71  n/a  0.000
CHANNEL[ 6: 0000] 1653 3 5.0  0.00  0.00  0.00  0.00  n/a  0.000
CHIC STORM                10.0
[ Ptot= 78.11 mm ]
* CALIB STANDHYD          0106 1 5.0  80.82  16.76  1.33  61.53  0.79  0.000
[I%=35.0:S%= 2.00]
ADD [ 0106+ 0504] 0904 3 5.0  137.15  17.47  1.33  51.74  n/a  0.000
CHANNEL[ 2: 0904] 0505 1 5.0  137.15  17.01  1.67  51.74  n/a  0.000
CHIC STORM                10.0
[ Ptot= 78.11 mm ]
** CALIB NASHYD            0107 1 5.0  61.28  3.89  1.67  29.20  0.37  0.000
[CN=71.2
 [ N = 3.0:Tp 0.32]
ADD [ 0107+ 0505] 0905 3 5.0  198.43  20.90  1.67  44.78  n/a  0.000

```

```

V V I SSSS U U A L (v 6.2.2019)
V V I SS U U A A L
V V I SS U U A A A A L
V V I SS U U A A L
V V I SSSS UUUU A A LLLL

```

```

OOO TTTT TTTT H H Y Y M M OOO TM
O O T T H H Y Y M M O O
O O T T H H Y Y M M O O
OOO T T H H Y Y M M OOO

```

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***** SUMMARY OUTPUT *****

Input filename: c:\Program Files (x86)\Visual OTTHYMO 6.2\Vo2\voindat
Output filename: c:\Users\nroque\AppData\Local\Civica\01950ebc-4212-48cb-aff7-545337e793f1\4bc741fe-5ee
Summary filename: c:\Users\nroque\AppData\Local\Civica\01950ebc-4212-48cb-aff7-545337e793f1\4bc741fe-5ee

DATE: 05/13/2025 TIME: 01:27:15

USER:

COMMENTS:

** SIMULATION : 10yr 12hr 15min SCS Type II (**

W/E COMMAND	HYD ID	DT	AREA	Qpeak	Tpeak	R.V.	R.C.	Qbase
		min	ha	cms	hrs	mm		cms

START @ 0.00 hrs

```

READ STORM                15.0
[ Ptot= 75.60 mm ]
fname : c:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\dfb03776-e04c-4681-81d2-8c
remark: 10yr 12hr 15min SCS Type II (MTO)

```

```

** CALIB NASHYD            0101 1 5.0  45.85  2.82  6.42  29.42  0.39  0.000
[CN=72.7
 [ N = 3.0:Tp 0.33]

```

```

CHANNEL[ 2: 0101] 0501 1 5.0  45.85  2.54  6.58  29.42  n/a  0.000

```

```

* READ STORM                15.0
[ Ptot= 75.60 mm ]
fname : c:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\dfb03776-e04c-4681-81d2-8c
remark: 10yr 12hr 15min SCS Type II (MTO)
** CALIB NASHYD            0102 1 5.0  110.40  5.75  6.50  26.17  0.35  0.000
[CN=69.7
 [ N = 3.0:Tp 0.35]
* READ STORM                15.0
[ Ptot= 75.60 mm ]
fname : c:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\dfb03776-e04c-4681-81d2-8c
remark: 10yr 12hr 15min SCS Type II (MTO)
** CALIB NASHYD            0103 1 5.0  79.40  2.93  6.83  27.63  0.37  0.000
[CN=71.1
 [ N = 3.0:Tp 0.62]
* ADD [ 0102+ 0103] 0901 3 5.0  189.80  8.17  6.50  26.78  n/a  0.000
* ADD [ 0901+ 0501] 0901 1 5.0  235.65  10.70  6.58  27.29  n/a  0.000
* CHANNEL[ 2: 0901] 0502 1 5.0  235.65  7.87  7.42  27.29  n/a  0.000
* READ STORM                15.0
[ Ptot= 75.60 mm ]
fname : c:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\dfb03776-e04c-4681-81d2-8c
remark: 10yr 12hr 15min SCS Type II (MTO)
** CALIB NASHYD            0104 1 5.0  99.35  8.17  6.33  33.18  0.44  0.000
[CN=77.1
 [ N = 3.0:Tp 0.26]
* ADD [ 0104+ 0502] 0902 3 5.0  335.00  11.11  6.50  29.03  n/a  0.000
* CHANNEL[ 2: 0902] 0503 1 5.0  335.00  10.60  6.58  29.03  n/a  0.000
* READ STORM                15.0
[ Ptot= 75.60 mm ]
fname : c:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\dfb03776-e04c-4681-81d2-8c
remark: 10yr 12hr 15min SCS Type II (MTO)
** CALIB NASHYD            0105 1 5.0  56.33  3.16  6.67  35.76  0.47  0.000
[CN=79.5
 [ N = 3.0:Tp 0.51]
* ADD [ 0105+ 0503] 0903 3 5.0  391.33  13.74  6.67  30.00  n/a  0.000
* CHANNEL[ 6: 0000] 1653 3 5.0  0.00  0.00  0.00  0.00  n/a  0.000
* READ STORM                15.0
[ Ptot= 75.60 mm ]
fname : c:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\dfb03776-e04c-4681-81d2-8c
remark: 10yr 12hr 15min SCS Type II (MTO)
* CALIB STANDHYD          0106 1 5.0  80.82  12.04  6.33  59.18  0.78  0.000
[I%=35.0:S%= 2.00]
* ADD [ 0106+ 0504] 0904 3 5.0  137.15  14.23  6.33  49.56  n/a  0.000
* CHANNEL[ 2: 0904] 0505 1 5.0  137.15  13.55  6.50  49.56  n/a  0.000
* READ STORM                15.0
[ Ptot= 75.60 mm ]
fname : c:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\dfb03776-e04c-4681-81d2-8c
remark: 10yr 12hr 15min SCS Type II (MTO)
** CALIB NASHYD            0107 1 5.0  61.28  3.61  6.42  27.57  0.36  0.000
[CN=71.2
 [ N = 3.0:Tp 0.32]
* ADD [ 0107+ 0505] 0905 3 5.0  198.43  17.09  6.50  42.77  n/a  0.000

```

```

V V I SSSS U U A L (v 6.2.2019)
V V I SS U U A A L
V V I SS U U A A A A L
V V I SS U U A A L
V V I SSSS UUUU A A LLLL

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OOO TTTT TTTT H H Y Y M M OOO TM

```

O O T T H H Y Y M M O O
 O O T T H H Y Y M M O O
 O O T T H H Y Y M M O O
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***** SUMMARY OUTPUT *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\Vo2\vojn.dat
 Output filename: C:\Users\nroque\AppData\Local\Civica\vh5\01950ebc-4212-48cb-aff7-545337e793f1\9ec8ff79-7ee
 Summary filename: C:\Users\nroque\AppData\Local\Civica\vh5\01950ebc-4212-48cb-aff7-545337e793f1\9ec8ff79-7ee

DATE: 05/13/2025 TIME: 01:27:16

USER:

COMMENTS: _____

 ** SIMULATION : 10yr 24hr 15min SCS Type II (**

W/E COMMAND	HYD ID	DT min	AREA ha	Qpeak cms	Tpeak hrs	R.V. mm	R.C.	Qbase cms
START @ 0.00 hrs								
READ STORM 15.0 [Ptot= 91.20 mm] fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\cbe6890e-d437-48c4-9547-38 remark: 10yr 24hr 15min SCS Type II (MTO)								
** CALIB NASHYD [CN=72.7] [N = 3.0:Tp 0.33]	0101	1	5.0	45.85	3.34	12.42	40.26	0.44 0.000
CHANNEL[2: 0101]	0501	1	5.0	45.85	2.94	12.58	40.25	n/a 0.000
READ STORM 15.0 [Ptot= 91.20 mm] fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\cbe6890e-d437-48c4-9547-38 remark: 10yr 24hr 15min SCS Type II (MTO)								
** CALIB NASHYD [CN=69.7] [N = 3.0:Tp 0.35]	0102	1	5.0	110.40	6.90	12.50	36.30	0.40 0.000
READ STORM 15.0 [Ptot= 91.20 mm] fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\cbe6890e-d437-48c4-9547-38 remark: 10yr 24hr 15min SCS Type II (MTO)								
** CALIB NASHYD [CN=71.1] [N = 3.0:Tp 0.62]	0103	1	5.0	79.40	3.44	12.75	38.09	0.42 0.000
ADD [0102+ 0103]	0901	3	5.0	189.80	9.79	12.50	37.05	n/a 0.000
ADD [0901+ 0501]	0901	1	5.0	235.65	12.66	12.58	37.67	n/a 0.000
CHANNEL[2: 0901]	0502	1	5.0	235.65	8.46	13.50	37.67	n/a 0.000
READ STORM 15.0 [Ptot= 91.20 mm] fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\cbe6890e-d437-48c4-9547-38 remark: 10yr 24hr 15min SCS Type II (MTO)								
** CALIB NASHYD [CN=77.1] [N = 3.0:Tp 0.26]	0104	1	5.0	99.35	9.64	12.33	44.95	0.49 0.000
ADD [0104+ 0502]	0902	3	5.0	335.00	13.48	12.42	39.82	n/a 0.000
CHANNEL[2: 0902]	0503	1	5.0	335.00	12.93	12.58	39.82	n/a 0.000
READ STORM 15.0 [Ptot= 91.20 mm] fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\cbe6890e-d437-48c4-9547-38								

remark: 10yr 24hr 15min SCS Type II (MTO)								
** CALIB NASHYD [CN=79.5] [N = 3.0:Tp 0.51]	0105	1	5.0	56.33	3.65	12.67	48.06	0.53 0.000
ADD [0105+ 0503]	0903	3	5.0	391.33	16.55	12.58	41.01	n/a 0.000
CHANNEL[6: 0000]	1653	3	5.0	0.00	0.00	0.00	0.00	n/a 0.000
READ STORM 15.0 [Ptot= 91.20 mm] fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\cbe6890e-d437-48c4-9547-38 remark: 10yr 24hr 15min SCS Type II (MTO)								
** CALIB STANDHYD [I%=35.0:S%= 2.00]	0106	1	5.0	80.82	14.39	12.33	73.89	0.81 0.000
ADD [0106+ 0504]	0904	3	5.0	137.15	16.92	12.33	63.28	n/a 0.000
CHANNEL[2: 0904]	0505	1	5.0	137.15	15.27	12.50	63.28	n/a 0.000
READ STORM 15.0 [Ptot= 91.20 mm] fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\cbe6890e-d437-48c4-9547-38 remark: 10yr 24hr 15min SCS Type II (MTO)								
** CALIB NASHYD [CN=71.2] [N = 3.0:Tp 0.32]	0107	1	5.0	61.28	4.32	12.42	38.04	0.42 0.000
ADD [0107+ 0505]	0905	3	5.0	198.43	19.49	12.50	55.49	n/a 0.000

V V I SSSS U U A L (v 6.2.2019)
 V V I SS U U A A L
 V V I SS U U A A A A L
 V V I SS U U A A L
 VV I SSSS UUUUU A A LLLLL

O O T T T T T H H Y Y M M O O T M
 O O T T T H H Y Y M M O O
 O O T T H H Y Y M M O O

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***** SUMMARY OUTPUT *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\Vo2\vojn.dat
 Output filename: C:\Users\nroque\AppData\Local\Civica\vh5\01950ebc-4212-48cb-aff7-545337e793f1\429280b-371
 Summary filename: C:\Users\nroque\AppData\Local\Civica\vh5\01950ebc-4212-48cb-aff7-545337e793f1\429280b-371

DATE: 05/13/2025 TIME: 01:27:18

USER:

COMMENTS: _____

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

W/E COMMAND	HYD ID	DT min	AREA ha	Qpeak cms	Tpeak hrs	R.V. mm	R.C.	Qbase cms
START @ 0.00 hrs								
CHIC STORM 10.0 [Ptot= 54.48 mm]								
** CALIB NASHYD [CN=72.7] [N = 3.0:Tp 0.33]	0101	1	5.0	45.85	1.54	1.67	16.39	0.30 0.000
CHANNEL[2: 0101]	0501	1	5.0	45.85	1.39	1.83	16.38	n/a 0.000

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CHIC STORM                10.0
[ Ptot= 54.48 mm ]
** CALIB NASHYD            0102 1 5.0 110.40 3.00 1.75 14.18 0.26 0.000
[CN=69.7
[ N = 3.0:Tp 0.35]
CHIC STORM                10.0
[ Ptot= 54.48 mm ]
** CALIB NASHYD            0103 1 5.0 79.40 1.62 2.08 15.16 0.28 0.000
[CN=71.1
[ N = 3.0:Tp 0.62]
ADD [ 0102+ 0103] 0901 3 5.0 189.80 4.33 1.83 14.59 n/a 0.000
ADD [ 0901+ 0501] 0901 1 5.0 235.65 5.73 1.83 14.94 n/a 0.000
CHANNEL[ 2: 0901] 0502 1 5.0 235.65 4.50 2.25 14.93 n/a 0.000
CHIC STORM                10.0
[ Ptot= 54.48 mm ]
** CALIB NASHYD            0104 1 5.0 99.35 4.53 1.58 18.78 0.34 0.000
[CN=77.1
[ N = 3.0:Tp 0.26]
ADD [ 0104+ 0502] 0902 3 5.0 335.00 6.30 2.25 16.07 n/a 0.000
CHANNEL[ 2: 0902] 0503 1 5.0 335.00 6.11 2.33 16.07 n/a 0.000
CHIC STORM                10.0
[ Ptot= 54.48 mm ]
** CALIB NASHYD            0105 1 5.0 56.33 1.83 1.92 20.53 0.38 0.000
[CN=79.5
[ N = 3.0:Tp 0.51]
ADD [ 0105+ 0503] 0903 3 5.0 391.33 7.66 2.25 16.71 n/a 0.000
CHANNEL[ 6: 0000] 1653 3 5.0 0.00 0.00 0.00 0.00 n/a 0.000
CHIC STORM                10.0
[ Ptot= 54.48 mm ]
** CALIB STANDHYD         0106 1 5.0 80.82 10.95 1.42 39.77 0.73 0.000
[IX=35.0:5%= 2.00]
ADD [ 0106+ 0504] 0904 3 5.0 137.15 11.60 1.42 31.87 n/a 0.000
CHANNEL[ 2: 0904] 0505 1 5.0 137.15 10.16 1.50 31.86 n/a 0.000
CHIC STORM                10.0
[ Ptot= 54.48 mm ]
** CALIB NASHYD            0107 1 5.0 61.28 1.90 1.67 15.10 0.28 0.000
[CN=71.2
[ N = 3.0:Tp 0.32]
ADD [ 0107+ 0505] 0905 3 5.0 198.43 11.76 1.50 26.69 n/a 0.000

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V V I SSSSS U U A L (v 6.2.2019)
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

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OOO TTTT TTTT 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 Y M M OOO

```

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***** SUMMARY OUTPUT *****

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

Output filename: C:\Users\nroque\AppData\Local\Civica\WH5\01950ebc-4212-48cb-aff7-545337e793f1\ed5e0f7f-200
 Summary filename: C:\Users\nroque\AppData\Local\Civica\WH5\01950ebc-4212-48cb-aff7-545337e793f1\ed5e0f7f-200

DATE: 05/13/2025 TIME: 01:27:17

USER:

COMMENTS:

 ** SIMULATION : 25yr 12hr 15min SCS Type II (**

```

W/E COMMAND HYD ID DT AREA * Qpeak Tpeak R.V. R.C. Qbase
min ha * cms hrs mm cms
-----
START @ 0.00 hrs
-----
READ STORM 15.0
[ Ptot= 88.80 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\7ae433ff-b078-4e3c-acf3-a9
remark: 25yr 12hr 15min SCS Type II (MTO)
** CALIB NASHYD 0101 1 5.0 45.85 3.73 6.42 38.54 0.43 0.000
[CN=72.7
[ N = 3.0:Tp 0.33]
CHANNEL[ 2: 0101] 0501 1 5.0 45.85 3.30 6.58 38.53 n/a 0.000
READ STORM 15.0
[ Ptot= 88.80 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\7ae433ff-b078-4e3c-acf3-a9
remark: 25yr 12hr 15min SCS Type II (MTO)
** CALIB NASHYD 0102 1 5.0 110.40 7.69 6.50 34.68 0.39 0.000
[CN=69.7
[ N = 3.0:Tp 0.35]
READ STORM 15.0
[ Ptot= 88.80 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\7ae433ff-b078-4e3c-acf3-a9
remark: 25yr 12hr 15min SCS Type II (MTO)
** CALIB NASHYD 0103 1 5.0 79.40 3.89 6.83 36.43 0.41 0.000
[CN=71.1
[ N = 3.0:Tp 0.62]
ADD [ 0102+ 0103] 0901 3 5.0 189.80 10.93 6.50 35.41 n/a 0.000
ADD [ 0901+ 0501] 0901 1 5.0 235.65 14.19 6.58 36.02 n/a 0.000
CHANNEL[ 2: 0901] 0502 1 5.0 235.65 9.11 7.67 36.01 n/a 0.000
READ STORM 15.0
[ Ptot= 88.80 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\7ae433ff-b078-4e3c-acf3-a9
remark: 25yr 12hr 15min SCS Type II (MTO)
** CALIB NASHYD 0104 1 5.0 99.35 10.69 6.33 43.09 0.49 0.000
[CN=77.1
[ N = 3.0:Tp 0.26]
ADD [ 0104+ 0502] 0902 3 5.0 335.00 14.62 6.42 38.11 n/a 0.000
CHANNEL[ 2: 0902] 0503 1 5.0 335.00 14.07 6.58 38.11 n/a 0.000
READ STORM 15.0
[ Ptot= 88.80 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\7ae433ff-b078-4e3c-acf3-a9
remark: 25yr 12hr 15min SCS Type II (MTO)
** CALIB NASHYD 0105 1 5.0 56.33 4.10 6.67 46.12 0.52 0.000
[CN=79.5
[ N = 3.0:Tp 0.51]
ADD [ 0105+ 0503] 0903 3 5.0 391.33 18.13 6.58 39.26 n/a 0.000
CHANNEL[ 6: 0000] 1653 3 5.0 0.00 0.00 0.00 0.00 n/a 0.000
READ STORM 15.0
[ Ptot= 88.80 mm ]

```

fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\7ae433ff-b078-4e3c-acf3-a9
remark: 25yr 12hr 15min SCS Type II (MTO)

CALIB STANDHYD 0106 1 5.0 80.82 15.77 6.33 71.62 0.81 0.000
[I%=35.0:S%= 2.00]
ADD [0106+ 0504] 0904 3 5.0 137.15 18.66 6.33 61.15 n/a 0.000
CHANNEL[2: 0904] 0505 1 5.0 137.15 15.85 6.42 61.14 n/a 0.000

READ STORM 15.0
[Ptot= 88.80 mm]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\7ae433ff-b078-4e3c-acf3-a9
remark: 25yr 12hr 15min SCS Type II (MTO)

** CALIB NASHYD 0107 1 5.0 61.28 4.80 6.42 36.37 0.41 0.000
[CN=71.2
[N = 3.0:Tp 0.32]
ADD [0107+ 0505] 0905 3 5.0 198.43 20.65 6.42 53.49 n/a 0.000

V V I SSSSS U U A L (v 6.2.2019)
V V I SS U U A A L
V V I SS U U A A A A L
V V I SSSSS UUUU A A LLLLL

OOO TTTTT TTTTT H H Y Y M M OOO TM
O O T T H H Y Y M M 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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***** SUMMARY OUTPUT *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\vojn.dat
Output filename: C:\Users\nroque\AppData\Local\Civica\vh5\01950ebc-4212-48cb-aff7-545337e793f1\6989ea53-dca
Summary filename: C:\Users\nroque\AppData\Local\Civica\vh5\01950ebc-4212-48cb-aff7-545337e793f1\6989ea53-dca

DATE: 05/13/2025 TIME: 01:27:15

USER:

COMMENTS:

** SIMULATION : 25yr 24hr 15min SCS Type II (**

W/E COMMAND HYD ID DT AREA Qpeak Tpeak R.V. R.C. Qbase
min ha cms hrs mm mm cms

START @ 0.00 hrs

READ STORM 15.0
[Ptot=108.00 mm]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\8d02a8a2-4a41-4290-bb80-35
remark: 25yr 24hr 15min SCS Type II (MTO)

** CALIB NASHYD 0101 1 5.0 45.85 4.42 12.42 52.77 0.49 0.000
[CN=72.7
[N = 3.0:Tp 0.33]

CHANNEL[2: 0101] 0501 1 5.0 45.85 3.94 12.58 52.77 n/a 0.000

READ STORM 15.0
[Ptot=108.00 mm]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\8d02a8a2-4a41-4290-bb80-35
remark: 25yr 24hr 15min SCS Type II (MTO)

** CALIB NASHYD 0102 1 5.0 110.40 9.21 12.50 48.11 0.45 0.000
[CN=69.7
[N = 3.0:Tp 0.35]

READ STORM 15.0
[Ptot=108.00 mm]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\8d02a8a2-4a41-4290-bb80-35
remark: 25yr 24hr 15min SCS Type II (MTO)

** CALIB NASHYD 0103 1 5.0 79.40 4.58 12.75 50.23 0.47 0.000
[CN=71.1
[N = 3.0:Tp 0.62]

ADD [0102+ 0103] 0901 3 5.0 189.80 13.09 12.50 49.00 n/a 0.000

ADD [0901+ 0501] 0901 1 5.0 235.65 16.91 12.58 49.73 n/a 0.000

CHANNEL[2: 0901] 0502 1 5.0 235.65 10.83 13.00 49.72 n/a 0.000

READ STORM 15.0
[Ptot=108.00 mm]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\8d02a8a2-4a41-4290-bb80-35
remark: 25yr 24hr 15min SCS Type II (MTO)

** CALIB NASHYD 0104 1 5.0 99.35 12.61 12.33 58.37 0.54 0.000
[CN=77.1
[N = 3.0:Tp 0.26]

ADD [0104+ 0502] 0902 3 5.0 335.00 17.69 12.42 52.29 n/a 0.000

CHANNEL[2: 0902] 0503 1 5.0 335.00 17.06 12.92 52.29 n/a 0.000

READ STORM 15.0
[Ptot=108.00 mm]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\8d02a8a2-4a41-4290-bb80-35
remark: 25yr 24hr 15min SCS Type II (MTO)

** CALIB NASHYD 0105 1 5.0 56.33 4.73 12.67 62.00 0.57 0.000
[CN=79.5
[N = 3.0:Tp 0.51]

ADD [0105+ 0503] 0903 3 5.0 391.33 21.31 12.67 53.69 n/a 0.000

CHANNEL[6: 0000] 1653 3 5.0 0.00 0.00 0.00 0.00 n/a 0.000

READ STORM 15.0
[Ptot=108.00 mm]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\8d02a8a2-4a41-4290-bb80-35
remark: 25yr 24hr 15min SCS Type II (MTO)

CALIB STANDHYD 0106 1 5.0 80.82 17.86 12.33 89.96 0.83 0.000
[I%=35.0:S%= 2.00]

ADD [0106+ 0504] 0904 3 5.0 137.15 21.19 12.33 78.47 n/a 0.000

CHANNEL[2: 0904] 0505 1 5.0 137.15 17.66 12.58 78.47 n/a 0.000

READ STORM 15.0
[Ptot=108.00 mm]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\8d02a8a2-4a41-4290-bb80-35
remark: 25yr 24hr 15min SCS Type II (MTO)

** CALIB NASHYD 0107 1 5.0 61.28 5.74 12.42 50.19 0.46 0.000
[CN=71.2
[N = 3.0:Tp 0.32]

ADD [0107+ 0505] 0905 3 5.0 198.43 23.30 12.42 69.74 n/a 0.000

V V I SSSSS U U A L (v 6.2.2019)
V V I SS U U A A L
V V I SS U U A A A A L
V V I SS U U A A L
VV I SSSSS UUUU A A LLLLL

OOO TTTTT TTTTT H H Y Y M M OOO TM
O O T T H H Y Y M M 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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***** SUMMARY OUTPUT *****

Input filename: c:\Program Files (x86)\Visual OTTHYMO 6.2\vo2\voin.dat
 Output filename: c:\Users\nroque\AppData\Local\Civica\XH5\01950ebc-4212-48cb-aff7-545337e793f1\b2358227-c1f
 Summary filename: c:\Users\nroque\AppData\Local\Civica\XH5\01950ebc-4212-48cb-aff7-545337e793f1\b2358227-c1f

DATE: 05/13/2025 TIME: 01:27:16

USER:

COMMENTS:

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

W/E COMMAND	HYD ID	DT min	AREA ha	Qpeak cms	Tpeak hrs	R.V. mm	R.C.	Qbase cms
START @ 0.00 hrs								
CHIC STORM [Ptot= 64.08 mm]								
** CALIB NASHYD [CN=72.7 [N = 3.0:Tp 0.33]	0101	1 5.0	45.85	2.13	1.67	22.03	0.34	0.000
CHANNEL[2: 0101]	0501	1 5.0	45.85	1.93	1.83	22.03	n/a	0.000
CHIC STORM [Ptot= 64.08 mm]								
** CALIB NASHYD [CN=69.7 [N = 3.0:Tp 0.35]	0102	1 5.0	110.40	4.19	1.67	19.34	0.30	0.000
CHIC STORM [Ptot= 64.08 mm]								
** CALIB NASHYD [CN=71.1 [N = 3.0:Tp 0.62]	0103	1 5.0	79.40	2.23	2.08	20.55	0.32	0.000
ADD [0102+ 0103]	0901	3 5.0	189.80	6.03	1.83	19.85	n/a	0.000
ADD [0901+ 0501]	0901	1 5.0	235.65	7.97	1.83	20.27	n/a	0.000
CHANNEL[2: 0901]	0502	1 5.0	235.65	7.83	2.58	20.26	n/a	0.000
CHIC STORM [Ptot= 64.08 mm]								
** CALIB NASHYD [CN=77.1 [N = 3.0:Tp 0.26]	0104	1 5.0	99.35	6.22	1.58	25.06	0.39	0.000
ADD [0104+ 0502]	0902	3 5.0	335.00	9.50	2.58	21.69	n/a	0.000
CHANNEL[2: 0902]	0503	1 5.0	335.00	8.71	2.67	21.69	n/a	0.000
CHIC STORM [Ptot= 64.08 mm]								
** CALIB NASHYD [CN=79.5 [N = 3.0:Tp 0.51]	0105	1 5.0	56.33	2.47	1.92	27.20	0.42	0.000
ADD [0105+ 0503]	0903	3 5.0	391.33	10.19	2.67	22.48	n/a	0.000
CHANNEL[6: 0000]	1653	3 5.0	0.00	0.00	0.00	0.00	n/a	0.000
CHIC STORM [Ptot= 64.08 mm]								
* CALIB STANDHYD [IX=35.0:5%= 2.00]	0106	1 5.0	80.82	12.84	1.33	48.50	0.76	0.000
ADD [0106+ 0504]	0904	3 5.0	137.15	13.29	1.33	39.75	n/a	0.000
CHANNEL[2: 0904]	0505	1 5.0	137.15	13.34	1.58	39.75	n/a	0.000

CHIC STORM 10.0

[Ptot= 64.08 mm]
 ** CALIB NASHYD 0107 1 5.0 61.28 2.65 1.67 20.48 0.32 0.000
 [CN=71.2
 [N = 3.0:Tp 0.32]
 **
 ADD [0107+ 0505] 0905 3 5.0 198.43 15.92 1.58 33.80 n/a 0.000

V V I SSSS U U A L (v 6.2.2019)
 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
 V V I SSSS UUUU A A LLLLL

OOO TTTT TTTT H H Y Y M M OOO TM
 O O T T H H Y Y M M O O
 O O T T H H Y Y M M O O
 OOO T T H H Y Y M M OOO

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***** SUMMARY OUTPUT *****

Input filename: c:\Program Files (x86)\Visual OTTHYMO 6.2\vo2\voin.dat
 Output filename: c:\Users\nroque\AppData\Local\Civica\XH5\01950ebc-4212-48cb-aff7-545337e793f1\76ec95c-15a
 Summary filename: c:\Users\nroque\AppData\Local\Civica\XH5\01950ebc-4212-48cb-aff7-545337e793f1\76ec95c-15a

DATE: 05/13/2025 TIME: 01:27:17

USER:

COMMENTS:

 ** SIMULATION : 50yr 12hr 15min SCS Type II (**

W/E COMMAND	HYD ID	DT min	AREA ha	Qpeak cms	Tpeak hrs	R.V. mm	R.C.	Qbase cms
START @ 0.00 hrs								
READ STORM [Ptot= 98.40 mm]								
fname : c:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\1483257c-0b35-4354-ac9a-9f remark: 50yr 12hr 15min SCS Type II (MTO)								
** CALIB NASHYD [CN=72.7 [N = 3.0:Tp 0.33]	0101	1 5.0	45.85	4.42	6.42	45.53	0.46	0.000
CHANNEL[2: 0101]	0501	1 5.0	45.85	3.97	6.58	45.52	n/a	0.000
READ STORM [Ptot= 98.40 mm]								
fname : c:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\1483257c-0b35-4354-ac9a-9f remark: 50yr 12hr 15min SCS Type II (MTO)								
** CALIB NASHYD [CN=69.7 [N = 3.0:Tp 0.35]	0102	1 5.0	110.40	9.18	6.50	41.26	0.42	0.000
READ STORM [Ptot= 98.40 mm]								
fname : c:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\1483257c-0b35-4354-ac9a-9f remark: 50yr 12hr 15min SCS Type II (MTO)								
** CALIB NASHYD [CN=71.1 [N = 3.0:Tp 0.62]	0103	1 5.0	79.40	4.63	6.83	43.20	0.44	0.000
ADD [0102+ 0103]	0901	3 5.0	189.80	13.07	6.50	42.07	n/a	0.000
ADD [0901+ 0501]	0901	1 5.0	235.65	16.95	6.58	42.74	n/a	0.000

```

CHANNEL[ 2: 0901] 0502 1 5.0 235.65 10.93 7.08 42.73 n/a 0.000
READ STORM 15.0
[ Ptot= 98.40 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\1483257c-0b35-4354-ac9a-9f
remark: 50yr 12hr 15min SCS Type II (MTO)
** CALIB NASHYD 0104 1 5.0 99.35 12.61 6.33 50.62 0.51 0.000
[CN=77.1 ]
[ N = 3.0:Tp 0.26]
ADD [ 0104+ 0502] 0902 3 5.0 335.00 17.62 6.50 45.07 n/a 0.000
CHANNEL[ 2: 0902] 0503 1 5.0 335.00 16.69 7.00 45.07 n/a 0.000
READ STORM 15.0
[ Ptot= 98.40 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\1483257c-0b35-4354-ac9a-9f
remark: 50yr 12hr 15min SCS Type II (MTO)
** CALIB NASHYD 0105 1 5.0 56.33 4.81 6.67 53.96 0.55 0.000
[CN=79.5 ]
[ N = 3.0:Tp 0.51]
ADD [ 0105+ 0503] 0903 3 5.0 391.33 21.43 6.67 46.35 n/a 0.000
CHANNEL[ 6: 0000] 1653 3 5.0 0.00 0.00 0.00 0.00 n/a 0.000
READ STORM 15.0
[ Ptot= 98.40 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\1483257c-0b35-4354-ac9a-9f
remark: 50yr 12hr 15min SCS Type II (MTO)
** CALIB STANDHYD 0106 1 5.0 80.82 17.97 6.33 80.75 0.82 0.000
[I%=35.0:S%= 2.00]
ADD [ 0106+ 0504] 0904 3 5.0 137.15 21.39 6.33 69.75 n/a 0.000
CHANNEL[ 2: 0904] 0505 1 5.0 137.15 18.40 6.42 69.75 n/a 0.000
READ STORM 15.0
[ Ptot= 98.40 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\1483257c-0b35-4354-ac9a-9f
remark: 50yr 12hr 15min SCS Type II (MTO)
** CALIB NASHYD 0107 1 5.0 61.28 5.72 6.42 43.15 0.44 0.000
[CN=71.2 ]
[ N = 3.0:Tp 0.32]
ADD [ 0107+ 0505] 0905 3 5.0 198.43 24.13 6.42 61.53 n/a 0.000

```

```

V V I SSSS U U A L (v 6.2.2019)
V V I SS U U A A L
V V I SS U U A A A L
V V I SS U U A A L
VV I SSSS UUUU A A LLLL

OOO TTTT TTTT H H Y Y M M OOO TM
O O T T H H Y Y M M O O
O O T T H H Y Y M M O O
OOO T T H H Y Y M M OOO

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```

***** S U M M A R Y O U T P U T *****

```

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\Vo2\voin.dat
Output filename: C:\Users\nroque\AppData\Local\Civica\VH5\01950ebc-4212-48cb-aff7-545337e793f1\eb1e8e47-62e
Summary filename: C:\Users\nroque\AppData\Local\Civica\VH5\01950ebc-4212-48cb-aff7-545337e793f1\eb1e8e47-62e

DATE: 05/13/2025 TIME: 01:27:17
USER:
COMMENTS:

```

***** SIMULATION : 50yr 24hr 15min SCS Type II (**

```

W/E COMMAND HYD ID DT AREA Qpeak Tpeak R.V. R.C. Qbase
min ha cms hrs mm cms

START @ 0.00 hrs
READ STORM 15.0
[ Ptot=120.00 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\2caeda3d-b9eb-4778-8760-68
remark: 50yr 24hr 15min SCS Type II (MTO)
** CALIB NASHYD 0101 1 5.0 45.85 5.22 12.42 62.13 0.52 0.000
[CN=72.7 ]
[ N = 3.0:Tp 0.33]
CHANNEL[ 2: 0101] 0501 1 5.0 45.85 4.74 12.58 62.13 n/a 0.000
READ STORM 15.0
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\2caeda3d-b9eb-4778-8760-68
remark: 50yr 24hr 15min SCS Type II (MTO)
** CALIB NASHYD 0102 1 5.0 110.40 10.96 12.50 57.01 0.48 0.000
[CN=69.7 ]
[ N = 3.0:Tp 0.35]
READ STORM 15.0
[ Ptot=120.00 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\2caeda3d-b9eb-4778-8760-68
remark: 50yr 24hr 15min SCS Type II (MTO)
** CALIB NASHYD 0103 1 5.0 79.40 5.44 12.75 59.35 0.49 0.000
[CN=71.1 ]
[ N = 3.0:Tp 0.62]
ADD [ 0102+ 0103] 0901 3 5.0 189.80 15.58 12.50 57.99 n/a 0.000
ADD [ 0901+ 0501] 0901 1 5.0 235.65 20.19 12.50 58.79 n/a 0.000
CHANNEL[ 2: 0901] 0502 1 5.0 235.65 13.17 13.00 58.78 n/a 0.000
READ STORM 15.0
[ Ptot=120.00 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\2caeda3d-b9eb-4778-8760-68
remark: 50yr 24hr 15min SCS Type II (MTO)
** CALIB NASHYD 0104 1 5.0 99.35 14.80 12.33 68.33 0.57 0.000
[CN=77.1 ]
[ N = 3.0:Tp 0.26]
ADD [ 0104+ 0502] 0902 3 5.0 335.00 21.18 12.50 61.61 n/a 0.000
CHANNEL[ 2: 0902] 0503 1 5.0 335.00 19.69 12.67 61.61 n/a 0.000
READ STORM 15.0
[ Ptot=120.00 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\2caeda3d-b9eb-4778-8760-68
remark: 50yr 24hr 15min SCS Type II (MTO)
** CALIB NASHYD 0105 1 5.0 56.33 5.52 12.67 72.29 0.60 0.000
[CN=79.5 ]
[ N = 3.0:Tp 0.51]
ADD [ 0105+ 0503] 0903 3 5.0 391.33 25.21 12.67 63.15 n/a 0.000
CHANNEL[ 6: 0000] 1653 3 5.0 0.00 0.00 0.00 0.00 n/a 0.000
READ STORM 15.0
[ Ptot=120.00 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\2caeda3d-b9eb-4778-8760-68
remark: 50yr 24hr 15min SCS Type II (MTO)
** CALIB STANDHYD 0106 1 5.0 80.82 20.84 12.25 101.53 0.85 0.000
[I%=35.0:S%= 2.00]
ADD [ 0106+ 0504] 0904 3 5.0 137.15 23.72 12.25 89.52 n/a 0.000
CHANNEL[ 2: 0904] 0505 1 5.0 137.15 19.71 12.42 89.52 n/a 0.000

```

READ STORM 15.0
 [Ptot=120.00 mm]
 rname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\2caeda3d-b9eb-4778-8760-68
 remark: 50yr 24hr 15min SCS Type II (MTO)

** CALIB NASHYD 0107 1 5.0 61.28 6.82 12.42 59.31 0.49 0.000
 [CN=71.2]
 [N = 3.0:Tp 0.32]
 ** ADD [0107+ 0505] 0905 3 5.0 198.43 26.53 12.42 80.19 n/a 0.000

```
V V I SSSSS U U A L (v 6.2.2019)
V V I SS U U A A L
V V I SS U U A A A A L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL
```

```
OOO TTTT TTTT 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 Y M M O O
OOO T T H H Y Y M M OOO
```

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***** SUMMARY OUTPUT *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\vo2\voin.dat
 Output filename: C:\Users\nroque\AppData\Local\Civica\vh5\01950ebc-4212-48cb-aff7-545337e793f1\8a7d6a62-e0b
 Summary filename: C:\Users\nroque\AppData\Local\Civica\vh5\01950ebc-4212-48cb-aff7-545337e793f1\8a7d6a62-e0b

DATE: 05/13/2025 TIME: 01:27:16

USER:

COMMENTS:

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

W/E COMMAND	HYD ID	DT min	AREA ha	Qpeak cms	Tpeak hrs	R.V. mm	R.C.	Qbase cms
START @ 0.00 hrs								
CHIC STORM [Ptot= 71.05 mm]		10.0						
** CALIB NASHYD [CN=72.7] [N = 3.0:Tp 0.33]	0101	1 5.0	45.85	2.59	1.67	26.44	0.37	0.000
CHANNEL [2: 0101]	0501	1 5.0	45.85	2.37	1.83	26.43	n/a	0.000
CHIC STORM [Ptot= 71.05 mm]		10.0						
** CALIB NASHYD [CN=69.7] [N = 3.0:Tp 0.35]	0102	1 5.0	110.40	5.16	1.67	23.40	0.33	0.000
CHIC STORM [Ptot= 71.05 mm]		10.0						
** CALIB NASHYD [CN=71.1] [N = 3.0:Tp 0.62]	0103	1 5.0	79.40	2.72	2.08	24.77	0.35	0.000
ADD [0102+ 0103]	0901	3 5.0	189.80	7.39	1.75	23.97	n/a	0.000
ADD [0901+ 0501]	0901	1 5.0	235.65	9.75	1.83	24.45	n/a	0.000
CHANNEL [2: 0901]	0502	1 5.0	235.65	8.64	2.83	24.44	n/a	0.000
CHIC STORM		10.0						

[Ptot= 71.05 mm]

** CALIB NASHYD 0104 1 5.0 99.35 7.54 1.58 29.91 0.42 0.000
 [CN=77.1]
 [N = 3.0:Tp 0.26]

ADD [0104+ 0502] 0902 3 5.0 335.00 10.27 2.83 26.06 n/a 0.000

CHANNEL [2: 0902] 0503 1 5.0 335.00 9.59 2.92 26.06 n/a 0.000

CHIC STORM
[Ptot= 71.05 mm] 10.0

** CALIB NASHYD 0105 1 5.0 56.33 2.98 1.92 32.32 0.45 0.000
 [CN=79.5]
 [N = 3.0:Tp 0.51]

ADD [0105+ 0503] 0903 3 5.0 391.33 11.87 1.92 26.96 n/a 0.000

CHANNEL [6: 0000] 1653 3 5.0 0.00 0.00 0.00 0.00 n/a 0.000

CHIC STORM
[Ptot= 71.05 mm] 10.0

** CALIB STANDHYD [I%=35.0:S%= 2.00] 0106 1 5.0 80.82 14.76 1.33 54.95 0.77 0.000

ADD [0106+ 0504] 0904 3 5.0 137.15 15.34 1.33 45.65 n/a 0.000

CHANNEL [2: 0904] 0505 1 5.0 137.15 15.63 1.58 45.65 n/a 0.000

CHIC STORM
[Ptot= 71.05 mm] 10.0

** CALIB NASHYD 0107 1 5.0 61.28 3.25 1.67 24.70 0.35 0.000
 [CN=71.2]
 [N = 3.0:Tp 0.32]

ADD [0107+ 0505] 0905 3 5.0 198.43 18.80 1.58 39.18 n/a 0.000

```
V V I SSSSS U U A L (v 6.2.2019)
V V I SS U U A A L
V V I SS U U A A A A L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL
```

```
OOO TTTT TTTT 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 Y M M O O
OOO T T H H Y Y M M OOO
```

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***** SUMMARY OUTPUT *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\vo2\voin.dat
 Output filename: C:\Users\nroque\AppData\Local\Civica\vh5\01950ebc-4212-48cb-aff7-545337e793f1\15d058e9-256
 Summary filename: C:\Users\nroque\AppData\Local\Civica\vh5\01950ebc-4212-48cb-aff7-545337e793f1\15d058e9-256

DATE: 05/13/2025 TIME: 01:27:15

USER:

COMMENTS:

 ** SIMULATION : 5yr 12hr 15min SCS Type II (M) **

W/E COMMAND	HYD ID	DT min	AREA ha	Qpeak cms	Tpeak hrs	R.V. mm	R.C.	Qbase cms
START @ 0.00 hrs								
READ STORM		15.0						

```

[ Ptot= 64.80 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\f02bde9b-6b16-470b-a562-ee
remark: 5yr 12hr 15min SCS Type II (MTO)
** CALIB NASHYD      0101  1  5.0  45.85  2.13  6.42  22.48  0.35  0.000
[CN=72.7
[ N = 3.0:Tp 0.33]
CHANNEL[ 2: 0101]  0501  1  5.0  45.85  1.93  6.58  22.48  n/a  0.000
READ STORM          15.0
[ Ptot= 64.80 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\f02bde9b-6b16-470b-a562-ee
remark: 5yr 12hr 15min SCS Type II (MTO)
** CALIB NASHYD      0102  1  5.0  110.40  4.30  6.50  19.75  0.30  0.000
[CN=69.7
[ N = 3.0:Tp 0.35]
READ STORM          15.0
[ Ptot= 64.80 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\f02bde9b-6b16-470b-a562-ee
remark: 5yr 12hr 15min SCS Type II (MTO)
** CALIB NASHYD      0103  1  5.0  79.40  2.20  6.83  20.97  0.32  0.000
[CN=71.1
[ N = 3.0:Tp 0.62]
ADD [ 0102+ 0103]  0901  3  5.0  189.80  6.11  6.58  20.26  n/a  0.000
ADD [ 0901+ 0501]  0901  1  5.0  235.65  8.04  6.58  20.69  n/a  0.000
CHANNEL[ 2: 0901]  0502  1  5.0  235.65  6.13  7.25  20.69  n/a  0.000
READ STORM          15.0
[ Ptot= 64.80 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\f02bde9b-6b16-470b-a562-ee
remark: 5yr 12hr 15min SCS Type II (MTO)
** CALIB NASHYD      0104  1  5.0  99.35  6.24  6.33  25.55  0.39  0.000
[CN=77.1
[ N = 3.0:Tp 0.26]
ADD [ 0104+ 0502]  0902  3  5.0  335.00  8.47  6.50  22.13  n/a  0.000
CHANNEL[ 2: 0902]  0503  1  5.0  335.00  8.03  6.67  22.13  n/a  0.000
READ STORM          15.0
[ Ptot= 64.80 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\f02bde9b-6b16-470b-a562-ee
remark: 5yr 12hr 15min SCS Type II (MTO)
** CALIB NASHYD      0105  1  5.0  56.33  2.43  6.67  27.72  0.43  0.000
[CN=79.5
[ N = 3.0:Tp 0.51]
ADD [ 0105+ 0503]  0903  3  5.0  391.33  10.46  6.67  22.93  n/a  0.000
CHANNEL[ 6: 0000]  1653  3  5.0  0.00  0.00  0.00  0.00  n/a  0.000
READ STORM          15.0
[ Ptot= 64.80 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\f02bde9b-6b16-470b-a562-ee
remark: 5yr 12hr 15min SCS Type II (MTO)
** CALIB STANDHYD    0106  1  5.0  80.82  9.82  6.33  49.16  0.76  0.000
[I%=35.0:S%= 2.00]
ADD [ 0106+ 0504]  0904  3  5.0  137.15  11.47  6.33  40.36  n/a  0.000
CHANNEL[ 2: 0904]  0505  1  5.0  137.15  10.56  6.42  40.35  n/a  0.000
READ STORM          15.0
[ Ptot= 64.80 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\f02bde9b-6b16-470b-a562-ee
remark: 5yr 12hr 15min SCS Type II (MTO)
** CALIB NASHYD      0107  1  5.0  61.28  2.71  6.42  20.91  0.32  0.000
[CN=71.2
[ N = 3.0:Tp 0.32]
ADD [ 0107+ 0505]  0905  3  5.0  198.43  13.27  6.42  34.35  n/a  0.000

```

```

V V I SSSS U U A L (v 6.2.2019)
V V I SS U U A A L
V V I SS U U A A A L
V V I SS U U A A L
VV I SSSS UUUU A A LLLLL

000 TTTT TTTT H H Y Y M M 000 TM
O O T T H H Y Y MM MM O O
O O T T H H Y Y M M O O
000 T T H H Y Y M M 000
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```

***** SUMMARY OUTPUT *****

```

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\nroque\AppData\Local\Civica\VH5\01950ebc-4212-48cb-aff7-545337e793f1\af1c37f7-b36
Summary filename: C:\Users\nroque\AppData\Local\Civica\VH5\01950ebc-4212-48cb-aff7-545337e793f1\af1c37f7-b36

```

DATE: 05/13/2025 TIME: 01:27:16

USER:

COMMENTS: _____

```

*****
** SIMULATION : 5yr 24hr 15min SCS Type II (M **
*****
W/E COMMAND          HYD ID  DT   AREA  Qpeak  Tpeak  R.V.  R.C.  Qbase
                   min    ha    cms   hrs   mm      cm/s
START @ 0.00 hrs
-----
READ STORM          15.0
[ Ptot= 79.20 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\f90d6c90-8931-477c-af4c-6a
remark: 5yr 24hr 15min SCS Type II (MTO)
** CALIB NASHYD      0101  1  5.0  45.85  2.62  12.42  31.84  0.40  0.000
[CN=72.7
[ N = 3.0:Tp 0.33]
CHANNEL[ 2: 0101]  0501  1  5.0  45.85  2.37  12.58  31.84  n/a  0.000
READ STORM          15.0
[ Ptot= 79.20 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\f90d6c90-8931-477c-af4c-6a
remark: 5yr 24hr 15min SCS Type II (MTO)
** CALIB NASHYD      0102  1  5.0  110.40  5.36  12.50  28.42  0.36  0.000
[CN=69.7
[ N = 3.0:Tp 0.35]
READ STORM          15.0
[ Ptot= 79.20 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\f90d6c90-8931-477c-af4c-6a
remark: 5yr 24hr 15min SCS Type II (MTO)
** CALIB NASHYD      0103  1  5.0  79.40  2.69  12.83  29.97  0.38  0.000
[CN=71.1
[ N = 3.0:Tp 0.62]
ADD [ 0102+ 0103]  0901  3  5.0  189.80  7.60  12.50  29.07  n/a  0.000
ADD [ 0901+ 0501]  0901  1  5.0  235.65  9.94  12.58  29.61  n/a  0.000
CHANNEL[ 2: 0901]  0502  1  5.0  235.65  7.55  13.33  29.60  n/a  0.000
READ STORM          15.0
[ Ptot= 79.20 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\f90d6c90-8931-477c-af4c-6a
remark: 5yr 24hr 15min SCS Type II (MTO)
** CALIB NASHYD      0104  1  5.0  99.35  7.63  12.33  35.82  0.45  0.000
[CN=77.1

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```

[ N = 3.0:Tp 0.26]
ADD [ 0104+ 0502] 0902 3 5.0 335.00 10.42 12.42 31.45 n/a 0.000
CHANNEL[ 2: 0902] 0503 1 5.0 335.00 9.90 12.58 31.44 n/a 0.000
READ STORM 15.0
[ Ptot= 79.20 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\f90d6c90-8931-477c-af4c-6a
remark: 5yr 24hr 15min SCS Type II (MTO)
** CALIB NASHYD 0105 1 5.0 56.33 2.91 12.67 38.53 0.49 0.000
[CN=79.5]
[ N = 3.0:Tp 0.51]
ADD [ 0105+ 0503] 0903 3 5.0 391.33 12.77 12.58 32.46 n/a 0.000
CHANNEL[ 6: 0000] 1653 3 5.0 0.00 0.00 0.00 0.00 n/a 0.000
READ STORM 15.0
[ Ptot= 79.20 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\f90d6c90-8931-477c-af4c-6a
remark: 5yr 24hr 15min SCS Type II (MTO)
CALIB STANDHYD 0106 1 5.0 80.82 11.18 12.33 62.56 0.79 0.000
[I%=35.0:S%= 2.00]
ADD [ 0106+ 0504] 0904 3 5.0 137.15 13.18 12.33 52.69 n/a 0.000
CHANNEL[ 2: 0904] 0505 1 5.0 137.15 12.23 12.42 52.69 n/a 0.000
READ STORM 15.0
[ Ptot= 79.20 mm ]
fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\f90d6c90-8931-477c-af4c-6a
remark: 5yr 24hr 15min SCS Type II (MTO)
** CALIB NASHYD 0107 1 5.0 61.28 3.36 12.42 29.91 0.38 0.000
[CN=71.2]
[ N = 3.0:Tp 0.32]
ADD [ 0107+ 0505] 0905 3 5.0 198.43 15.59 12.42 45.65 n/a 0.000

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V V I SSSSS U U A L (v 6.2.2019)
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

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000 TTTT TTTT H H Y Y M M 000 TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
000 T T H H Y M M 000

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***** SUMMARY OUTPUT *****

```

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\vo2\vo1n.dat
Output filename: C:\Users\nroque\AppData\Local\Civica\VH5\01950ebc-4212-48cb-aff7-545337e793f1\23ff302f-f60
summary filename: C:\Users\nroque\AppData\Local\Civica\VH5\01950ebc-4212-48cb-aff7-545337e793f1\23ff302f-f60

```

DATE: 05/13/2025 TIME: 01:27:15
 USER:

COMMENTS: _____

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

W/E COMMAND	HYD ID	DT	AREA	Qpeak	Tpeak	R.V.	R.C.	Qbase
		min	ha	cms	hrs	mm	mm	cms
START @	0.00	hrs						

```

-----
CHIC STORM 10.0
[ Ptot= 46.91 mm ]
** CALIB NASHYD 0101 1 5.0 45.85 1.13 1.67 12.33 0.26 0.000
[CN=72.7]
[ N = 3.0:Tp 0.33]
CHANNEL[ 2: 0101] 0501 1 5.0 45.85 1.01 1.83 12.32 n/a 0.000
CHIC STORM 10.0
[ Ptot= 46.91 mm ]
** CALIB NASHYD 0102 1 5.0 110.40 2.16 1.75 10.51 0.22 0.000
[CN=69.7]
[ N = 3.0:Tp 0.35]
CHIC STORM 10.0
[ Ptot= 46.91 mm ]
** CALIB NASHYD 0103 1 5.0 79.40 1.18 2.17 11.31 0.24 0.000
[CN=71.1]
[ N = 3.0:Tp 0.62]
ADD [ 0102+ 0103] 0901 3 5.0 189.80 3.14 1.83 10.84 n/a 0.000
ADD [ 0901+ 0501] 0901 1 5.0 235.65 4.15 1.83 11.13 n/a 0.000
CHANNEL[ 2: 0901] 0502 1 5.0 235.65 2.86 2.33 11.12 n/a 0.000
CHIC STORM 10.0
[ Ptot= 46.91 mm ]
** CALIB NASHYD 0104 1 5.0 99.35 3.33 1.58 14.22 0.30 0.000
[CN=77.1]
[ N = 3.0:Tp 0.26]
ADD [ 0104+ 0502] 0902 3 5.0 335.00 4.48 1.83 12.04 n/a 0.000
CHANNEL[ 2: 0902] 0503 1 5.0 335.00 4.36 2.08 12.04 n/a 0.000
CHIC STORM 10.0
[ Ptot= 46.91 mm ]
** CALIB NASHYD 0105 1 5.0 56.33 1.36 1.92 15.64 0.33 0.000
[CN=79.5]
[ N = 3.0:Tp 0.51]
ADD [ 0105+ 0503] 0903 3 5.0 391.33 5.68 2.08 12.56 n/a 0.000
CHANNEL[ 6: 0000] 1653 3 5.0 0.00 0.00 0.00 0.00 n/a 0.000
CHIC STORM 10.0
[ Ptot= 46.91 mm ]
CALIB STANDHYD 0106 1 5.0 80.82 7.94 1.42 33.02 0.70 0.000
[I%=35.0:S%= 2.00]
ADD [ 0106+ 0504] 0904 3 5.0 137.15 8.40 1.42 25.89 n/a 0.000
CHANNEL[ 2: 0904] 0505 1 5.0 137.15 7.58 1.58 25.88 n/a 0.000
CHIC STORM 10.0
[ Ptot= 46.91 mm ]
CALIB NASHYD 0107 1 5.0 61.28 1.37 1.67 11.25 0.24 0.000
[CN=71.2]
[ N = 3.0:Tp 0.32]
ADD [ 0107+ 0505] 0905 3 5.0 198.43 8.89 1.58 21.36 n/a 0.000

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V V I SSSSS U U A L (v 6.2.2019)
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

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000 TTTT TTTT H H Y Y M M 000 TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
000 T T H H Y M M 000

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***** SUMMARY OUTPUT *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voind.dat
 Output filename: C:\Users\nroque\AppData\Local\Civica\XH5\01950ebc-4212-48cb-aff7-545337e793f1\d118aeb-212
 Summary filename: C:\Users\nroque\AppData\Local\Civica\XH5\01950ebc-4212-48cb-aff7-545337e793f1\d118aeb-212

DATE: 05/13/2025 TIME: 01:27:18

USER:

COMMENTS: _____

 ** SIMULATION : REGIONAL DESIGN STORM - HAZEL **

W/E COMMAND	HYD ID	DT	AREA	Qpeak	Tpeak	R.V.	R.C.	Qbase	
		min	ha	cms	hrs	mm		cms	
START @ 0.00 hrs									
READ STORM 12.0 [Ptot=212.00 mm] fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\1ee91574-8aaa-4995-8443-cc remark: REGIONAL DESIGN STORM - HAZEL*									
** CALIB NASHYD	0101	1	5.0	45.85	5.39	10.08	140.86	0.66	0.000
[CN=72.7] [N = 3.0:Tp 0.33]									
CHANNEL[2: 0101]	0501	1	5.0	45.85	5.31	10.17	140.85	n/a	0.000
READ STORM 12.0 [Ptot=212.00 mm] fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\1ee91574-8aaa-4995-8443-cc remark: REGIONAL DESIGN STORM - HAZEL*									
** CALIB NASHYD	0102	1	5.0	110.40	12.34	10.08	133.05	0.63	0.000
[CN=69.7] [N = 3.0:Tp 0.35]									
READ STORM 12.0 [Ptot=212.00 mm] fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\1ee91574-8aaa-4995-8443-cc remark: REGIONAL DESIGN STORM - HAZEL*									
** CALIB NASHYD	0103	1	5.0	79.40	7.90	10.50	136.68	0.64	0.000
[CN=71.1] [N = 3.0:Tp 0.62]									
ADD [0102+ 0103]	0901	3	5.0	189.80	19.69	10.17	134.57	n/a	0.000
ADD [0901+ 0501]	0901	1	5.0	235.65	25.00	10.17	135.79	n/a	0.000
CHANNEL[2: 0901]	0502	1	5.0	235.65	22.18	11.00	135.78	n/a	0.000
READ STORM 12.0 [Ptot=212.00 mm] fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\1ee91574-8aaa-4995-8443-cc remark: REGIONAL DESIGN STORM - HAZEL*									
** CALIB NASHYD	0104	1	5.0	99.35	12.62	10.00	150.43	0.71	0.000
[CN=77.1] [N = 3.0:Tp 0.26]									
ADD [0104+ 0502]	0902	3	5.0	335.00	31.79	10.92	140.13	n/a	0.000
CHANNEL[2: 0902]	0503	1	5.0	335.00	31.76	11.00	140.13	n/a	0.000
READ STORM 12.0 [Ptot=212.00 mm] fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\1ee91574-8aaa-4995-8443-cc remark: REGIONAL DESIGN STORM - HAZEL*									
** CALIB NASHYD	0105	1	5.0	56.33	6.49	10.25	156.17	0.74	0.000

[CN=79.5] [N = 3.0:Tp 0.51]									
ADD [0105+ 0503]	0903	3	5.0	391.33	37.70	10.75	142.44	n/a	0.000
CHANNEL[6: 0000]	1653	3	5.0	0.00	0.00	0.00	0.00	n/a	0.000
READ STORM 12.0 [Ptot=212.00 mm] fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\1ee91574-8aaa-4995-8443-cc remark: REGIONAL DESIGN STORM - HAZEL*									
CALIB STANDHYD	0106	1	5.0	80.82	11.17	10.00	191.64	0.90	0.000
[I%=35.0:S%= 2.00]									
ADD [0106+ 0504]	0904	3	5.0	137.15	17.29	10.08	177.07	n/a	0.000
CHANNEL[2: 0904]	0505	1	5.0	137.15	17.01	10.17	177.07	n/a	0.000
READ STORM 12.0 [Ptot=212.00 mm] fname : C:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\1ee91574-8aaa-4995-8443-cc remark: REGIONAL DESIGN STORM - HAZEL*									
** CALIB NASHYD	0107	1	5.0	61.28	7.09	10.08	136.68	0.64	0.000
[CN=71.2] [N = 3.0:Tp 0.32]									
ADD [0107+ 0505]	0905	3	5.0	198.43	23.99	10.17	164.60	n/a	0.000
FINISH									

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V V I SSSSS U U A L (v 6.2.2019)
V V I SS U U A A L
V V I SS U U A A A A L
V V I SS U U A A L
VV I SSSSS UUUU A A LLLL

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000 TTTT TTTT H H Y Y M M 000 TM
O O T T H H Y Y M M O O
O O T T H H Y Y M M O O

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***** DETAILED OUTPUT *****

Input filename: c:\Program Files (x86)\visual OTTHYMO 6.2\VO2\voind.dat
 Output filename: c:\Users\nroque\AppData\Local\Civica\vh5\01950ebc-4212-48cb-aff7-545337e793f1\d118aaeb-212
 Summary filename: c:\Users\nroque\AppData\Local\Civica\vh5\01950ebc-4212-48cb-aff7-545337e793f1\d118aaeb-212

DATE: 05/13/2025 TIME: 01:27:18

USER:

COMMENTS: _____

 ** SIMULATION : REGIONAL DESIGN STORM - HAZEL **

READ STORM
 Filename: c:\Users\nroque\AppData\Local\Temp\ef3756df-fb08-478c-82b1-1928bd59ed5c\1ee91574
 Comments: REGIONAL DESIGN STORM - HAZEL*

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	6.00	3.00	13.00	6.00	23.00	9.00	53.00
0.20	6.00	3.20	13.00	6.20	23.00	9.20	53.00
0.40	6.00	3.40	13.00	6.40	23.00	9.40	53.00
0.60	6.00	3.60	13.00	6.60	23.00	9.60	53.00
0.80	6.00	3.80	13.00	6.80	23.00	9.80	53.00
1.00	4.00	4.00	17.00	7.00	13.00	10.00	38.00
1.20	4.00	4.20	17.00	7.20	13.00	10.20	38.00
1.40	4.00	4.40	17.00	7.40	13.00	10.40	38.00
1.60	4.00	4.60	17.00	7.60	13.00	10.60	38.00
1.80	4.00	4.80	17.00	7.80	13.00	10.80	38.00
2.00	6.00	5.00	13.00	8.00	13.00	11.00	13.00
2.20	6.00	5.20	13.00	8.20	13.00	11.20	13.00
2.40	6.00	5.40	13.00	8.40	13.00	11.40	13.00
2.60	6.00	5.60	13.00	8.60	13.00	11.60	13.00
2.80	6.00	5.80	13.00	8.80	13.00	11.80	13.00

CALIB NASHYD (0101) ID= 1 DT= 5.0 min
 Area (ha)= 45.85 Curve Number (CN)= 72.7
 Ia (mm)= 5.90 # of Linear Res.(N)= 3.00
 U.H. tp(hrs)= 0.33

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	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00

0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 5.307

PEAK FLOW (cms)= 5.391 (i)
 TIME TO PEAK (hrs)= 10.083
 RUNOFF VOLUME (mm)= 140.858
 TOTAL RAINFALL (mm)= 212.000
 RUNOFF COEFFICIENT = 0.664

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

ROUTE CHN(0501)
 IN= 2--> OUT= 1 Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

Distance	Elevation	Manning
0.00	526.62	0.0350
1.00	526.59	0.0350
2.00	526.59	0.0350
3.00	526.59	0.0350
4.00	526.51	0.0350
5.00	526.69	0.0350 / 0.0300
6.00	526.50	0.0300
7.00	526.33	0.0300
8.00	526.17	0.0300
9.00	526.12	0.0300
10.00	525.79	0.0300
11.00	525.16	0.0300
12.00	525.24	0.0300
13.00	525.69	0.0300
14.00	526.05	0.0300
15.00	526.12	0.0300 / 0.0350
16.00	526.07	0.0350
17.00	526.19	0.0350
18.00	526.37	0.0350

----- TRAVEL TIME TABLE ----->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.08	525.24	.265E+02	0.0	0.22	45.42
0.16	525.32	.867E+02	0.1	0.40	24.55
0.24	525.40	.161E+03	0.1	0.53	18.64
0.32	525.48	.250E+03	0.3	0.63	15.59
0.40	525.56	.353E+03	0.4	0.72	13.66
0.48	525.64	.471E+03	0.6	0.80	12.28
0.56	525.72	.603E+03	0.9	0.87	11.26
0.64	525.80	.751E+03	1.2	0.93	10.51
0.72	525.88	.919E+03	1.5	0.98	10.00
0.80	525.96	.111E+04	1.9	1.03	9.51
0.88	526.04	.132E+04	2.4	1.08	9.06
0.96	526.12	.159E+04	2.8	1.04	9.44
1.04	526.20	.200E+04	3.6	1.05	9.32

1.12	526.28	.246E+04	4.8	1.15	8.50
1.20	526.36	.298E+04	6.4	1.26	7.76
1.29	526.45	.353E+04	8.4	1.39	7.03
1.37	526.53	.410E+04	10.6	1.53	6.42
1.45	526.61	.476E+04	13.3	1.64	5.97
1.53	526.69	.560E+04	16.7	1.75	5.61

		-<--- hydrograph --->			-<-pipe / channel-->	
AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL	
(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)	
INFLOW : ID= 2 (0101)	45.85	5.39	10.08	140.86	1.15	1.19
OUTFLOW: ID= 1 (0501)	45.85	5.31	10.17	140.85	1.15	1.18

CALIB	Area (ha)=	110.40	Curve Number (CN)=	69.7
NASHYD (0102)	Ia (mm)=	7.18	# of Linear Res.(N)=	3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)=	0.35		

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

TIME		RAIN		TRANSFORMED		HYETOGRAPH	
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 12.048

PEAK FLOW	(cms)=	12.341 (i)
TIME TO PEAK	(hrs)=	10.083
RUNOFF VOLUME	(mm)=	133.050
TOTAL RAINFALL	(mm)=	212.000
RUNOFF COEFFICIENT	=	0.628

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

CALIB	Area (ha)=	79.40	Curve Number (CN)=	71.1
NASHYD (0103)	Ia (mm)=	6.61	# of Linear Res.(N)=	3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)=	0.62		

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

TIME		RAIN		TRANSFORMED		HYETOGRAPH	
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 4.891

PEAK FLOW	(cms)=	7.905 (i)
TIME TO PEAK	(hrs)=	10.500
RUNOFF VOLUME	(mm)=	136.681
TOTAL RAINFALL	(mm)=	212.000
RUNOFF COEFFICIENT	=	0.645

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

ADD HYD (0901)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0102):	110.40	12.341	10.08	133.05
+ ID2= 2 (0103):	79.40	7.905	10.50	136.68
ID = 3 (0901):	189.80	19.691	10.17	134.57

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0901)	AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (0901):	189.80	19.691	10.17	134.57
+ ID2= 2 (0501):	45.85	5.312	10.17	140.85
ID = 1 (0901):	235.65	25.003	10.17	135.79

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0502)	Routing time step (min)=	5.00
IN= 2---> OUT= 1		

<----- DATA FOR SECTION (1.1) ----->		
Distance	Elevation	Manning
0.00	524.28	0.0350
1.00	524.27	0.0350

2.00	524.23	0.0350	
3.00	524.19	0.0350	
4.00	524.17	0.0350	
5.00	524.07	0.0350	
6.00	524.06	0.0350	
7.00	523.98	0.0350	
8.00	524.15	0.0350	
9.00	524.05	0.0350 / 0.0300	Main Channel
10.00	523.11	0.0300	Main Channel
11.00	523.25	0.0300	Main Channel
12.00	523.25	0.0300	Main Channel
13.00	524.41	0.0300 / 0.0350	Main Channel
14.00	524.04	0.0350	
15.00	524.04	0.0350	
16.00	524.27	0.0350	
17.00	524.24	0.0350	
18.00	524.29	0.0350	
19.00	524.43	0.0350	

1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Opeak (cms) = 14.595

PEAK FLOW (cms) = 12.622 (i)
 TIME TO PEAK (hrs) = 10.000
 RUNOFF VOLUME (mm) = 150.428
 TOTAL RAINFALL (mm) = 212.000
 RUNOFF COEFFICIENT = 0.710

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

----- TRAVEL TIME TABLE ----->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV. TIME (min)
0.06	523.17	.256E+02	0.0	0.09	318.83
0.12	523.23	.102E+03	0.0	0.15	200.85
0.18	523.29	.288E+03	0.0	0.17	174.06
0.24	523.34	.529E+03	0.1	0.25	121.40
0.29	523.40	.783E+03	0.1	0.31	97.60
0.35	523.46	.105E+04	0.2	0.36	83.62
0.41	523.52	.133E+04	0.3	0.41	74.25
0.47	523.58	.162E+04	0.4	0.45	67.46
0.53	523.64	.192E+04	0.5	0.48	62.26
0.59	523.70	.223E+04	0.6	0.52	58.13
0.65	523.76	.256E+04	0.8	0.55	54.74
0.71	523.82	.289E+04	0.9	0.58	51.90
0.76	523.87	.324E+04	1.1	0.61	49.47
0.82	523.93	.360E+04	1.3	0.64	47.37
0.88	523.99	.398E+04	1.5	0.66	45.54
0.94	524.05	.446E+04	1.7	0.68	44.13
1.02	524.13	.558E+04	2.3	0.75	40.20
1.09	524.20	.708E+04	3.4	0.88	34.22
1.17	524.28	.904E+04	5.0	1.00	29.99

ADD HYD (0902)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (0104):	99.35	12.622	10.00	150.43
+ ID2= 2 (0502):	235.65	22.180	11.00	135.78
ID = 3 (0902):	335.00	31.790	10.92	140.13

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0503)
 IN= 2---> OUT= 1 Routing time step (min)'= 5.00

**** WARNING: TRAVEL TIME TABLE EXCEEDED

AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
235.65	25.00	10.17	135.79	1.16	0.98
235.65	22.18	11.00	135.78	1.17	1.00

----- DATA FOR SECTION (1.1) ----->

Distance	Elevation	Manning
0.00	527.01	0.0350
1.00	526.97	0.0350
1.50	527.08	0.0350
2.00	526.82	0.0350
3.50	526.82	0.0350 / 0.0300
4.50	526.30	0.0300
6.00	526.30	0.0300
7.00	525.99	0.0300
8.00	526.06	0.0300
9.00	525.97	0.0300
10.00	525.97	0.0300
11.00	526.06	0.0300
12.00	526.06	0.0300
13.00	526.55	0.0300 / 0.0350
14.00	526.55	0.0350
15.00	526.85	0.0350
16.00	526.85	0.0350
17.00	527.13	0.0350
18.00	527.13	0.0350

CALIB	Area (ha) = 99.35	Curve Number (CN) = 77.1
NASHYD (0104)	Ia (mm) = 6.27	# of Linear Res. (N) = 3.00
ID= 1 DT= 5.0 min	U.H. Tp (hrs) = 0.26	

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	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00

----- TRAVEL TIME TABLE ----->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV. TIME (min)
0.05	526.02	.693E+02	0.0	0.20	61.60
0.11	526.08	.227E+03	0.1	0.29	43.42
0.16	526.13	.441E+03	0.3	0.43	28.90
0.21	526.18	.665E+03	0.5	0.55	22.72
0.26	526.23	.901E+03	0.8	0.65	19.18
0.32	526.29	.115E+04	1.1	0.74	16.84
0.37	526.34	.145E+04	1.4	0.73	16.90
0.42	526.39	.177E+04	2.0	0.83	15.05
0.47	526.44	.210E+04	2.6	0.91	13.66
0.53	526.50	.245E+04	3.2	0.99	12.58
0.58	526.55	.279E+04	4.0	1.06	11.71
0.63	526.60	.319E+04	4.8	1.13	10.99
0.69	526.66	.364E+04	5.9	1.21	10.29
0.75	526.72	.410E+04	7.1	1.28	9.68
0.81	526.78	.457E+04	8.3	1.36	9.15

STANDHYD (0106) | Area (ha)= 80.82
 ID= 1 DT= 5.0 min | Total Imp(%)= 50.00 Dir. Conn.(%)= 35.00

IMPERVIOUS PERVIOUS (i)
 Surface Area (ha)= 40.41 40.41
 Dep. Storage (mm)= 1.00 1.50
 Average Slope (%)= 1.00 2.00
 Length (m)= 734.03 40.00
 Mannings n = 0.013 0.250

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

--- TRANSFORMED HYETOGRAPH ---					
TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00
0.167	6.00	3.167	13.00	6.167	23.00
0.250	6.00	3.250	13.00	6.250	23.00
0.333	6.00	3.333	13.00	6.333	23.00
0.417	6.00	3.417	13.00	6.417	23.00
0.500	6.00	3.500	13.00	6.500	23.00
0.583	6.00	3.583	13.00	6.583	23.00
0.667	6.00	3.667	13.00	6.667	23.00
0.750	6.00	3.750	13.00	6.750	23.00
0.833	6.00	3.833	13.00	6.833	23.00
0.917	6.00	3.917	13.00	6.917	23.00
1.000	6.00	4.000	13.00	7.000	23.00
1.083	4.00	4.083	17.00	7.083	13.00
1.167	4.00	4.167	17.00	7.167	13.00
1.250	4.00	4.250	17.00	7.250	13.00
1.333	4.00	4.333	17.00	7.333	13.00
1.417	4.00	4.417	17.00	7.417	13.00
1.500	4.00	4.500	17.00	7.500	13.00
1.583	4.00	4.583	17.00	7.583	13.00
1.667	4.00	4.667	17.00	7.667	13.00
1.750	4.00	4.750	17.00	7.750	13.00
1.833	4.00	4.833	17.00	7.833	13.00
1.917	4.00	4.917	17.00	7.917	13.00
2.000	4.00	5.000	17.00	8.000	13.00
2.083	6.00	5.083	13.00	8.083	13.00
2.167	6.00	5.167	13.00	8.167	13.00
2.250	6.00	5.250	13.00	8.250	13.00
2.333	6.00	5.333	13.00	8.333	13.00
2.417	6.00	5.417	13.00	8.417	13.00
2.500	6.00	5.500	13.00	8.500	13.00
2.583	6.00	5.583	13.00	8.583	13.00
2.667	6.00	5.667	13.00	8.667	13.00
2.750	6.00	5.750	13.00	8.750	13.00
2.833	6.00	5.833	13.00	8.833	13.00
2.917	6.00	5.917	13.00	8.917	13.00
3.000	6.00	6.000	13.00	9.000	13.00

Max. Eff. Inten. (mm/hr)= 53.00 66.63
 over (min)= 10.00 20.00
 Storage Coeff. (min)= 10.89 (ii) 19.19 (ii)
 Unit Hyd. Tpeak (min)= 10.00 20.00
 Unit Hyd. peak (cms)= 0.11 0.06

TOTALS
 PEAK FLOW (cms)= 4.15 7.03 11.168 (iii)
 TIME TO PEAK (hrs)= 10.00 10.08 10.00
 RUNOFF VOLUME (mm)= 211.00 181.21 191.64
 TOTAL RAINFALL (mm)= 212.00 212.00 212.00
 RUNOFF COEFFICIENT = 1.00 0.85 0.90

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN² = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0904)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0106):	80.82	11.168	10.00	191.64
+ ID2= 2 (0504):	56.33	6.490	10.25	156.17
ID = 3 (0904):	137.15	17.287	10.08	177.07

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0505) | Routing time step (min)'= 5.00
 IN= 2----> OUT= 1 |

<----- DATA FOR SECTION (1.1) ----->			
Distance	Elevation	Manning	
0.00	513.67	0.0500	
1.00	513.74	0.0500	
2.00	513.78	0.0500	
3.00	513.64	0.0500	
4.00	513.65	0.0500	
5.00	513.72	0.0500	
6.00	513.80	0.0500	
7.00	513.78	0.0500 / 0.0300	Main Channel
8.00	513.44	0.0300	Main Channel
9.00	513.11	0.0300	Main Channel
10.00	512.71	0.0300	Main Channel
11.00	512.87	0.0300	Main Channel
12.00	512.92	0.0300	Main Channel
13.00	513.05	0.0300	Main Channel
14.00	513.17	0.0300	Main Channel
15.00	513.37	0.0300	Main Channel
16.00	513.36	0.0300 / 0.0350	Main Channel
17.00	513.42	0.0350	
18.00	513.24	0.0350	
19.00	513.31	0.0350	

<----- TRAVEL TIME TABLE ----->						
DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV. TIME	
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)	
0.05	512.77	.861E+01	0.0	0.17	62.00	
0.11	512.82	.345E+02	0.0	0.28	39.06	
0.16	512.88	.776E+02	0.0	0.35	30.69	
0.22	512.93	.154E+03	0.1	0.39	28.00	
0.27	512.98	.258E+03	0.2	0.48	22.57	
0.33	513.04	.382E+03	0.3	0.56	19.35	
0.38	513.09	.526E+03	0.5	0.63	17.21	
0.44	513.15	.692E+03	0.7	0.69	15.66	
0.49	513.20	.880E+03	1.0	0.76	14.26	
0.55	513.26	.109E+04	1.4	0.83	13.10	
0.60	513.31	.134E+04	1.8	0.88	12.31	
0.66	513.37	.163E+04	2.3	0.93	11.68	
0.72	513.43	.205E+04	3.2	1.01	10.71	
0.78	513.49	.249E+04	4.3	1.12	9.67	
0.84	513.55	.294E+04	5.6	1.24	8.77	
0.91	513.62	.340E+04	7.1	1.35	8.02	
0.97	513.68	.389E+04	8.7	1.46	7.44	
1.03	513.74	.448E+04	10.6	1.54	7.05	
1.09	513.80	.517E+04	12.8	1.61	6.75	

*** WARNING: TRAVEL TIME TABLE EXCEEDED
 <----- hydrograph -----> <-pipe / channel-->
 AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
 (ha) (cms) (hrs) (mm) (m) (m/s)
 INFLOW : ID= 2 (0904) 137.15 17.29 10.08 177.07 1.09 1.60
 OUTFLOW: ID= 1 (0505) 137.15 17.01 10.17 177.07 1.09 1.61

CALIB NASHBY (0107) | Area (ha)= 61.28 Curve Number (CN)= 71.2
 ID= 1 DT= 5.0 min | Ia (mm)= 6.82 # of Linear Res.(N)= 3.00
 U.H. Tp(hrs)= 0.32

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

--- TRANSFORMED HYETOGRAPH ---					
TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00
0.167	6.00	3.167	13.00	6.167	23.00
0.250	6.00	3.250	13.00	6.250	23.00
0.333	6.00	3.333	13.00	6.333	23.00
0.417	6.00	3.417	13.00	6.417	23.00
0.500	6.00	3.500	13.00	6.500	23.00
0.583	6.00	3.583	13.00	6.583	23.00
0.667	6.00	3.667	13.00	6.667	23.00
0.750	6.00	3.750	13.00	6.750	23.00
0.833	6.00	3.833	13.00	6.833	23.00
0.917	6.00	3.917	13.00	6.917	23.00

1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms) = 7.314
 PEAK FLOW (cms) = 7.089 (i)
 TIME TO PEAK (hrs) = 10.083
 RUNOFF VOLUME (mm) = 136.678
 TOTAL RAINFALL (mm) = 212.000
 RUNOFF COEFFICIENT = 0.645

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

ADD HYD (0905)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (0107):	61.28	7.089	10.08	136.68
+ ID2= 2 (0505):	137.15	17.009	10.17	177.07
ID = 3 (0905):	198.43	23.990	10.17	164.60

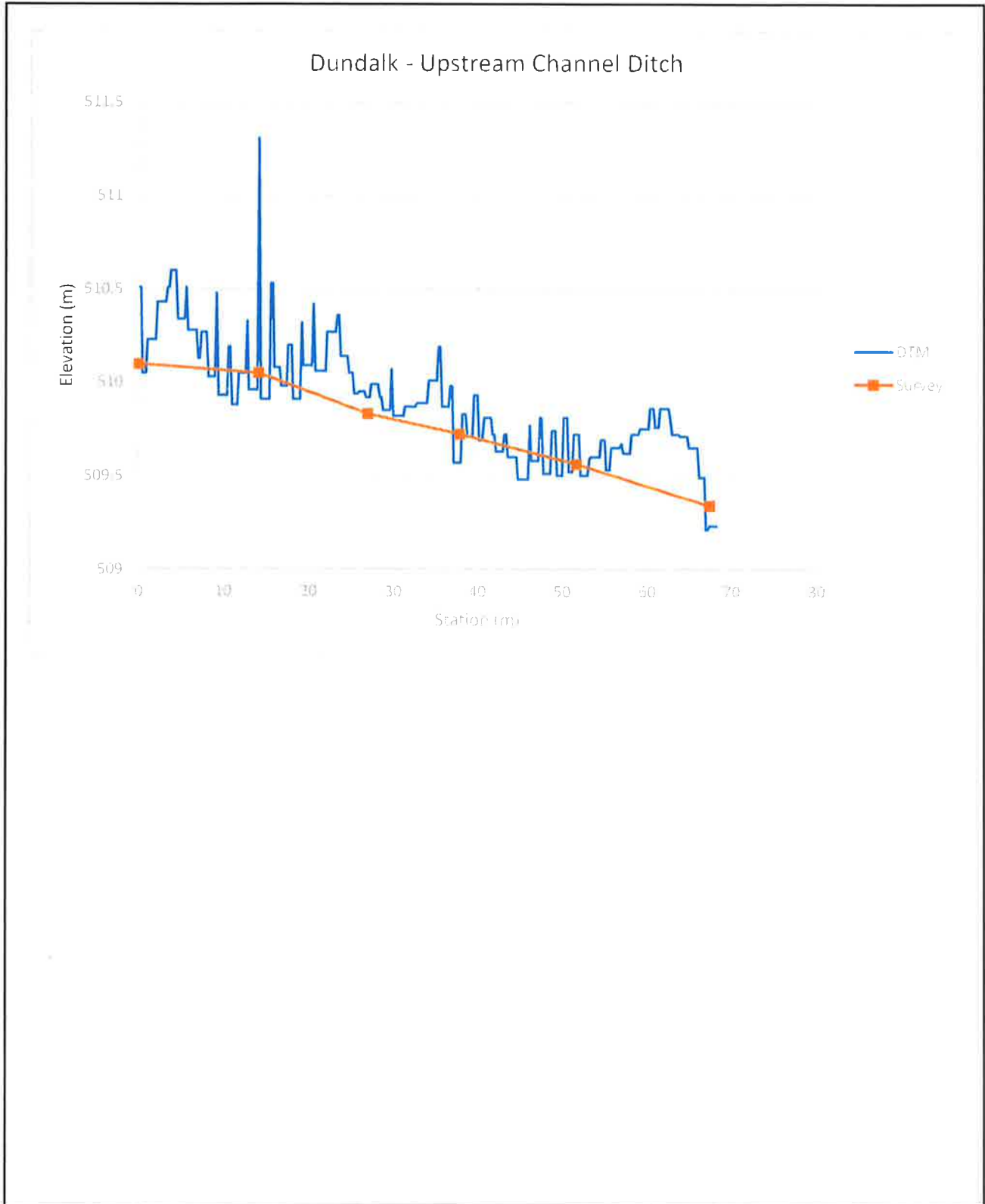
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

Appendix B: Elevation Datum Comparison



PROJECT	772082 Highway 10 Dundalk	FILE	452018
		DATE	April 23, 2025
SUBJECT	Elevation Datum Comparison	NAME	Nick Roque
		PAGE	1 OF 1



**Appendix C:
Hydraulic Assessment - Existing
Conditions**



HEC-RAS Plan: 100yr & Regional River: River 1 Reach: Reach 1

Reach	River Sta	Profile	E.G. Elev (m)	W.S. Elev (m)	Vel Head (m)	Frctn Loss (m)	C & E Loss (m)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (m3/s)	Top Width (m)
Reach 1	1145	100 Yr	513.17	513.07	0.10	0.15	0.00	4.54	14.85	10.36	122.41
Reach 1	1145	Regional	513.12	513.02	0.10	0.14	0.00	3.67	13.72	8.49	116.62
Reach 1	1120	100 Yr	513.01	512.88	0.13	0.13	0.02	5.68	16.65	7.41	113.84
Reach 1	1120	Regional	512.98	512.88	0.11	0.12	0.01	4.75	14.91	6.21	112.54
Reach 1	1084	100 Yr	512.83	512.76	0.07	0.12	0.01	5.32	17.92	6.51	142.14
Reach 1	1084	Regional	512.79	512.73	0.06	0.11	0.01	4.29	16.18	5.40	134.38
Reach 1	1049	100 Yr	512.71	512.57	0.13	0.21	0.02	8.37	15.93	5.44	130.13
Reach 1	1049	Regional	512.67	512.54	0.13	0.21	0.02	6.59	14.92	4.37	124.91
Reach 1	1014	100 Yr	512.40	512.32	0.08	0.18	0.00	9.71	12.79	7.25	144.47
Reach 1	1014	Regional	512.37	512.30	0.07	0.18	0.00	8.31	11.56	6.01	142.58
Reach 1	984	100 Yr	512.22	512.14	0.08	0.15	0.01	7.75	12.43	9.56	154.28
Reach 1	984	Regional	512.19	512.10	0.09	0.15	0.01	6.32	11.74	7.82	150.52
Reach 1	945	100 Yr	512.07	512.02	0.05	0.17	0.01	5.03	16.07	8.65	157.14
Reach 1	945	Regional	512.03	511.97	0.06	0.17	0.01	4.04	15.09	6.74	150.70
Reach 1	906	100 Yr	511.89	511.76	0.12	0.15	0.00	9.74	14.38	5.63	171.04
Reach 1	906	Regional	511.85	511.72	0.13	0.16	0.00	8.26	13.54	4.07	157.44
Reach 1	876	100 Yr	511.73	511.60	0.13	0.19	0.02	11.60	15.98	2.17	163.91
Reach 1	876	Regional	511.69	511.56	0.13	0.19	0.02	9.48	14.90	1.50	149.20
Reach 1	842	100 Yr	511.39	511.32	0.08	0.19	0.01	15.84	10.77	3.14	176.36
Reach 1	842	Regional	511.36	511.29	0.08	0.20	0.00	13.48	10.04	2.36	167.78
Reach 1	808	100 Yr	511.20	511.14	0.06	0.14	0.00	14.46	10.55	4.74	152.03
Reach 1	808	Regional	511.16	511.09	0.06	0.14	0.00	12.15	9.95	3.78	149.94
Reach 1	772	100 Yr	511.06	510.98	0.07	0.14	0.00	7.87	18.50	3.38	130.83
Reach 1	772	Regional	511.02	510.94	0.08	0.13	0.00	6.17	17.21	2.50	121.89

HEC-RAS Plan: 100yr & Regional River: River 1 Reach: Reach 1 (Continued)

Reach	River Sta	Profile	E.G. Elev (m)	W.S. Elev (m)	Vel Head (m)	Frctn Loss (m)	C & E Loss (m)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (m3/s)	Top Width (m)
Reach 1	735	100 Yr	510.91	510.85	0.06	0.17	0.01	14.56	11.08	4.11	143.62
Reach 1	735	Regional	510.88	510.82	0.06	0.17	0.01	12.37	10.14	3.36	139.53
Reach 1	698	100 Yr	510.74	510.69	0.04	0.18	0.00	19.09	7.57	3.08	157.01
Reach 1	698	Regional	510.71	510.67	0.04	0.18	0.00	16.40	6.92	2.55	152.79
Reach 1	669	100 Yr	510.56	510.49	0.07	0.18	0.01	13.59	8.83	7.32	141.44
Reach 1	669	Regional	510.52	510.45	0.07	0.19	0.02	11.22	8.15	6.51	133.45
Reach 1	612	100 Yr	510.37	510.35	0.02	0.08	0.00	20.66	9.09		164.85
Reach 1	612	Regional	510.31	510.29	0.02	0.08	0.00	17.54	8.34		159.05
Reach 1	566	100 Yr	510.29	510.25	0.03	0.03	0.00	17.28	12.44	0.02	143.66
Reach 1	566	Regional	510.23	510.19	0.04	0.03	0.00	14.28	11.59	0.01	126.35
Reach 1	545	100 Yr	510.25	510.23	0.02	0.02	0.00	18.17	10.79	0.78	177.77
Reach 1	545	Regional	510.20	510.17	0.02	0.02	0.00	15.32	10.03	0.54	163.65
Reach 1	518	100 Yr	510.23	510.22	0.01	0.01	0.00	16.23	10.25	3.26	190.47
Reach 1	518	Regional	510.17	510.16	0.01	0.01	0.00	13.84	9.45	2.59	186.40
Reach 1	496	100 Yr	510.22	510.21	0.01	0.00	0.00	17.00	9.53	3.21	298.01
Reach 1	496	Regional	510.16	510.15	0.01	0.00	0.00	14.50	8.86	2.52	279.31
Reach 1	476	100 Yr	510.22	510.21	0.00	0.00	0.00	20.35	6.91	2.49	252.58
Reach 1	476	Regional	510.16	510.15	0.00	0.00	0.00	17.50	6.38	2.00	247.19
Reach 1	456	100 Yr	510.21	510.21	0.00	0.00	0.00	20.53	6.12	3.10	267.04
Reach 1	456	Regional	510.15	510.15	0.00	0.00	0.00	17.92	5.54	2.42	259.26
Reach 1	435	100 Yr	510.21	510.21	0.00	0.00	0.00	19.94	7.22	2.58	229.56
Reach 1	435	Regional	510.15	510.15	0.00	0.00	0.00	17.41	6.43	2.04	218.97
Reach 1	415	100 Yr	510.21	510.21	0.00	0.00	0.00	20.31	6.70	2.74	278.73
Reach 1	415	Regional	510.15	510.15	0.00	0.00	0.00	17.79	5.92	2.16	256.39

HEC-RAS Plan: 100yr & Regional River: River 1 Reach: Reach 1 (Continued)

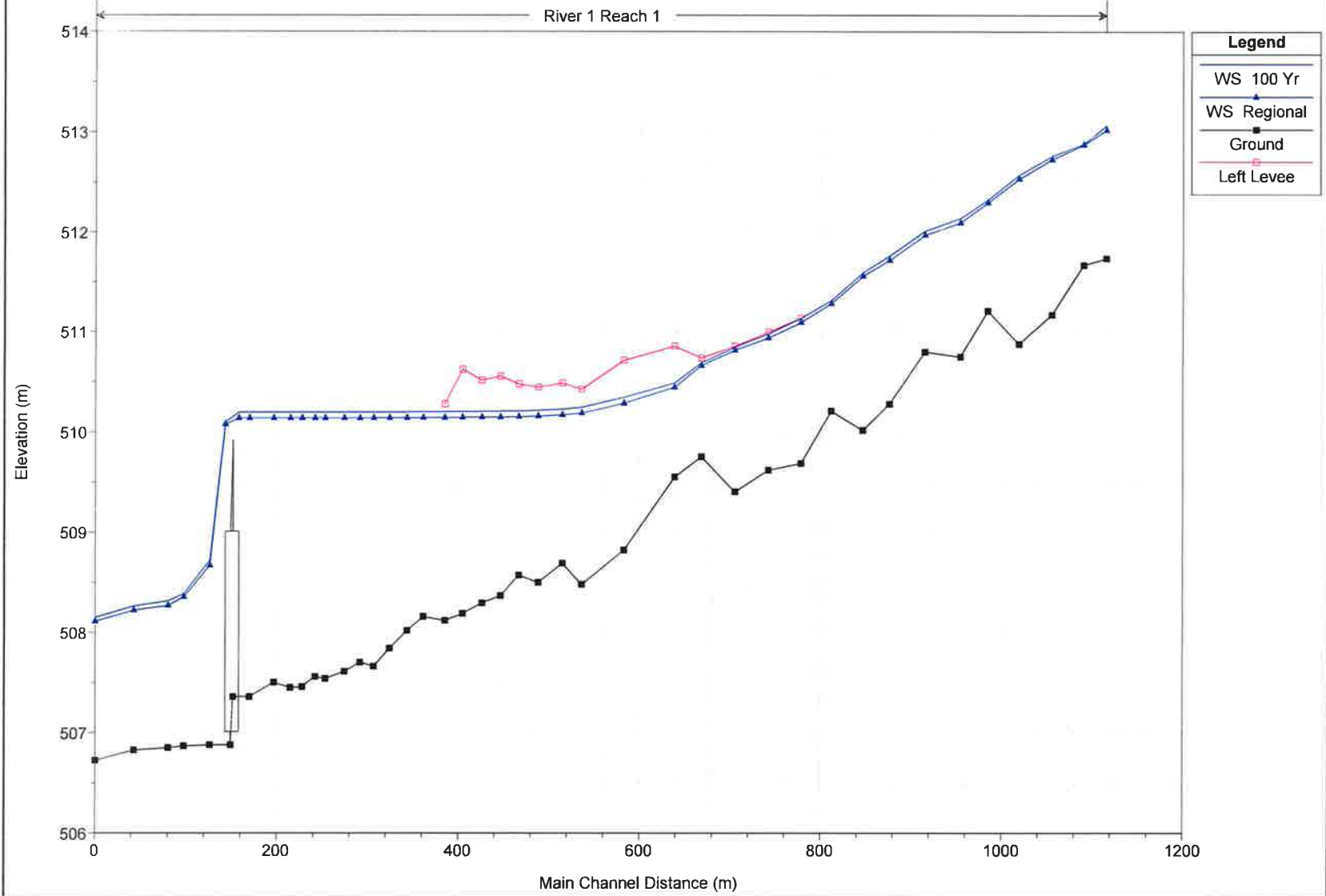
Reach	River Sta	Profile	E.G. Elev (m)	W.S. Elev (m)	Vel Head (m)	Frctn Loss (m)	C & E Loss (m)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (m3/s)	Top Width (m)
Reach 1	391	100 Yr	510.21	510.20	0.00	0.00	0.00	20.60	5.40	3.75	287.80
Reach 1	391	Regional	510.15	510.15	0.00	0.00	0.00	17.95	4.74	3.19	282.47
Reach 1	373	100 Yr	510.20	510.20	0.00	0.00	0.00	19.15	5.12	5.48	291.98
Reach 1	373	Regional	510.15	510.14	0.00	0.00	0.00	16.76	4.57	4.55	287.16
Reach 1	354	100 Yr	510.20	510.20	0.00	0.00	0.00	17.90	5.22	6.62	293.31
Reach 1	354	Regional	510.14	510.14	0.00	0.00	0.00	15.55	4.69	5.64	286.67
Reach 1	337	100 Yr	510.20	510.20	0.00	0.00	0.00	16.76	5.32	7.67	300.74
Reach 1	337	Regional	510.14	510.14	0.00	0.00	0.00	14.49	4.78	6.60	294.90
Reach 1	322	100 Yr	510.20	510.20	0.00	0.00	0.00	16.59	5.05	8.11	333.14
Reach 1	322	Regional	510.14	510.14	0.00	0.00	0.00	14.39	4.52	6.97	324.99
Reach 1	305	100 Yr	510.20	510.20	0.00	0.00	0.00	15.07	6.08	8.60	407.48
Reach 1	305	Regional	510.14	510.14	0.00	0.00	0.00	13.10	5.33	7.44	399.57
Reach 1	283	100 Yr	510.20	510.20	0.00	0.00	0.00	15.90	4.86	8.98	415.13
Reach 1	283	Regional	510.14	510.14	0.00	0.00	0.00	13.82	4.30	7.76	402.80
Reach 1	272	100 Yr	510.20	510.20	0.00	0.00	0.00	15.15	5.22	9.38	397.51
Reach 1	272	Regional	510.14	510.14	0.00	0.00	0.00	13.10	4.62	8.16	386.57
Reach 1	258	100 Yr	510.20	510.20	0.00	0.00	0.00	14.52	5.20	10.02	367.58
Reach 1	258	Regional	510.14	510.14	0.00	0.00	0.00	12.54	4.60	8.74	360.30
Reach 1	245	100 Yr	510.20	510.20	0.00	0.00	0.00	14.32	4.81	10.61	342.71
Reach 1	245	Regional	510.14	510.14	0.00	0.00	0.00	12.39	4.27	9.22	336.44
Reach 1	226	100 Yr	510.20	510.20	0.00	0.00	0.00	12.96	6.15	10.63	337.94
Reach 1	226	Regional	510.14	510.14	0.00	0.00	0.00	11.17	5.36	9.34	330.09
Reach 1	200	100 Yr	510.20	510.20	0.00			13.40	6.24	10.10	383.60
Reach 1	200	Regional	510.14	510.14	0.00			11.59	5.52	8.77	378.90

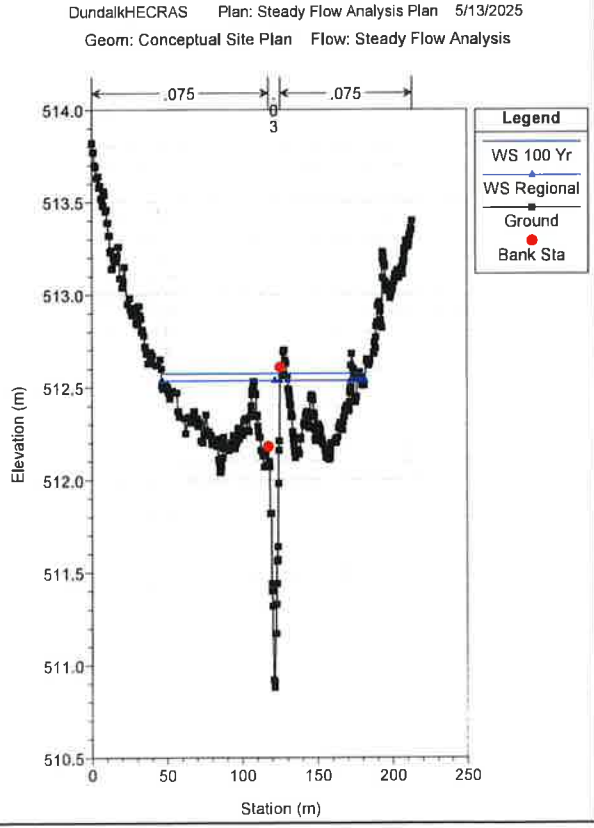
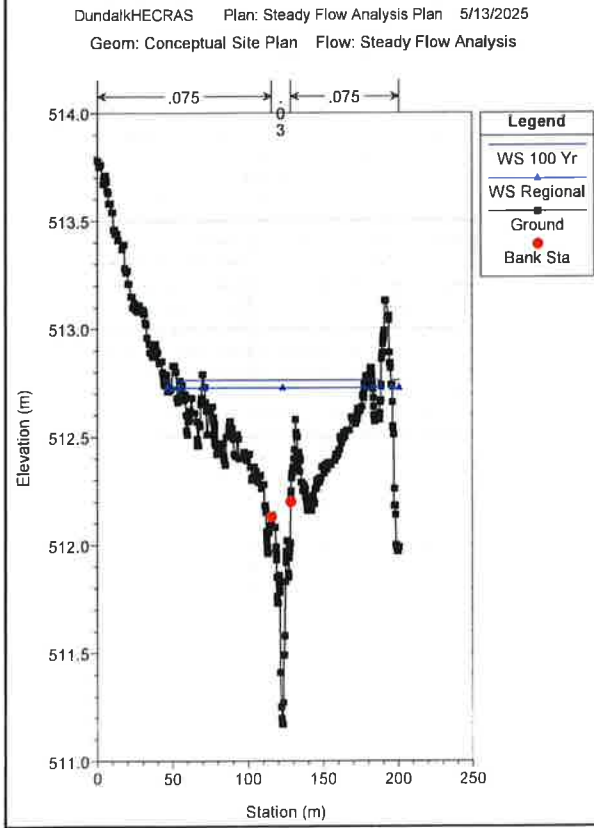
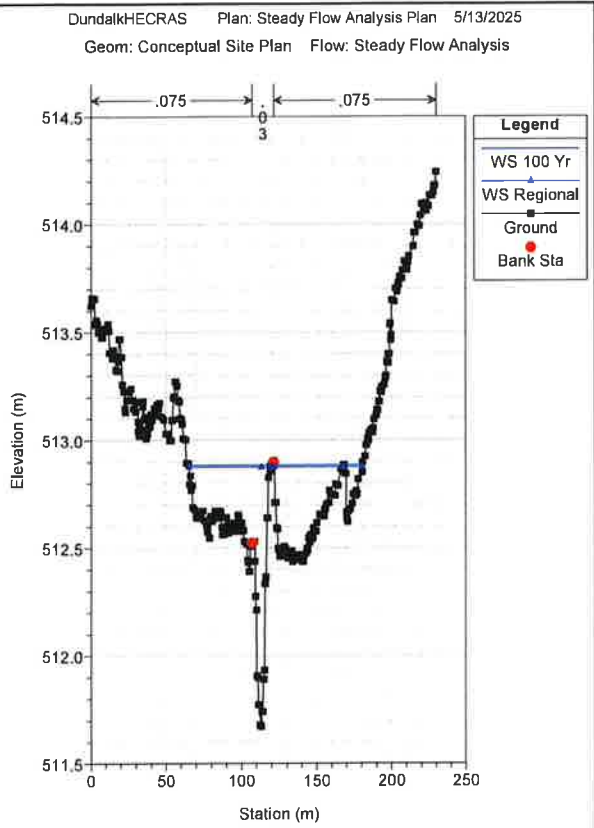
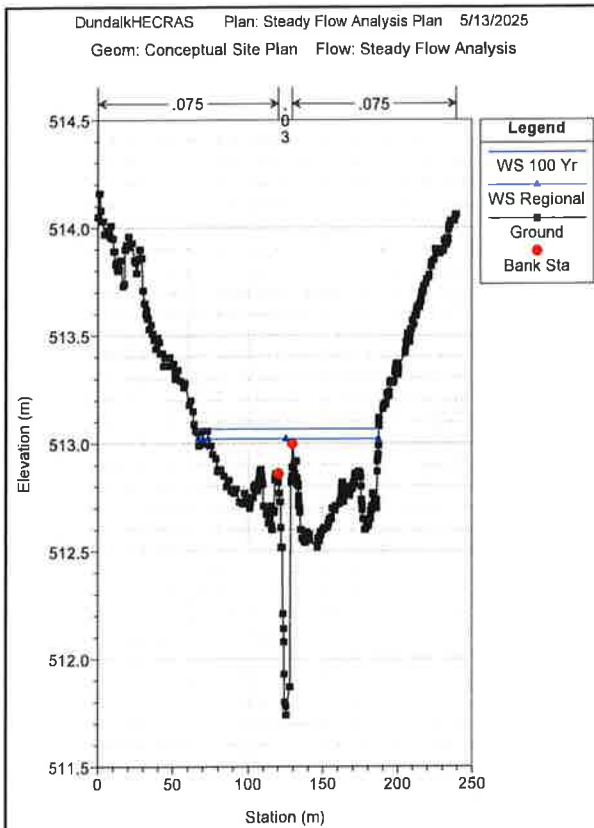
HEC-RAS Plan: 100yr & Regional River: River 1 Reach: Reach 1 (Continued)

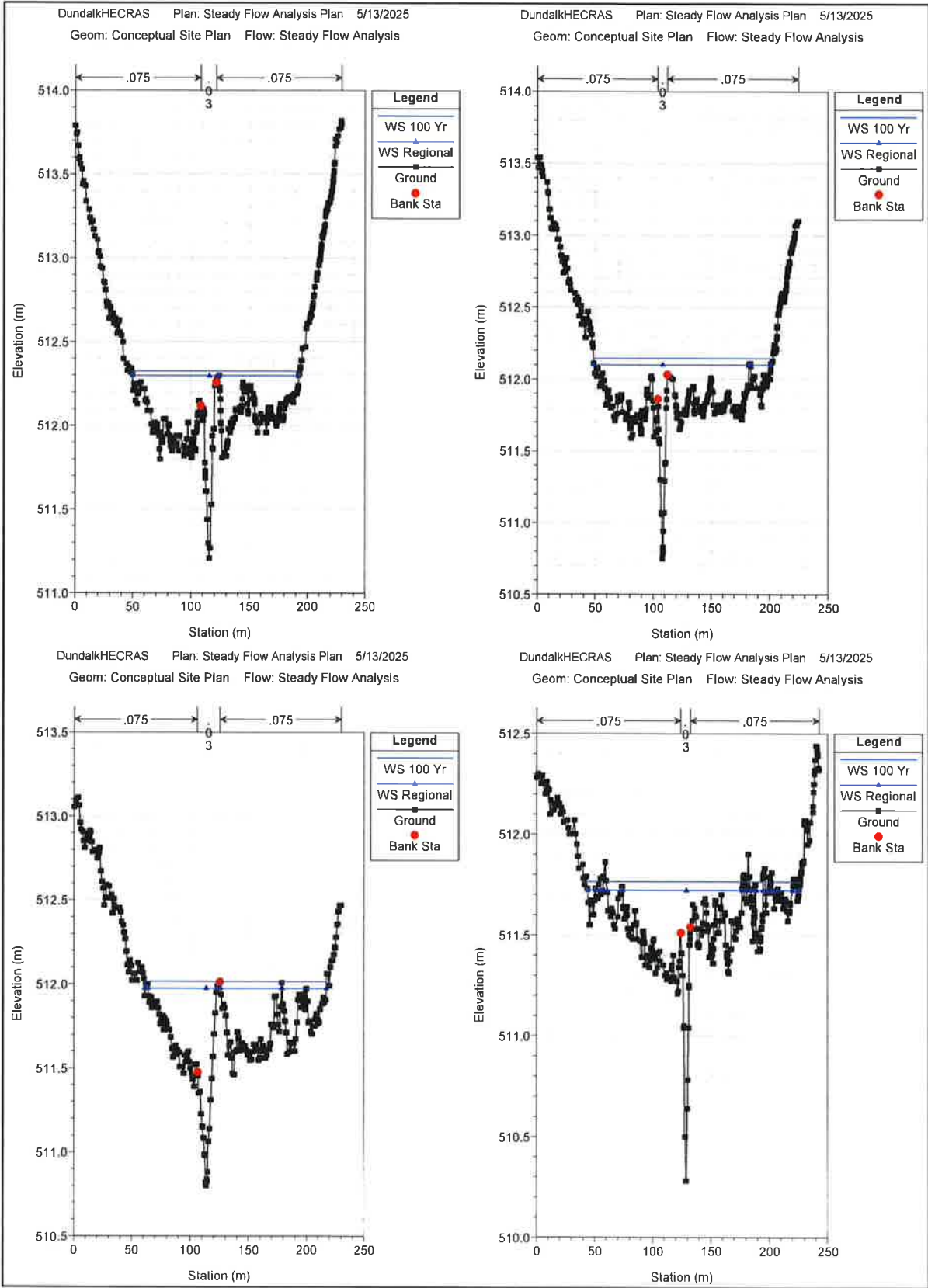
Reach	River Sta	Profile	E.G. Elev (m)	W.S. Elev (m)	Vel Head (m)	Frctn Loss (m)	C & E Loss (m)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (m3/s)	Top Width (m)
Reach 1	181		Culvert								
Reach 1	156	100 Yr	509.03	508.72	0.31	0.18	0.12		29.75		222.16
Reach 1	156	Regional	508.95	508.67	0.28	0.17	0.10		25.88		215.51
Reach 1	127	100 Yr	508.46	508.39	0.07	0.06	0.00	6.85	16.53	6.36	208.28
Reach 1	127	Regional	508.42	508.36	0.07	0.06	0.01	6.00	14.88	5.00	181.06
Reach 1	110	100 Yr	508.40	508.31	0.08	0.08	0.01	7.03	16.01	6.71	236.39
Reach 1	110	Regional	508.36	508.27	0.09	0.08	0.01	5.32	15.08	5.48	202.91
Reach 1	72	100 Yr	508.31	508.26	0.05	0.09	0.00	0.92	18.86	9.96	155.14
Reach 1	72	Regional	508.27	508.22	0.04	0.09	0.00	0.69	17.13	8.06	143.74
Reach 1	30	100 Yr	508.22	508.15	0.07			0.04	15.01	14.70	152.39
Reach 1	30	Regional	508.18	508.11	0.07			0.02	13.75	12.10	147.17

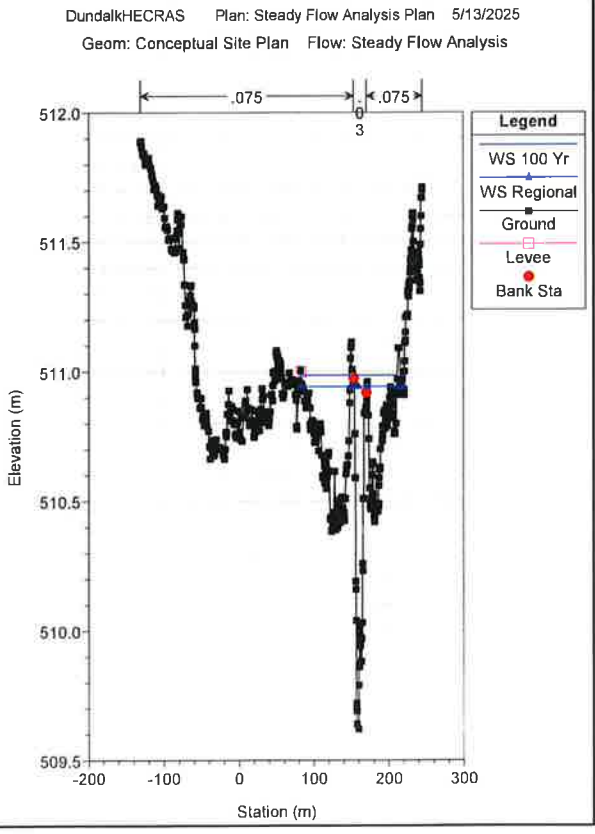
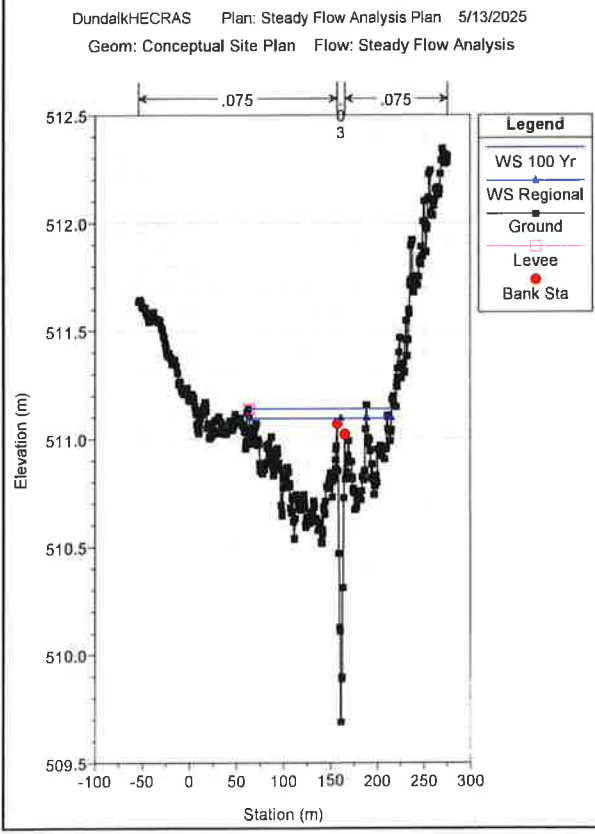
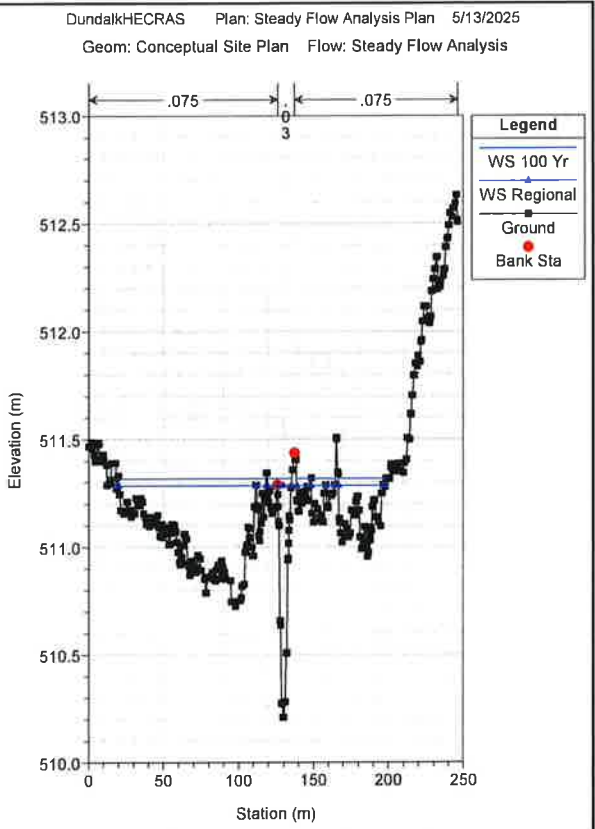
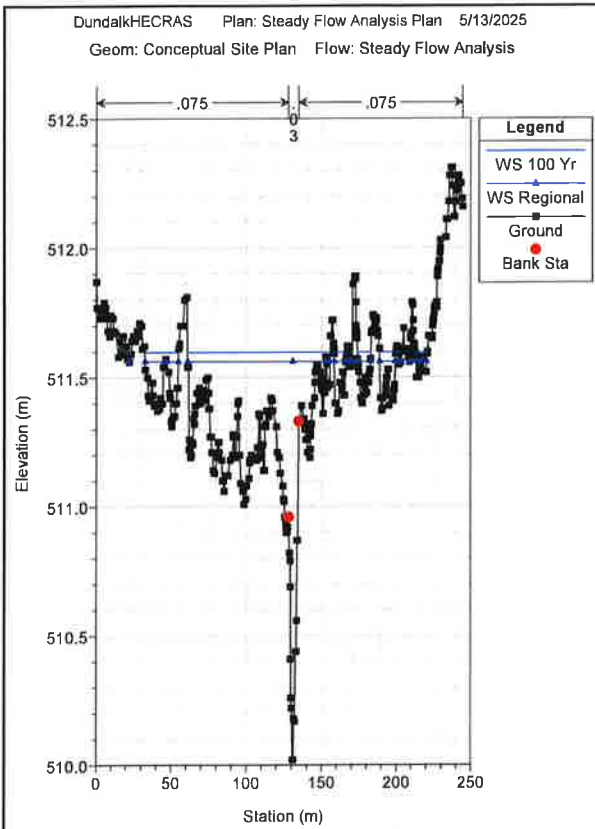
DundalkHECRAS Plan: Steady Flow Analysis Plan 5/13/2025

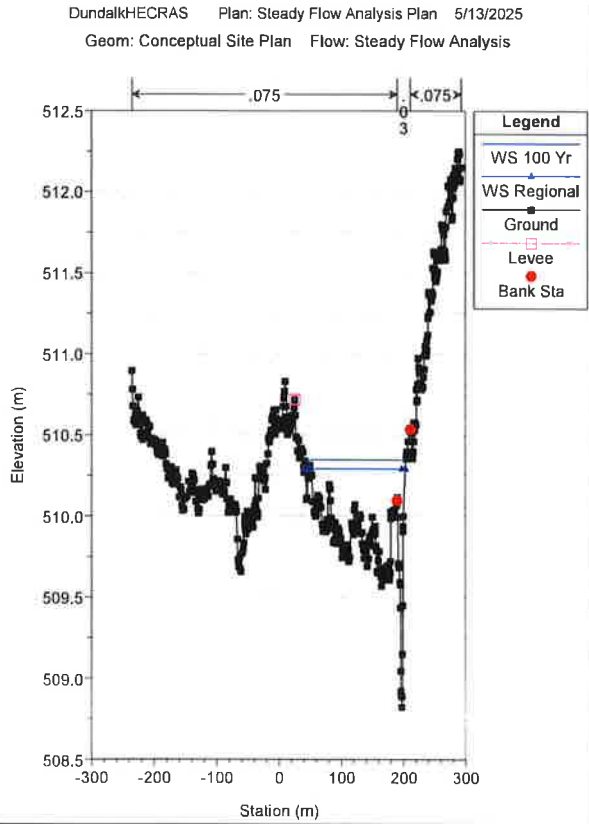
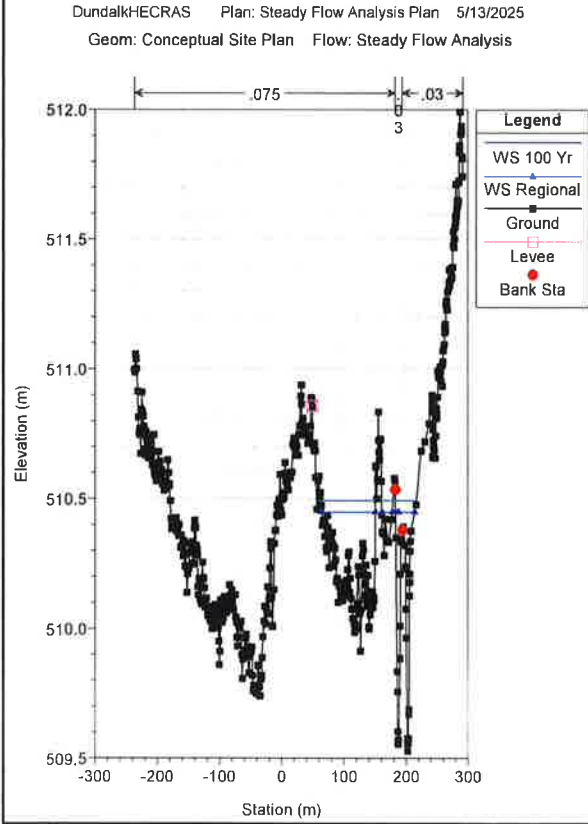
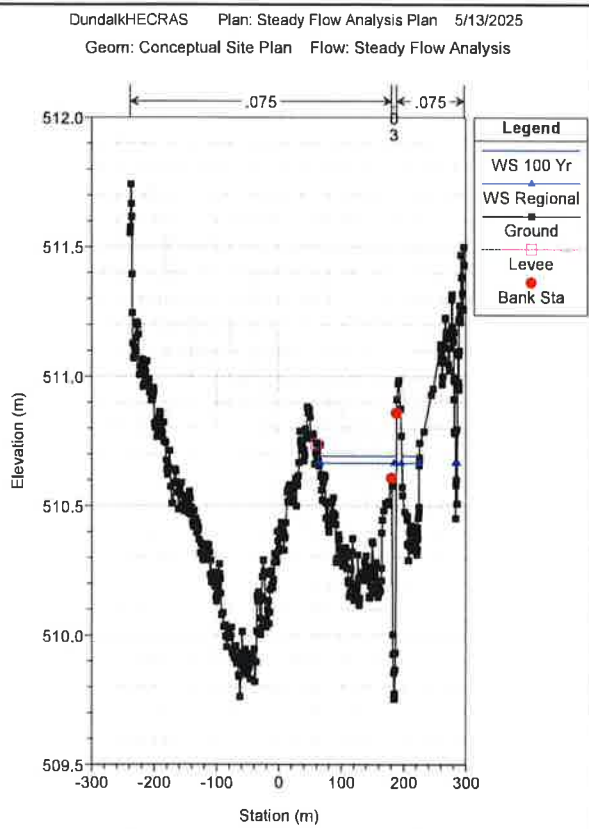
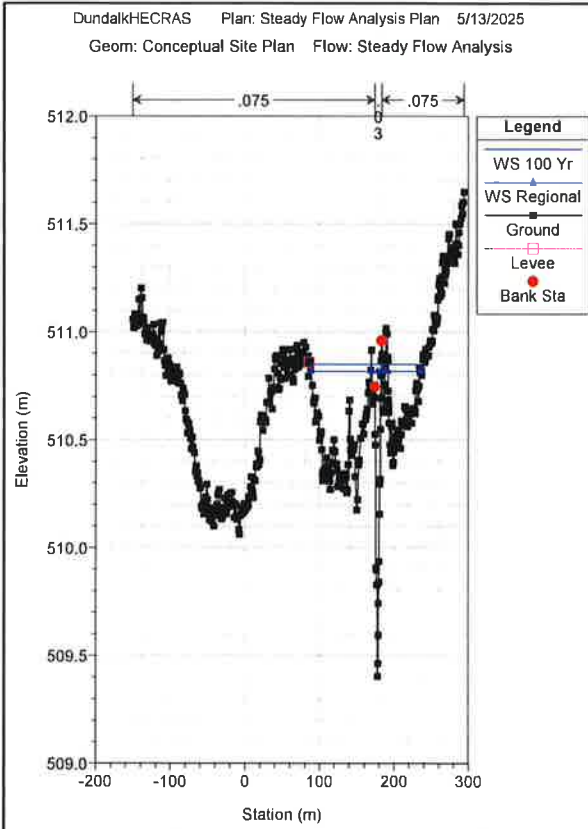
Geom: Conceptual Site Plan Flow: Steady Flow Analysis



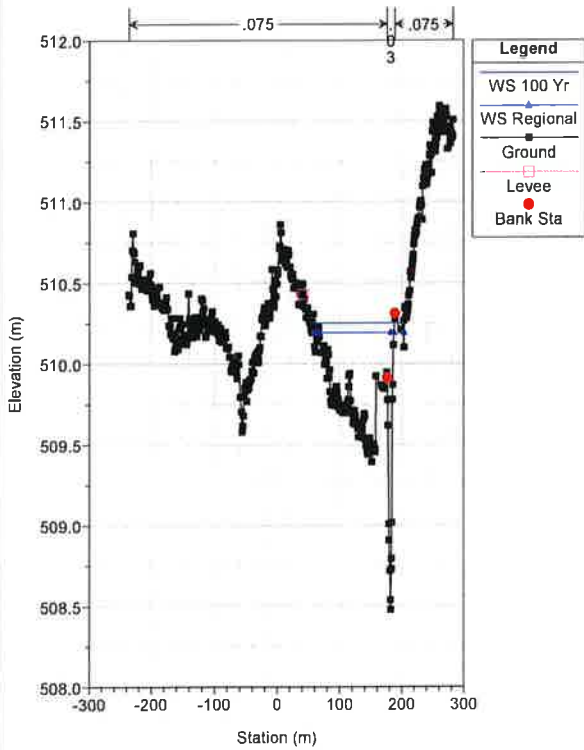




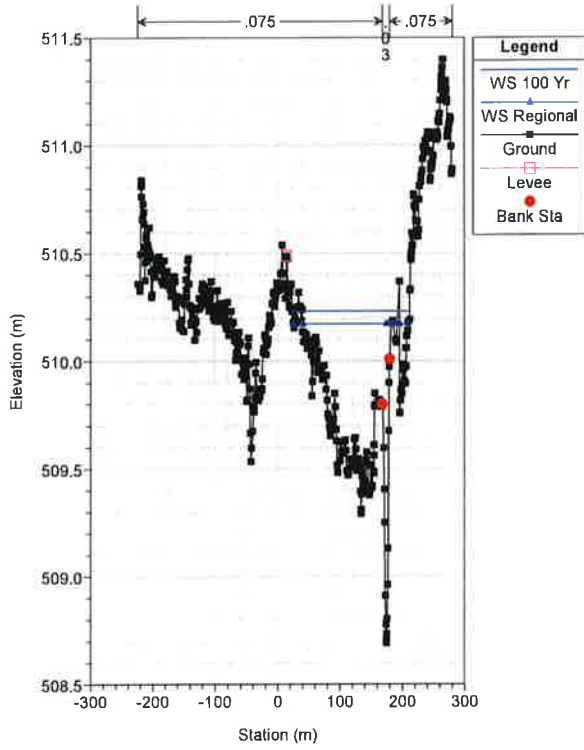




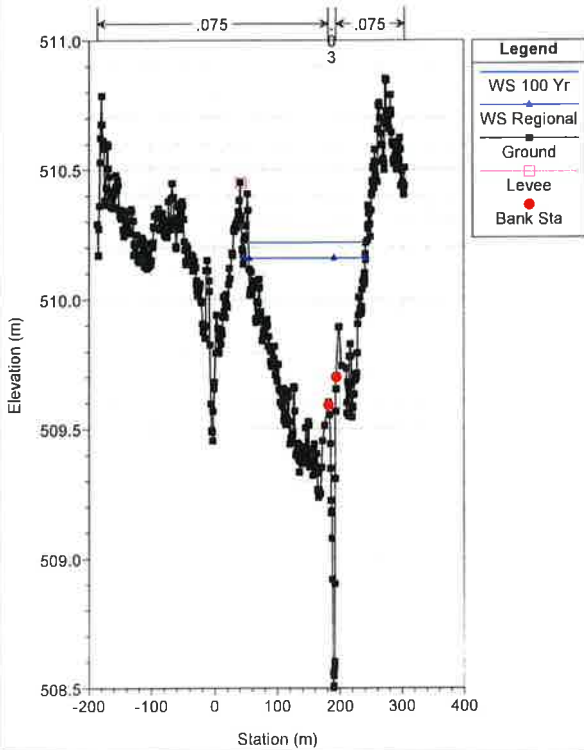
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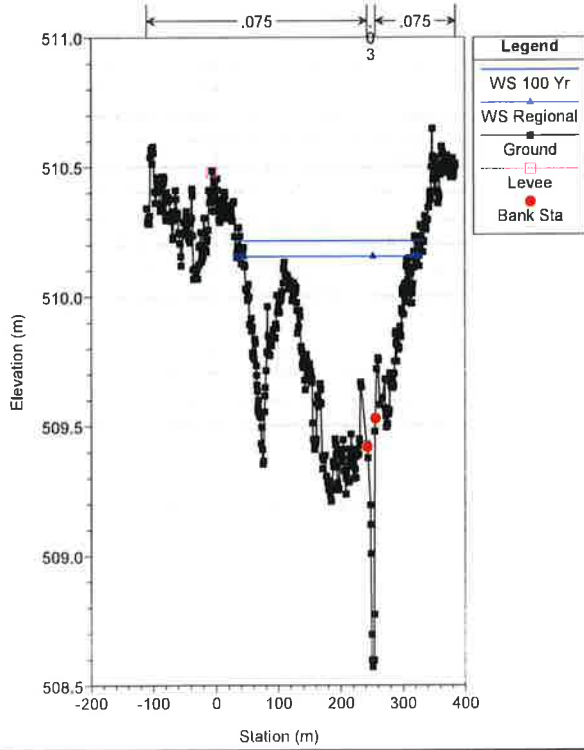
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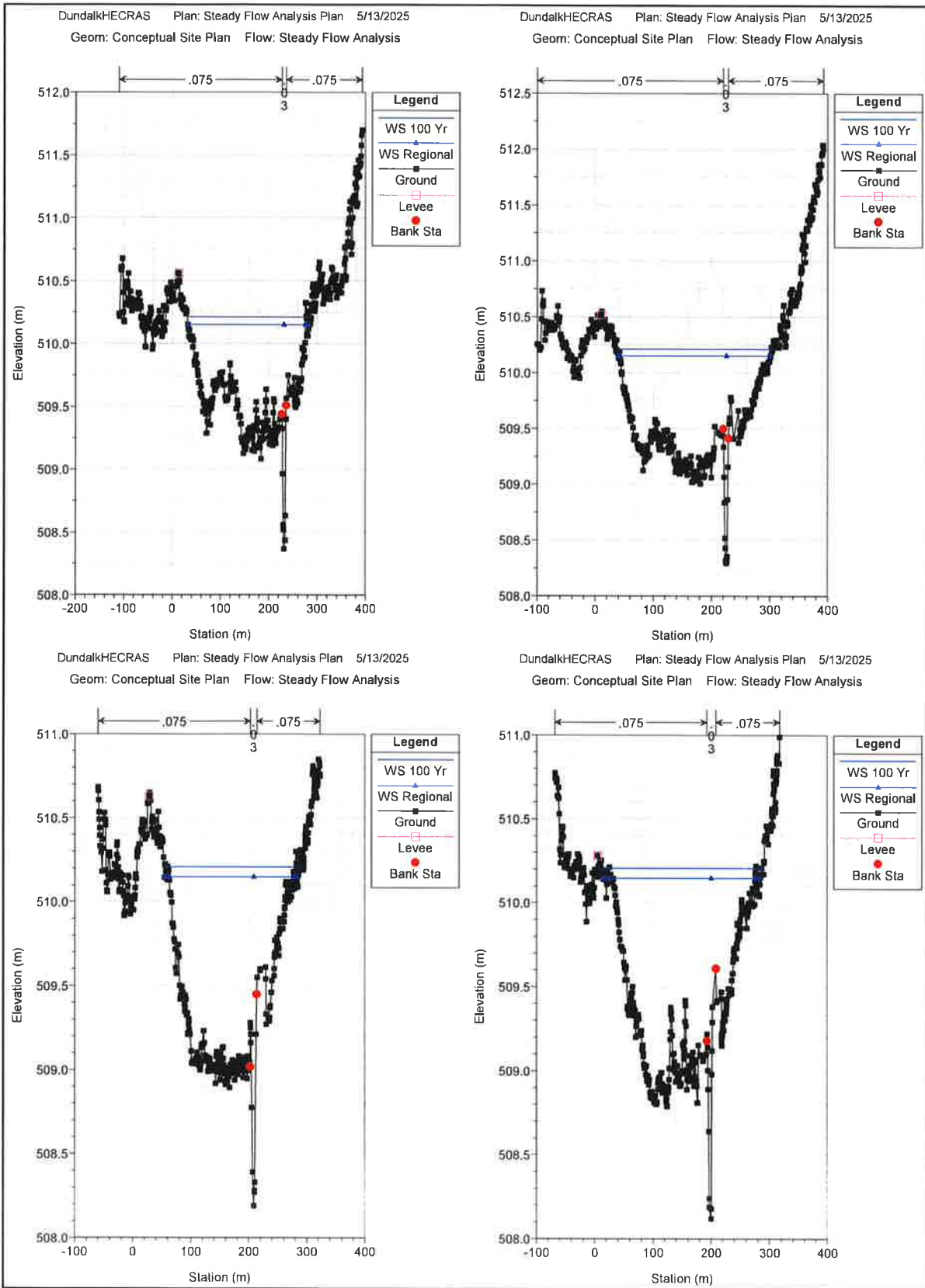


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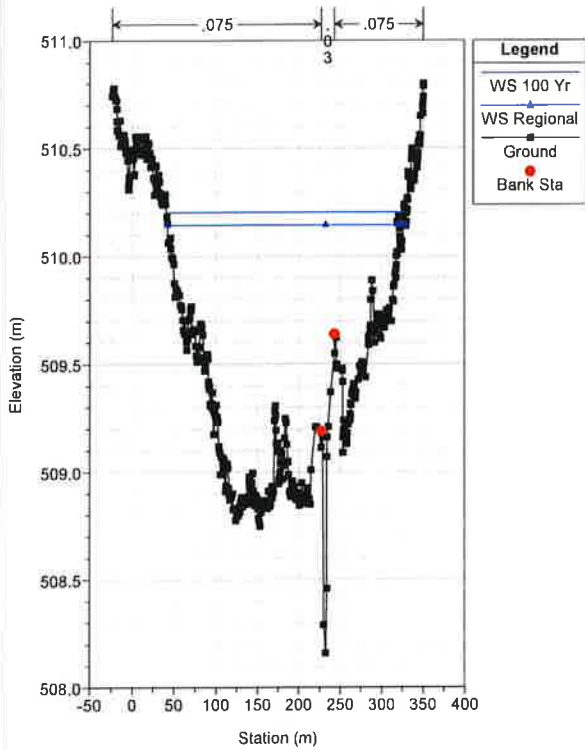


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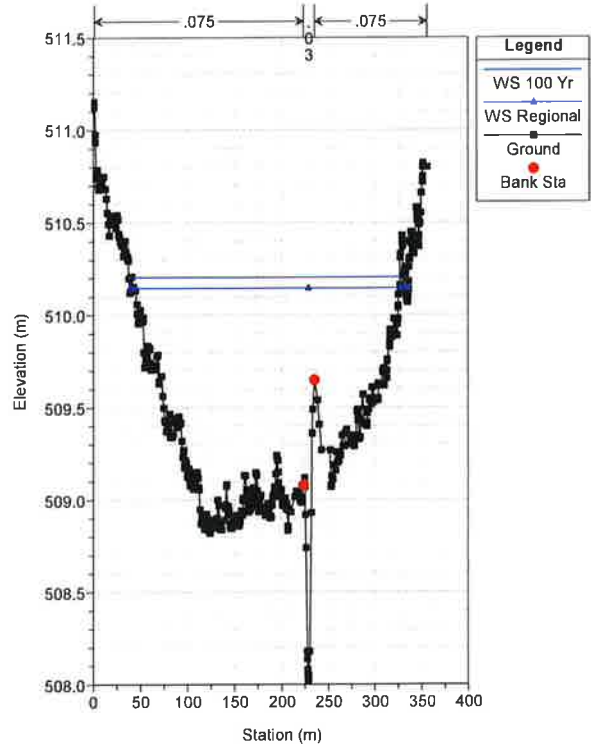




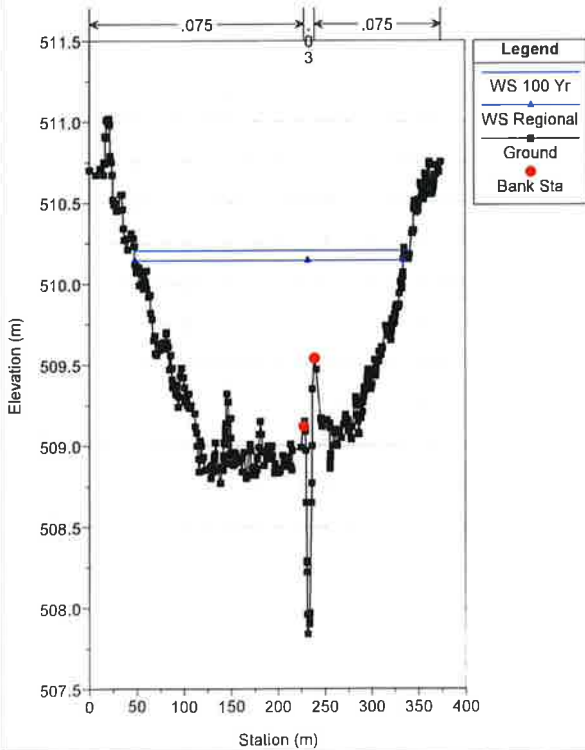
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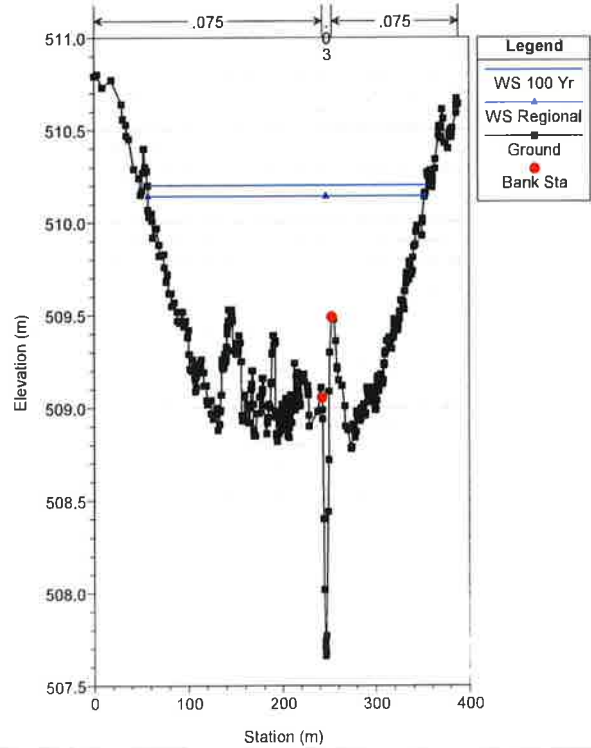
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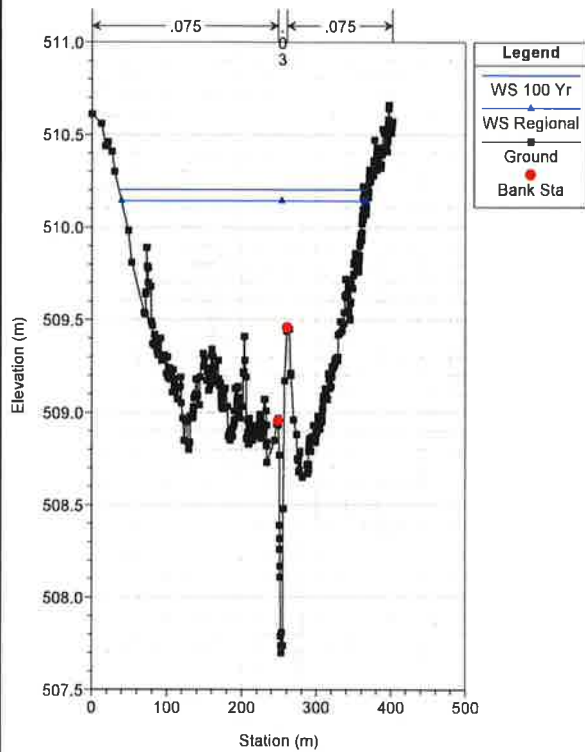
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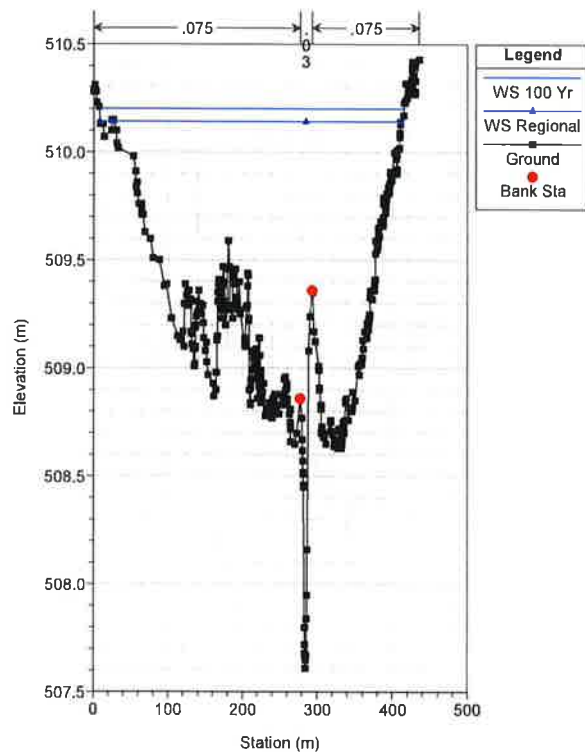
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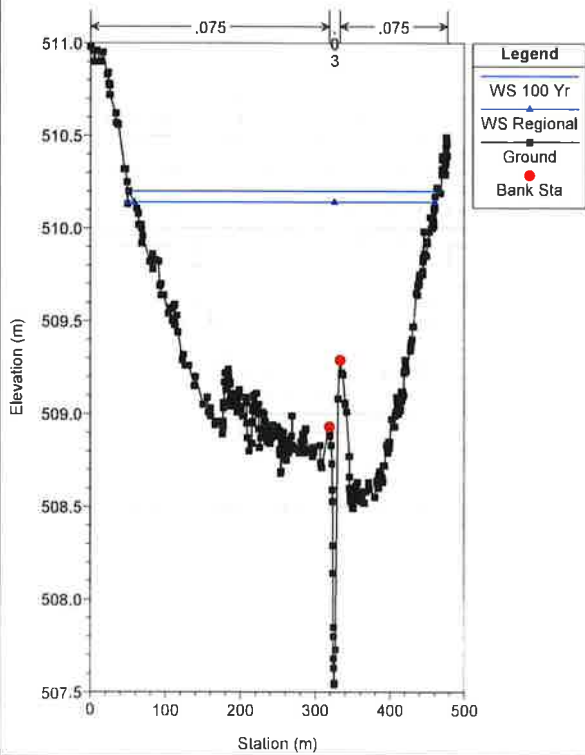
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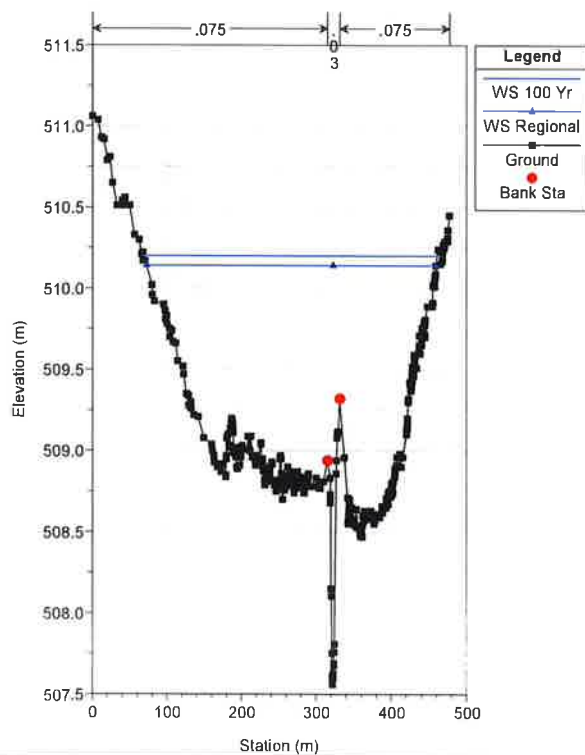
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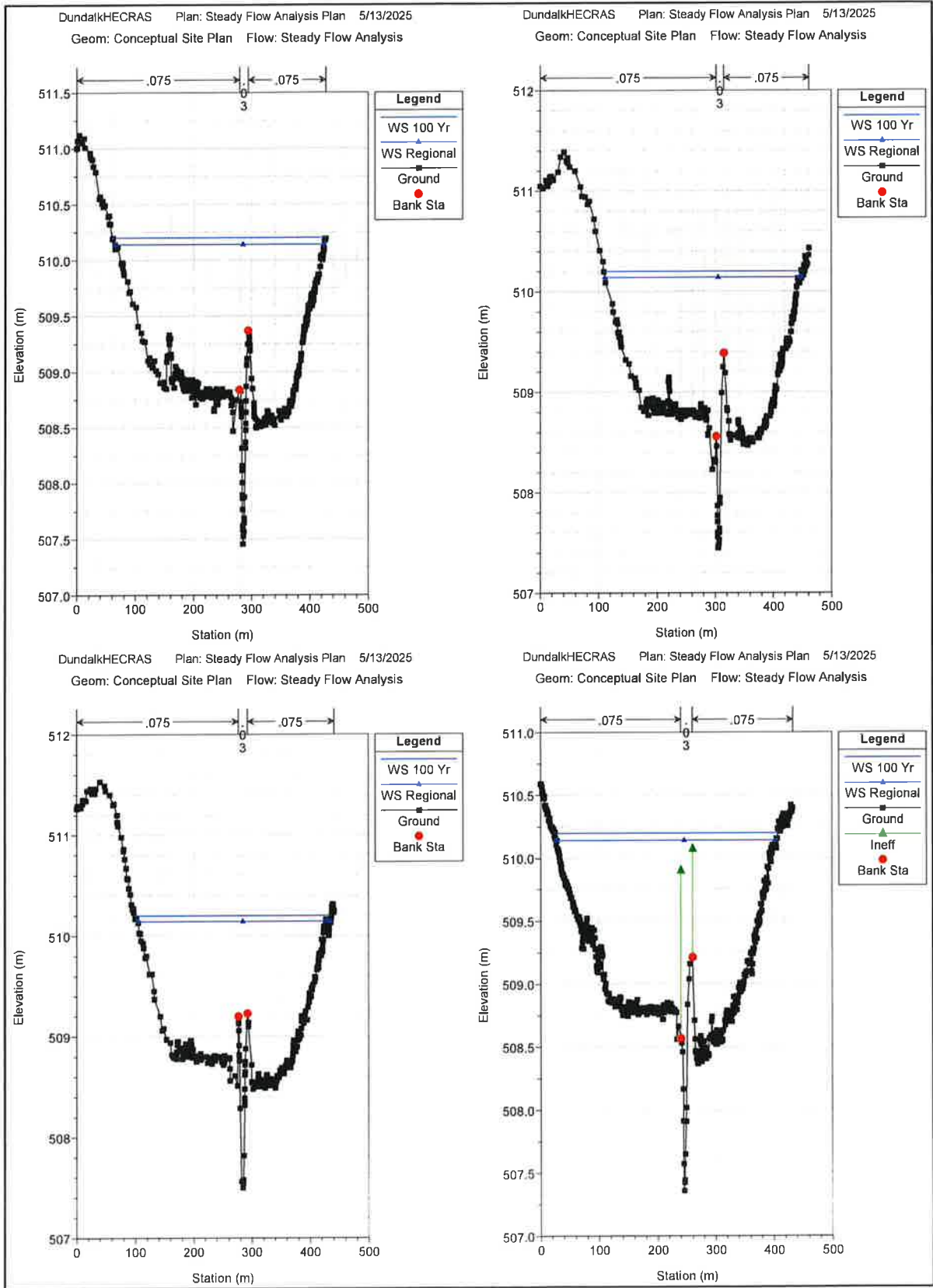


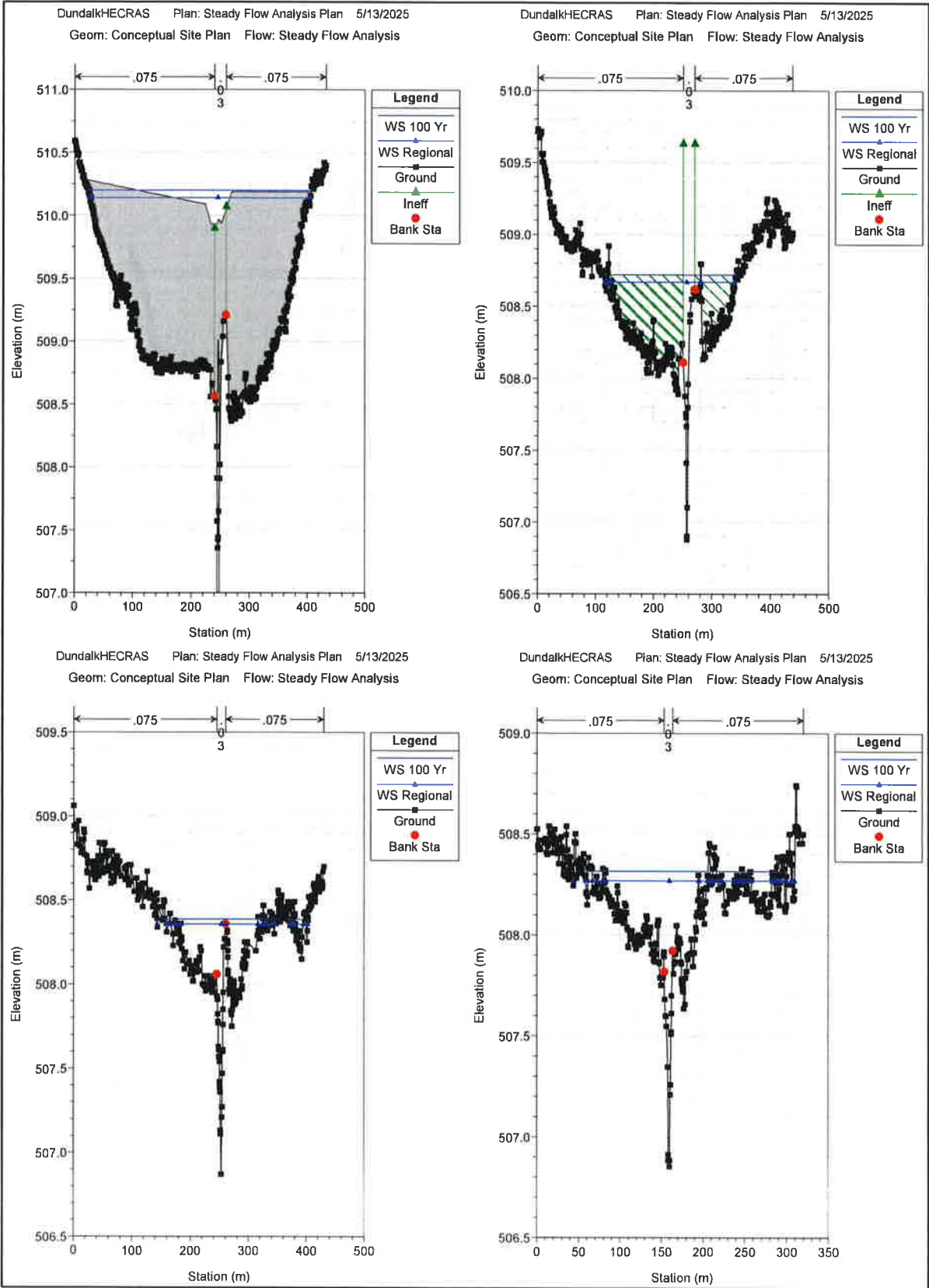
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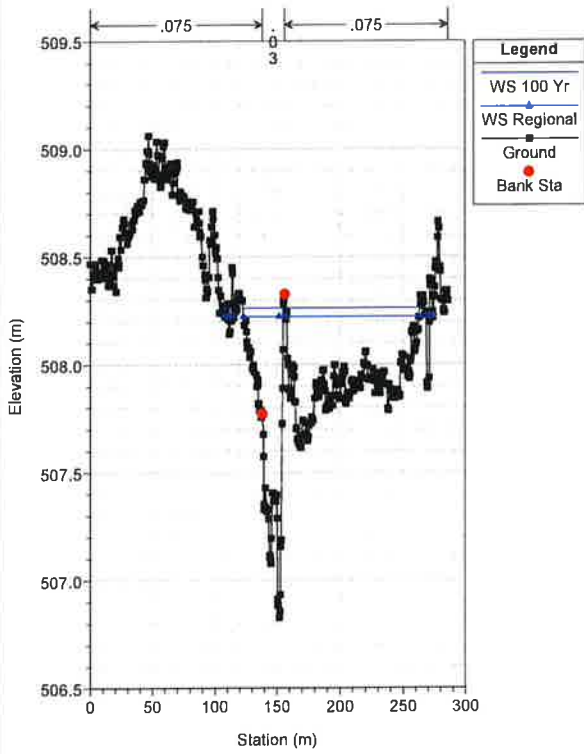
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