Functional Servicing and Preliminary Stormwater Management Report

Residential Subdivision

537086 Main Street, Horning's Mills
Town of Melancthon

PEARSON ENGINEERING
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Functional Servicing and Preliminary Stormwater Management Report
Carnevale's, 537086 Main St, Horning's Mills

1. Introduction

PEARSON Engineering Ltd. has been retained by the Carnevale's (Client) to prepare a Functional Servicing Report (FSR) in support of the proposed residential subdivision (Project) located at 537086 Main Street, in the Township of Melancthon (Town).

The subject property is approximately 10.2 ha in size and is located in Horning's Mills in the Township of Melancthon (Township), County of Dufferin (County). The site is bound by Dufferin County Road 124 to the west, existing agricultural lands to the north and south and Main Street to the east. The Project site is currently agricultural lands, and the majority of the site drains west to east towards Main Street. The location of the site can be seen on Figure 1.

This FSR assesses the onsite Stormwater Management (SWM) facilities and internal services required to service the proposed Project. The report also includes preliminary design calculations and a brief outline of the proposed internal services, as well as comments regarding the ability of the various secondary utilities to service the site.

1.1. Terms of Reference

- Identify the existing site characteristics including any external drainage conditions.
- Illustrate the design of the stormwater conveyance and detention system, capable of accommodating both minor and major storm flows from the site;
- Incorporate the appropriate Best Management Practices for controlling on-site erosion and sedimentation during construction while ultimately ensuring that the pos-development release of stormwater is of adequate quality; and
- Summarize this design in a technically comprehensive and concise manner.

2. Supporting Documents

The following documents have been referenced in the preparation of this report:

- Ministry of the Environment, Design Guidelines for Sewage Works, 2008
- Ministry of the Environment, Design Guidelines for Drinking Water Systems, 2008
- Ministry of the Environment, Stormwater Management Planning and Design Manual, March 2003
- Nottawasaga Vally Conservation Authority Technical Guidelines for Stormwater Management Submissions, December 2013

3. Water Design

3.1. Individual Well Design

There is no municipal watermain adjacent to the project site, and therefore the subdivision will be serviced by private wells. Individual well supply will be implemented by an authorized well driller. The location and detailed well design for individual wells will be developed through a detailed plot plan and building permit application process. The preliminary location of individual wells is shown on the Preliminary Site Servicing and Grading drawing SSG-1.

4. Sanitary Design

4.1. Individual Septic Bed Design

There are no municipal services fronting the Project site. As such, the subdivision will be serviced with individual septic beds for each individual lot. Residential septic bed design with daily sanitary sewage flows less than 10,000 L/day are governed by part 8 of the Ontario Building Code (2016).

Preliminary filter bed size calculations have been completed and were based on a T-time of 30 min/cm, which is the highest T-time noted in the Geotechnical Investigation completed by Cambium Inc., dated March 11, 2024 (refer to appendix G). The T-time of 30 min/cm is considered to be conservative for the development as the range provided is between 10-30 min/cm with most of the samples being less then 20. Once T-time is confirmed for each lot by installer, the septic bed sizes will be reduced accordingly.

Based on a 4 bedroom home of 320 m², the area required for the filter bed with a t-time of 30 will be approximately 400 m². Preliminary bed and house locations for each lot can be seen on the Preliminary Site Servicing and Grading Drawing SSG-1.

5. Stormwater Management

5.1. Overview

A key component of the development is the need to address environmental and related SWM issues. These are examined in a framework aimed at meeting the Township of Melancthon, Nottawasaga Valley Conservation Authority (NVCA), and the Ministry of the Environment, Conservation, and Parks (MECP) requirements. This report focuses on the necessary measures to satisfy the MECP's SWM requirements.

It is understood the objectives of the SWM plan are to:

- Protect life and property from flooding and erosion.
- Maintain water quality for ecological integrity, recreational opportunities etc.
- Protect and maintain groundwater flow regime(s).
- Protect aquatic and fishery communities and habitats.
- Maintain and protect significant natural features.
- Incorporate Low Impact Development (LID) practices to promote infiltration and reduce phosphorus levels to downstream watercourses.

5.2. Analysis Methodology

The design of the SWM Facilities for this site has been conducted in accordance with:

- The Ministry of the Environment Stormwater Management Planning and Design Manual, March 2003.
- Nottawasaga Valley Conservation Authority (NVCA) Stormwater Technical Guide, December 2013.

In order to design the facilities to meet these requirements, it is essential to select the appropriate modeling methodology for the storm system design. Given the size of the site, the hydrologic modeling software visual OTTHYMO, is appropriate for the design for the SWM system.

5.3. Existing Drainage Conditions

The project site currently consists of vacant farmland with a small treed area along the north property lines. The majority of the site drains east at a slope of 1% - 5% towards the roadside ditch adjacent to Main Street while the eastern portion of the site drains east towards the Horning's Mills Creek. A portion of the northwestern corner of the site drains northerly, and an existing residential lot southwest of the site drains through the project site. Details of the existing storm drainage conditions are shown on Drawing STM-1.

The Cambium geotechnical investigation revealed that the site is composed of a surficial topsoil layer containing organics underlain by silty sand, predominately containing organics. The silty sand containing organics extended to a depth of about 0.8 m below ground surface and contained trace amount of gravel and clay. As the proposed site will be comprised of estate lots serviced with individual wells and septic systems, additional groundwater monitoring and water quality tests will be required. Throughout the four boreholes and three monitoring wells completed by Cambium, groundwater was only encountered within monitoring well (#BH104-23) at a depth of 4.3 m below existing ground surface. Refer to Appendix G for more information.

The Visual OTTHYMO hydrologic modelling software was used to determine the pre-development peak flows for the site for 2-year storm up to the 100-year storm and Regional Storm and are shown in Table 1. The Visual OTTHYMO Parameter calculations can be found in Appendix D, and pre-development OTTHYMO modelling output results can be found in Appendix C.

Table 1: Pre-Development Peak Flows

	2 Year Storm	5 Year Storm	10 Year Storm	25 Year Storm	50 Year Storm	100 Year Storm	Regional Storm
4-Hour Chicago Storm (m^3/s)	0.16	0.31	0.43	0.60	0.73	0.88	-
24-Hour SCS Storm (m^3/s)	0.30	0.55	0.75	1.01	1.21	1.42	0.96

5.4. Proposed Drainage Conditions

The post-development storm drainage for the project will generally follow pre-development conditions. The proposed development consists of 21 residential estate lots with a SWM pond block. The majority of the proposed drainage from the project will be conveyed easterly via roadside ditches to a dry pond located at the northeast corner of the site. The south portion of the site will flow southerly uncontrolled towards Horning's Mills Creek. Peak flows will be released from the SWM pond with the use of a hickenbottom complete with orifice tube to reduce post-development peak flows to at or below pre-development values. Peak Flow released from the dry pond will be conveyed through an Oil Grit Separator (OGS) unit to provide quality control prior to discharge into the existing roadside ditch on Main Street.

As per Azimuth's Environmental Impact Study (2024), the wetland area located to the northeast corner of the project site will be maintained and a 5.0 m buffer has been applied to it. The proposed SWM pond outlet will bypass the wetland and direct stormwater through the proposed colling trench and into the existing roadside ditch on Main Street.

The Project's drainage ditches will be sized to convey all storms up to and including the 100-year storm event. Driveway culverts have been sized using the 10-year storm event flows. The proposed culverts across Street 'A', Street 'B' and SWM pond access road have been designed to convey the 10-year storm event without overtopping the road surface. Refer to drawing STM-2 for proposed drainage patterns.

5.5. Stormwater Quantity Control

The proposed development will increase the imperviousness of the site and as such, the post-development peak flows will increase. The majority of the proposed drainage from the project will be conveyed easterly to a dry pond located in the northeast corner of the development, which has been designed to provide quantity control by retaining flows and releasing them at or below pre-development values. The outlet control structure for the SWM pond will consist of an orifice tube located within a hickenbottom structure and an overflow weir which will reduce post-development peak flows to allowable values for all storm events. The proposed dry pond has been designed with a 4:1 side slopes as per MECP guidelines. 2,266 m³ of quantity control storage volume in the dry pond is required to reduce post development peak flows for the 2-year to 100-year storm events. The dry pond has a storage volume of 2395 m³ at an elevation of 462.15, providing approximately 0.30 m of freeboard to the top of berm. Rip-rap will be placed at the inlet and at the emergency overflow weir location to prevent erosion. Based on the Site Evaluation Report by Azimuth Environmental Consulting, Inc., Horning's Mills Creek is a coldwater system. Temperature mitigation measures such as a cooling trench and planting in the shoreline fringe areas of the pond will be investigated further at the detailed stage of the project based on recommendations in the environmental report. A preliminary cooling trench has been shown on the drawings for reference.

Table 2 summarizes post-development peak flows and storage volume requirements for the SWM pond.

Table 2: SWM Pond Outflow and Storage

	2 Year Storm	5 Year Storm	10 Year Storm	25 Year Storm	50 Year Storm	100 Year Storm	Regional Storm
4 Hour Chicago Storm Events							
Peak Flows (m^3/s)	0.11	0.26	0.35	0.51	0.58	0.72	-
Storage Volume (m^3)	617	844	1020	1274	1474	1679	-
24 Hour SCS Storm Events							
Peak Flows (m^3/s)	0.21	0.41	0.58	0.84	1.07	1.25	0.81
Storage Volume (m^3)	788	1179	1456	1881	2115	2401	1834

Table 3 below summarizes the post-development peak flows for the site and demonstrates that the total site peak flow is at or below pre-development flows.

Table 3: Post-Development Peak Flows

	2 Year Storm	5 Year Storm	10 Year Storm	25 Year Storm	50 Year Storm	100 Year Storm	Regional Storm
4-Hour Chicago Storm (m^3/s)	0.12	0.28	0.38	0.56	0.66	0.82	-
24-Hour SCS Storm (m^3/s)	0.23	0.45	0.64	0.95	1.19	1.39	0.88

5.6. Low Impact Development

Current SWM practices have evolved over recent years, with Low Impact Development (LID) techniques being widely used as the preferred method of Stormwater Management. As such, it is proposed that LID techniques be implemented throughout the development to meet Township and NVCA requirements.

The estate lot nature of the proposed development will help minimize the degradation of storm runoff when compared to higher density developments. Stormwater runoff from the rooftops will be directed to individual soakaway pits to control runoff for each lot. Low Impact Development (LID) controls will be implemented where available to improve storm runoff quality and will be reviewed in greater detail at the detailed design stage of the project.

5.7. Quality Control

The MECP issued a “Stormwater Management Planning and Design Manual” in March 2003. This manual has been adopted by a variety of agencies including the Township of Melancthon. The development’s Stormwater Quality Control objective is to provide Enhanced Protection quality control as stated in the MECP manual. To achieve enhanced protection, permanent and temporary control of erosion and sediment transport are proposed and are discussed in the following sections.

5.7.1. Permanent Quality Control

The development's active roadways pose a risk to stormwater quality through the collection of grit, salt, sand, and oils on the paved surfaces. The majority of the development's stormwater will drain into the SWM pond. An oil/grit separator (OGS) unit is proposed at the outlet of the SWM Pond which will treat stormwater prior to outletting to the existing ditch on Main Street. The MECP standard stipulates a Total Suspended Solids (TSS) removal of at least 80%. The OGS unit will treat the post development flows to the required MECP quality standard with a minimum TSS removal rate of 80%. The OGS sizing and model information will be provided at the detailed design stage.

5.7.2. Quality Control during Construction

During construction, earth grading and excavation will create the potential for soil erosion and sedimentation. It is imperative that effective environmental and sedimentation controls are in place and maintained throughout the duration of construction activities to ensure the stormwater runoff's quality. Therefore, the following recommendations shall be implemented and maintained during construction to achieve acceptable stormwater runoff quality:

Installation of filter strips, silt fences and rock check dams or other similar facilities throughout the site, and specifically during all construction activities, in order to reduce stormwater drainage velocities and trap sediment on-site; and,

- Restoration of exposed surfaces with vegetative and non-vegetative material as soon as construction schedules permit; the duration in which surfaces are disturbed/exposed shall not exceed 30 days.
- Provision of a mud-mat where applicable at the construction entrances in order to control the tracking of sediment and debris onto municipal streets.
- Reduce stormwater drainage velocities where possible.
- Minimize the amount of existing vegetation removed.

6. Floodline Analysis

6.1. NVCA Hydraulic Model Calibration

Based on NVCA regulation mapping, the proposed subdivision is located adjacent to the Horning's Mills Creek. The Generic Regulations Floodplain model was obtained from NVCA, which is based on their digital elevation model (DEM) which is accurate to ± 1.0 m. By comparing 25 elevation points in the model to the site's topographic survey, a surface adjustment factor of 0.50 m was calculated. NVCA comparison calculations can be found in Appendix A.

Parameters including bank locations and Mannings 'n' values were reviewed and updated in the NVCA HEC-RAS model where required to better reflect existing site conditions. Cross sections including 629.5018 and 708.8950 were updated with roadway deck elevations obtained from the topographic survey data completed in 2023 by Van Harten Land Surveyors (Van Harten).

6.2. Existing Conditions

Horning's Mills Creek flows northerly adjacent to the subject site. The Project site is located nearest to cross sections 1101.924 adjacent to the northern property line and to 550.5031 adjacent to the southern property line along Horning's Mills Creek. Site specific topographic information was added to the NVCA HEC-RAS Model wherever the existing cross sections intersected the Van Harten topographic survey. The model was run with the updated cross sections and parameters, and a summary of the floodline elevations at these cross sections can be seen in Table 4 below.

Table 4: Horning's Mills Creek Existing Floodline Elevations

HEC-RAS Cross Section Station (m)	Regulation NVCA Model Floodline Elevation (m)	Adjusted Floodline Elevation (m)
1101.924	468.90	469.40
992.4937	464.87	465.37
861.7521	461.71	462.21
820.3592	460.71	461.21
708.8950	458.81	459.31
629.5018	458.70	459.31
591.3686	458.81	459.31
550.5031	455.38	455.88

Note: Adjusted floodline elevation calculated using surface adjustment factor.

6.3. Main Street Overtopping Analysis

Horning's Mills Creek runs northerly crossing west to east under Main Street to the southeast of the site and crosses again east to west under Main Street to the northeast of the site. The existing 900mm diameter culvert to the southeast of the site does not have capacity to convey the full Regional peak flow without overtopping the road. Based on a topographic survey provided by Van Harten, there is no low point overtop of the culvert for conveyance of the Regional flow across Main Street. Regional flow not conveyed by the 900mm culvert is conveyed northerly in the ditch on the west side of Main Street until it must overtop the driveway of 537080 Main Street (537080) just north of the 900mm culvert crossing. The driveway of 537080 and the centerline of the road create a weir over Main Street which is utilized to calculate the floodline elevation in front of 537080. Conveyance over Main Street at this location was analyzed by culvert and weir flow calculations to determine the following:

- Flow in 900mm culvert of 1.42m3/s
- Flow overtopping Main Street (to Horning's Mills Creek) of 3.2m3/s
- Flow overtopping 537080 to west ditch of 3.2m3/s.
- Overtopping elevation of 462.27

At the location of the proposed municipal roadway for the project, an existing farmers entrance exists. Similar to the driveway at 537080 Regional peak flows must overtop this driveway to continue northerly to the Creek. An existing 550mm culvert under the farmers entrance and weir flow were used to calculate the flow across Main Street and northerly within the west ditch. Calculations show that the Regional elevation crossing Main Street at this location is 406.93.

Ditch flow calculations were completed for the ditch between 537080 and the proposed municipal road for the project and downstream of the proposed municipal road. Detailed weir calculations and ditch capacity calculations can be found in Appendix B.

6.4. Proposed Conditions

Typically, the HEC-RAS model is updated to include the proposed site conditions for analysis. However, it can be seen on Drawing FL-1 that the limit of grading of the site is outside the flood

extents and required setbacks except for the road connection. Given the elevations of the existing site topography and the farmers entrance elevations, the proposed road will be at similar elevations to the existing grades. Therefore, the floodline will not be impacted by the development and the model of proposed conditions will be equivalent to that of existing conditions. The culvert which will cross under the access road for the site will be sized at the detailed design phase of this project to Township standards and is assumed to be at least as big as the existing 550mm culvert.

7. Phosphorus Budget

Local conservation authorities have determined the importance of reducing phosphorus levels in water courses. Best efforts are proposed in order to reduce phosphorus levels to pre-development levels or better.

The existing site consists of cultivated land and a small treed area and generates approximately 2.03 kg of phosphorus annually. The development of the project will increase the amount of phosphorus contributed from the site to 2.81 kg annually if uncontrolled. To minimize the site's phosphorous discharge, a treatment train approach will be implemented. Stormwater from the rooftop area will drain to soakaway pits for infiltration. Stormwater that doesn't infiltrate will overflow to the surface and drain to the roadside drainage ditch conveyance system and ultimately to the proposed SWM Pond. Stormwater will then be conveyed through an OGS treatment unit prior to outlet to the roadside ditch on Main Street.

According to the NVCA Phosphorus Loading Tool, a reduction of 10% is provided for dry detention ponds, 20% for OGS units, and 100% for infiltration. As per water balance calculations, the soakaway pits have been sized to infiltrate 95% of annual rainfall, therefore a phosphorous reduction of 95% was utilized. Table 5 below details the anticipated phosphorus loading for pre- and post-development conditions for the total site based on the above noted treatment train approach. Detailed phosphorus loading calculations derived from NVCA Phosphorus Loading Tool for the project can be found in Appendix E with a summary of values shown in Table 5 below.

Table 5: Phosphorus Loadings

	Total P (kg)
Pre-Development	2.03
Uncontrolled Post-Development	2.81
Controlled Post-Development	1.69

8. Water Balance

Since the post-development state will increase the imperviousness of the site, considerations were taken in regard to groundwater recharge. A water budget was completed as per NVCA guidelines. Calculations were completed comparing the current condition infiltration volumes to post-development infiltration volumes. In the pre-development conditions, the site provides 26,306 m^3 of infiltration annually. In the post development condition, the site provides 19,953 m^3 of infiltration volume resulting in a deficit of 6,352 m^3 annually.

It is proposed to infiltrate the rooftop area of the proposed houses in soakaway pits. The soakaway pits will be sized for the 25 mm storm which accounts for 95% of annual rainfall. Calculations in Appendix F demonstrate that infiltrating the 25 mm storm will result in an annual infiltration of 5,464 m^3 of the total deficit of 6,352 m^3. Given that the maximum stormwater will be infiltrated from the rooftop area, this was considered best efforts for the project site. As per the Geotechnical Investigation completed by Cambium, the groundwater was encountered at 4.3 m below existing surface within monitoring well located to the northeast portion of the site.

A total of two 8.0 m x 2.5 m soakaway pits are proposed in all the lots, which will have a minimum depth and bottom area of 0.5m and 30m^2, respectively according to MECP requirements. Detailed water balance and soakaway pits calculations can be found in Appendix F.

9. Grading

A preliminary grading design has been completed for the project and has been designed to generally drain storm runoff to the northeast corner of the property at an average grade of 2.0% to 5.0% allowing the majority of the site to be conveyed to the proposed SWM pond. A small portion to the northeast corner, the northwest corner and south corner of the site will drain uncontrolled. Lots 1-11 as well as lots 15 ,19-21 will be split drainage. Lots 12-14,16,17 will have rear-to-front drainage. A rear yard swale along the north property is proposed which will convey flows from the rear portion of the lots to the proposed SWM pond. The proposed ditch located east of ‘Street B’ conveys stormwater to the proposed roadside ditch on Street ‘A’ and ultimately to the SWM pond. Refer to drawing SGS-1 for details of the preliminary grading design.

10. Secondary Utilities

Although there are no municipal services adjacent to the Project site, it is anticipated that secondary utilities (hydro, cable, phone and gas) will be readily available to service the site. Due to the rural nature of the development site, letters will be sent to utilities to confirm the location of existing utilities at the detailed design stage.

11. Conclusions

The proposed development will require septic beds and wells to service individual houses.

Quantity control for the development will be provided through the use of a proposed dry SWM pond controlling post-development flows to pre-development levels.

Quality control is provided by an OGS treatment unit and SWM pond.

To reduce phosphorus levels leaving the site, a treatment train approach will be implemented consisting of rooftop infiltration, dry SWM Pond and OGS treatment unit.

The analysis and designs outlined in this report demonstrates that servicing of the site is feasible.

The NVCA's HEC-RAS model was updated with additional cross-sections to demonstrate that the proposed project does not increase the existing floodline elevation.

All of which is respectfully submitted,

Pearson Engineering Ltd.

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Appendix A

Sanitary Flow Calculations

GSP Group Inc., Horning's Mills
Sanitary Flow Calculations

CLIENT: GSP Group Inc. **Date:** 22-Mar-24
PROJECT: 537086 Main Street, Horning's Mills **Designer:** NP
FILE: 23008

Property Information

	DESCRIPTION	Total Floor Area	Total Flow	
	Residential Subdivision	320.0 sq.m	**3200 L/day**	(Table 8.2.1.3.B)

Q = 3200 L/day
T = 30 min/cm (Based on Geotechnical Report)
Level of Pre-Treatment = Primary

FILTER BED (OBC 8.7.5.)

A_{stone} = Q/75 (if Q<3000)
A_{stone} = Q/50 (if Q>3000) — A_{stone} = 64.0 sq.m
A_{stone} = Q/100 (if Tertiary treatment is being used)

where
A = total area of sand layer in metres squared
Q = the total daily design sanitary sewage flow in litres

$A_{sand} = Q*T/850$ — A_{sand} = 112.9 sq.m

where
A = the area of contact in meters squared between the soil base of the filter medium and the underlying soil
Q = the total daily design sanitary sewage flow in litres
T = the design percolation time in minutes

$A_{mantle} = Q/L_R$ — A_{mantle} = 400.0 sq.m *

where
A = the area of the mantle in meters squared
L_R = Loading Rates (8L/m² for 20 < T ≤ 35 min as per OBC Table 8.7.4.1)

TYPE A DISPERSAL (OBC 8.7.7.)

A_{sand} = Q*T/850 (if T<15 min/com)
A_{sand} = Q*T/400 (if T>15 min/cm) — A_{sand} = 240.0 sq.m

where
A = total area of sand layer in metres squared
Q = the total daily design sanitary sewage flow in litres
T = the design percolation time in minutes

(OBC 8.7.7.)

A_{stone} = Q/B (where B = 50 if Q>3000L)
A_{stone} = Q/B (where B = 75 if Q<3000L) — A_{stone} = 64.0 sq.m

where
A = total area of stone layer in metres squared
Q = the total daily design sanitary sewage flow in litres

Note: * indicates the area of septic bed drawn in the drawings

GSP Group Inc., Horning's Mills

DESCRIPTION	Total Floor Area	Base Flow
4 Bedroom Dwelling	320.0	**2000 L/day**

Fixture		Fixture Count	Fixture Load	TOTAL Hydraulic Load / *Fixture Units*
	Domestic	1	1.5	1.5
	Commercial		3	0
Drinking Fountain			0.5	0
Fish Tank or Tray			1.5	0
Floor Drain				
	2" Trap	1	2	2
	3" Trap		3	0
Garbage Grinder (commercial)			3	0
Icebox			1	0
Laundry Tray				
	Single/Double	1	1.5	1.5
	3 Compartment		2	0
Lavatory				
	Barber or beauty parlor		1.5	0
	Dental Lavatory		1	0
	Domestic type single w/ 1.25" Trap		1	0
	Domestic type single w/ 1.5" Trap		1.5	0
	mulitple or industrial type		3	0
Potatoe Peeler			3	0
Shower Drain				
	from 1 head		1.5	0
	from 2 or 3 heads		3	0
	from 4 to 6 heads		6	0
Sink				
	Domestic and other small type without garbage grinders other sinks	1	1.5	1.5
	1.5" Trap		1.5	0
	2" Trap		2	0
	3" Trap		3	0
Total		**9**		**32.0**

Total Flow	3200 L/day

Appendix B

Stormwater Management Calculations

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GSP Inc., Horning's Mill
Calculation of Runoff Coefficients

Runoff Coefficient	=	0.15	0.35	0.25	0.95	0.95	0.60	0.95		Weighted Runoff Coefficient
Surface Cover	=	Grass	Cultivated/Pastures	Forest	Asphalt	Building	Gravel	Concrete		
Pre-Development	Total Area (m^2)	Area (m^2)	Area (m^2)	Area (m^2)	Area (m^2)	Area (m^2)	Area (m^2)	Area (m^2)		
100	113460	0	102471	10057	0	335	597	0		0.34
Pre Total	113460	0	102471	10057	0	335	597	0		0.34

Post-Development	Total Area (m^2)	Area (m^2)	Area (m^2)	Area (m^2)	Area (m^2)	Area (m^2)	Area (m^2)	Area (m^2)		
200	101048	82521	0	0	9230	7055	2074	168		0.29
201	2440	0	2161	0	210	0	69	0		0.41
202	1794	0	734	1060	0	0	0	0		0.29
203	8178	0	6060	2118	0	0	0	0		0.32
Post Total	113460	82521	8955	3178	9440	7055	2143	168		0.30

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GSP Inc., Horning's Mill
Pre-Development OTTHYMO Parameters

Drainage ID	=	**100**	
Cultivated	=	10.25	ha.
Woods Area	=	1.01	ha.
Impervious area	=	0.09	
Total Area	=	11.35	ha.

Based on soils revealed in Cambium Inc,'s Geotechnical Investigation and Borehole Logs, the following Soil Group was assumed:

Hydrologic Soils Group:	=	B	

CN Value is as follows:

CN	=	74	(Cultivated as per NVCA Guidelines)
CN	=	60	(Woods as per NVCA Guidelines)
CN	=	100	(Impervious as per NVCA Guidelines)
CN	=	$\frac{74 \times 10.24 + 60 \times 1.01 + 100 \times 0.10}{11.35}$	
CN	=	73	

IA Value is as follows:

IA	=	7	(Cultivated as per NVCA Guidelines)
IA	=	10	(Woods as per NVCA Guidelines)
IA	=	2	(Impervious as per NVCA Guidelines)
IA	=	$\frac{7 \times 10.24 + 10 \times 1.01 + 2 \times 0.10}{11.35}$	
IA	=	7.2	

Runoff Coefficient Value is as follows:

C	=	0.35	(Cultivated as per NVCA Guidelines)
C	=	0.25	(Woods as per NVCA Guidelines)
C	=	0.95	(Impervious as per NVCA Guidelines)
C	=	$\frac{0.35 \times 10.24 + 0.25 \times 1.01 + 0.95 \times 0.10}{11.35}$	
C	=	0.35	

Find Time to Peak using Airport Equation and Uplands Method

Airport Equation $T_c = 3.26(1.1 - c)L^{0.5}S_w^{-0.33}$

Length (L)	=	499	m
Elevation 1 (El_1)	=	483.87	m
Elevation 2 (El_2)	=	458.14	m
Slope (S)	=	0.052	m/m
Time of Concentration (T_c)	=	31.80	minutes
Total Time of Concentration (T_c)	=	31.80	minutes
T_c	=	0.53	hrs.
Time to Peak (T_p = 2/3 T_c)	=	0.35	hrs.

Uplands Method

Section	=	1		2	
Land Cover	=	Pasture		Woods	
Length	=	125	m	44	m
Slope	=	0.052	m/m	0.052	m/m
Velocity	=	0.52	m/s	0.52	m/s
Time	=	0.07	hrs.	0.02	hrs.
Total Time	=	0.09	hrs.		

Governing Time to Peak

Airport Equation

T_c	=	0.53	hrs.
T_p	=	0.35	hrs.
D_T (1/5 T_p)	=	4	mins.

PEARSON ENGINEERING

GSP Inc., Horning's Mill
Post-Development OTTHYMO Parameters

Drainage ID	**=**	**200**	
Lot Coverage			
Total Catchment Area	=	101,048	m^2
Number of Lots	=	21	
Area of House	=	320	m^2
Rooftop Area	=	6,720	m^2
Number of Driveways	=	21	
Length of Driveways	=	20.0	m
Width of Driveway	=	9.0	m
Area of Driveways	=	3,742	m^2
Existing Imperviousness (517143 DCR)	=	932	m^2
Number of Walkways	=	21	
Length of Walkway	=	4.0	m
Width of Walkway	=	2.0	m
Area of Walkways	=	168	m^2
20.0 m R.O.W. - 9.1 m Road (Assumed):			
Area of Road	=	5,488	m^2
Pond Block			
Area of Pond Block	=	2,756	m^2
impervious Area of Pond Block (50%)	=	1378	m^2
Total Impervious Area	=	1.84	ha
Total Catchment Area	=	10.10	ha
% Total Impervious	=	1.84 / 10.10	ha / ha
	=	18%	

Drainage ID	**=**	**201**	
Pasture	=	0.22	ha.
Impervious	=	0.03	ha.
Total Area	=	0.24	ha.

Based on soils revealed in Cambium Inc,'s Geotechnical Investigation and Borehole Logs, the following Soil Group was assumed:

Hydrologic Soils Group: = B

CN Value is as follows:

CN	=	69	(Pasture/lawn as per NVCA Guidelines)
CN	=	100	(Impervious as per NVCA Guidelines)
CN	=	$\frac{69 \times 0.22 + 100 \times 0.03}{0.24}$	
CN	=	73	

IA Value is as follows:

IA	=	5	(Lawns as per NVCA Guidelines)
IA	=	2	(Impervious as per NVCA Guidelines)
IA	=	$\frac{5 \times 0.22 + 2 \times 0.03}{0.24}$	
IA	=	5	

Runoff Coefficient Value is as follows:

C	=	0.20	(Pasture/lawn as per NVCA Guidelines)
C	=	0.95	(Impervious as per MTO Guidelines)
C	=	$\frac{0.20 \times 0.22 + 0.95 \times 0.03}{0.24}$	
C	=	0.29	

Find Time to Peak using Airport Equation and Uplands Method

Airport Equation $T_c = 3.26(1.1 - c)L^{0.5}S_w^{-0.33}$

Length (L)	=	41	m
Elevation 1 (El_1)	=	463.15	m
Elevation 2 (El_2)	=	458.50	m
Slope (S)	=	0.113	m/m
Time of Concentration (T_c)	=	7.57	minutes
Total Time of Concentration (T_c)	=	7.57	minutes
	=	0.13	hrs.

Uplands Method

Section	=	1	
Land Cover	=	Pasture	
Length	=	41	m
Slope	=	0.113	m/m
Velocity	=	0.77	m/s
Time of Concentration (T_c)	=	0.01	hrs.
Total Time of Concentration (T_c)	=	0.01	hrs.

Governing Time to Peak

Airport Equation

T_c	=	0.13	hrs.
T_p (Tp = 2/3 Tc)	=	0.08	hrs.
D_T (1/5 T_p)	=	1	mins.

Drainage ID	**=**	**202**	
Pasture	=	0.18	ha.
Total Area	=	0.18	ha.

Based on soils revealed in Cambium Inc,'s Geotechnical Investigation and Borehole Logs, the following Soil Group was assumed:

Hydrologic Soils Group:	=	B	

CN Value is as follows:

CN	=	69	(Pasture/lawn as per NVCA Guidelines)

IA Value is as follows:

IA	=	5	(Lawn as per NVCA Guidelines)

Runoff Coefficient Value is as follows:

C	=	0.20	(Lawns as per NVCA Guidelines)

Find Time to Peak using Airport Equation and Uplands Method

Airport Equation $T_c = 3.26(1.1 - c)L^{0.5}S_w^{-0.33}$

Length (L)	=	161	m
Elevation 1 (EI_1)	=	481.00	m
Elevation 2 (EI_2)	=	476.30	m
Slope (S)	=	0.029	m/m
Time of Concentration (T_c)	=	22.84	minutes
Total Time of Concentration (T_c)	=	22.84	minutes
	=	0.38	hrs.

Uplands Method

Section	=	1	
Land Cover	=	Pasture	
Length	=	161	m
Slope	=	0.029	m/m
Velocity	=	0.39	m/s
Time of Concentration (T_c)	=	0.11	hrs.
Total Time of Concentration (T_c)	=	0.11	hrs.

Governing Time to Peak

Airport Equation

T_c	=	0.38	hrs.
T_p (Tp = 2/3 Tc)	=	0.25	hrs.
D_T (1/5 T_p)	=	3	mins.

Drainage ID	**=**	**203**	
Pasture	=	0.82	ha.
Total Area	=	0.82	ha.

Based on soils revealed in Cambium Inc,'s Geotechnical Investigation and Borehole Logs, the following Soil Group was assumed:

Hydrologic Soils Group:	=	B	

CN Value is as follows:

CN	=	69	(Pasture/lawns as per NVCA Guidelines)

IA Value is as follows:

IA	=	5	(Lawns as per NVCA Guidelines)

Runoff Coefficient Value is as follows:

C	=	0.20	(Grass as per NVCA Guidelines)

Find Time to Peak using Airport Equation and Uplands Method

Airport Equation		$T_c = 3.26(1.1 - c)L^{0.5}S_w^{-0.33}$	
Length (L)	=	77	m
Elevation 1 (El_1)	=	474.00	m
Elevation 2 (El_2)	=	468.88	m
Slope (S)	=	0.066	m/m
Time of Concentration (T_c)	=	13.70	minutes
Total Time of Concentration (T_c)	=	13.70	minutes
	=	0.23	hrs.

Uplands Method

Section	=	1	
Land Cover	=	Pasture	
Length	=	77	m
Slope	=	0.066	m/m
Velocity	=	0.59	m/s
Time of Concentration (T_c)	=	0.04	hrs.
Total Time of Concentration (T_c)	=	0.04	hrs.

Governing Time to Peak

Airport Equation

T_c	=	0.23	hrs.
T_p (Tp = 2/3 Tc)	=	0.15	hrs.
D_T (1/5 T_p)	=	2	mins.

Outlook

FW: Summary of Meeting

From April Cleaves <acleaves@pearsoneng.com>
Date Wed 10/15/2025 11:45 AM
To Dennis Bozek <dbozek@pearsoneng.com>

Regards,

April Cleaves, B.A. Tech., C.E.T.
Senior Project Manager

PEARSON ENGINEERING

BARRIE HEAD OFFICE
93 Bell Farm Road, Suite 107
Barrie, ON L4M 5G1
P: 705-719-4785 ext. 233
acleaves@pearsoneng.com
pearsoneng.com

GTA	OTTAWA	OWEN SOUND
905-597-5572	613-416-1232	226-256-7957

From: Gord Feniak <Gord.Feniak@rjburnside.com>
Sent: May 21, 2025 1:45 PM
To: April Cleaves <acleaves@pearsoneng.com>; Valerie Schmidt <vschmidt@gspgroup.ca>; Liam Morgan <lmorgan@melancthontownship.ca>
Cc: Denise Holmes <dholmes@melancthontownship.ca>; Kaitlin Dinnick <kdinnick@melancthontownship.ca>; Marco Carnevale <marcoc@peelplastics.com>; Angelo Carnevale <angelocarnevale@hotmail.com>; Gary Pearson <gpearson@pearsoneng.com>; Mike Dejean <mdejean@pearsoneng.com>; Dan Stuart <dstuart@azimuthenvironmental.com>; Craig Micks (roads@melancthontownship.ca) <roads@melancthontownship.ca>
Subject: RE: Summary of Meeting

Hi April- We have reviewed the information you submitted and agree with your conclusions. The Township accepts your recommendation for an oil-grit separator…..gf

Gord Feniak
Executive Vice President, Public Sector
R.J. Burnside & Associates Limited | www.rjburnside.com
Office: +1 800-265-9662 Direct: +1 519-938-3076

From: April Cleaves <acleaves@pearsoneng.com>
Sent: Wednesday, May 14, 2025 9:12 AM
To: Gord Feniak <Gord.Feniak@rjburnside.com>; Valerie Schmidt <vschmidt@gspgroup.ca>; Liam Morgan <lmorgan@melancthontownship.ca>
Cc: Denise Holmes <dholmes@melancthontownship.ca>; Kaitlin Dinnick <kdinnick@melancthontownship.ca>; Marco Carnevale <marcoc@peelplastics.com>; Angelo Carnevale <angelocarnevale@hotmail.com>; Gary Pearson <gpearson@pearsoneng.com>; Mike Dejean <mdejean@pearsoneng.com>; Dan Stuart <dstuart@azimuthenvironmental.com>
Subject: RE: Summary of Meeting

Good Morning Gord,
Please find attached our maintenance cost comparison for a wet pond versus an oil-grit separator. We would like to confirm approach prior to our resubmission. If you have any questions or require any further information, please let us know.

Regards,

April Cleaves, B.A. Tech., C.E.T.
Senior Project Manager

PEARSON ENGINEERING

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Barrie, ON L4M 5G1
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acleaves@pearsoneng.com
pearsoneng.com

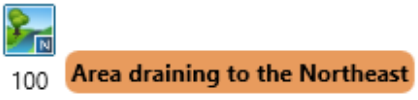
GTA	OTTAWA	OWEN SOUND
905-597-5572	613-416-1232	226-256-7957

From: Gord Feniak <Gord.Feniak@rjburnside.com>
Sent: March 7, 2025 9:36 AM
To: Valerie Schmidt <vschmidt@gspgroup.ca>; Liam Morgan <lmorgan@melancthontownship.ca>
Cc: Denise Holmes <dholmes@melancthontownship.ca>; Kaitlin Dinnick <kdinnick@melancthontownship.ca>; Marco Carnevale <marcoc@peelplastics.com>; Angelo Carnevale <angelocarnevale@hotmail.com>; April Cleaves <acleaves@pearsoneng.com>; Gary Pearson <gpearson@pearsoneng.com>; Mike Dejean <mdejean@pearsoneng.com>; Dan Stuart <dstuart@azimuthenvironmental.com>
Subject: RE: Summary of Meeting

Hi Valerie- I have added some text in blue below…..gf

Appendix C

Pre-Development OTTHYMO Results



```
================================================================================
==========================

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

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


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  Output  filename: C:\Users\nparmar\AppData\Local\Civica\VH5\eaaed411-b099-4108-
b6b0-cc0fca6dc942\38639de7-2f51-4740-aad1-74720b25ce43\scen
  Summary filename: C:\Users\nparmar\AppData\Local\Civica\VH5\eaaed411-b099-4108-
b6b0-cc0fca6dc942\38639de7-2f51-4740-aad1-74720b25ce43\scen


DATE: 02-23-2024                              TIME: 08:29:30

USER:



COMMENTS: _____________________________________________________________________

--------------------------------------------------------------------------------
--------------------------
  ************************************************
  ** SIMULATION : Run 07                        **
  ************************************************



--------------------
|    READ STORM    |    Filename: C:\Users\nparmar\AppD
|                  |              ata\Local\Temp\
|                  |              2218ca26-588a-4c72-a3d8-a41c1a450bb1\9bce3a2a
| Ptotal= 55.00 mm |    Comments: 24hr 2year SCS STORM - CITY OF BARRIE
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.55 |  6.00    1.10 | 12.00    7.92 | 18.00    0.99
                0.25    0.55 |  6.25    1.10 | 12.25    7.92 | 18.25    0.99
                0.50    0.55 |  6.50    1.10 | 12.50    4.07 | 18.50    0.99
                0.75    0.55 |  6.75    1.10 | 12.75    4.07 | 18.75    0.99
                1.00    0.55 |  7.00    1.10 | 13.00    0.77 | 19.00    0.99
                1.25    0.55 |  7.25    1.10 | 13.25    0.77 | 19.25    0.99
                1.50    0.55 |  7.50    1.10 | 13.50    4.51 | 19.50    0.99
                1.75    0.99 |  7.75    1.10 | 13.75    4.51 | 19.75    0.99
                2.00    0.71 |  8.00    1.49 | 14.00    1.65 | 20.00    0.66
                2.25    0.71 |  8.25    1.49 | 14.25    1.65 | 20.25    0.66
                2.50    0.71 |  8.50    1.49 | 14.50    1.65 | 20.50    0.66
                2.75    0.71 |  8.75    1.49 | 14.75    1.65 | 20.75    0.66
```

3.00	0.71	9.00	1.76	15.00	1.65	21.00	0.66
3.25	0.71	9.25	1.76	15.25	1.65	21.25	0.66
3.50	0.71	9.50	1.98	15.50	1.65	21.50	0.66
3.75	0.71	9.75	1.98	15.75	1.65	21.75	0.66
4.00	0.88	10.00	2.53	16.00	0.99	22.00	0.66
4.25	0.88	10.25	2.53	16.25	0.99	22.25	0.66
4.50	0.88	10.50	3.41	16.50	0.99	22.50	0.66
4.75	0.88	10.75	3.41	16.75	0.99	22.75	0.66
5.00	0.88	11.00	5.28	17.00	0.99	23.00	0.66
5.25	0.88	11.25	5.28	17.25	0.99	23.25	0.66
5.50	0.88	11.50	22.88	17.50	0.99	23.50	0.66
5.75	0.88	11.75	60.72	17.75	0.99	23.75	0.66

CALIB			
NASHYD (0100)	Area (ha)=	11.35	Curve Number (CN)= 73.0
ID= 1 DT= 5.0 min	Ia (mm)=	7.20	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.35	

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	0.55	6.083	1.10	12.083	7.93	18.08	0.99
0.167	0.55	6.167	1.10	12.167	7.92	18.17	0.99
0.250	0.55	6.250	1.10	12.250	7.92	18.25	0.99
0.333	0.55	6.333	1.10	12.333	7.92	18.33	0.99
0.417	0.55	6.417	1.10	12.417	7.92	18.42	0.99
0.500	0.55	6.500	1.10	12.500	7.92	18.50	0.99
0.583	0.55	6.583	1.10	12.583	4.07	18.58	0.99
0.667	0.55	6.667	1.10	12.667	4.07	18.67	0.99
0.750	0.55	6.750	1.10	12.750	4.07	18.75	0.99
0.833	0.55	6.833	1.10	12.833	4.07	18.83	0.99
0.917	0.55	6.917	1.10	12.917	4.07	18.92	0.99
1.000	0.55	7.000	1.10	13.000	4.07	19.00	0.99
1.083	0.55	7.083	1.10	13.083	0.77	19.08	0.99
1.167	0.55	7.167	1.10	13.167	0.77	19.17	0.99
1.250	0.55	7.250	1.10	13.250	0.77	19.25	0.99
1.333	0.55	7.333	1.10	13.333	0.77	19.33	0.99
1.417	0.55	7.417	1.10	13.417	0.77	19.42	0.99
1.500	0.55	7.500	1.10	13.500	0.77	19.50	0.99
1.583	0.55	7.583	1.10	13.583	4.51	19.58	0.99
1.667	0.55	7.667	1.10	13.667	4.51	19.67	0.99
1.750	0.55	7.750	1.10	13.750	4.51	19.75	0.99
1.833	0.99	7.833	1.10	13.833	4.51	19.83	0.99
1.917	0.99	7.917	1.10	13.917	4.51	19.92	0.99
2.000	0.99	8.000	1.10	14.000	4.51	20.00	0.99
2.083	0.71	8.083	1.49	14.083	1.65	20.08	0.66
2.167	0.71	8.167	1.49	14.167	1.65	20.17	0.66
2.250	0.71	8.250	1.48	14.250	1.65	20.25	0.66
2.333	0.71	8.333	1.49	14.333	1.65	20.33	0.66
2.417	0.71	8.417	1.49	14.417	1.65	20.42	0.66
2.500	0.71	8.500	1.48	14.500	1.65	20.50	0.66
2.583	0.71	8.583	1.49	14.583	1.65	20.58	0.66
2.667	0.71	8.667	1.49	14.667	1.65	20.67	0.66
2.750	0.71	8.750	1.48	14.750	1.65	20.75	0.66
2.833	0.71	8.833	1.49	14.833	1.65	20.83	0.66
2.917	0.71	8.917	1.49	14.917	1.65	20.92	0.66
3.000	0.71	9.000	1.49	15.000	1.65	21.00	0.66
3.083	0.71	9.083	1.76	15.083	1.65	21.08	0.66

3.167	0.71	9.167	1.76	15.167	1.65	21.17	0.66
3.250	0.71	9.250	1.76	15.250	1.65	21.25	0.66
3.333	0.71	9.333	1.76	15.333	1.65	21.33	0.66
3.417	0.71	9.417	1.76	15.417	1.65	21.42	0.66
3.500	0.71	9.500	1.76	15.500	1.65	21.50	0.66
3.583	0.71	9.583	1.98	15.583	1.65	21.58	0.66
3.667	0.71	9.667	1.98	15.667	1.65	21.67	0.66
3.750	0.71	9.750	1.98	15.750	1.65	21.75	0.66
3.833	0.71	9.833	1.98	15.833	1.65	21.83	0.66
3.917	0.71	9.917	1.98	15.917	1.65	21.92	0.66
4.000	0.71	10.000	1.98	16.000	1.65	22.00	0.66
4.083	0.88	10.083	2.53	16.083	0.99	22.08	0.66
4.167	0.88	10.167	2.53	16.167	0.99	22.17	0.66
4.250	0.88	10.250	2.53	16.250	0.99	22.25	0.66
4.333	0.88	10.333	2.53	16.333	0.99	22.33	0.66
4.417	0.88	10.417	2.53	16.417	0.99	22.42	0.66
4.500	0.88	10.500	2.53	16.500	0.99	22.50	0.66
4.583	0.88	10.583	3.41	16.583	0.99	22.58	0.66
4.667	0.88	10.667	3.41	16.667	0.99	22.67	0.66
4.750	0.88	10.750	3.41	16.750	0.99	22.75	0.66
4.833	0.88	10.833	3.41	16.833	0.99	22.83	0.66
4.917	0.88	10.917	3.41	16.917	0.99	22.92	0.66
5.000	0.88	11.000	3.41	17.000	0.99	23.00	0.66
5.083	0.88	11.083	5.28	17.083	0.99	23.08	0.66
5.167	0.88	11.167	5.28	17.167	0.99	23.17	0.66
5.250	0.88	11.250	5.28	17.250	0.99	23.25	0.66
5.333	0.88	11.333	5.28	17.333	0.99	23.33	0.66
5.417	0.88	11.417	5.28	17.417	0.99	23.42	0.66
5.500	0.88	11.500	5.28	17.500	0.99	23.50	0.66
5.583	0.88	11.583	22.88	17.583	0.99	23.58	0.66
5.667	0.88	11.667	22.88	17.667	0.99	23.67	0.66
5.750	0.88	11.750	22.88	17.750	0.99	23.75	0.66
5.833	0.88	11.833	60.72	17.833	0.99	23.83	0.66
5.917	0.88	11.917	60.72	17.917	0.99	23.92	0.66
6.000	0.88	12.000	60.72	18.000	0.99	24.00	0.66

Unit Hyd Qpeak (cms)= 1.239

PEAK FLOW (cms)= 0.300 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 16.116
TOTAL RAINFALL (mm)= 55.000
RUNOFF COEFFICIENT = 0.293

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

```
================================================================================
==========================

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

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


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  Summary filename: C:\Users\nparmar\AppData\Local\Civica\VH5\eaaed411-b099-4108-
b6b0-cc0fca6dc942\baf3b75a-a091-4fe3-bbe0-a168bbba3b91\scen


DATE: 02-23-2024                              TIME: 08:29:30

USER:



COMMENTS: _____________________________________________________________________

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  ************************************************
  ** SIMULATION : Run 08                        **
  ************************************************



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|    READ STORM    |    Filename: C:\Users\nparmar\AppD
|                  |              ata\Local\Temp\
|                  |              2218ca26-588a-4c72-a3d8-a41c1a450bb1\689870c2
| Ptotal= 76.00 mm |    Comments: 24hr 5year SCS STORM - CITY OF BARRIE
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.76 |  6.00    1.52 | 12.00   10.94 | 18.00    1.37
                0.25    0.76 |  6.25    1.52 | 12.25   10.94 | 18.25    1.37
                0.50    0.76 |  6.50    1.52 | 12.50    5.62 | 18.50    1.37
                0.75    0.76 |  6.75    1.52 | 12.75    5.62 | 18.75    1.37
                1.00    0.76 |  7.00    1.52 | 13.00    1.06 | 19.00    1.37
                1.25    0.76 |  7.25    1.52 | 13.25    1.06 | 19.25    1.37
                1.50    0.76 |  7.50    1.52 | 13.50    6.23 | 19.50    1.37
                1.75    1.37 |  7.75    1.52 | 13.75    6.23 | 19.75    1.37
                2.00    0.99 |  8.00    2.05 | 14.00    2.28 | 20.00    0.91
                2.25    0.99 |  8.25    2.05 | 14.25    2.28 | 20.25    0.91
                2.50    0.99 |  8.50    2.05 | 14.50    2.28 | 20.50    0.91
                2.75    0.99 |  8.75    2.05 | 14.75    2.28 | 20.75    0.91
```

3.00	0.99	9.00	2.43	15.00	2.28	21.00	0.91
3.25	0.99	9.25	2.43	15.25	2.28	21.25	0.91
3.50	0.99	9.50	2.74	15.50	2.28	21.50	0.91
3.75	0.99	9.75	2.74	15.75	2.28	21.75	0.91
4.00	1.22	10.00	3.50	16.00	1.37	22.00	0.91
4.25	1.22	10.25	3.50	16.25	1.37	22.25	0.91
4.50	1.22	10.50	4.71	16.50	1.37	22.50	0.91
4.75	1.22	10.75	4.71	16.75	1.37	22.75	0.91
5.00	1.22	11.00	7.30	17.00	1.37	23.00	0.91
5.25	1.22	11.25	7.30	17.25	1.37	23.25	0.91
5.50	1.22	11.50	31.62	17.50	1.37	23.50	0.91
5.75	1.22	11.75	83.90	17.75	1.37	23.75	0.91

CALIB			
NASHYD (0100)	Area (ha)=	11.35	Curve Number (CN)= 73.0
ID= 1 DT= 5.0 min	Ia (mm)=	7.20	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.35	

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	0.76	6.083	1.52	12.083	10.95	18.08	1.37
0.167	0.76	6.167	1.52	12.167	10.94	18.17	1.37
0.250	0.76	6.250	1.52	12.250	10.94	18.25	1.37
0.333	0.76	6.333	1.52	12.333	10.94	18.33	1.37
0.417	0.76	6.417	1.52	12.417	10.94	18.42	1.37
0.500	0.76	6.500	1.52	12.500	10.94	18.50	1.37
0.583	0.76	6.583	1.52	12.583	5.62	18.58	1.37
0.667	0.76	6.667	1.52	12.667	5.62	18.67	1.37
0.750	0.76	6.750	1.52	12.750	5.62	18.75	1.37
0.833	0.76	6.833	1.52	12.833	5.62	18.83	1.37
0.917	0.76	6.917	1.52	12.917	5.62	18.92	1.37
1.000	0.76	7.000	1.52	13.000	5.62	19.00	1.37
1.083	0.76	7.083	1.52	13.083	1.06	19.08	1.37
1.167	0.76	7.167	1.52	13.167	1.06	19.17	1.37
1.250	0.76	7.250	1.52	13.250	1.06	19.25	1.37
1.333	0.76	7.333	1.52	13.333	1.06	19.33	1.37
1.417	0.76	7.417	1.52	13.417	1.06	19.42	1.37
1.500	0.76	7.500	1.52	13.500	1.06	19.50	1.37
1.583	0.76	7.583	1.52	13.583	6.23	19.58	1.37
1.667	0.76	7.667	1.52	13.667	6.23	19.67	1.37
1.750	0.76	7.750	1.52	13.750	6.23	19.75	1.37
1.833	1.37	7.833	1.52	13.833	6.23	19.83	1.37
1.917	1.37	7.917	1.52	13.917	6.23	19.92	1.37
2.000	1.37	8.000	1.52	14.000	6.23	20.00	1.37
2.083	0.99	8.083	2.05	14.083	2.28	20.08	0.91
2.167	0.99	8.167	2.05	14.167	2.28	20.17	0.91
2.250	0.99	8.250	2.05	14.250	2.28	20.25	0.91
2.333	0.99	8.333	2.05	14.333	2.28	20.33	0.91
2.417	0.99	8.417	2.05	14.417	2.28	20.42	0.91
2.500	0.99	8.500	2.05	14.500	2.28	20.50	0.91
2.583	0.99	8.583	2.05	14.583	2.28	20.58	0.91
2.667	0.99	8.667	2.05	14.667	2.28	20.67	0.91
2.750	0.99	8.750	2.05	14.750	2.28	20.75	0.91
2.833	0.99	8.833	2.05	14.833	2.28	20.83	0.91
2.917	0.99	8.917	2.05	14.917	2.28	20.92	0.91
3.000	0.99	9.000	2.05	15.000	2.28	21.00	0.91
3.083	0.99	9.083	2.43	15.083	2.28	21.08	0.91

3.167	0.99	9.167	2.43	15.167	2.28	21.17	0.91
3.250	0.99	9.250	2.43	15.250	2.28	21.25	0.91
3.333	0.99	9.333	2.43	15.333	2.28	21.33	0.91
3.417	0.99	9.417	2.43	15.417	2.28	21.42	0.91
3.500	0.99	9.500	2.43	15.500	2.28	21.50	0.91
3.583	0.99	9.583	2.74	15.583	2.28	21.58	0.91
3.667	0.99	9.667	2.74	15.667	2.28	21.67	0.91
3.750	0.99	9.750	2.74	15.750	2.28	21.75	0.91
3.833	0.99	9.833	2.74	15.833	2.28	21.83	0.91
3.917	0.99	9.917	2.74	15.917	2.28	21.92	0.91
4.000	0.99	10.000	2.74	16.000	2.28	22.00	0.91
4.083	1.22	10.083	3.50	16.083	1.37	22.08	0.91
4.167	1.22	10.167	3.50	16.167	1.37	22.17	0.91
4.250	1.22	10.250	3.50	16.250	1.37	22.25	0.91
4.333	1.22	10.333	3.50	16.333	1.37	22.33	0.91
4.417	1.22	10.417	3.50	16.417	1.37	22.42	0.91
4.500	1.22	10.500	3.50	16.500	1.37	22.50	0.91
4.583	1.22	10.583	4.71	16.583	1.37	22.58	0.91
4.667	1.22	10.667	4.71	16.667	1.37	22.67	0.91
4.750	1.22	10.750	4.71	16.750	1.37	22.75	0.91
4.833	1.22	10.833	4.71	16.833	1.37	22.83	0.91
4.917	1.22	10.917	4.71	16.917	1.37	22.92	0.91
5.000	1.22	11.000	4.71	17.000	1.37	23.00	0.91
5.083	1.22	11.083	7.30	17.083	1.37	23.08	0.91
5.167	1.22	11.167	7.30	17.167	1.37	23.17	0.91
5.250	1.22	11.250	7.30	17.250	1.37	23.25	0.91
5.333	1.22	11.333	7.30	17.333	1.37	23.33	0.91
5.417	1.22	11.417	7.30	17.417	1.37	23.42	0.91
5.500	1.22	11.500	7.30	17.500	1.37	23.50	0.91
5.583	1.22	11.583	31.61	17.583	1.37	23.58	0.91
5.667	1.22	11.667	31.62	17.667	1.37	23.67	0.91
5.750	1.22	11.750	31.62	17.750	1.37	23.75	0.91
5.833	1.22	11.833	83.90	17.833	1.37	23.83	0.91
5.917	1.22	11.917	83.90	17.917	1.37	23.92	0.91
6.000	1.22	12.000	83.90	18.000	1.37	24.00	0.91

Unit Hyd Qpeak (cms)= 1.239

PEAK FLOW (cms)= 0.555 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 29.079
TOTAL RAINFALL (mm)= 76.000
RUNOFF COEFFICIENT = 0.383

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\nparmar\AppData\Local\Civica\VH5\eaaed411-b099-4108-
b6b0-cc0fca6dc942\4dc5a568-c574-4abb-95c9-a3299e46b4f5\scen
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b6b0-cc0fca6dc942\4dc5a568-c574-4abb-95c9-a3299e46b4f5\scen


DATE: 02-23-2024                          TIME: 08:29:30

USER:



COMMENTS: _____________________________________________________________________

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  ************************************************
  ** SIMULATION : Run 09                        **
  ************************************************



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|    READ STORM    |    Filename: C:\Users\nparmar\AppD
|                  |              ata\Local\Temp\
|                  |              2218ca26-588a-4c72-a3d8-a41c1a450bb1\0d41b358
| Ptotal= 89.90 mm |    Comments: 24hr 10year SCS STORM - CITY OF BARRIE
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.90 |  6.00    1.80 | 12.00   12.95 | 18.00    1.62
                0.25    0.90 |  6.25    1.80 | 12.25   12.95 | 18.25    1.62
                0.50    0.90 |  6.50    1.80 | 12.50    6.65 | 18.50    1.62
                0.75    0.90 |  6.75    1.80 | 12.75    6.65 | 18.75    1.62
                1.00    0.90 |  7.00    1.80 | 13.00    1.26 | 19.00    1.62
                1.25    0.90 |  7.25    1.80 | 13.25    1.26 | 19.25    1.62
                1.50    0.90 |  7.50    1.80 | 13.50    7.37 | 19.50    1.62
                1.75    1.62 |  7.75    1.80 | 13.75    7.37 | 19.75    1.62
                2.00    1.17 |  8.00    2.43 | 14.00    2.70 | 20.00    1.08
                2.25    1.17 |  8.25    2.43 | 14.25    2.70 | 20.25    1.08
                2.50    1.17 |  8.50    2.43 | 14.50    2.70 | 20.50    1.08
                2.75    1.17 |  8.75    2.43 | 14.75    2.70 | 20.75    1.08
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3.00	1.17	9.00	2.88	15.00	2.70	21.00	1.08
3.25	1.17	9.25	2.88	15.25	2.70	21.25	1.08
3.50	1.17	9.50	3.24	15.50	2.70	21.50	1.08
3.75	1.17	9.75	3.24	15.75	2.70	21.75	1.08
4.00	1.44	10.00	4.14	16.00	1.62	22.00	1.08
4.25	1.44	10.25	4.14	16.25	1.62	22.25	1.08
4.50	1.44	10.50	5.57	16.50	1.62	22.50	1.08
4.75	1.44	10.75	5.57	16.75	1.62	22.75	1.08
5.00	1.44	11.00	8.63	17.00	1.62	23.00	1.08
5.25	1.44	11.25	8.63	17.25	1.62	23.25	1.08
5.50	1.44	11.50	37.40	17.50	1.62	23.50	1.08
5.75	1.44	11.75	99.25	17.75	1.62	23.75	1.08

CALIB			
NASHYD (0100)	Area (ha)= 11.35	Curve Number (CN)= 73.0	
ID= 1 DT= 5.0 min	Ia (mm)= 7.20	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.35		

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	0.90	6.083	1.80	12.083	12.96	18.08	1.62
0.167	0.90	6.167	1.80	12.167	12.95	18.17	1.62
0.250	0.90	6.250	1.80	12.250	12.95	18.25	1.62
0.333	0.90	6.333	1.80	12.333	12.95	18.33	1.62
0.417	0.90	6.417	1.80	12.417	12.95	18.42	1.62
0.500	0.90	6.500	1.80	12.500	12.95	18.50	1.62
0.583	0.90	6.583	1.80	12.583	6.65	18.58	1.62
0.667	0.90	6.667	1.80	12.667	6.65	18.67	1.62
0.750	0.90	6.750	1.80	12.750	6.65	18.75	1.62
0.833	0.90	6.833	1.80	12.833	6.65	18.83	1.62
0.917	0.90	6.917	1.80	12.917	6.65	18.92	1.62
1.000	0.90	7.000	1.80	13.000	6.65	19.00	1.62
1.083	0.90	7.083	1.80	13.083	1.26	19.08	1.62
1.167	0.90	7.167	1.80	13.167	1.26	19.17	1.62
1.250	0.90	7.250	1.80	13.250	1.26	19.25	1.62
1.333	0.90	7.333	1.80	13.333	1.26	19.33	1.62
1.417	0.90	7.417	1.80	13.417	1.26	19.42	1.62
1.500	0.90	7.500	1.80	13.500	1.26	19.50	1.62
1.583	0.90	7.583	1.80	13.583	7.37	19.58	1.62
1.667	0.90	7.667	1.80	13.667	7.37	19.67	1.62
1.750	0.90	7.750	1.80	13.750	7.37	19.75	1.62
1.833	1.62	7.833	1.80	13.833	7.37	19.83	1.62
1.917	1.62	7.917	1.80	13.917	7.37	19.92	1.62
2.000	1.62	8.000	1.80	14.000	7.37	20.00	1.62
2.083	1.17	8.083	2.43	14.083	2.70	20.08	1.08
2.167	1.17	8.167	2.43	14.167	2.70	20.17	1.08
2.250	1.17	8.250	2.43	14.250	2.70	20.25	1.08
2.333	1.17	8.333	2.43	14.333	2.70	20.33	1.08
2.417	1.17	8.417	2.43	14.417	2.70	20.42	1.08
2.500	1.17	8.500	2.43	14.500	2.70	20.50	1.08
2.583	1.17	8.583	2.43	14.583	2.70	20.58	1.08
2.667	1.17	8.667	2.43	14.667	2.70	20.67	1.08
2.750	1.17	8.750	2.43	14.750	2.70	20.75	1.08
2.833	1.17	8.833	2.43	14.833	2.70	20.83	1.08
2.917	1.17	8.917	2.43	14.917	2.70	20.92	1.08
3.000	1.17	9.000	2.43	15.000	2.70	21.00	1.08
3.083	1.17	9.083	2.88	15.083	2.70	21.08	1.08

3.167	1.17	9.167	2.88	15.167	2.70	21.17	1.08
3.250	1.17	9.250	2.88	15.250	2.70	21.25	1.08
3.333	1.17	9.333	2.88	15.333	2.70	21.33	1.08
3.417	1.17	9.417	2.88	15.417	2.70	21.42	1.08
3.500	1.17	9.500	2.88	15.500	2.70	21.50	1.08
3.583	1.17	9.583	3.24	15.583	2.70	21.58	1.08
3.667	1.17	9.667	3.24	15.667	2.70	21.67	1.08
3.750	1.17	9.750	3.24	15.750	2.70	21.75	1.08
3.833	1.17	9.833	3.24	15.833	2.70	21.83	1.08
3.917	1.17	9.917	3.24	15.917	2.70	21.92	1.08
4.000	1.17	10.000	3.24	16.000	2.70	22.00	1.08
4.083	1.44	10.083	4.14	16.083	1.62	22.08	1.08
4.167	1.44	10.167	4.14	16.167	1.62	22.17	1.08
4.250	1.44	10.250	4.14	16.250	1.62	22.25	1.08
4.333	1.44	10.333	4.14	16.333	1.62	22.33	1.08
4.417	1.44	10.417	4.14	16.417	1.62	22.42	1.08
4.500	1.44	10.500	4.14	16.500	1.62	22.50	1.08
4.583	1.44	10.583	5.57	16.583	1.62	22.58	1.08
4.667	1.44	10.667	5.57	16.667	1.62	22.67	1.08
4.750	1.44	10.750	5.57	16.750	1.62	22.75	1.08
4.833	1.44	10.833	5.57	16.833	1.62	22.83	1.08
4.917	1.44	10.917	5.57	16.917	1.62	22.92	1.08
5.000	1.44	11.000	5.57	17.000	1.62	23.00	1.08
5.083	1.44	11.083	8.63	17.083	1.62	23.08	1.08
5.167	1.44	11.167	8.63	17.167	1.62	23.17	1.08
5.250	1.44	11.250	8.63	17.250	1.62	23.25	1.08
5.333	1.44	11.333	8.63	17.333	1.62	23.33	1.08
5.417	1.44	11.417	8.63	17.417	1.62	23.42	1.08
5.500	1.44	11.500	8.63	17.500	1.62	23.50	1.08
5.583	1.44	11.583	37.40	17.583	1.62	23.58	1.08
5.667	1.44	11.667	37.40	17.667	1.62	23.67	1.08
5.750	1.44	11.750	37.40	17.750	1.62	23.75	1.08
5.833	1.44	11.833	99.24	17.833	1.62	23.83	1.08
5.917	1.44	11.917	99.25	17.917	1.62	23.92	1.08
6.000	1.44	12.000	99.25	18.000	1.62	24.00	1.08

Unit Hyd Qpeak (cms)= 1.239

PEAK FLOW (cms)= 0.745 (i)
TIME TO PEAK (hrs)= 12.167
RUNOFF VOLUME (mm)= 38.710
TOTAL RAINFALL (mm)= 89.900
RUNOFF COEFFICIENT = 0.431

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\nparmar\AppData\Local\Civica\VH5\eaaed411-b099-4108-
b6b0-cc0fca6dc942\78439ddb-c4b1-438e-ba1c-bffbad1ca4f0\scen
  Summary filename: C:\Users\nparmar\AppData\Local\Civica\VH5\eaaed411-b099-4108-
b6b0-cc0fca6dc942\78439ddb-c4b1-438e-ba1c-bffbad1ca4f0\scen


DATE: 02-23-2024                              TIME: 08:29:30

USER:



COMMENTS: _____________________________________________________________________

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  ************************************************
  ** SIMULATION : Run 10                        **
  ************************************************



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|    READ STORM    |    Filename: C:\Users\nparmar\AppD
|                  |              ata\Local\Temp\
|                  |              2218ca26-588a-4c72-a3d8-a41c1a450bb1\9ad5e3ee
| Ptotal=107.50 mm |    Comments: 24hr 25year SCS STORM - CITY OF BARRIE
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    1.08 |  6.00    2.15 | 12.00   15.48 | 18.00    1.93
                0.25    1.08 |  6.25    2.15 | 12.25   15.48 | 18.25    1.93
                0.50    1.08 |  6.50    2.15 | 12.50    7.95 | 18.50    1.93
                0.75    1.08 |  6.75    2.15 | 12.75    7.95 | 18.75    1.93
                1.00    1.08 |  7.00    2.15 | 13.00    1.50 | 19.00    1.93
                1.25    1.08 |  7.25    2.15 | 13.25    1.50 | 19.25    1.93
                1.50    1.08 |  7.50    2.15 | 13.50    8.81 | 19.50    1.93
                1.75    1.93 |  7.75    2.15 | 13.75    8.81 | 19.75    1.93
                2.00    1.40 |  8.00    2.90 | 14.00    3.22 | 20.00    1.29
                2.25    1.40 |  8.25    2.90 | 14.25    3.22 | 20.25    1.29
                2.50    1.40 |  8.50    2.90 | 14.50    3.22 | 20.50    1.29
                2.75    1.40 |  8.75    2.90 | 14.75    3.22 | 20.75    1.29
```

3.00	1.40	9.00	3.44	15.00	3.22	21.00	1.29
3.25	1.40	9.25	3.44	15.25	3.22	21.25	1.29
3.50	1.40	9.50	3.87	15.50	3.22	21.50	1.29
3.75	1.40	9.75	3.87	15.75	3.22	21.75	1.29
4.00	1.72	10.00	4.95	16.00	1.93	22.00	1.29
4.25	1.72	10.25	4.95	16.25	1.93	22.25	1.29
4.50	1.72	10.50	6.66	16.50	1.93	22.50	1.29
4.75	1.72	10.75	6.66	16.75	1.93	22.75	1.29
5.00	1.72	11.00	10.32	17.00	1.93	23.00	1.29
5.25	1.72	11.25	10.32	17.25	1.93	23.25	1.29
5.50	1.72	11.50	44.72	17.50	1.93	23.50	1.29
5.75	1.72	11.75	118.68	17.75	1.93	23.75	1.29

CALIB			
NASHYD (0100)	Area (ha)=	11.35	Curve Number (CN)= 73.0
ID= 1 DT= 5.0 min	Ia (mm)=	7.20	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.35	

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	1.08	6.083	2.15	12.083	15.49	18.08	1.94
0.167	1.08	6.167	2.15	12.167	15.48	18.17	1.93
0.250	1.08	6.250	2.15	12.250	15.48	18.25	1.93
0.333	1.08	6.333	2.15	12.333	15.48	18.33	1.94
0.417	1.08	6.417	2.15	12.417	15.48	18.42	1.93
0.500	1.08	6.500	2.15	12.500	15.48	18.50	1.93
0.583	1.08	6.583	2.15	12.583	7.96	18.58	1.94
0.667	1.08	6.667	2.15	12.667	7.95	18.67	1.93
0.750	1.08	6.750	2.15	12.750	7.95	18.75	1.93
0.833	1.07	6.833	2.15	12.833	7.95	18.83	1.94
0.917	1.08	6.917	2.15	12.917	7.95	18.92	1.93
1.000	1.08	7.000	2.15	13.000	7.95	19.00	1.93
1.083	1.07	7.083	2.15	13.083	1.51	19.08	1.94
1.167	1.08	7.167	2.15	13.167	1.50	19.17	1.93
1.250	1.08	7.250	2.15	13.250	1.50	19.25	1.93
1.333	1.08	7.333	2.15	13.333	1.50	19.33	1.94
1.417	1.08	7.417	2.15	13.417	1.50	19.42	1.93
1.500	1.08	7.500	2.15	13.500	1.50	19.50	1.94
1.583	1.08	7.583	2.15	13.583	8.81	19.58	1.93
1.667	1.08	7.667	2.15	13.667	8.81	19.67	1.93
1.750	1.08	7.750	2.15	13.750	8.81	19.75	1.94
1.833	1.93	7.833	2.15	13.833	8.81	19.83	1.93
1.917	1.93	7.917	2.15	13.917	8.81	19.92	1.93
2.000	1.93	8.000	2.15	14.000	8.81	20.00	1.93
2.083	1.40	8.083	2.90	14.083	3.23	20.08	1.29
2.167	1.40	8.167	2.90	14.167	3.22	20.17	1.29
2.250	1.40	8.250	2.90	14.250	3.22	20.25	1.29
2.333	1.40	8.333	2.90	14.333	3.22	20.33	1.29
2.417	1.40	8.417	2.90	14.417	3.22	20.42	1.29
2.500	1.40	8.500	2.90	14.500	3.22	20.50	1.29
2.583	1.40	8.583	2.90	14.583	3.22	20.58	1.29
2.667	1.40	8.667	2.90	14.667	3.22	20.67	1.29
2.750	1.40	8.750	2.90	14.750	3.22	20.75	1.29
2.833	1.40	8.833	2.90	14.833	3.22	20.83	1.29
2.917	1.40	8.917	2.90	14.917	3.22	20.92	1.29
3.000	1.40	9.000	2.90	15.000	3.22	21.00	1.29
3.083	1.40	9.083	3.44	15.083	3.22	21.08	1.29

3.167	1.40	9.167	3.44	15.167	3.22	21.17	1.29
3.250	1.40	9.250	3.44	15.250	3.22	21.25	1.29
3.333	1.40	9.333	3.44	15.333	3.22	21.33	1.29
3.417	1.40	9.417	3.44	15.417	3.22	21.42	1.29
3.500	1.40	9.500	3.44	15.500	3.22	21.50	1.29
3.583	1.40	9.583	3.87	15.583	3.22	21.58	1.29
3.667	1.40	9.667	3.87	15.667	3.22	21.67	1.29
3.750	1.40	9.750	3.87	15.750	3.22	21.75	1.29
3.833	1.40	9.833	3.87	15.833	3.22	21.83	1.29
3.917	1.40	9.917	3.87	15.917	3.22	21.92	1.29
4.000	1.40	10.000	3.87	16.000	3.22	22.00	1.29
4.083	1.72	10.083	4.94	16.083	1.94	22.08	1.29
4.167	1.72	10.167	4.95	16.167	1.93	22.17	1.29
4.250	1.72	10.250	4.95	16.250	1.93	22.25	1.29
4.333	1.72	10.333	4.94	16.333	1.94	22.33	1.29
4.417	1.72	10.417	4.95	16.417	1.93	22.42	1.29
4.500	1.72	10.500	4.95	16.500	1.93	22.50	1.29
4.583	1.72	10.583	6.66	16.583	1.94	22.58	1.29
4.667	1.72	10.667	6.66	16.667	1.93	22.67	1.29
4.750	1.72	10.750	6.66	16.750	1.93	22.75	1.29
4.833	1.72	10.833	6.66	16.833	1.94	22.83	1.29
4.917	1.72	10.917	6.66	16.917	1.93	22.92	1.29
5.000	1.72	11.000	6.66	17.000	1.93	23.00	1.29
5.083	1.72	11.083	10.32	17.083	1.94	23.08	1.29
5.167	1.72	11.167	10.32	17.167	1.93	23.17	1.29
5.250	1.72	11.250	10.32	17.250	1.93	23.25	1.29
5.333	1.72	11.333	10.32	17.333	1.94	23.33	1.29
5.417	1.72	11.417	10.32	17.417	1.93	23.42	1.29
5.500	1.72	11.500	10.32	17.500	1.93	23.50	1.29
5.583	1.72	11.583	44.72	17.583	1.94	23.58	1.29
5.667	1.72	11.667	44.72	17.667	1.93	23.67	1.29
5.750	1.72	11.750	44.72	17.750	1.93	23.75	1.29
5.833	1.72	11.833	118.67	17.833	1.94	23.83	1.29
5.917	1.72	11.917	118.68	17.917	1.93	23.92	1.29
6.000	1.72	12.000	118.68	18.000	1.93	24.00	1.29

Unit Hyd Qpeak (cms)= 1.239

PEAK FLOW (cms)= 1.007 (i)
TIME TO PEAK (hrs)= 12.167
RUNOFF VOLUME (mm)= 51.780
TOTAL RAINFALL (mm)= 107.500
RUNOFF COEFFICIENT = 0.482

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\nparmar\AppData\Local\Civica\VH5\eaaed411-b099-4108-
b6b0-cc0fca6dc942\ea7a419b-0d38-4031-b0db-5fd9af185cfd\scen
  Summary filename: C:\Users\nparmar\AppData\Local\Civica\VH5\eaaed411-b099-4108-
b6b0-cc0fca6dc942\ea7a419b-0d38-4031-b0db-5fd9af185cfd\scen


DATE: 02-23-2024                              TIME: 08:29:30

USER:



COMMENTS: _____________________________________________________________________

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  ************************************************
  ** SIMULATION : Run 11                        **
  ************************************************



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|    READ STORM    |    Filename: C:\Users\nparmar\AppD
|                  |              ata\Local\Temp\
|                  |              2218ca26-588a-4c72-a3d8-a41c1a450bb1\9948bc8a
| Ptotal=120.60 mm |    Comments: 24hr 50year SCS STORM - CITY OF BARRIE
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    1.21 |  6.00    2.41 | 12.00   17.37 | 18.00    2.17
                0.25    1.21 |  6.25    2.41 | 12.25   17.37 | 18.25    2.17
                0.50    1.21 |  6.50    2.41 | 12.50    8.92 | 18.50    2.17
                0.75    1.21 |  6.75    2.41 | 12.75    8.92 | 18.75    2.17
                1.00    1.21 |  7.00    2.41 | 13.00    1.69 | 19.00    2.17
                1.25    1.21 |  7.25    2.41 | 13.25    1.69 | 19.25    2.17
                1.50    1.21 |  7.50    2.41 | 13.50    9.89 | 19.50    2.17
                1.75    2.17 |  7.75    2.41 | 13.75    9.89 | 19.75    2.17
                2.00    1.57 |  8.00    3.26 | 14.00    3.62 | 20.00    1.45
                2.25    1.57 |  8.25    3.26 | 14.25    3.62 | 20.25    1.45
                2.50    1.57 |  8.50    3.26 | 14.50    3.62 | 20.50    1.45
                2.75    1.57 |  8.75    3.26 | 14.75    3.62 | 20.75    1.45
```

3.00	1.57	9.00	3.86	15.00	3.62	21.00	1.45
3.25	1.57	9.25	3.86	15.25	3.62	21.25	1.45
3.50	1.57	9.50	4.34	15.50	3.62	21.50	1.45
3.75	1.57	9.75	4.34	15.75	3.62	21.75	1.45
4.00	1.93	10.00	5.55	16.00	2.17	22.00	1.45
4.25	1.93	10.25	5.55	16.25	2.17	22.25	1.45
4.50	1.93	10.50	7.48	16.50	2.17	22.50	1.45
4.75	1.93	10.75	7.48	16.75	2.17	22.75	1.45
5.00	1.93	11.00	11.58	17.00	2.17	23.00	1.45
5.25	1.93	11.25	11.58	17.25	2.17	23.25	1.45
5.50	1.93	11.50	50.17	17.50	2.17	23.50	1.45
5.75	1.93	11.75	133.14	17.75	2.17	23.75	1.45

CALIB			
NASHYD (0100)	Area (ha)=	11.35	Curve Number (CN)= 73.0
ID= 1 DT= 5.0 min	Ia (mm)=	7.20	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.35	

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	1.21	6.083	2.41	12.083	17.38	18.08	2.17
0.167	1.21	6.167	2.41	12.167	17.37	18.17	2.17
0.250	1.21	6.250	2.41	12.250	17.37	18.25	2.17
0.333	1.21	6.333	2.41	12.333	17.37	18.33	2.17
0.417	1.21	6.417	2.41	12.417	17.37	18.42	2.17
0.500	1.21	6.500	2.41	12.500	17.37	18.50	2.17
0.583	1.21	6.583	2.41	12.583	8.93	18.58	2.17
0.667	1.21	6.667	2.41	12.667	8.92	18.67	2.17
0.750	1.21	6.750	2.41	12.750	8.92	18.75	2.17
0.833	1.21	6.833	2.41	12.833	8.92	18.83	2.17
0.917	1.21	6.917	2.41	12.917	8.92	18.92	2.17
1.000	1.21	7.000	2.41	13.000	8.92	19.00	2.17
1.083	1.21	7.083	2.41	13.083	1.69	19.08	2.17
1.167	1.21	7.167	2.41	13.167	1.69	19.17	2.17
1.250	1.21	7.250	2.41	13.250	1.69	19.25	2.17
1.333	1.21	7.333	2.41	13.333	1.69	19.33	2.17
1.417	1.21	7.417	2.41	13.417	1.69	19.42	2.17
1.500	1.21	7.500	2.41	13.500	1.69	19.50	2.17
1.583	1.21	7.583	2.41	13.583	9.89	19.58	2.17
1.667	1.21	7.667	2.41	13.667	9.89	19.67	2.17
1.750	1.21	7.750	2.41	13.750	9.89	19.75	2.17
1.833	2.17	7.833	2.41	13.833	9.89	19.83	2.17
1.917	2.17	7.917	2.41	13.917	9.89	19.92	2.17
2.000	2.17	8.000	2.41	14.000	9.89	20.00	2.17
2.083	1.57	8.083	3.26	14.083	3.62	20.08	1.45
2.167	1.57	8.167	3.26	14.167	3.62	20.17	1.45
2.250	1.57	8.250	3.26	14.250	3.62	20.25	1.45
2.333	1.57	8.333	3.26	14.333	3.62	20.33	1.45
2.417	1.57	8.417	3.26	14.417	3.62	20.42	1.45
2.500	1.57	8.500	3.26	14.500	3.62	20.50	1.45
2.583	1.57	8.583	3.26	14.583	3.62	20.58	1.45
2.667	1.57	8.667	3.26	14.667	3.62	20.67	1.45
2.750	1.57	8.750	3.26	14.750	3.62	20.75	1.45
2.833	1.57	8.833	3.26	14.833	3.62	20.83	1.45
2.917	1.57	8.917	3.26	14.917	3.62	20.92	1.45
3.000	1.57	9.000	3.26	15.000	3.62	21.00	1.45
3.083	1.57	9.083	3.86	15.083	3.62	21.08	1.45

3.167	1.57	9.167	3.86	15.167	3.62	21.17	1.45
3.250	1.57	9.250	3.86	15.250	3.62	21.25	1.45
3.333	1.57	9.333	3.86	15.333	3.62	21.33	1.45
3.417	1.57	9.417	3.86	15.417	3.62	21.42	1.45
3.500	1.57	9.500	3.86	15.500	3.62	21.50	1.45
3.583	1.57	9.583	4.34	15.583	3.62	21.58	1.45
3.667	1.57	9.667	4.34	15.667	3.62	21.67	1.45
3.750	1.57	9.750	4.34	15.750	3.62	21.75	1.45
3.833	1.57	9.833	4.34	15.833	3.62	21.83	1.45
3.917	1.57	9.917	4.34	15.917	3.62	21.92	1.45
4.000	1.57	10.000	4.34	16.000	3.62	22.00	1.45
4.083	1.93	10.083	5.55	16.083	2.17	22.08	1.45
4.167	1.93	10.167	5.55	16.167	2.17	22.17	1.45
4.250	1.93	10.250	5.55	16.250	2.17	22.25	1.45
4.333	1.93	10.333	5.55	16.333	2.17	22.33	1.45
4.417	1.93	10.417	5.55	16.417	2.17	22.42	1.45
4.500	1.93	10.500	5.55	16.500	2.17	22.50	1.45
4.583	1.93	10.583	7.48	16.583	2.17	22.58	1.45
4.667	1.93	10.667	7.48	16.667	2.17	22.67	1.45
4.750	1.93	10.750	7.48	16.750	2.17	22.75	1.45
4.833	1.93	10.833	7.48	16.833	2.17	22.83	1.45
4.917	1.93	10.917	7.48	16.917	2.17	22.92	1.45
5.000	1.93	11.000	7.48	17.000	2.17	23.00	1.45
5.083	1.93	11.083	11.58	17.083	2.17	23.08	1.45
5.167	1.93	11.167	11.58	17.167	2.17	23.17	1.45
5.250	1.93	11.250	11.58	17.250	2.17	23.25	1.45
5.333	1.93	11.333	11.58	17.333	2.17	23.33	1.45
5.417	1.93	11.417	11.58	17.417	2.17	23.42	1.45
5.500	1.93	11.500	11.58	17.500	2.17	23.50	1.45
5.583	1.93	11.583	50.17	17.583	2.17	23.58	1.45
5.667	1.93	11.667	50.17	17.667	2.17	23.67	1.45
5.750	1.93	11.750	50.17	17.750	2.17	23.75	1.45
5.833	1.93	11.833	133.13	17.833	2.17	23.83	1.45
5.917	1.93	11.917	133.14	17.917	2.17	23.92	1.45
6.000	1.93	12.000	133.14	18.000	2.17	24.00	1.45

Unit Hyd Qpeak (cms)= 1.239

PEAK FLOW (cms)= 1.212 (i)
TIME TO PEAK (hrs)= 12.167
RUNOFF VOLUME (mm)= 62.007
TOTAL RAINFALL (mm)= 120.600
RUNOFF COEFFICIENT = 0.514

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\nparmar\AppData\Local\Civica\VH5\eaaed411-b099-4108-
b6b0-cc0fca6dc942\78f8d168-9cdb-4c65-8c67-d58f7d9134a5\scen
  Summary filename: C:\Users\nparmar\AppData\Local\Civica\VH5\eaaed411-b099-4108-
b6b0-cc0fca6dc942\78f8d168-9cdb-4c65-8c67-d58f7d9134a5\scen


DATE: 02-23-2024                              TIME: 08:29:30

USER:



COMMENTS: _____________________________________________________________________

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  ************************************************
  ** SIMULATION : Run 12                        **
  ************************************************



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|    READ STORM    |    Filename: C:\Users\nparmar\AppD
|                  |              ata\Local\Temp\
|                  |              2218ca26-588a-4c72-a3d8-a41c1a450bb1\6d480168
| Ptotal=133.60 mm |    Comments: 24hr 100year SCS STORM - CITY OF BARRIE
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    1.34 |  6.00    2.67 | 12.00   19.24 | 18.00    2.40
                0.25    1.34 |  6.25    2.67 | 12.25   19.24 | 18.25    2.40
                0.50    1.34 |  6.50    2.67 | 12.50    9.89 | 18.50    2.40
                0.75    1.34 |  6.75    2.67 | 12.75    9.89 | 18.75    2.40
                1.00    1.34 |  7.00    2.67 | 13.00    1.87 | 19.00    2.40
                1.25    1.34 |  7.25    2.67 | 13.25    1.87 | 19.25    2.40
                1.50    1.34 |  7.50    2.67 | 13.50   10.96 | 19.50    2.40
                1.75    2.40 |  7.75    2.67 | 13.75   10.96 | 19.75    2.40
                2.00    1.74 |  8.00    3.61 | 14.00    4.01 | 20.00    1.60
                2.25    1.74 |  8.25    3.61 | 14.25    4.01 | 20.25    1.60
                2.50    1.74 |  8.50    3.61 | 14.50    4.01 | 20.50    1.60
                2.75    1.74 |  8.75    3.61 | 14.75    4.01 | 20.75    1.60
```

3.00	1.74	9.00	4.28	15.00	4.01	21.00	1.60
3.25	1.74	9.25	4.28	15.25	4.01	21.25	1.60
3.50	1.74	9.50	4.81	15.50	4.01	21.50	1.60
3.75	1.74	9.75	4.81	15.75	4.01	21.75	1.60
4.00	2.14	10.00	6.15	16.00	2.40	22.00	1.60
4.25	2.14	10.25	6.15	16.25	2.40	22.25	1.60
4.50	2.14	10.50	8.28	16.50	2.40	22.50	1.60
4.75	2.14	10.75	8.28	16.75	2.40	22.75	1.60
5.00	2.14	11.00	12.83	17.00	2.40	23.00	1.60
5.25	2.14	11.25	12.83	17.25	2.40	23.25	1.60
5.50	2.14	11.50	55.58	17.50	2.40	23.50	1.60
5.75	2.14	11.75	147.49	17.75	2.40	23.75	1.60

CALIB			
NASHYD (0100)	Area (ha)=	11.35	Curve Number (CN)= 73.0
ID= 1 DT= 5.0 min	Ia (mm)=	7.20	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.35	

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	1.34	6.083	2.67	12.083	19.25	18.08	2.40
0.167	1.34	6.167	2.67	12.167	19.24	18.17	2.40
0.250	1.34	6.250	2.67	12.250	19.24	18.25	2.40
0.333	1.34	6.333	2.67	12.333	19.24	18.33	2.40
0.417	1.34	6.417	2.67	12.417	19.24	18.42	2.40
0.500	1.34	6.500	2.67	12.500	19.24	18.50	2.40
0.583	1.34	6.583	2.67	12.583	9.89	18.58	2.40
0.667	1.34	6.667	2.67	12.667	9.89	18.67	2.40
0.750	1.34	6.750	2.67	12.750	9.89	18.75	2.40
0.833	1.34	6.833	2.67	12.833	9.89	18.83	2.40
0.917	1.34	6.917	2.67	12.917	9.89	18.92	2.40
1.000	1.34	7.000	2.67	13.000	9.89	19.00	2.40
1.083	1.34	7.083	2.67	13.083	1.87	19.08	2.40
1.167	1.34	7.167	2.67	13.167	1.87	19.17	2.40
1.250	1.34	7.250	2.67	13.250	1.87	19.25	2.40
1.333	1.34	7.333	2.67	13.333	1.87	19.33	2.40
1.417	1.34	7.417	2.67	13.417	1.87	19.42	2.40
1.500	1.34	7.500	2.67	13.500	1.87	19.50	2.40
1.583	1.34	7.583	2.67	13.583	10.95	19.58	2.40
1.667	1.34	7.667	2.67	13.667	10.96	19.67	2.40
1.750	1.34	7.750	2.67	13.750	10.96	19.75	2.40
1.833	2.40	7.833	2.67	13.833	10.96	19.83	2.40
1.917	2.40	7.917	2.67	13.917	10.96	19.92	2.40
2.000	2.40	8.000	2.67	14.000	10.96	20.00	2.40
2.083	1.74	8.083	3.61	14.083	4.01	20.08	1.60
2.167	1.74	8.167	3.61	14.167	4.01	20.17	1.60
2.250	1.74	8.250	3.61	14.250	4.01	20.25	1.60
2.333	1.74	8.333	3.61	14.333	4.01	20.33	1.60
2.417	1.74	8.417	3.61	14.417	4.01	20.42	1.60
2.500	1.74	8.500	3.61	14.500	4.01	20.50	1.60
2.583	1.74	8.583	3.61	14.583	4.01	20.58	1.60
2.667	1.74	8.667	3.61	14.667	4.01	20.67	1.60
2.750	1.74	8.750	3.61	14.750	4.01	20.75	1.60
2.833	1.74	8.833	3.61	14.833	4.01	20.83	1.60
2.917	1.74	8.917	3.61	14.917	4.01	20.92	1.60
3.000	1.74	9.000	3.61	15.000	4.01	21.00	1.60
3.083	1.74	9.083	4.28	15.083	4.01	21.08	1.60

3.167	1.74	9.167	4.28	15.167	4.01	21.17	1.60
3.250	1.74	9.250	4.28	15.250	4.01	21.25	1.60
3.333	1.74	9.333	4.28	15.333	4.01	21.33	1.60
3.417	1.74	9.417	4.28	15.417	4.01	21.42	1.60
3.500	1.74	9.500	4.28	15.500	4.01	21.50	1.60
3.583	1.74	9.583	4.81	15.583	4.01	21.58	1.60
3.667	1.74	9.667	4.81	15.667	4.01	21.67	1.60
3.750	1.74	9.750	4.81	15.750	4.01	21.75	1.60
3.833	1.74	9.833	4.81	15.833	4.01	21.83	1.60
3.917	1.74	9.917	4.81	15.917	4.01	21.92	1.60
4.000	1.74	10.000	4.81	16.000	4.01	22.00	1.60
4.083	2.14	10.083	6.15	16.083	2.41	22.08	1.60
4.167	2.14	10.167	6.15	16.167	2.40	22.17	1.60
4.250	2.14	10.250	6.15	16.250	2.40	22.25	1.60
4.333	2.14	10.333	6.15	16.333	2.40	22.33	1.60
4.417	2.14	10.417	6.15	16.417	2.40	22.42	1.60
4.500	2.14	10.500	6.15	16.500	2.40	22.50	1.60
4.583	2.14	10.583	8.28	16.583	2.40	22.58	1.60
4.667	2.14	10.667	8.28	16.667	2.40	22.67	1.60
4.750	2.14	10.750	8.28	16.750	2.40	22.75	1.60
4.833	2.14	10.833	8.28	16.833	2.40	22.83	1.60
4.917	2.14	10.917	8.28	16.917	2.40	22.92	1.60
5.000	2.14	11.000	8.28	17.000	2.40	23.00	1.60
5.083	2.14	11.083	12.83	17.083	2.40	23.08	1.60
5.167	2.14	11.167	12.83	17.167	2.40	23.17	1.60
5.250	2.14	11.250	12.83	17.250	2.40	23.25	1.60
5.333	2.14	11.333	12.83	17.333	2.40	23.33	1.60
5.417	2.14	11.417	12.83	17.417	2.40	23.42	1.60
5.500	2.14	11.500	12.83	17.500	2.40	23.50	1.60
5.583	2.14	11.583	55.57	17.583	2.40	23.58	1.60
5.667	2.14	11.667	55.58	17.667	2.40	23.67	1.60
5.750	2.14	11.750	55.58	17.750	2.40	23.75	1.60
5.833	2.14	11.833	147.48	17.833	2.40	23.83	1.60
5.917	2.14	11.917	147.49	17.917	2.40	23.92	1.60
6.000	2.14	12.000	147.49	18.000	2.40	24.00	1.60

Unit Hyd Qpeak (cms)= 1.239

PEAK FLOW (cms)= 1.423 (i)
TIME TO PEAK (hrs)= 12.167
RUNOFF VOLUME (mm)= 72.494
TOTAL RAINFALL (mm)= 133.600
RUNOFF COEFFICIENT = 0.543

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\nparmar\AppData\Local\Civica\VH5\eaaed411-b099-4108-
b6b0-cc0fca6dc942\1fef9938-20f9-46b3-ad1b-0ddac1d564e7\scen
  Summary filename: C:\Users\nparmar\AppData\Local\Civica\VH5\eaaed411-b099-4108-
b6b0-cc0fca6dc942\1fef9938-20f9-46b3-ad1b-0ddac1d564e7\scen


DATE: 02-23-2024                          TIME: 08:29:30

USER:



COMMENTS: _____________________________________________________________________

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  ************************************************
  ** SIMULATION : Run 13                        **
  ************************************************



--------------------
|    READ STORM    |    Filename: C:\Users\nparmar\AppD
|                  |              ata\Local\Temp\
|                  |              2218ca26-588a-4c72-a3d8-a41c1a450bb1\b0a73a8f
| Ptotal=193.00 mm |    Comments: REGIONAL STORM TIMMINS - 12 hour storm
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00   15.00 |  3.00    3.00 |  6.00   43.00 |  9.00   13.00
                1.00   20.00 |  4.00    5.00 |  7.00   20.00 | 10.00   13.00
                2.00   10.00 |  5.00   20.00 |  8.00   23.00 | 11.00    8.00

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


--------------------
| CALIB            |
| NASHYD   (  0100)|   Area    (ha)=  11.35   Curve Number   (CN)= 73.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.20   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.35
```

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	15.00	3.083	3.00	6.083	43.00	9.08	13.00
0.167	15.00	3.167	3.00	6.167	43.00	9.17	13.00
0.250	15.00	3.250	3.00	6.250	43.00	9.25	13.00
0.333	15.00	3.333	3.00	6.333	43.00	9.33	13.00
0.417	15.00	3.417	3.00	6.417	43.00	9.42	13.00
0.500	15.00	3.500	3.00	6.500	43.00	9.50	13.00
0.583	15.00	3.583	3.00	6.583	43.00	9.58	13.00
0.667	15.00	3.667	3.00	6.667	43.00	9.67	13.00
0.750	15.00	3.750	3.00	6.750	43.00	9.75	13.00
0.833	15.00	3.833	3.00	6.833	43.00	9.83	13.00
0.917	15.00	3.917	3.00	6.917	43.00	9.92	13.00
1.000	15.00	4.000	3.00	7.000	43.00	10.00	13.00
1.083	20.00	4.083	5.00	7.083	20.00	10.08	13.00
1.167	20.00	4.167	5.00	7.167	20.00	10.17	13.00
1.250	20.00	4.250	5.00	7.250	20.00	10.25	13.00
1.333	20.00	4.333	5.00	7.333	20.00	10.33	13.00
1.417	20.00	4.417	5.00	7.417	20.00	10.42	13.00
1.500	20.00	4.500	5.00	7.500	20.00	10.50	13.00
1.583	20.00	4.583	5.00	7.583	20.00	10.58	13.00
1.667	20.00	4.667	5.00	7.667	20.00	10.67	13.00
1.750	20.00	4.750	5.00	7.750	20.00	10.75	13.00
1.833	20.00	4.833	5.00	7.833	20.00	10.83	13.00
1.917	20.00	4.917	5.00	7.917	20.00	10.92	13.00
2.000	20.00	5.000	5.00	8.000	20.00	11.00	13.00
2.083	10.00	5.083	20.00	8.083	23.00	11.08	8.00
2.167	10.00	5.167	20.00	8.167	23.00	11.17	8.00
2.250	10.00	5.250	20.00	8.250	23.00	11.25	8.00
2.333	10.00	5.333	20.00	8.333	23.00	11.33	8.00
2.417	10.00	5.417	20.00	8.417	23.00	11.42	8.00
2.500	10.00	5.500	20.00	8.500	23.00	11.50	8.00
2.583	10.00	5.583	20.00	8.583	23.00	11.58	8.00
2.667	10.00	5.667	20.00	8.667	23.00	11.67	8.00
2.750	10.00	5.750	20.00	8.750	23.00	11.75	8.00
2.833	10.00	5.833	20.00	8.833	23.00	11.83	8.00
2.917	10.00	5.917	20.00	8.917	23.00	11.92	8.00
3.000	10.00	6.000	20.00	9.000	23.00	12.00	8.00

Unit Hyd Qpeak (cms)= 1.239

PEAK FLOW (cms)= 0.964 (i)
TIME TO PEAK (hrs)= 7.083
RUNOFF VOLUME (mm)= 123.378
TOTAL RAINFALL (mm)= 193.000
RUNOFF COEFFICIENT = 0.639

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

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\nparmar\AppData\Local\Civica\VH5\eaaed411-b099-4108-
b6b0-cc0fca6dc942\ba458ca8-a9ee-4292-8efc-f63654c3c9a8\scen
  Summary filename: C:\Users\nparmar\AppData\Local\Civica\VH5\eaaed411-b099-4108-
b6b0-cc0fca6dc942\ba458ca8-a9ee-4292-8efc-f63654c3c9a8\scen


DATE: 02-23-2024                              TIME: 08:29:30

USER:



COMMENTS: _____________________________________________________________________

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  ************************************************
  ** SIMULATION : Run 01                        **
  ************************************************



--------------------
|    READ STORM    |    Filename: C:\Users\nparmar\AppD
|                  |              ata\Local\Temp\
|                  |              2218ca26-588a-4c72-a3d8-a41c1a450bb1\8501ff12
| Ptotal= 36.95 mm |    Comments: 4hr 2year CHICAGO STORM - CITY OF BARRIE
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.00 |  1.17   18.78 |  2.33    4.89 |  3.50    2.55
                0.17    2.47 |  1.33   83.11 |  2.50    4.28 |  3.67    2.39
                0.33    2.82 |  1.50   24.57 |  2.67    3.82 |  3.83    2.26
                0.50    3.31 |  1.67   13.01 |  2.83    3.46 |  4.00    2.15
                0.67    4.05 |  1.83    9.01 |  3.00    3.17 |
                0.83    5.30 |  2.00    6.97 |  3.17    2.93 |
                1.00    7.98 |  2.17    5.73 |  3.33    2.72 |

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--------------------
| CALIB            |
```

| NASHYD (0100)| Area (ha)= 11.35 Curve Number (CN)= 73.0
|ID= 1 DT= 5.0 min | Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.35

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	0.00	1.167	7.98	2.250	5.73	3.33	2.93
0.167	0.00	1.250	18.78	2.333	5.73	3.42	2.72
0.250	2.47	1.333	18.78	2.417	4.89	3.50	2.72
0.333	2.47	1.417	83.11	2.500	4.89	3.58	2.55
0.417	2.82	1.500	83.11	2.583	4.28	3.67	2.55
0.500	2.82	1.583	24.57	2.667	4.28	3.75	2.39
0.583	3.31	1.667	24.57	2.750	3.82	3.83	2.39
0.667	3.31	1.750	13.01	2.833	3.82	3.92	2.26
0.750	4.05	1.833	13.01	2.917	3.46	4.00	2.26
0.833	4.05	1.917	9.01	3.000	3.46	4.08	2.15
0.917	5.30	2.000	9.01	3.083	3.17	4.17	2.15
1.000	5.30	2.083	6.97	3.167	3.17		
1.083	7.98	2.167	6.97	3.250	2.93		

Unit Hyd Qpeak (cms)= 1.239

PEAK FLOW (cms)= 0.156 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 7.156
TOTAL RAINFALL (mm)= 36.955
RUNOFF COEFFICIENT = 0.194

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

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\nparmar\AppData\Local\Civica\VH5\eaaed411-b099-4108-
b6b0-cc0fca6dc942\ef81fde4-621b-4d0e-8716-39239967bc1c\scen
  Summary filename: C:\Users\nparmar\AppData\Local\Civica\VH5\eaaed411-b099-4108-
b6b0-cc0fca6dc942\ef81fde4-621b-4d0e-8716-39239967bc1c\scen


DATE: 02-23-2024                              TIME: 08:29:30

USER:



COMMENTS: _____________________________________________________________________

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  ************************************************
  ** SIMULATION : Run 02                        **
  ************************************************



--------------------
|    READ STORM    |    Filename: C:\Users\nparmar\AppD
|                  |              ata\Local\Temp\
|                  |              2218ca26-588a-4c72-a3d8-a41c1a450bb1\0cb77411
| Ptotal= 50.52 mm |    Comments: 4hr 5year CHICAGO STORM - CITY OF BARRIE
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.00 |  1.17   25.64 |  2.33    6.96 |  3.50    3.68
                0.17    3.57 |  1.33  108.92 |  2.50    6.12 |  3.67    3.47
                0.33    4.07 |  1.50   33.31 |  2.67    5.48 |  3.83    3.28
                0.50    4.76 |  1.67   17.99 |  2.83    4.97 |  4.00    3.12
                0.67    5.79 |  1.83   12.60 |  3.00    4.56 |
                0.83    7.53 |  2.00    9.82 |  3.17    4.22 |
                1.00   11.20 |  2.17    8.12 |  3.33    3.93 |

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| CALIB            |
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| NASHYD (0100)| Area (ha)= 11.35 Curve Number (CN)= 73.0
|ID= 1 DT= 5.0 min | Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.35

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	0.00	1.167	11.20	2.250	8.12	3.33	4.22
0.167	0.00	1.250	25.64	2.333	8.12	3.42	3.93
0.250	3.57	1.333	25.64	2.417	6.96	3.50	3.93
0.333	3.57	1.417	108.92	2.500	6.96	3.58	3.68
0.417	4.07	1.500	108.92	2.583	6.12	3.67	3.68
0.500	4.07	1.583	33.31	2.667	6.12	3.75	3.47
0.583	4.76	1.667	33.31	2.750	5.48	3.83	3.47
0.667	4.76	1.750	17.99	2.833	5.48	3.92	3.28
0.750	5.79	1.833	17.99	2.917	4.97	4.00	3.28
0.833	5.79	1.917	12.60	3.000	4.97	4.08	3.12
0.917	7.53	2.000	12.60	3.083	4.56	4.17	3.12
1.000	7.53	2.083	9.82	3.167	4.56		
1.083	11.20	2.167	9.82	3.250	4.22		

Unit Hyd Qpeak (cms)= 1.239

PEAK FLOW (cms)= 0.307 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 13.668
TOTAL RAINFALL (mm)= 50.518
RUNOFF COEFFICIENT = 0.271

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

FINISH

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\nparmar\AppData\Local\Civica\VH5\eaaed411-b099-4108-
b6b0-cc0fca6dc942\ea4fa228-ad17-4611-a5ed-d7499b0bc3f6\scen
  Summary filename: C:\Users\nparmar\AppData\Local\Civica\VH5\eaaed411-b099-4108-
b6b0-cc0fca6dc942\ea4fa228-ad17-4611-a5ed-d7499b0bc3f6\scen


DATE: 02-23-2024                          TIME: 08:29:30

USER:



COMMENTS: _____________________________________________________________________

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  ************************************************
  ** SIMULATION : Run 03                        **
  ************************************************



--------------------
|    READ STORM    |    Filename: C:\Users\nparmar\AppD
|                  |              ata\Local\Temp\
|                  |              2218ca26-588a-4c72-a3d8-a41c1a450bb1\05237a76
| Ptotal= 59.69 mm |    Comments: 4hr 10year CHICAGO STORM - CITY OF BARRI
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.00 |  1.17   30.27 |  2.33    8.35 |  3.50    4.45
                0.17    4.32 |  1.33  126.55 |  2.50    7.35 |  3.67    4.19
                0.33    4.91 |  1.50   39.22 |  2.67    6.59 |  3.83    3.97
                0.50    5.73 |  1.67   21.35 |  2.83    5.99 |  4.00    3.77
                0.67    6.96 |  1.83   15.01 |  3.00    5.50 |
                0.83    9.03 |  2.00   11.74 |  3.17    5.09 |
                1.00   13.36 |  2.17    9.72 |  3.33    4.74 |

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| CALIB            |
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| NASHYD (0100)| Area (ha)= 11.35 Curve Number (CN)= 73.0
|ID= 1 DT= 5.0 min | Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.35

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	0.00	1.167	13.36	2.250	9.72	3.33	5.09
0.167	0.00	1.250	30.27	2.333	9.72	3.42	4.74
0.250	4.32	1.333	30.27	2.417	8.35	3.50	4.74
0.333	4.32	1.417	126.55	2.500	8.35	3.58	4.45
0.417	4.91	1.500	126.55	2.583	7.35	3.67	4.45
0.500	4.91	1.583	39.22	2.667	7.35	3.75	4.19
0.583	5.73	1.667	39.22	2.750	6.59	3.83	4.19
0.667	5.73	1.750	21.35	2.833	6.59	3.92	3.97
0.750	6.96	1.833	21.35	2.917	5.99	4.00	3.97
0.833	6.96	1.917	15.01	3.000	5.99	4.08	3.77
0.917	9.03	2.000	15.01	3.083	5.50	4.17	3.77
1.000	9.03	2.083	11.74	3.167	5.50		
1.083	13.36	2.167	11.74	3.250	5.09		

Unit Hyd Qpeak (cms)= 1.239

PEAK FLOW (cms)= 0.428 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 18.813
TOTAL RAINFALL (mm)= 59.693
RUNOFF COEFFICIENT = 0.315

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\nparmar\AppData\Local\Civica\VH5\eaaed411-b099-4108-
b6b0-cc0fca6dc942\a5928bd0-5321-4e4c-a28e-7d317dd749d4\scen
  Summary filename: C:\Users\nparmar\AppData\Local\Civica\VH5\eaaed411-b099-4108-
b6b0-cc0fca6dc942\a5928bd0-5321-4e4c-a28e-7d317dd749d4\scen


DATE: 02-23-2024                              TIME: 08:29:30

USER:



COMMENTS: _____________________________________________________________________

--------------------------------------------------------------------------------
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  ************************************************
  ** SIMULATION : Run 04                        **
  ************************************************



--------------------
|    READ STORM    |    Filename: C:\Users\nparmar\AppD
|                  |              ata\Local\Temp\
|                  |              2218ca26-588a-4c72-a3d8-a41c1a450bb1\4ed3113b
| Ptotal= 71.24 mm |    Comments: 4hr 25year CHICAGO STORM - CITY OF BARRI
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.00 |  1.17   36.37 |  2.33   10.09 |  3.50    5.38
                0.17    5.22 |  1.33  148.15 |  2.50    8.89 |  3.67    5.08
                0.33    5.94 |  1.50   47.06 |  2.67    7.96 |  3.83    4.80
                0.50    6.93 |  1.67   25.72 |  2.83    7.24 |  4.00    4.57
                0.67    8.42 |  1.83   18.11 |  3.00    6.65 |
                0.83   10.91 |  2.00   14.17 |  3.17    6.15 |
                1.00   16.13 |  2.17   11.74 |  3.33    5.74 |

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| CALIB            |
```

| NASHYD (0100)| Area (ha)= 11.35 Curve Number (CN)= 73.0
|ID= 1 DT= 5.0 min | Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.35

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	0.00	1.167	16.13	2.250	11.74	3.33	6.15
0.167	0.00	1.250	36.37	2.333	11.74	3.42	5.74
0.250	5.22	1.333	36.37	2.417	10.09	3.50	5.74
0.333	5.22	1.417	148.15	2.500	10.09	3.58	5.38
0.417	5.94	1.500	148.15	2.583	8.89	3.67	5.38
0.500	5.94	1.583	47.06	2.667	8.89	3.75	5.08
0.583	6.93	1.667	47.06	2.750	7.96	3.83	5.08
0.667	6.93	1.750	25.72	2.833	7.96	3.92	4.80
0.750	8.42	1.833	25.72	2.917	7.24	4.00	4.80
0.833	8.42	1.917	18.11	3.000	7.24	4.08	4.57
0.917	10.91	2.000	18.11	3.083	6.65	4.17	4.57
1.000	10.91	2.083	14.17	3.167	6.65		
1.083	16.13	2.167	14.17	3.250	6.15		

Unit Hyd Qpeak (cms)= 1.239

PEAK FLOW (cms)= 0.600 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 25.951
TOTAL RAINFALL (mm)= 71.237
RUNOFF COEFFICIENT = 0.364

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\nparmar\AppData\Local\Civica\VH5\eaaed411-b099-4108-
b6b0-cc0fca6dc942\5163f435-f51c-416a-a109-2b1f420f335a\scen
  Summary filename: C:\Users\nparmar\AppData\Local\Civica\VH5\eaaed411-b099-4108-
b6b0-cc0fca6dc942\5163f435-f51c-416a-a109-2b1f420f335a\scen


DATE: 02-23-2024                              TIME: 08:29:30

USER:



COMMENTS: _____________________________________________________________________

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  **********************************************
  ** SIMULATION : Run 05                      **
  **********************************************



--------------------
|    READ STORM    |    Filename: C:\Users\nparmar\AppD
|                  |              ata\Local\Temp\
|                  |              2218ca26-588a-4c72-a3d8-a41c1a450bb1\806310ce
| Ptotal= 79.45 mm |    Comments: 4hr 50year CHICAGO STORM - CITY OF BARRI
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.00 |  1.17   40.22 |  2.33   11.37 |  3.50    6.11
                0.17    5.93 |  1.33  164.22 |  2.50   10.03 |  3.67    5.77
                0.33    6.74 |  1.50   51.92 |  2.67    9.00 |  3.83    5.46
                0.50    7.85 |  1.67   28.58 |  2.83    8.19 |  4.00    5.19
                0.67    9.50 |  1.83   20.23 |  3.00    7.53 |
                0.83   12.27 |  2.00   15.88 |  3.17    6.98 |
                1.00   18.04 |  2.17   13.20 |  3.33    6.51 |

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--------------------
| CALIB            |
```

| NASHYD (0100)| Area (ha)= 11.35 Curve Number (CN)= 73.0
|ID= 1 DT= 5.0 min | Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.35

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	0.00	1.167	18.04	2.250	13.20	3.33	6.98
0.167	0.00	1.250	40.22	2.333	13.20	3.42	6.51
0.250	5.93	1.333	40.22	2.417	11.37	3.50	6.51
0.333	5.93	1.417	164.22	2.500	11.37	3.58	6.11
0.417	6.74	1.500	164.22	2.583	10.03	3.67	6.11
0.500	6.74	1.583	51.92	2.667	10.03	3.75	5.77
0.583	7.85	1.667	51.92	2.750	9.00	3.83	5.77
0.667	7.85	1.750	28.58	2.833	9.00	3.92	5.46
0.750	9.50	1.833	28.58	2.917	8.19	4.00	5.46
0.833	9.50	1.917	20.23	3.000	8.19	4.08	5.19
0.917	12.27	2.000	20.23	3.083	7.53	4.17	5.19
1.000	12.27	2.083	15.88	3.167	7.53		
1.083	18.04	2.167	15.88	3.250	6.98		

Unit Hyd Qpeak (cms)= 1.239

PEAK FLOW (cms)= 0.729 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 31.405
TOTAL RAINFALL (mm)= 79.453
RUNOFF COEFFICIENT = 0.395

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\nparmar\AppData\Local\Civica\VH5\eaaed411-b099-4108-
b6b0-cc0fca6dc942\b777d7cb-91b5-4e3d-b9ab-9295e068ea74\scen
  Summary filename: C:\Users\nparmar\AppData\Local\Civica\VH5\eaaed411-b099-4108-
b6b0-cc0fca6dc942\b777d7cb-91b5-4e3d-b9ab-9295e068ea74\scen


DATE: 02-23-2024                          TIME: 08:29:30

USER:



COMMENTS: _____________________________________________________________________

--------------------------------------------------------------------------------
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  ************************************************
  ** SIMULATION : Run 06                        **
  ************************************************



--------------------
|    READ STORM    |    Filename: C:\Users\nparmar\AppD
|                  |              ata\Local\Temp\
|                  |              2218ca26-588a-4c72-a3d8-a41c1a450bb1\47ce8768
| Ptotal= 87.58 mm |    Comments: 4hr 100year CHICAGO STORM - CITY OF BARR
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.00 |  1.17   45.22 |  2.33   12.44 |  3.50    6.60
                0.17    6.41 |  1.33  180.15 |  2.50   10.94 |  3.67    6.22
                0.33    7.29 |  1.50   58.54 |  2.67    9.80 |  3.83    5.89
                0.50    8.52 |  1.67   31.96 |  2.83    8.90 |  4.00    5.59
                0.67   10.36 |  1.83   22.45 |  3.00    8.16 |
                0.83   13.45 |  2.00   17.52 |  3.17    7.56 |
                1.00   19.96 |  2.17   14.50 |  3.33    7.04 |

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


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| CALIB            |
```

| NASHYD (0100)| Area (ha)= 11.35 Curve Number (CN)= 73.0
|ID= 1 DT= 5.0 min | Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.35

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	0.00	1.167	19.96	2.250	14.50	3.33	7.56
0.167	0.00	1.250	45.22	2.333	14.50	3.42	7.04
0.250	6.41	1.333	45.22	2.417	12.44	3.50	7.04
0.333	6.41	1.417	180.15	2.500	12.44	3.58	6.60
0.417	7.29	1.500	180.15	2.583	10.94	3.67	6.60
0.500	7.29	1.583	58.54	2.667	10.94	3.75	6.22
0.583	8.52	1.667	58.54	2.750	9.80	3.83	6.22
0.667	8.52	1.750	31.96	2.833	9.80	3.92	5.89
0.750	10.36	1.833	31.96	2.917	8.90	4.00	5.89
0.833	10.36	1.917	22.45	3.000	8.90	4.08	5.59
0.917	13.45	2.000	22.45	3.083	8.16	4.17	5.59
1.000	13.45	2.083	17.52	3.167	8.16		
1.083	19.96	2.167	17.52	3.250	7.56		

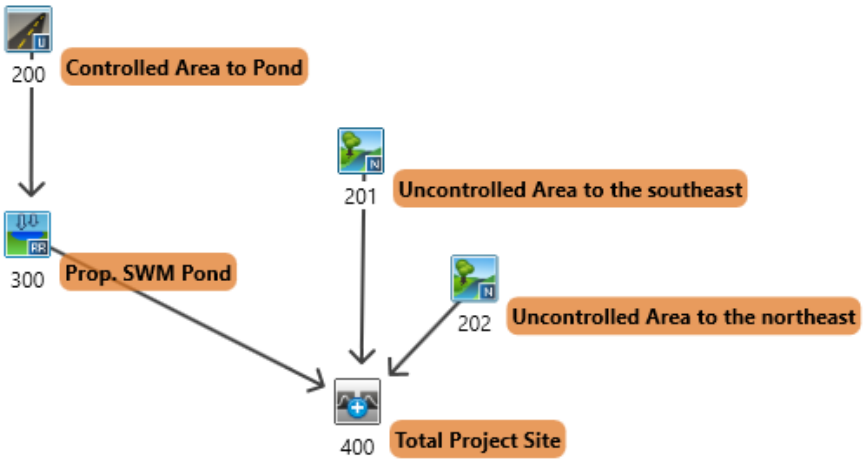
Unit Hyd Qpeak (cms)= 1.239

PEAK FLOW (cms)= 0.875 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 37.054
TOTAL RAINFALL (mm)= 87.578
RUNOFF COEFFICIENT = 0.423

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

Appendix D

Post-Development OTTHYMO Result



```
================================================================================================================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2022)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\dbozek\AppData\Local\Civica\VH5\eaaed411-b099-4108-b6b0-cc0fca6dc942\78768325-db6
  Summary filename: C:\Users\dbozek\AppData\Local\Civica\VH5\eaaed411-b099-4108-b6b0-cc0fca6dc942\78768325-db6


DATE: 11-10-2025                          TIME: 01:37:09

USER:



COMMENTS: _____________________________________________________________

--------------------------------------------------------------------------------------------------------------
  ***********************************************
  ** SIMULATION : Run 01                       **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\dbozek\AppD
|                  |              ata\Local\Temp\
|                  |              8ca4bf6c-4ce3-4b10-92ef-3c7287f829ff\8501ff12
| Ptotal= 36.95 mm |    Comments: 4hr 2year CHICAGO STORM - CITY OF BARRIE
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	1.17	18.78	2.33	4.89	3.50	2.55
0.17	2.47	1.33	83.11	2.50	4.28	3.67	2.39
0.33	2.82	1.50	24.57	2.67	3.82	3.83	2.26
0.50	3.31	1.67	13.01	2.83	3.46	4.00	2.15
0.67	4.05	1.83	9.01	3.00	3.17		
0.83	5.30	2.00	6.97	3.17	2.93		
1.00	7.98	2.17	5.73	3.33	2.72		

```
--------------------------------------------------------------------------------

--------------------
| CALIB            |
| NASHYD   (  0202)|   Area    (ha)=   0.18   Curve Number   (CN)= 69.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.25

         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	0.00	1.167	7.98	2.250	5.73	3.33	2.93
0.167	0.00	1.250	18.78	2.333	5.73	3.42	2.72
0.250	2.47	1.333	18.78	2.417	4.89	3.50	2.72
0.333	2.47	1.417	83.11	2.500	4.89	3.58	2.55
0.417	2.82	1.500	83.11	2.583	4.28	3.67	2.55
0.500	2.82	1.583	24.57	2.667	4.28	3.75	2.39
0.583	3.31	1.667	24.57	2.750	3.82	3.83	2.39
0.667	3.31	1.750	13.01	2.833	3.82	3.92	2.26
0.750	4.05	1.833	13.01	2.917	3.46	4.00	2.26
0.833	4.05	1.917	9.01	3.000	3.46	4.08	2.15
0.917	5.30	2.000	9.01	3.083	3.17	4.17	2.15
1.000	5.30	2.083	6.97	3.167	3.17		
1.083	7.98	2.167	6.97	3.250	2.93		

Unit Hyd Qpeak (cms)= 0.028

PEAK FLOW (cms)= 0.003 (i)
TIME TO PEAK (hrs)= 1.750
RUNOFF VOLUME (mm)= 6.982
TOTAL RAINFALL (mm)= 36.955
RUNOFF COEFFICIENT = 0.189

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

| CALIB NASHYD (0201) | Area (ha)= 0.24 Curve Number (CN)= 73.0
|ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.08

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	0.00	1.167	7.98	2.250	5.73	3.33	2.93
0.167	0.00	1.250	18.78	2.333	5.73	3.42	2.72
0.250	2.47	1.333	18.78	2.417	4.89	3.50	2.72
0.333	2.47	1.417	83.11	2.500	4.89	3.58	2.55
0.417	2.82	1.500	83.11	2.583	4.28	3.67	2.55
0.500	2.82	1.583	24.57	2.667	4.28	3.75	2.39
0.583	3.31	1.667	24.57	2.750	3.82	3.83	2.39
0.667	3.31	1.750	13.01	2.833	3.82	3.92	2.26
0.750	4.05	1.833	13.01	2.917	3.46	4.00	2.26
0.833	4.05	1.917	9.01	3.000	3.46	4.08	2.15
0.917	5.30	2.000	9.01	3.083	3.17	4.17	2.15
1.000	5.30	2.083	6.97	3.167	3.17		
1.083	7.98	2.167	6.97	3.250	2.93		

Unit Hyd Qpeak (cms)= 0.115

PEAK FLOW (cms)= 0.009 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 7.651
TOTAL RAINFALL (mm)= 36.955
RUNOFF COEFFICIENT = 0.207

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

| CALIB NASHYD (0203) | Area (ha)= 0.82 Curve Number (CN)= 69.0
|ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.15

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	0.00	1.167	7.98	2.250	5.73	3.33	2.93
0.167	0.00	1.250	18.78	2.333	5.73	3.42	2.72
0.250	2.47	1.333	18.78	2.417	4.89	3.50	2.72
0.333	2.47	1.417	83.11	2.500	4.89	3.58	2.55
0.417	2.82	1.500	83.11	2.583	4.28	3.67	2.55
0.500	2.82	1.583	24.57	2.667	4.28	3.75	2.39
0.583	3.31	1.667	24.57	2.750	3.82	3.83	2.39
0.667	3.31	1.750	13.01	2.833	3.82	3.92	2.26
0.750	4.05	1.833	13.01	2.917	3.46	4.00	2.26
0.833	4.05	1.917	9.01	3.000	3.46	4.08	2.15
0.917	5.30	2.000	9.01	3.083	3.17	4.17	2.15
1.000	5.30	2.083	6.97	3.167	3.17		
1.083	7.98	2.167	6.97	3.250	2.93		

Unit Hyd Qpeak (cms)= 0.209

PEAK FLOW (cms)= 0.018 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 6.950
TOTAL RAINFALL (mm)= 36.955
RUNOFF COEFFICIENT = 0.188

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

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0200)|   Area    (ha)=  10.10
|ID= 1 DT= 5.0 min |   Total Imp(%)=  29.00   Dir. Conn.(%)=  14.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.93          7.17
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     259.49         40.00
     Mannings n             =     0.013         0.150

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


                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    0.00 | 1.167    7.98 | 2.250    5.73 |  3.33    2.93
               0.167    0.00 | 1.250   18.78 | 2.333    5.73 |  3.42    2.72
               0.250    2.47 | 1.333   18.78 | 2.417    4.89 |  3.50    2.72
               0.333    2.47 | 1.417   83.11 | 2.500    4.89 |  3.58    2.55
               0.417    2.82 | 1.500   83.11 | 2.583    4.28 |  3.67    2.55
               0.500    2.82 | 1.583   24.57 | 2.667    4.28 |  3.75    2.39
               0.583    3.31 | 1.667   24.57 | 2.750    3.82 |  3.83    2.39
               0.667    3.31 | 1.750   13.01 | 2.833    3.82 |  3.92    2.26
               0.750    4.05 | 1.833   13.01 | 2.917    3.46 |  4.00    2.26
               0.833    4.05 | 1.917    9.01 | 3.000    3.46 |  4.08    2.15
               0.917    5.30 | 2.000    9.01 | 3.083    3.17 |  4.17    2.15
               1.000    5.30 | 2.083    6.97 | 3.167    3.17 |
               1.083    7.98 | 2.167    6.97 | 3.250    2.93 |

     Max.Eff.Inten.(mm/hr)=      83.11         15.23
               over (min)         5.00         20.00
     Storage Coeff.  (min)=       4.87 (ii)    15.90 (ii)
     Unit Hyd. Tpeak (min)=       5.00         20.00
     Unit Hyd. peak  (cms)=       0.22          0.07
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.29          0.18          0.346 (iii)
     TIME TO PEAK    (hrs)=       1.50          1.75           1.50
     RUNOFF VOLUME    (mm)=      35.95          8.48          12.33
     TOTAL RAINFALL   (mm)=      36.95         36.95          36.95
     RUNOFF COEFFICIENT   =       0.97          0.23           0.33

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  69.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0300)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000      0.0000   |    0.7200      0.1600
                          0.0500      0.0500   |    0.7300      0.1800
                          0.1500      0.0700   |    0.8600      0.1850
                          0.3000      0.0900   |    0.9500      0.1900
                          0.4200      0.1200   |    0.9900      0.1950
                          0.5500      0.1300   |    1.1900      0.2300
                          0.5900      0.1500   |    1.4000      0.2550

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0200)     10.100      0.346      1.50      12.33
   OUTFLOW: ID= 1 (  0300)     10.100      0.108      2.33      12.30

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 31.25
                  TIME SHIFT OF PEAK FLOW         (min)= 50.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0617

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

--------------------
| ADD HYD  (  0400)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
```

```
        ID1= 1 (  0201):     0.24   0.009     1.50     7.65
      + ID2= 2 (  0202):     0.18   0.003     1.75     6.98
        ================================================
        ID = 3 (  0400):     0.42   0.010     1.50     7.36

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


--------------------
| ADD HYD  (  0400)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0400):     0.42   0.010     1.50     7.36
      + ID2= 2 (  0203):     0.82   0.018     1.58     6.95
        ================================================
        ID = 1 (  0400):     1.24   0.027     1.58     7.09

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


--------------------
| ADD HYD  (  0400)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0400):     1.24   0.027     1.58     7.09
      + ID2= 2 (  0300):    10.10   0.108     2.33    12.30
        ================================================
        ID = 3 (  0400):    11.34   0.116     2.33    11.73

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

```
=================================================================================================================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2022)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  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\dbozek\AppData\Local\Civica\VH5\eaaed411-b099-4108-b6b0-cc0fca6dc942\bad7bbac-5ed
  Summary filename: C:\Users\dbozek\AppData\Local\Civica\VH5\eaaed411-b099-4108-b6b0-cc0fca6dc942\bad7bbac-5ed


DATE: 11-10-2025                          TIME: 02:03:38

USER:


COMMENTS: _____________________________________________________________


  ************************************************
  ** SIMULATION : Run 02                         **
  ************************************************

  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                10.0
    [ Ptot= 50.52 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\0cb77411-5e49-48b4-9043-c5
    remark: 4hr 5year CHICAGO STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0202  1  5.0    0.18    0.01  1.75  12.97 0.26   0.000
    [CN=69.0         ]
    [ N = 3.0:Tp 0.25]
*
    READ STORM                10.0
    [ Ptot= 50.52 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\0cb77411-5e49-48b4-9043-c5
    remark: 4hr 5year CHICAGO STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0201  1  5.0    0.24    0.02  1.50  14.01 0.28   0.000
    [CN=73.0         ]
    [ N = 3.0:Tp 0.08]
*
    READ STORM                10.0
    [ Ptot= 50.52 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\0cb77411-5e49-48b4-9043-c5
    remark: 4hr 5year CHICAGO STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0203  1  5.0    0.82    0.03  1.58  12.90 0.26   0.000
    [CN=69.0         ]
    [ N = 3.0:Tp 0.15]
*
    READ STORM                10.0
    [ Ptot= 50.52 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\0cb77411-5e49-48b4-9043-c5
    remark: 4hr 5year CHICAGO STORM - CITY OF BARRIE
*
 *  CALIB STANDHYD        0200  1  5.0   10.10    0.57  1.50  20.10 0.40   0.000
    [I%=14.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:              0300  1  5.0   10.10    0.26  2.08  20.07  n/a   0.000
*
    ADD [  0201+  0202]   0400  3  5.0    0.42    0.02  1.50  13.56  n/a   0.000
*
    ADD [  0400+  0203]   0400  1  5.0    1.24    0.05  1.58  13.13  n/a   0.000
```

```
*
    ADD [  0400+  0300]  0400  3  5.0   11.34    0.28  2.00  19.31  n/a   0.000
*
================================================================================================================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2022)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  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\dbozek\AppData\Local\Civica\VH5\eaaed411-b099-4108-b6b0-cc0fca6dc942\a4e53c6d-aa9
  Summary filename: C:\Users\dbozek\AppData\Local\Civica\VH5\eaaed411-b099-4108-b6b0-cc0fca6dc942\a4e53c6d-aa9


DATE: 11-10-2025                          TIME: 02:03:38

USER:


COMMENTS: _____________________________________________________


  ************************************************
  ** SIMULATION : Run 03                        **
  ************************************************

  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                 10.0
    [ Ptot= 59.69 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\05237a76-8cec-41e7-ae3f-a3
    remark: 4hr 10year CHICAGO STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0202  1  5.0    0.18    0.01  1.75  17.70 0.30   0.000
    [CN=69.0         ]
    [ N = 3.0:Tp 0.25]
*
    READ STORM                 10.0
    [ Ptot= 59.69 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\05237a76-8cec-41e7-ae3f-a3
    remark: 4hr 10year CHICAGO STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0201  1  5.0    0.24    0.02  1.50  18.98 0.32   0.000
    [CN=73.0         ]
    [ N = 3.0:Tp 0.08]
*
    READ STORM                 10.0
    [ Ptot= 59.69 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\05237a76-8cec-41e7-ae3f-a3
    remark: 4hr 10year CHICAGO STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0203  1  5.0    0.82    0.05  1.58  17.62 0.30   0.000
    [CN=69.0         ]
    [ N = 3.0:Tp 0.15]
*
    READ STORM                 10.0
    [ Ptot= 59.69 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\05237a76-8cec-41e7-ae3f-a3
    remark: 4hr 10year CHICAGO STORM - CITY OF BARRIE
*
 *  CALIB STANDHYD       0200  1  5.0   10.10    0.73  1.50  25.94 0.43   0.000
    [I%=14.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0300  1  5.0   10.10    0.35  2.00  25.92  n/a   0.000
*
```

```
    ADD [  0201+  0202]  0400  3  5.0    0.42    0.03  1.50  18.44  n/a   0.000
*
    ADD [  0400+  0203]  0400  1  5.0    1.24    0.07  1.58  17.89  n/a   0.000
*
    ADD [  0400+  0300]  0400  3  5.0   11.34    0.38  2.00  25.04  n/a   0.000
*
================================================================================================================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2022)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  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\dbozek\AppData\Local\Civica\VH5\eaaed411-b099-4108-b6b0-cc0fca6dc942\ba2d25ff-cb4
  Summary filename: C:\Users\dbozek\AppData\Local\Civica\VH5\eaaed411-b099-4108-b6b0-cc0fca6dc942\ba2d25ff-cb4


DATE: 11-10-2025                          TIME: 02:03:38

USER:


COMMENTS: _____________________________________________________________


  ************************************************
  ** SIMULATION : Run 04                         **
  ************************************************

  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                 10.0
    [ Ptot= 71.24 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\4ed3113b-7e98-452e-bcb2-4d
    remark: 4hr 25year CHICAGO STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0202  1  5.0    0.18    0.01  1.75  24.30 0.34   0.000
    [CN=69.0         ]
    [ N = 3.0:Tp 0.25]
*
    READ STORM                 10.0
    [ Ptot= 71.24 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\4ed3113b-7e98-452e-bcb2-4d
    remark: 4hr 25year CHICAGO STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0201  1  5.0    0.24    0.03  1.50  25.84 0.36   0.000
    [CN=73.0         ]
    [ N = 3.0:Tp 0.08]
*
    READ STORM                 10.0
    [ Ptot= 71.24 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\4ed3113b-7e98-452e-bcb2-4d
    remark: 4hr 25year CHICAGO STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0203  1  5.0    0.82    0.07  1.58  24.19 0.34   0.000
    [CN=69.0         ]
    [ N = 3.0:Tp 0.15]
*
    READ STORM                 10.0
    [ Ptot= 71.24 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\4ed3113b-7e98-452e-bcb2-4d
    remark: 4hr 25year CHICAGO STORM - CITY OF BARRIE
*
 *  CALIB STANDHYD       0200  1  5.0   10.10    0.99  1.67  33.84 0.48   0.000
    [I%=14.0:S%= 2.00]
*
```

```
 ** Reservoir
    OUTFLOW:             0300  1  5.0   10.10    0.51  2.00  33.82  n/a   0.000
*
    ADD [  0201+  0202]  0400  3  5.0    0.42    0.04  1.50  25.18  n/a   0.000
*
    ADD [  0400+  0203]  0400  1  5.0    1.24    0.10  1.58  24.52  n/a   0.000
*
    ADD [  0400+  0300]  0400  3  5.0   11.34    0.56  1.92  32.80  n/a   0.000
*
================================================================================================================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2022)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  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\dbozek\AppData\Local\Civica\VH5\eaaed411-b099-4108-b6b0-cc0fca6dc942\a0324624-227
  Summary filename: C:\Users\dbozek\AppData\Local\Civica\VH5\eaaed411-b099-4108-b6b0-cc0fca6dc942\a0324624-227


DATE: 11-10-2025                          TIME: 02:03:38

USER:


COMMENTS: _____________________________________________________________


  ************************************************
  ** SIMULATION : Run 05                        **
  ************************************************

  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                  10.0
    [ Ptot= 79.45 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\806310ce-922a-4988-915a-30
    remark: 4hr 50year CHICAGO STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0202  1  5.0    0.18    0.01  1.75  29.37 0.37   0.000
    [CN=69.0         ]
    [ N = 3.0:Tp 0.25]
*
    READ STORM                  10.0
    [ Ptot= 79.45 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\806310ce-922a-4988-915a-30
    remark: 4hr 50year CHICAGO STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0201  1  5.0    0.24    0.04  1.50  31.05 0.39   0.000
    [CN=73.0         ]
    [ N = 3.0:Tp 0.08]
*
    READ STORM                  10.0
    [ Ptot= 79.45 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\806310ce-922a-4988-915a-30
    remark: 4hr 50year CHICAGO STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0203  1  5.0    0.82    0.08  1.58  29.23 0.37   0.000
    [CN=69.0         ]
    [ N = 3.0:Tp 0.15]
*
    READ STORM                  10.0
    [ Ptot= 79.45 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\806310ce-922a-4988-915a-30
    remark: 4hr 50year CHICAGO STORM - CITY OF BARRIE
*
```

```
 *  CALIB STANDHYD       0200  1  5.0   10.10    1.39  1.50  39.76 0.50   0.000
    [I%=14.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0300  1  5.0   10.10    0.58  1.92  39.74  n/a   0.000
*
    ADD [  0201+  0202]  0400  3  5.0    0.42    0.04  1.50  30.33  n/a   0.000
*
    ADD [  0400+  0203]  0400  1  5.0    1.24    0.12  1.58  29.60  n/a   0.000
*
    ADD [  0400+  0300]  0400  3  5.0   11.34    0.66  1.75  38.63  n/a   0.000
*
================================================================================================================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2022)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  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\dbozek\AppData\Local\Civica\VH5\eaaed411-b099-4108-b6b0-cc0fca6dc942\e4ee3afb-cc1
  Summary filename: C:\Users\dbozek\AppData\Local\Civica\VH5\eaaed411-b099-4108-b6b0-cc0fca6dc942\e4ee3afb-cc1


DATE: 11-10-2025                          TIME: 02:03:39

USER:


COMMENTS: _____________________________________________________________


  ************************************************
  ** SIMULATION : Run 06                        **
  ************************************************

  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                10.0
    [ Ptot= 87.58 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\47ce8768-8307-4f82-b860-a9
    remark: 4hr 100year CHICAGO STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0202  1  5.0    0.18    0.02  1.75  34.64 0.40   0.000
    [CN=69.0         ]
    [ N = 3.0:Tp 0.25]
*
    READ STORM                10.0
    [ Ptot= 87.58 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\47ce8768-8307-4f82-b860-a9
    remark: 4hr 100year CHICAGO STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0201  1  5.0    0.24    0.04  1.50  36.44 0.42   0.000
    [CN=73.0         ]
    [ N = 3.0:Tp 0.08]
*
    READ STORM                10.0
    [ Ptot= 87.58 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\47ce8768-8307-4f82-b860-a9
    remark: 4hr 100year CHICAGO STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0203  1  5.0    0.82    0.10  1.58  34.47 0.39   0.000
    [CN=69.0         ]
    [ N = 3.0:Tp 0.15]
*
    READ STORM                10.0
    [ Ptot= 87.58 mm ]
```

```
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\47ce8768-8307-4f82-b860-a9
    remark: 4hr 100year CHICAGO STORM - CITY OF BARRIE
*
 *  CALIB STANDHYD       0200  1  5.0   10.10    1.64  1.50  45.83 0.52   0.000
    [I%=14.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0300  1  5.0   10.10    0.72  1.92  45.81  n/a   0.000
*
    ADD [  0201+  0202]  0400  3  5.0    0.42    0.05  1.50  35.67  n/a   0.000
*
    ADD [  0400+  0203]  0400  1  5.0    1.24    0.14  1.58  34.88  n/a   0.000
*
    ADD [  0400+  0300]  0400  3  5.0   11.34    0.82  1.75  44.61  n/a   0.000
*
 FINISH

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

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


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2022)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  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\dbozek\AppData\Local\Civica\VH5\eaaed411-b099-4108-b6b0-cc0fca6dc942\1624655e-075
  Summary filename: C:\Users\dbozek\AppData\Local\Civica\VH5\eaaed411-b099-4108-b6b0-cc0fca6dc942\1624655e-075


DATE: 11-10-2025                          TIME: 02:03:38

USER:


COMMENTS: _____________________________________________________________


  ************************************************
  ** SIMULATION : Run 07                         **
  ************************************************

  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= 55.00 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\9bce3a2a-638d-476c-9997-03
    remark: 24hr 2year SCS STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0202  1  5.0    0.18    0.01 12.08  15.22 0.28   0.000
    [CN=69.0         ]
    [ N = 3.0:Tp 0.25]
*
    READ STORM                 15.0
    [ Ptot= 55.00 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\9bce3a2a-638d-476c-9997-03
    remark: 24hr 2year SCS STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0201  1  5.0    0.24    0.01 12.00  16.38 0.30   0.000
    [CN=73.0         ]
    [ N = 3.0:Tp 0.08]
*
    READ STORM                 15.0
    [ Ptot= 55.00 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\9bce3a2a-638d-476c-9997-03
    remark: 24hr 2year SCS STORM - CITY OF BARRIE
```

```
*
 ** CALIB NASHYD         0203  1  5.0    0.82    0.03 12.00  15.14 0.28   0.000
    [CN=69.0         ]
    [ N = 3.0:Tp 0.15]
*
    READ STORM                 15.0
    [ Ptot= 55.00 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\9bce3a2a-638d-476c-9997-03
    remark: 24hr 2year SCS STORM - CITY OF BARRIE
*
 *  CALIB STANDHYD       0200  1  5.0   10.10    0.52 12.00  22.90 0.42   0.000
    [I%=14.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0300  1  5.0   10.10    0.21 12.42  22.87  n/a   0.000
*
    ADD [  0201+  0202]  0400  3  5.0    0.42    0.02 12.00  15.88  n/a   0.000
*
    ADD [  0400+  0203]  0400  1  5.0    1.24    0.05 12.00  15.40  n/a   0.000
*
    ADD [  0400+  0300]  0400  3  5.0   11.34    0.23 12.33  22.06  n/a   0.000
*
================================================================================================================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2022)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  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\dbozek\AppData\Local\Civica\VH5\eaaed411-b099-4108-b6b0-cc0fca6dc942\d797fcae-28d
  Summary filename: C:\Users\dbozek\AppData\Local\Civica\VH5\eaaed411-b099-4108-b6b0-cc0fca6dc942\d797fcae-28d


DATE: 11-10-2025                          TIME: 02:03:39

USER:


COMMENTS: _____________________________________________________________


  ************************************************
  ** SIMULATION : Run 08                         **
  ************************************************

  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= 76.00 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\689870c2-55df-42b7-842b-aa
    remark: 24hr 5year SCS STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0202  1  5.0    0.18    0.01 12.08  27.21 0.36   0.000
    [CN=69.0         ]
    [ N = 3.0:Tp 0.25]
*
    READ STORM                 15.0
    [ Ptot= 76.00 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\689870c2-55df-42b7-842b-aa
    remark: 24hr 5year SCS STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0201  1  5.0    0.24    0.03 12.00  28.83 0.38   0.000
    [CN=73.0         ]
    [ N = 3.0:Tp 0.08]
*
    READ STORM                 15.0
```

```
    [ Ptot= 76.00 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\689870c2-55df-42b7-842b-aa
    remark: 24hr 5year SCS STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0203  1  5.0    0.82    0.06 12.00  27.07 0.36   0.000
    [CN=69.0        ]
    [ N = 3.0:Tp 0.15]
*
    READ STORM                15.0
    [ Ptot= 76.00 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\689870c2-55df-42b7-842b-aa
    remark: 24hr 5year SCS STORM - CITY OF BARRIE
*
 *  CALIB STANDHYD       0200  1  5.0   10.10    0.89 12.00  37.25 0.49   0.000
    [I%=14.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:              0300  1  5.0   10.10    0.41 12.33  37.22  n/a   0.000
*
    ADD [  0201+  0202]  0400  3  5.0    0.42    0.03 12.00  28.13  n/a   0.000
*
    ADD [  0400+  0203]  0400  1  5.0    1.24    0.10 12.00  27.43  n/a   0.000
*
    ADD [  0400+  0300]  0400  3  5.0   11.34    0.45 12.25  36.15  n/a   0.000
*
================================================================================================================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2022)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  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\dbozek\AppData\Local\Civica\VH5\eaaed411-b099-4108-b6b0-cc0fca6dc942\7a1dee26-23d
  Summary filename: C:\Users\dbozek\AppData\Local\Civica\VH5\eaaed411-b099-4108-b6b0-cc0fca6dc942\7a1dee26-23d


DATE: 11-10-2025                          TIME: 02:03:38

USER:


COMMENTS: _____________________________________________________________


  ************************************************
  ** SIMULATION : Run 09                         **
  ************************************************

  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= 89.90 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\0d41b358-09f3-47de-9141-71
    remark: 24hr 10year SCS STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0202  1  5.0    0.18    0.01 12.08  36.19 0.40   0.000
    [CN=69.0        ]
    [ N = 3.0:Tp 0.25]
*
    READ STORM                15.0
    [ Ptot= 89.90 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\0d41b358-09f3-47de-9141-71
    remark: 24hr 10year SCS STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0201  1  5.0    0.24    0.03 12.00  38.02 0.42   0.000
    [CN=73.0        ]
```

```
    [ N = 3.0:Tp 0.08]
*
    READ STORM                 15.0
    [ Ptot= 89.90 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\0d41b358-09f3-47de-9141-71
    remark: 24hr 10year SCS STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0203  1  5.0    0.82    0.08 12.00  36.01 0.40   0.000
    [CN=69.0         ]
    [ N = 3.0:Tp 0.15]
*
    READ STORM                 15.0
    [ Ptot= 89.90 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\0d41b358-09f3-47de-9141-71
    remark: 24hr 10year SCS STORM - CITY OF BARRIE
*
 *  CALIB STANDHYD       0200  1  5.0   10.10    1.17 12.00  47.60 0.53   0.000
    [I%=14.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0300  1  5.0   10.10    0.58 12.25  47.57  n/a   0.000
*
    ADD [  0201+  0202]  0400  3  5.0    0.42    0.05 12.00  37.23  n/a   0.000
*
    ADD [  0400+  0203]  0400  1  5.0    1.24    0.13 12.00  36.42  n/a   0.000
*
    ADD [  0400+  0300]  0400  3  5.0   11.34    0.64 12.17  46.35  n/a   0.000
*
================================================================================================================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2022)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  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\dbozek\AppData\Local\Civica\VH5\eaaed411-b099-4108-b6b0-cc0fca6dc942\d5d42c1e-418
  Summary filename: C:\Users\dbozek\AppData\Local\Civica\VH5\eaaed411-b099-4108-b6b0-cc0fca6dc942\d5d42c1e-418


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COMMENTS: _____________________________________________________________


  ************************************************
  ** SIMULATION : Run 10                         **
  ************************************************

  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=107.50 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\9ad5e3ee-ca63-422c-a35a-30
    remark: 24hr 25year SCS STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0202  1  5.0    0.18    0.02 12.08  48.46 0.45   0.000
    [CN=69.0         ]
    [ N = 3.0:Tp 0.25]
*
    READ STORM                 15.0
    [ Ptot=107.50 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\9ad5e3ee-ca63-422c-a35a-30
    remark: 24hr 25year SCS STORM - CITY OF BARRIE
```

```
*
 ** CALIB NASHYD         0201  1  5.0    0.24    0.04 12.00  50.45 0.47   0.000
    [CN=73.0         ]
    [ N = 3.0:Tp 0.08]
*
    READ STORM                 15.0
    [ Ptot=107.50 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\9ad5e3ee-ca63-422c-a35a-30
    remark: 24hr 25year SCS STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0203  1  5.0    0.82    0.11 12.00  48.22 0.45   0.000
    [CN=69.0         ]
    [ N = 3.0:Tp 0.15]
*
    READ STORM                 15.0
    [ Ptot=107.50 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\9ad5e3ee-ca63-422c-a35a-30
    remark: 24hr 25year SCS STORM - CITY OF BARRIE
*
 *  CALIB STANDHYD       0200  1  5.0   10.10    1.75 12.00  61.42 0.57   0.000
    [I%=14.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0300  1  5.0   10.10    0.84 12.17  61.40  n/a   0.000
*
    ADD [  0201+  0202]  0400  3  5.0    0.42    0.06 12.00  49.60  n/a   0.000
*
    ADD [  0400+  0203]  0400  1  5.0    1.24    0.17 12.00  48.69  n/a   0.000
*
    ADD [  0400+  0300]  0400  3  5.0   11.34    0.95 12.17  60.01  n/a   0.000
*
================================================================================================================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2022)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\dbozek\AppData\Local\Civica\VH5\eaaed411-b099-4108-b6b0-cc0fca6dc942\2a9b3116-c9c
  Summary filename: C:\Users\dbozek\AppData\Local\Civica\VH5\eaaed411-b099-4108-b6b0-cc0fca6dc942\2a9b3116-c9c


DATE: 11-10-2025                          TIME: 02:03:38

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COMMENTS: _____________________________________________________


  ************************************************
  ** SIMULATION : Run 11                         **
  ************************************************

  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=120.60 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\9948bc8a-e877-4407-9ede-f4
    remark: 24hr 50year SCS STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0202  1  5.0    0.18    0.02 12.08  58.12 0.48   0.000
    [CN=69.0         ]
    [ N = 3.0:Tp 0.25]
*
    READ STORM                 15.0
```

```
    [ Ptot=120.60 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\9948bc8a-e877-4407-9ede-f4
    remark: 24hr 50year SCS STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0201  1  5.0    0.24    0.05 12.00  60.16 0.50   0.000
    [CN=73.0         ]
    [ N = 3.0:Tp 0.08]
*
    READ STORM                 15.0
    [ Ptot=120.60 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\9948bc8a-e877-4407-9ede-f4
    remark: 24hr 50year SCS STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0203  1  5.0    0.82    0.14 12.00  57.84 0.48   0.000
    [CN=69.0         ]
    [ N = 3.0:Tp 0.15]
*
    READ STORM                 15.0
    [ Ptot=120.60 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\9948bc8a-e877-4407-9ede-f4
    remark: 24hr 50year SCS STORM - CITY OF BARRIE
*
 *  CALIB STANDHYD       0200  1  5.0   10.10    2.09 12.00  72.12 0.60   0.000
    [I%=14.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0300  1  5.0   10.10    1.07 12.17  72.09  n/a   0.000
*
    ADD [  0201+  0202]  0400  3  5.0    0.42    0.07 12.00  59.29  n/a   0.000
*
    ADD [  0400+  0203]  0400  1  5.0    1.24    0.21 12.00  58.33  n/a   0.000
*
    ADD [  0400+  0300]  0400  3  5.0   11.34    1.19 12.17  70.59  n/a   0.000
*
================================================================================================================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2022)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\dbozek\AppData\Local\Civica\VH5\eaaed411-b099-4108-b6b0-cc0fca6dc942\75c47d97-4a7
  Summary filename: C:\Users\dbozek\AppData\Local\Civica\VH5\eaaed411-b099-4108-b6b0-cc0fca6dc942\75c47d97-4a7


DATE: 11-10-2025                          TIME: 02:03:38

USER:


COMMENTS: _____________________________________________________________


  ************************************************
  ** SIMULATION : Run 12                         **
  ************************************************

  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=133.60 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\6d480168-7105-4af1-9a85-e0
    remark: 24hr 100year SCS STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0202  1  5.0    0.18    0.03 12.08  68.08 0.51   0.000
    [CN=69.0         ]
```

```
    [ N = 3.0:Tp 0.25]
*
    READ STORM                 15.0
    [ Ptot=133.60 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\6d480168-7105-4af1-9a85-e0
    remark: 24hr 100year SCS STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0201  1  5.0    0.24    0.06 12.00  70.10 0.52   0.000
    [CN=73.0         ]
    [ N = 3.0:Tp 0.08]
*
    READ STORM                 15.0
    [ Ptot=133.60 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\6d480168-7105-4af1-9a85-e0
    remark: 24hr 100year SCS STORM - CITY OF BARRIE
*
 ** CALIB NASHYD         0203  1  5.0    0.82    0.16 12.00  67.74 0.51   0.000
    [CN=69.0         ]
    [ N = 3.0:Tp 0.15]
*
    READ STORM                 15.0
    [ Ptot=133.60 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\6d480168-7105-4af1-9a85-e0
    remark: 24hr 100year SCS STORM - CITY OF BARRIE
*
 *  CALIB STANDHYD       0200  1  5.0   10.10    2.44 12.00  83.01 0.62   0.000
    [I%=14.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0300  1  5.0   10.10    1.25 12.17  82.99  n/a   0.000
*
    ADD [  0201+  0202]  0400  3  5.0    0.42    0.08 12.00  69.24  n/a   0.000
*
    ADD [  0400+  0203]  0400  1  5.0    1.24    0.25 12.00  68.25  n/a   0.000
*
    ADD [  0400+  0300]  0400  3  5.0   11.34    1.39 12.17  81.38  n/a   0.000
*
================================================================================================================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2022)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\dbozek\AppData\Local\Civica\VH5\eaaed411-b099-4108-b6b0-cc0fca6dc942\5a76a84d-15a
  Summary filename: C:\Users\dbozek\AppData\Local\Civica\VH5\eaaed411-b099-4108-b6b0-cc0fca6dc942\5a76a84d-15a


DATE: 11-10-2025                          TIME: 02:03:38

USER:


COMMENTS: _____________________________________________________________


  ************************************************
  ** SIMULATION : Run 13                         **
  ************************************************

  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                 60.0
    [ Ptot=193.00 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\b0a73a8f-acb3-470b-8f6b-0b
    remark: REGIONAL STORM TIMMINS - 12 hour storm
```

```
*
 ** CALIB NASHYD         0202  1  5.0    0.18    0.02  7.00 116.89 0.61   0.000
    [CN=69.0         ]
    [ N = 3.0:Tp 0.25]
*
    READ STORM                 60.0
    [ Ptot=193.00 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\b0a73a8f-acb3-470b-8f6b-0b
    remark: REGIONAL STORM TIMMINS - 12 hour storm
*
 ** CALIB NASHYD         0201  1  5.0    0.24    0.02  7.00 118.26 0.61   0.000
    [CN=73.0         ]
    [ N = 3.0:Tp 0.08]
*
    READ STORM                 60.0
    [ Ptot=193.00 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\b0a73a8f-acb3-470b-8f6b-0b
    remark: REGIONAL STORM TIMMINS - 12 hour storm
*
 ** CALIB NASHYD         0203  1  5.0    0.82    0.07  7.00 116.31 0.60   0.000
    [CN=69.0         ]
    [ N = 3.0:Tp 0.15]
*
    READ STORM                 60.0
    [ Ptot=193.00 mm ]
    fname : C:\Users\dbozek\AppData\Local\Temp\471efee5-3535-451d-85b0-f6cda60247bc\b0a73a8f-acb3-470b-8f6b-0b
    remark: REGIONAL STORM TIMMINS - 12 hour storm
*
 *  CALIB STANDHYD       0200  1  5.0   10.10    0.95  7.00 135.25 0.70   0.000
    [I%=14.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0300  1  5.0   10.10    0.81  7.17 135.23  n/a   0.000
*
    ADD [  0201+  0202]  0400  3  5.0    0.42    0.04  7.00 117.67  n/a   0.000
*
    ADD [  0400+  0203]  0400  1  5.0    1.24    0.11  7.00 116.77  n/a   0.000
*
    ADD [  0400+  0300]  0400  3  5.0   11.34    0.88  7.17 133.21  n/a   0.000
*
```

Appendix E

Phosphorous Budget Calculations

GSP Inc., Horning's Mill
Phosphorus Budget

Subwater Shed - Pine River	Residential	Commercial	Industrial	Transportation
Phosphorus Export (mg/L)*	0.41	0.20	0.41	0.50

*Values from the NVCA Phosphorus Loading Development Tool

As per the Hutchinson Environmental Services Ltd. Report, October 31, 2004, for the NVCA Phosphorous Tool.

Pre-Development Condition

TP for Residential (mg/L)=	0.41	
Precipitation (mm/yr) =	901.5	
Pj = Fraction that produces runoff =	0.35	
Impervious Fraction =	0.097	
Rv (Runoff Coefficient = 0.05+0.91x Impervious fraction)=	0.14	
TP Export Coefficient (kg/ha/yr) =	TP x Precip X Pj x Rv x 10^{-2}	
=	0.18	

Post Development Condition

TP for Residential (mg/L)=	0.41	
Precipitation (mm/yr) =	901.5	
Pj = Fraction that produces runoff =	0.30	
Impervious Fraction =	0.19	
Rv (Runoff Coefficient = 0.05+0.91x Impervious fraction)=	0.22	
TP Export Coefficient (kg/ha/yr) =	TP x Precip X Pj x Rv x 10^{-2}	
=	0.25	

GSP Inc., Horning's Mill
Phosphorus Budget

Pre-Development Condition

Total Pre-Development P (kg/ha/yr)	0.18
Total Pre-Development P (kg/yr)	2.03

Post-Development Condition (Uncontrolled):

Total Uncontrolled Post-Development (kg/ha/yr):	0.25
Total Uncontrolled Post-Development (kg/yr)	2.81

Post Development Condition (Controlled)

Without Treatment	
Total (kg/yr):	1.24
Rooftop Area Draining to Soakaway Pits	
Total P (kg/yr):	0.17
Soakaway Pits Proficiency (%):	95
P Removed (kg/yr):	0.16
P Remaining (kg/yr):	0.01
Area Draining to Dry Pond	
Total P (kg/yr):	2.33
Total P (kg/yr):	2.00
Dry Pond Proficiency (%):	10
P Removed (kg/yr):	0.23
P Remaining (kg/yr):	2.10
Area Draining to OGS	
Total P (kg):	2.10
OGS Proficiency (%):	20
P Removed (kg):	0.42
P Remaining (kg):	1.68
Total Site P (kg):	**1.69**

Appendix F

Water Balance Calculations

PEARSON ENGINEERING

GSP Inc., Horning's Mill
Water Balance Calculations

Pre-Development Recharge:

Precipitation data taken from Environment Canada information for the Town of Orangeville

Yearly Precipitation	=	901.5	mm

Using Table 3.1 of the MOE's SWM Planning & Design Manual, the infiltration amount is approximately 29.1% of the precipitation value for Mature Forest and 25.6% of the Moderately Rooted Crops for Fine Sandy Loam. Using site specific rainfall data, the infiltration can be calculated.

Mature Forest	=	1.01	ha		
Cultivated Area	=	10.25	ha		
Annual Site Area Recharge Volume	=	(1.01 x 0.29 + 10.25 x 0.26)		x	901.5
	=	26,306	m^3		

Therefore, 26,306 m^3 per year of recharge volume is required for the proposed project.

Post-Development Recharge:

Using Table 3.1 of the MOE's SWM Planning & Design Manual, the infiltration amount is approximately 24.3% of the precipitation value for Urban Lawn and approximately 25.6% of Moderately Rooted Crops was considered.

Grassed Area	=	8.25	ha		
Cultivated Area	=	0.90			
Annual Site Area Recharge Volume	=	(8.25 x 0.24 + 0.89 x 0.26)		x	901.5
	=	19,953	m^3		

Therefore, post-development infiltration deficit is as follows:

Deficit Volume	=	Pre Development		-	Post Development
	=	26,306		-	19,953
	=	6,352	m^3		

Roof Top Infiltration:

Find the depth of annual rainfall required to infiltrate 6352 m3 from the rooftops into the ground.

Area Contributing to the Infiltration Locations	=	6,720	m^2
Infiltration Deficit	=	6,352	m^3

Annual Precipitation Depth Required

Required Precipitation Depth	=	6,352	m^3
		6,720	m^2
	=	945.3	mm

The runoff coefficient for the contributing area is 0.95, the precipitation depth required to get 945.3 mm of runoff is:

Precipitation Depth	=	945.3	mm
		0.95	
	=	995.1	mm

Find Percent of Annual Precipitation that Required Precipitation Depth represents:

Annual Precipitation for Study Area	=	901.5	mm
% Annual Rainfall	=	995.1 / 901.5	mm / mm
	=	110%	

As required rainfall exceeds 100%, find rainfal depth which represents 95% of rainfall per year:

% Annual Rainfall	=	D / 901.5	mm / mm
95%	=	D / 901.5	mm
D	=	856	mm

Find required precipiation depth using precipitation depth and runoff:

Required Precipitation Depth	=	856.0	x	0.95
	=	813	mm	

Find infiltration deficit using required precipitation depth:

Infiltration Deficit	=	813.0	x	6720
	=	5,464	m^2	

Find annual site recharge volume:

Post-Development Deficit	=	Deficit	-	Post-development Infiltraiton
	=	6,352	-	5,464
	=	888		

From MOE Figure C-2, 95% of rainfall occurs for storm events of 25mm or less:

Contributing Area	=	6,720	m^2	
Precipitation Depth	=	25	mm	
Storage Volume Req'd	=	A	x	D
	=	6,720	x	25
	=	168	m^3	

The site will require a minimum infiltration volume of 168 m³ and will be provided using soakaway pits.

NVCA Reuirements to retain 5mm of rainfall depth over the site

Total site area	=	113460	m^2
Precipitation depth	=	5	mm
Infiltration Storage Volume Required	=	567.3	m^3

Best efforts have been implemented to infiltrate the required storage volume on site.

PEARSON ENGINEERING

GSP Inc., Horning's Mill
Soakaway Pit Infiltration Calculations

Storage Volume Provided Using 25 mm Storm Event as per Water Balance Calculations:

Average Roof Area per Soakaway Pit	=	320	m^2		
Soakaway Pit Volume Required (V)	=	A x D			
	=	320		x	25
	=	8.00	m^3		
Volume of Stone Required per lot	=	Volume		/	Porosity
	=	8.0		/	0.4
	=	20.0	m^3		

MECP Maximum Allowable Soakaway Pit Depth:

Percolation (P)	=	35	mm/hr	(Average Estimated Percolation Rate Based on
Percolation (P) with 2.5x reduction in rate	=	14		the Hydrogeological Assessment Grain Size
Drawdown Time (T)	=	36	hr	Analysis)
Maximum Depth (d)	=	$\frac{PT}{1{,}000}$		
	=	0.51	m	

MECP Required Soakaway Pit Bottom Area:

Percolation (P)	=	14	mm/hr	
Porosity Of The Storage Material (n)	=	0.40	(for Clear Stone)	
Runoff Volume to be Infiltrated (V)	=	8	m^3	
Retention Time (Δt)	=	48	hr	
Soakaway Pit Bottom Area Required (A)	=	$\frac{1000V}{Pn\Delta t}$		
	=	30	m^2	

Therefore, two soakaway pits with dimensions of 2.5m x 8.0m x 0.5m will be required per lot

Appendix G

Geotechnical Investigation Report, Cambium Inc., March 11th, 2024

Geotechnical Investigation Report - 537086 Main Street, Horning's Mills, Ontario

March 11, 2024

Prepared for:
Angelo Carnevale

Cambium Reference: 17217-001

CAMBIUM INC.

866.217.7900

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1.0 Introduction

Cambium Inc. (Cambium) was retained by Angelo Carnevale (Client) to complete a geotechnical investigation in support of a proposed residential development located at 537086 Main Street in Horning's Mills, Township of Melancthon, Ontario (Site).

This report presents and summarizes the methodology and findings of the geotechnical investigation conducted by Cambium at the Site. Based on the results of the investigation, geotechnical engineering recommendations relevant to the proposed development are provided. In addition, the results of visual slope stability and karst assessments conducted by Cambium at the Site are presented in this report.

1.1 Reviewed Documents

The following project documents were received and reviewed during the drafting of this report:

[1] GSP Group Inc. – Kitchener, Ontario
Development Concept – 537080 Main Street, Horning's Mills; 1:2000; Project No. 22028; February 2, 2022.

[2] Van Harten Surveying Inc. – Orangeville, Ontario
Lot 13, Concession 2 – Preliminary Topo (32159-23) UTM 2010; received by email on May 4, 2023.

1.2 Standards and Guidelines

Applicable standards, guidelines and other normative documents utilized in preparing geotechnical engineering recommendations for this report are provided below.

[3] Canadian Foundation Engineering Manual – 4th Edition; Canadian Geotechnical Society; 2006.

[4] Technical Guide – River & Stream Systems: Erosion Hazard Limit; Ontario Ministry of Natural Resources; 2002.

2.0 Site and Project Description

2.1 Site Description

The Site covers an area of approximately 10.2 acres and is bordered by Dufferin County Road 124 to the west, Main Street to the east, and on all other sides by both vacant and residentially developed properties. The current parcel is vacant and used for agricultural purposes. The adjoining parcel on the eastern side of the property with the civic address 537080 Main Street is developed with a residential dwelling and a barn structure.

The ground elevation at the Site generally falls from west to east, from a maximum elevation of around 482 m above sea level (mASL) along the western property line bordering County Road 124 to elevations around 458 mASL along the eastern property line bordering Main Street. The ground elevation predominantly falls at shallow inclinations (approximately 20H:1V) throughout the property, at times steepening to inclinations of about 10H:1V.

Two defined slope areas exist within the Site, with one slope area along the eastern property line bordering Main Street (height difference of about 4 m to 5 m between the top and bottom of bank based on [2], and maximum inclination approximately 6H:1V) and the second slope area intersecting the southeastern corner of the property (height difference of up to about 4 m, and maximum inclination approximately 5H:1V). Both of the slope areas are regulated by the Nottawasaga Valley Conservation Authority (NVCA) under O.Reg. 172/06 in conjunction with Horning’s Mills Creek.

A Site Location Plan is provided as Figure 1 of this report for reference.

2.2 Project Description

Based on the concept plan provided to Cambium [1], the proposed development will consist of 19 separate residential lots, accessed from Main Street by two new roadways. In the southeastern corner of the Site, near Horning’s Mills Creek, parkland is currently proposed.

It is understood that the lots will be privately serviced.

3.0 Methodology

3.1 Borehole Investigation

Seven boreholes were advanced throughout the Site on May 11 and 12, 2023, at predetermined locations confirmed with the Client and staked by Cambium during a site visit conducted on May 9, 2023. The boreholes were designated as BH101-23 to BH107-23 and were terminated at depths ranging from 4.5 m below ground surface (mbgs) to 5.2 mbgs.

BH101-23, BH104-23 and BH106-23 were outfitted with monitoring wells to allow for subsequent groundwater level monitoring at the Site.

Borehole drilling and sampling were completed using a track-mounted drill rig operating under the supervision of a Cambium geotechnical analyst. The boreholes were advanced to the sampling depths by means of continuous flight hollow and solid stem augers with 50 mm O.D. split spoon samplers.

Standard Penetration Test (SPT) N values were recorded for the sampled intervals as the number of blows required to drive a split spoon sampler 305 mm into the soil, using a 63.5 kg drop hammer falling 750 mm, as per ASTM D1586 procedures. The SPT N values are used in this report to assess the consistency of cohesive soils and relative density of non-cohesive materials. Soil samples were collected at approximately 0.75 m intervals in the upper 3.0 mbgs and at 1.5 m intervals below that depth.

The encountered soil units were logged in the field using visual and tactile methods, and samples were placed in labelled plastic bags for transport, future reference, laboratory testing, and storage. Borehole logs are provided in Appendix A.

3.2 Site Survey

The borehole coordinates were obtained during the geotechnical investigation using a handheld GPS-enabled device. The approximate borehole elevations were determined by interpolating between 0.25 m contour lines provided on a topographic survey of the property conducted by others [2].

3.3 Physical Laboratory Testing

Physical laboratory testing, including five particle size distribution analyses (LS-702, 705), was completed on selected soil samples to confirm textural classification and to assess geotechnical parameters. Natural moisture content testing (LS-701) was completed on all retrieved soil samples. The physical laboratory testing results are presented in Appendix B and are discussed in Section 4.0.

4.0 Subsurface Conditions

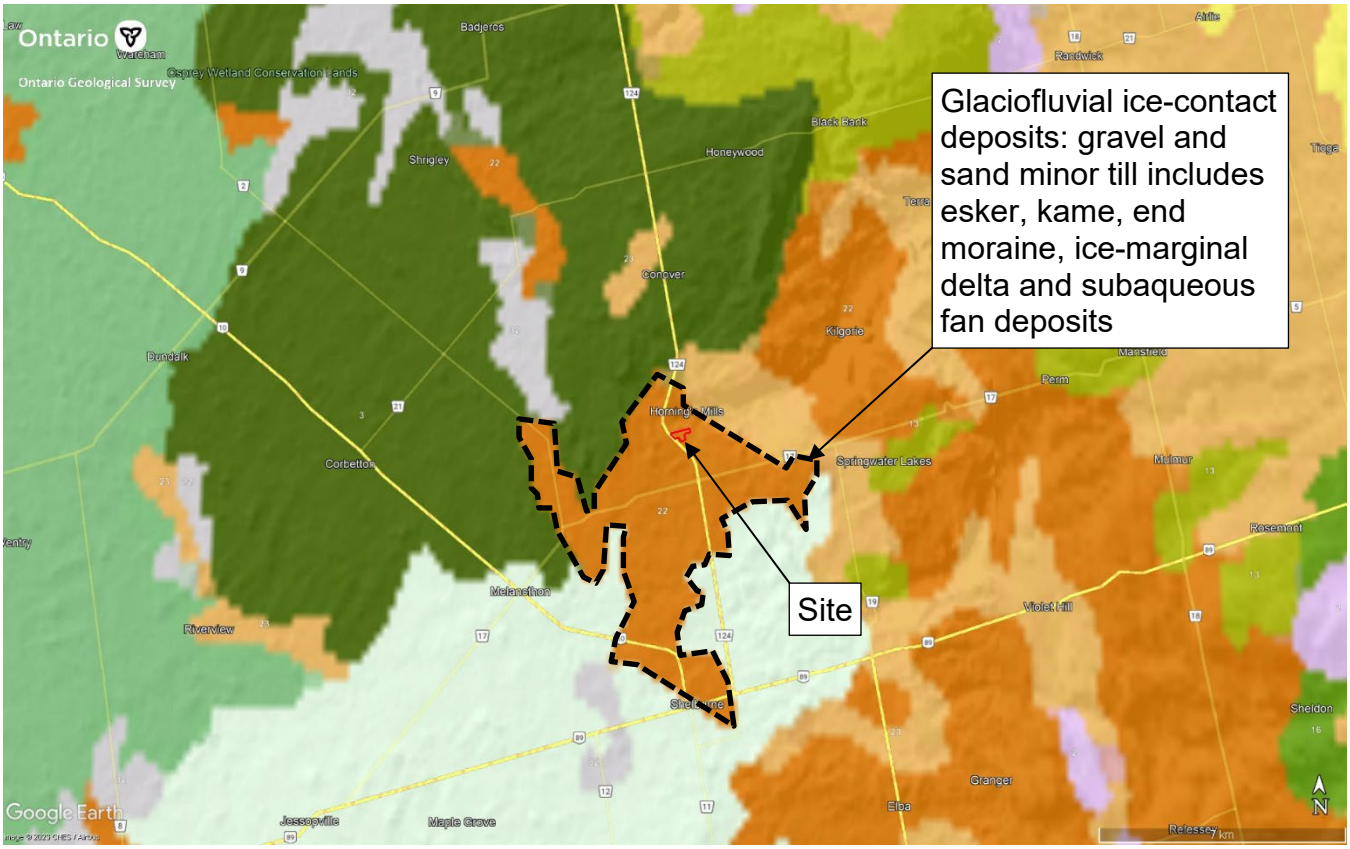
The stratigraphy encountered in the boreholes is indicated on the attached borehole logs in Appendix A. It is noted that the conditions indicated on the borehole logs are for specific locations only and can vary between and beyond the borehole locations. The soil boundaries indicated on the borehole logs are inferred from non-continuous sampling and observations during drilling. These boundaries are intended to reflect approximate transition zones and should not be interpreted as exact planes of geological change. In addition, the descriptions provided in the borehole logs are inferred from a variety of factors, including visual observations of the soil samples retrieved, laboratory testing, measurements prior to and after drilling, and the drilling process itself (drilling speed, shaking/grinding of the augers, etc.).

In general, the encountered subsurface conditions consist of surficial topsoil and silty sand containing organics, primarily underlain by non-cohesive soil deposits.

4.1 Regional Geology

Ontario Geological Survey (OGS) quaternary geologic mapping indicates that the Site is projected to fall within a formation of glaciofluvial ice-contact deposits, including gravel and sand minor till including esker, kame, end moraine, ice-marginal delta and subaqueous fan deposits.

Embedded Figure 1 shows the site (outlined in red) and surrounding quaternary geologic formations.



Embedded Figure 1: Quaternary geologic mapping

4.2 Surficial Soils

A surficial layer of topsoil containing organics was encountered in all boreholes advanced at the Site. The recorded thickness of the topsoil layer varied between 125 mm and 150 mm.

Below the topsoil, a layer of brown silty sand, predominantly containing organics, was encountered in all boreholes. The silty sand containing organics extended to a depth of about 0.8 mbgs and contained trace amounts of gravel and clay.

SPT N values recorded for the surficial soils ranged between 5 and 18, indicating loose to compact relative density. Natural moisture contents determined by laboratory testing ranged between 8.4% and 25.4%.

Assessments of organic matter content or other topsoil quality tests were beyond the scope of this study.

4.3 Non-Cohesive Deposits

Below the surficial soils described above, non-cohesive soil deposits inferred to be native were generally encountered to the termination depths of the boreholes. The composition of the non-cohesive deposits ranged significantly from finer-grained non-cohesive soils (sand and silt, silty sand, sand with some silt) to coarser-grained non-cohesive soils (gravel and sand, gravelly sand, to gravelly silty sand). The soils were predominantly brown in colour.

SPT N values within the non-cohesive deposits generally ranged between 8 and 25 up to a depth of 1.5 mbgs, indicating loose to compact relative density. Below a depth of 1.5 mbgs, the recorded SPT N values generally ranged between 33 and 100, indicating dense to very dense relative density. At varying locations and depths within this formation, auger advancement was noted as being difficult and split spoon refusal was noted, at times leading to minimal sample recovery, which is often indicative of cobbles/boulders being present within the investigated soils. Organics were noted within the non-cohesive soils between 1.5 mbgs and 2.3 mbgs in BH102-23, however it is unclear whether the encountered organics are present within the deposit or represent caved material due to the drilling method (i.e., use of solid stem augers).

Natural moisture contents in the non-cohesive deposits ranged between 3.2% and 17.2% based on laboratory testing. Particle size distribution analysis was completed on four samples collected from the non-cohesive deposits. The testing results are provided in Appendix B and summarized in Table 1.

Table 1 Particle Size Distribution – Non-Cohesive Deposits

Sample ID	Depth (mbgs)	Description	% Gravel	% Sand	% Silt	% Clay	% Moisture Content
BH102-23-SS4	2.3 – 2.9	Silty Gravel and Sand trace Clay	36	36	21	7	4.4
BH103-23-SS3	1.5 – 2.1	Sand and Silt trace Gravel trace Clay	9	44	40	7	12.5
BH105-23-SS2	0.8 – 1.4	Sand and Gravel some Silt trace Clay	35	44	18	3	6.2
BH107-23-SS2	0.8 – 1.4	Silty Sand trace Gravel trace Clay	7	68	20	5	6.6

4.4 Cohesive Deposits

A layer of predominantly cohesive soil was encountered in BH101-23 between depths of 1.5 mbgs and 2.3 mbgs.

The soil was classified as a brown silt with some clay and some sand, and a trace amount of gravel. The recorded SPT N value of 36 indicated hard consistency. Table 2 summarizes the results of the particle size distribution analysis and natural moisture content testing completed on the retrieved sample.

Table 2 Particle Size Distribution – Cohesive Deposits

Sample ID	Depth (mbgs)	Description	% Gravel	% Sand	% Silt	% Clay	% Moisture Content
BH101-23-SS3	1.5 – 2.1	Silt some Clay some Sand trace Gravel	1	11	74	14	22.3

4.5 Bedrock

Bedrock was not confirmed in any of the boreholes advanced by Cambium at the Site. The boreholes were terminated at depths ranging between 4.5 mbgs and 5.2 mbgs, corresponding to absolute elevations between 459.5 mASL and 475.8 mASL.

In BH103-23, BH105-23, BH106-23 and BH107-23, split spoon refusal (i.e., split spoon bouncing on a probable hard surface) was encountered within the final sampling interval prior to reaching the proposed termination depth, and the boreholes were terminated between depths of 4.5 mbgs and 5.1 mbgs. To determine whether the early termination depths are indicative of a bedrock surface at the Site, further confirmation would be required using methods outside of the current scope of work (i.e., coring or other methods such as geophysical surveys or test pit works). A drift thickness map showing approximate projected drift thicknesses in the project area is provided in Section 5.0 below.

4.6 Groundwater

The soils were predominantly described as being dry to moist throughout the borehole investigation. Wet soils were encountered at a depth of approximately 4.6 mbgs in BH104-23,

which was advanced near the lowest ground elevations at the Site. BH102-23 and BH103-23 were observed to be open and dry upon completion of drilling. In BH105-23 and BH107-23, caving occurred to depths of 3.6 mbgs and 3.9 mbgs respectively (about 0.9 m to 1.2 m above the borehole termination depth), and no water was observed in the boreholes upon completion.

Monitoring wells were installed in BH101-23, BH104-23 and BH106-23 to allow for subsequent groundwater level monitoring at the Site. The water levels measured in the installed wells following the investigation are summarized in Table 3.

Table 3 Groundwater Observations During Monitoring Events

Date	Borehole	Ground Elevation (mASL)	Water Level in Monitoring Well (mbgs)	Water Level Elevation (mASL)	Bottom of Well Elevation (mASL)
June 6, 2023	BH101-23	480.25	Dry	-	475.7
	BH104-23	464.45	4.3	460.15	459.9
	BH106-23	474.35	Dry	-	469.9
August 8, 2023	BH101-23	480.25	Dry	-	475.7
	BH104-23	464.45	4.5	459.95	459.9
	BH106-23	474.35	Dry	-	469.9

During the monitoring event conducted on June 6, 2023, water was solely encountered in BH104-23, at a depth of 4.3 mbgs (absolute elevation of approximately 460.15 mASL).

It is noted that the encountered and measured groundwater levels reflect the groundwater conditions in the boreholes at the time of the borehole investigation and subsequent monitoring events between May and August 2023. Groundwater levels at the Site may be anticipated to vary between and beyond the borehole locations and to fluctuate with seasonal variations in precipitation and snowmelt.

4.7 Percolation Rates

Percolation rates were estimated for each of the soil samples submitted for particle size distribution testing, with the results summarized in Table 4.

Table 4 Estimated Percolation Rates

Sample ID	Depth	Description	Estimated Percolation Rate [min/cm]
BH101-23-SS3	1.5 – 2.1	Silt some Clay some Sand trace Gravel	30
BH102-23-SS4	2.3 – 2.9	Silty Gravel and Sand trace Clay	12
BH103-23-SS3	1.5 – 2.1	Sand and Silt trace Gravel trace Clay	20
BH105-23-SS2	0.8 – 1.4	Sand and Gravel some Silt trace Clay	10
BH107-23-SS2	0.8 – 1.4	Silty Sand trace Gravel trace Clay	18

5.0 Slope Stability and Karst Assessments

On May 9, 2023, a Site visit was conducted by Cambium personnel to conduct visual slope stability assessments of relevant slope areas within the property boundaries (slope area to the east along Main Street, and in the southeastern corner of the property near Horning's Mills Creek). In addition, a visual karst assessment was completed to fulfil project-specific permitting requirements communicated to Cambium by the Client. The results of these assessments are documented in this Section of the report.

5.1 Slope Stability Assessment

A visual slope stability assessment was conducted separately for two distinct slope areas at the Site (one slope area parallel to Main Street along the eastern property line, and an additional slope area intersecting the southeastern corner of the property near Horning's Mills Creek).

During the slope stability assessment, the top of bank of both slope areas was inferred and staked by Cambium, with coordinates for the inferred top of bank obtained at each stake location using a handheld GPS-enabled device. The inferred top of bank is provided for both slope areas on the Borehole Location Plan appended as Figure 2 of this report.

The visual slope stability assessment was conducted for both slope areas according to the criteria defined in the Ontario MNRF Technical Guide [4]. The Slope Stability Rating Chart per Table 4.2 of the Technical Guide was completed for both slope areas, with the results summarized in Table 5, including commentary and explanations for the selected rating values. The completed rating charts can be found in Appendix C of this report, and photographs taken during the inspection are included in Appendix D.

Table 5 Slope Stability Rating Chart – Results

Criterion	Slope area adjacent to Main Street (eastern property line) *Photographs 1 to 8 in Appendix D*	Slope area near Horning's Mills Creek (southeastern corner of property) *Photographs 9 to 16 in Appendix D*
Slope Inclination	Maximum inclination approx. 6H:1V based on [2], giving a rating of **0**.	Maximum inclination of approx. 5H:1V based on [2], giving a rating of **0**.
Soil Stratigraphy	Predominantly non-cohesive sands and gravels based on the geotechnical investigation. Based on quaternary geologic mapping, the encountered materials could potentially represent glacial till formations, therefore a recommended rating of **6** to **9** applies.	
Seepage from Slope Face	None observed, giving a rating of **0**.	
Slope Height	Maximum 5 m based on [2], giving a rating of **2**.	Maximum 4 m based on [2], giving a rating of **2**.
Vegetation Cover on Slope Face	Forested with mature trees, giving a rating of **0**.	Vegetation ranges from grass to low-lying shrubs, to mature trees, giving a rating of **0** to **4**.
Table Land Drainage	The table land is gently sloped towards the slope area, which may result in minor drainage occurring over the slope, giving a rating of **2**.	
Proximity of Watercourse to Slope Toe	No regulated watercourse exists adjacent to the slope toe. A ditch exists between the western road edge of Main Street and the slope toe area and was directing water on the inspection date. While not expected to cause significant and continual erosion of the slope toe, a conservative rating of **6** is applied.	Horning's Mills Creek is located within 15 m of the slope toe area based on available NVCA mapping. Based on the NVCA mapping, the creek source is located approximately 150 m south of the southern property line, and the creek was not directing water on the inspection date. A conservative rating of **6** is applied.
Previous Landslide Activity	No evidence of previous landslide activity was noted, giving a rating of **0**.	

Based on the slope stability rating chart results, a rating between **16 and 19** would apply for the eastern slope area adjacent to Main Street, and a rating between **16 and 23** would apply for the southeastern slope area near Horning's Mills Creek.

The rating values indicate that both slopes can be classified as having a ***low potential for slope instability*** (rating value less than 24). For low potential slopes, the minimum investigation requirements per the Technical Guide consist of a visual site inspection and letter report. The fieldwork completed by Cambium and the current report are considered to fulfil the investigation requirements for low potential slopes.

From a geotechnical perspective and given the low potential for slope instability, the permitting authority can consider permitting the development at a distance of at least 6 m (erosion access allowance) from the top of bank, however, it is noted a site-specific setback/erosion access allowance will be stipulated by the NVCA or the local municipality.

5.2 Karst Assessment

As part of Cambium's scope of work, a karst assessment including a desktop review and field inspection was completed for the Site. The field inspection for evidence of karst conditions was completed concurrently with the visual slope assessment described above.

The following available information was reviewed by Cambium prior to conducting the visual inspection:

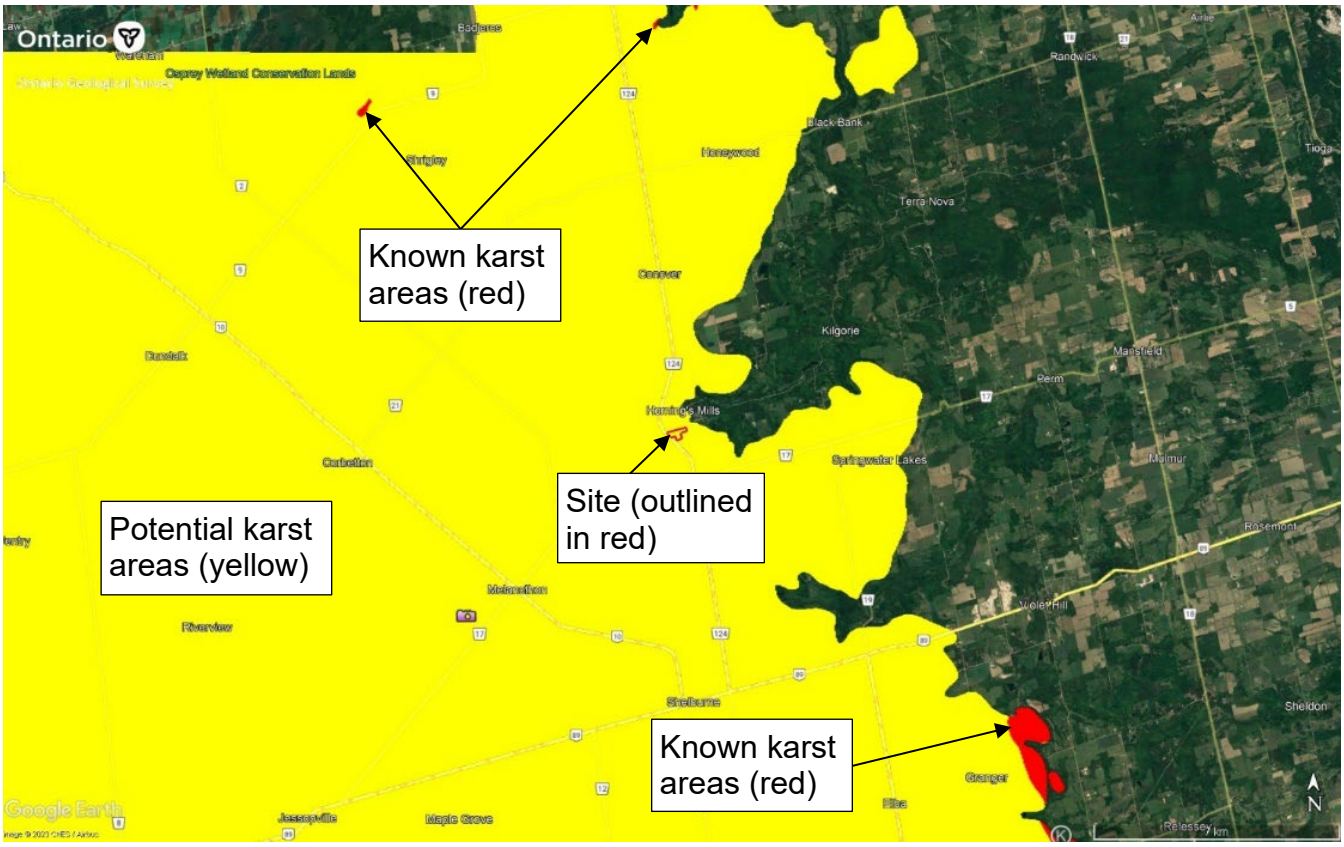
- Karst mapping:
  Brunton, F.R. and Dodge, J.E.P.; Karst of Southern Ontario and Manitoulin Island; Ontario Geological Survey, Groundwater Resources Study 5; 2008.
- Drift thickness mapping:
  Gwyn, Q.H.J. and Frazer, J.Z.; Drift Thickness of the Dundalk Area, Southern Ontario; Ontario Div. Mines, Prelim. Map P.1023, Drift Thickness Ser., Scale 1:50,000. Geological compilation; 1975.

Based on the desktop review of available karst mapping, the Site is located at the eastern edge of a ***potential karst area*** (yellow area shown on Embedded Figure 2 below), which indicates areas of carbonate rock units identified as most susceptible to karst processes. The nearest ***known karst areas*** (red areas shown on Embedded Figure 2 below) are located between approximately 12 km and 14 km to the northwest, north and southeast of the Site. Known karst areas indicate areas where karst features have been confirmed by visual observation, measured field data or data from published reports.

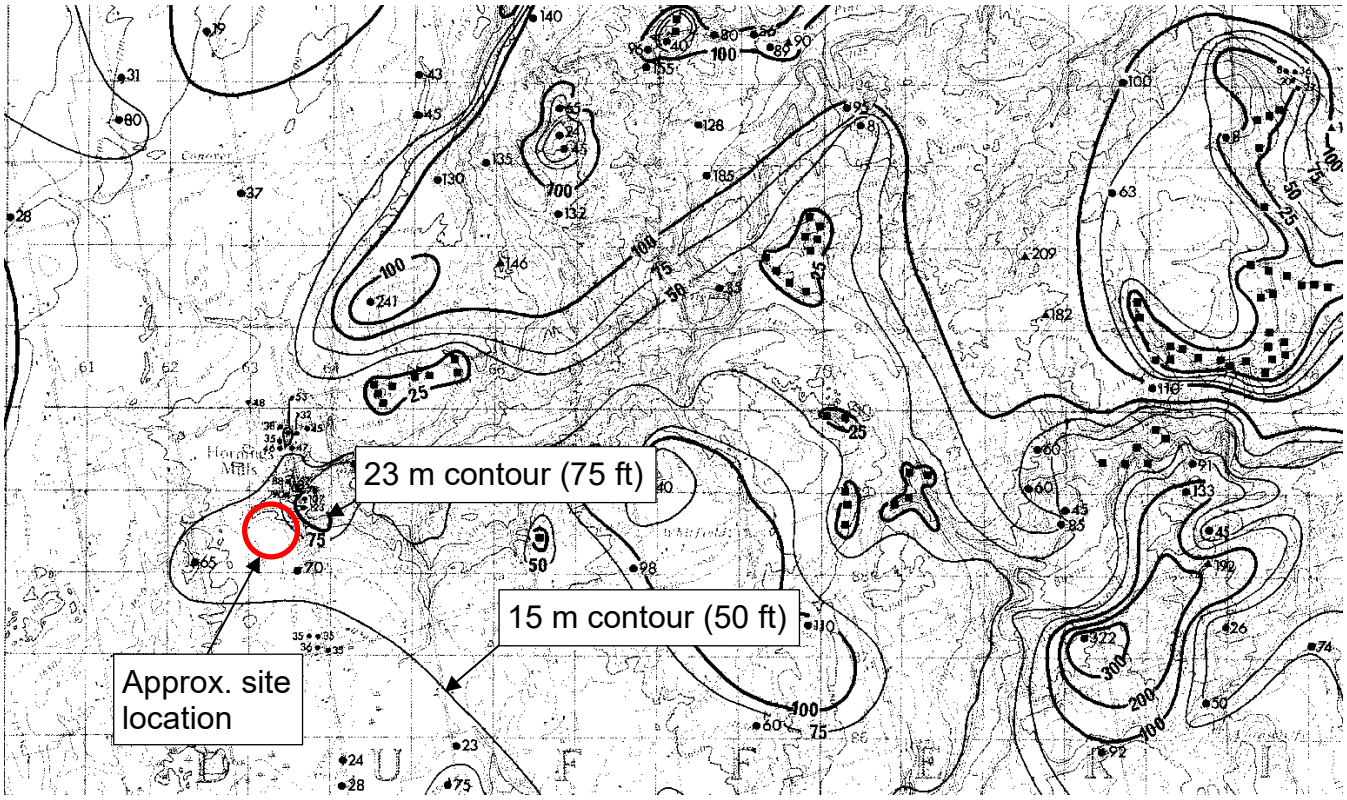
Further to the karst mapping, available drift thickness mapping for the project area indicates that the drift thickness (i.e., depth of bedrock from the ground surface) is projected to be

between approximately 15 m and 23 m in the project area. The bedrock drift thickness mapping is shown on Embedded Figure 3.

Given that the Site is located at the edge of a potential karst area, with no inferred or known karst areas in the immediate vicinity of the Site, the desktop review indicated a low probability of karst conditions being present at the Site. Further, the projected drift thickness (> 15 m) indicates that karst conditions, if present at the Site, will likely be difficult/impossible to observe from the surface during the visual assessment.



Embedded Figure 2*: *Karst mapping



Embedded Figure 3: Drift thickness mapping

During the visual inspection, no bedrock outcropping was confirmed and therefore, no karstification or features such as voids in bedrock were observed from the surface.

Water was observed in the ditch area along Main Street but was not disappearing into the ground surface at any location along the ditch alignment. A pond containing standing water was observed on the neighbouring property on the east side of Main Street (see Photograph 8 in Appendix D). No sinkholes, conical depressions, pinnacled surfaces, etc., were observed during the inspection.

In summary, ***no conditions indicating the presence of karst were observed during the visual inspection***. As noted above, given the projected depth of bedrock (> 15 m), visual observations of the bedrock surface were unlikely to be made from the surface during the inspection, and any physical exposure of bedrock using methods such as a test pit investigation would likely be impractical. Early refusal was encountered in some boreholes

around a depth of approximately 5 mbgs, which could indicate a higher bedrock surface at the Site than anticipated based on drift thickness mapping. It should be noted that the early refusal depths encountered in some boreholes could also be indicative of larger cobbles and boulders present within the investigated soils, and therefore should not be taken as definitively confirming a bedrock surface at the Site.

Should further confirmation of the existence of karst conditions be required at certain locations throughout the Site, it may be cost effective to consider geophysical investigation methods (georadar) to effectively map bedrock and any cavities (should they exist).

It is understood that test well installations for water supply will be conducted at the Site. It is recommended to document bedrock observations during the well installations (i.e., drift thickness at well location, and type and composition of bedrock), and to report any relevant observations encountered during well installation and subsequent testing to Cambium.

6.0 Geotechnical Considerations

This section of the report provides engineering information on, and recommendations for, the geotechnical design aspects of the project based on our interpretation of the borehole information, the laboratory test data, and our understanding of the project requirements. The information in this portion of the report is provided for planning and design purposes for the guidance of the design engineers and architects. Where comments are made on construction, they are provided only to highlight aspects of construction which could affect the design of the project. Contractors bidding on or undertaking any work at the Site should examine the factual results of the investigation, satisfy themselves as to the adequacy of the information for construction and make their own independent interpretation of the factual data as it affects their proposed construction techniques, schedule, equipment capabilities, costs, sequencing and the like. Cambium will not assume any responsibility for construction-related decisions made by contractors on the basis of this report.

6.1 Site Preparation

Existing topsoil and organic material, any loose reworked/disturbed native materials and any deleterious material (i.e., construction debris, fibrous material, asphalt, brick fragments, etc.) encountered should be excavated and removed beneath proposed development areas prior to construction. Additionally, this material should be excavated and removed to a minimum distance of 3 m around the building footprint. Any topsoil and materials with significant quantities of organics and deleterious materials are not appropriate for use as fill.

The exposed subgrade should be proof-rolled and inspected by a qualified geotechnical engineer prior to placement of any granular fill or foundations. Any loose/soft soils identified at the time of the proof-rolling that are unable to uniformly be compacted should be sub-excavated and removed.

The excavations created through the removal of these materials should be backfilled with approved engineered fill consistent with the recommendations provided below.

The near surface soils can become unstable if wet or saturated. Such conditions are common in the spring and late fall. Under these conditions, temporary use of granular fill, and possible separating/reinforcing geotextiles, may be required to prevent severe rutting on construction access routes.

6.2 Frost Penetration

Based on climate data and design charts, the maximum frost penetration depth below the surface at the Site is estimated at 1.6 mbgs. Exterior footings for the proposed structure should be situated at or below this depth for frost penetration or should be appropriately protected. Any services should be located below this depth or be sufficiently insulated.

6.3 Excavations

Excavations will be required at the Site to construct footings for the proposed structures, which are currently assumed to be single detached dwellings. It is currently not known whether the structures will be constructed with basements, however, for the purposes of these recommendations it is assumed that excavation depths below the current ground surface will range between 1.6 mbgs and 3 mbgs.

Where sufficient space is available between the proposed building lines and property boundaries, unsupported excavations can be carried out and must be completed in accordance with Occupation Health and Safety (OHSA) requirements, as detailed below.

For practical purposes, the overburden soils at the Site above the groundwater table and within continually dewatered depths can be considered Type 3 soils, as such, excavation side slopes should be no steeper than 1H:1V. Soils below the groundwater table are to be considered Type 4 soils in accordance with OHSA, and excavation side slopes are to be limited to 3H:1V.

It is noted that a workspace allowance of approximately 0.5 m should be maintained between building lines and the toe of the adjacent temporary excavation slopes (applies for slopes with a maximum inclination of 1H:1V).

Excavation slopes should be protected during construction from precipitation, runoff, or snow/ice melt and should be inspected regularly for signs of instability. If localized instability is noted during excavation or if wet conditions are encountered, the side slopes should be flattened as required to maintain safe working conditions or the excavation sidewalls must be fully supported (shored).

The crest area of unsupported excavation slopes is to be held free of any loading (i.e., by heavy machinery, stockpiled construction materials, etc.).

6.4 Groundwater Control and Dewatering

During the water level monitoring events conducted in June and August 2023, two of the installed monitoring wells were dry and the water level in BH104-23, located in the eastern portion of the property, was at or lower than approximately 4.3 mbgs.

Though the extent of the dewatering methods will be dependent on actual excavation depths, it is not anticipated that excavations required to construct proposed dwellings will encounter significant groundwater seepage. It is generally recommended to conduct further water level monitoring events during high groundwater seasons (i.e., during the spring following snowmelt and significant precipitation events) to confirm seasonal high groundwater levels. The recommendations provided in this section should be revisited and revised as necessary if significantly higher groundwater levels are measured in the monitoring wells.

Based on currently available information, infiltrating surface water or groundwater should be manageable using filtered sumps and pumps. It is generally recommended to conduct excavation and foundation construction works during drier seasons to minimize or mitigate potential groundwater-related issues.

Should dewatering methods be deemed necessary for any excavations at the Site, any dewatering methods employed at the Site must ensure that the water table is maintained at least 1 m below the excavation base for the duration of construction. The Contractor is responsible for selecting and designing an appropriate dewatering method to meet project requirements.

6.5 Foundation Design

6.5.1 Conventional Shallow Footings

From a geotechnical perspective, conventional shallow footings placed on competent native soils may be used to transfer loads from the proposed structures to the soils below. In general, the dense to very dense non-cohesive soils and hard cohesive soils encountered below a depth of 1.5 mbgs throughout the Site are considered competent to directly support loads from shallow footings.

Should incompetent (loose, soft and/or deleterious) soils be encountered at the proposed footing depths following excavation, these soils are to be sub-excavated down to competent soils under the guidance of a qualified geotechnical engineer and replaced with competent engineered fill as detailed in Section 6.6. The recommendations and bearing capacities provided in this report assume that any incompetent materials encountered at underside of footing depths will be sub-excavated and replaced in this manner.

Further, any large cobbles or boulders encountered at footing subgrade elevations are to be removed and replaced with engineered fill or other material approved by a geotechnical engineer.

Provided that footings are constructed according to the recommendations provided above, bearing directly on competent native soils with any localized incompetent soils removed and replaced with competent engineered fill material, the following bearing capacities can be provided:

- Serviceability Limit State (SLS): 150 kPa
- Ultimate Limit State (ULS): 225 kPa

The bearing capacities given above apply for strip foundations with a width of 0.5 to 1 m, and for spread footings with dimensions between 1 m x 1 m and 2 m x 2 m, with all footings having at least 1.6 m of adjacent earth cover satisfying frost penetration depth requirements. It is noted that the provided SLS bearing capacity represents the allowable bearing capacity value as calculated according to the methodology in [3], and is to be compared with unfactored load

values. The provided ULS bearing capacity represents the factored bearing resistance calculated according to the methodology in [3] and is to be compared with load values increased by load factors according to applicable standards/building codes. If any proposed structures are subject to stringent settlement requirements (i.e., such that estimated settlement in the order of 20 mm to 25 mm is not tolerable), it is recommended that a geotechnical engineer be retained to conduct a detailed settlement analysis, to ensure that project-specific requirements are met.

Cambium should be contacted to review final site grading plans and foundation dimensions and elevations, in order to confirm the bearing capacities provided in this report. A qualified geotechnical engineer should be retained to confirm bearing capacities onsite, following excavation to the proposed footing subgrade elevations, or to develop further recommendations such as the required depth of engineered fill pads.

6.5.2 Floor Slabs

To create a stable working surface, to distribute loadings, and for drainage purposes, an allowance should be made to provide at least 200 mm of OPSS.MUNI 1010 Granular A compacted to 98% of Standard Proctor Maximum Dry Density (SPMDD) beneath all floor slabs. It is recommended that all floor slabs are situated at least 500 mm above the seasonal high groundwater elevation.

Within any interior areas that may be exposed to freezing conditions for extended periods of time, the floor slab may be susceptible to frost heaving, depending on the composition of the subgrade. The subgrade underlying these areas should be adequately insulated to prevent frost penetration.

Any basement floor slabs (if applicable) should be underlain by a 300 mm thick layer of 19 mm diameter crushed clear stone wrapped in a geotextile (Terrafix 270R or equivalent) and hydraulically connected to perimeter subdrains. The clear stone material should be nominally compacted to a dense state.

6.6 Backfill and Compaction

Engineered fill, if required for foundations, should consist of free-draining granular material meeting the specifications of OPSS 1010 Granular B or an approved equivalent and should be placed in maximum 200 mm thick lifts compacted to 100% of SPMDD, as confirmed by nuclear densometer testing.

Imported material for engineered fill should consist of clean, no-organic, soils, free of chemical contamination or deleterious material. The moisture content of the engineered fill will need to be close enough to optimum at the time of placement to allow for adequate compaction.

Foundation wall and any buried utility backfill material should consist of free draining imported granular material. Excavated sand and gravel materials at the Site may be suitable for re-use as backfill for foundation walls and for grading purposes. Geotechnical testing of the material will be required to confirm suitability and compaction parameters (i.e., Proctor testing to confirm optimum moisture content). The fines (silt and clay) content of materials utilized as backfill for foundation walls/grading should not exceed 35%, which will need to be confirmed by sampling from stockpiled material and conducting confirmatory grain size analyses. The fines content of the samples collected during the borehole investigation and subsequently selected for particle size distribution testing generally ranged between 21% and 28%, however higher fines contents between 47% and 88% were also determined for samples collected from the Site.

Typically, backfill should be placed in maximum 300 mm thick lifts and should be compacted to a minimum of 98% of SPMDD. Backfill adjacent to the structural elements (i.e., foundation walls) should be compacted to 95% of SPMDD taking care not to damage the adjacent structures. The backfill material in the upper 300 mm below the pavement subgrade elevation should be compacted to 100% of SPMDD in all areas.

All existing vegetation, topsoil, organic and non-organic fills, and any loose soils shall be removed down to a competent base. Backfill areas must be approved by a qualified geotechnical engineer prior to placement of any new fill, to ensure the suitability of subgrade conditions.

6.6.1 Engineered Fill

Where the existing fill is treated as an engineered fill to support structural elements such as foundations and/or floor slabs the following is recommended for the construction of engineered fill:

I. Remove any and all existing vegetation, surficial topsoil / organics, organic fills or fills and any loose/disturbed soils to a competent subgrade for a suitable envelope.

II. The area of the engineered fill should extend horizontally 1 m beyond the outside edge of the foundations then extend downward at an imaginary 1H:1V slope to the competent approved native soil. The exposed edges of the engineered fill should be sloped at a maximum of 3H:1V to avoid weakening of the engineered fill edges due to slope movement. If fill is required adjacent to sloped banks (i.e., slope steeper than 3H:1V), the fill shall be placed in stepped planes to avoid a plane weakness.

III. The subgrade or base of the engineered fill area must be approved by Cambium prior to placement of any new fill, to ensure that suitability of subgrade condition.

IV. Place approved OPSS 1010.MUNI SSM or Granular ‘B’ Type I material at a moisture content at or near optimum moisture in suitable maximum 200 mm thick lifts, compacted to 100% of SPMDD. If native soils from the site are not used as engineered fill, imported material for engineered fill should consist of clean, non-organic soils, free of chemical contamination or deleterious material. Any frost penetration into the fill material must be removed prior to placement of subsequent lifts of fill and reviewed by Cambium.

V. The engineered fill should be placed at least 600 mm above the elevation of the proposed underside of footing.

VI. Due to the potential negative effects of differential settlement between the engineered fill and the native soils, in any block where footings are to be placed partly on engineered fill and partly on native soils, reinforcing steel bars should be included and placed within the footings and the top of the foundation walls. All tie reinforcing steel bars should be included and placed within the top of the foundation walls. All tie

reinforcing steel bars should have at least 600 mm of overlap. The actual steel reinforcement design should be confirmed / designed by the project structural engineer.

VII. Full time testing and inspection of the engineered fill will be required for it to be used as a founding material, as outlined in Section 4.2.2.2 of the Ontario Building Code.

6.7 Subdrainage

The exterior grade around any buildings should be sloped from the walls to direct surface runoff away from the building. In order to deal with seasonal perched water and/or the water table, perimeter subdrains consisting of geotextile-wrapped perforated pipe subdrains set in a trench of clear stone and connected to a sump or other frost-free positive outlet are recommended.

Subsurface walls should be adequately damp proofed above the water table and waterproofed below the water table.

6.8 Buried Utilities

Bedding and cover material for any buried utilities should consist of OPSS 1010 Granular A or B Type II, placed in accordance with pertinent Ontario Provincial Standard Drawings (OPSD 802.013). The bedding and cover material shall be placed in maximum 200 mm thick lifts and should be compacted to at least 98% of SPMDD.

The cover material shall be a minimum of 300 mm over the top of the pipe and compacted to 98% of SPMDD, taking care not to damage the utility pipes during compaction.

6.9 Lateral Earth Pressure

Lateral earth pressure coefficients (K) are shown in Table 6 and may be used for the preliminary design of temporary and permanent structures at the Site. It is assumed that potential lateral loads will result from cohesion less, frictional materials, such as granular backfill and the encountered near surface native sand.

Table 6 Lateral Earth Pressure Coefficients

Stratum/Parameter	γ / γ ‘ [kN/m^3]	Φ [°]	c [kN/m^2]	K_o [-]	K_a [-]	K_p [-]
Non-Cohesive Soils (Sand and Gravel) *compact to dense*	19.5 / 10.5	30	0	0.50	0.33	3.00
Engineered Fill (per recommendations provided above)	20.5 / 11.5	32	0	0.47	0.31	3.25

Where: γ = bulk unit weight of soil (kN/m^3)
γ' = submerged (effective) unit weight of soil (kN/m^3)
φ = internal angle of friction (degrees)
c = soil cohesion (kN/m^2)
K_a = Rankine active earth pressure coefficient (dimensionless)
K_o = Rankine at-rest earth pressure coefficient (dimensionless)
K_p = Rankine passive earth pressure coefficient (dimensionless)

The coefficients provided in Table 6 assume that the surface of the granular backfill is horizontal against any proposed retaining wall, and the wall is vertical and smooth. Cambium should be contacted to provide updated lateral earth pressure coefficients should the assumptions differ to those noted.

6.10 Pavement Design

The performance of pavement is dependent on proper subgrade preparation. All topsoil and organic materials should be removed and backfilled with approved engineered fill or native material (if tested and approved for use by a qualified geotechnical/pavement engineer), compacted to 98% of SPMDD. The subgrade should be proof rolled and inspected by a geotechnical engineer. Any areas were boulders, rutting, or appreciable deflection is noted should be sub-excavated and replaced with suitable fill. The fill should be compacted to at least 100% of SPMDD.

The recommended pavement structure should meet relevant standards, if prescribed by the local municipality. A preliminary minimum pavement structure is provided in Table 7.

Table 7 Minimum Pavement Structure

Pavement Layer	Compaction Requirements	Minimum Thickness and Material Requirements
Surface Course Asphalt	92% - 96.5% MRD (OPSS 310)	40 mm HL3
Binder Course Asphalt	92% - 96.5% MRD (OPSS 310)	50 mm HL8
Granular Base	100% SPMDD (ASTM-D698)	150 mm OPSS 1010 Granular A
Granular Subbase	100% SPMDD (ASTM-D698)	300 mm OPSS 1010 Granular B Type I

Final material and thickness requirements, and any material/thickness substitutions must be approved by the Design Engineer.

The thickness of the subbase layer could be increased at the discretion of the Engineer, to accommodate site conditions at the time of construction, including any soft or weak subgrade soil replacement.

Compaction of the subgrade should be verified by the Engineer prior to placing the granular fill. Granular layers should be placed in 200 mm maximum loose lifts and compacted to at least 100% of SPMDD. The granular materials specified should conform to OPSS standards, as confirmed by appropriate materials testing. Asphalt materials should be rolled and compacted as per OPSS 310.

The final asphalt surface should be sloped at a minimum of 2% to shed runoff. Abutting pavements should be saw cut to provide clean vertical joints with new pavement areas.

7.0 Report Limitations

7.1 Design Review and Inspections

Cambium should be contacted to review and approve design drawings, prior to tendering or commencing construction, to ensure that all pertinent geotechnical-related factors have been addressed. It is important that onsite geotechnical supervision be provided at this site for excavation and backfill procedures, deleterious soil removal, subgrade inspections and compaction testing.

7.2 Changes in Site and Project Scope

This geotechnical engineering report is intended for planning and design purposes only.

Subsurface conditions can be altered by the passage of sufficient time, natural occurrences, and human intervention. In particular, consideration should be given to contractual responsibilities as they relate to control of groundwater seepage, disturbance of soils, and frost protection.

The design parameters provided, and the engineering advice offered in this report are intended for use by the owner and its retained design consultants. If there are changes to the project scope and development features, these interpretations made of the subsurface information, for geotechnical design parameters, advice, and comments relating to constructability issues and quality control may not be complete for the project. Cambium should be retained to conduct further review to interpret the implications of such changes with respect to this report.

8.0 Closing

We trust that the information contained in this report meets your current requirements. If you have questions or comments regarding this document, please do not hesitate to contact the undersigned at (705) 719-0700.

Respectfully submitted,

Cambium Inc.

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DS

LICENSED PROFESSIONAL ENGINEER
S.E.BAIRD
90405788
PROVINCE OF ONTARIO

2024-03-12

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Standard Limitations

Limited Warranty

In performing work on behalf of a client, Cambium relies on its client to provide instructions on the scope of its retainer, and, on that basis, Cambium determines the precise nature of the work to be performed. Cambium undertakes all work in accordance with applicable accepted industry practices and standards. Unless required under local laws, other than as expressly stated herein, no other warranties or conditions, either expressed or implied, are made regarding the services, work or reports provided.

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Site Assessments

A site assessment is created using data and information collected during the investigation of a site and based on conditions encountered at the time and particular locations at which fieldwork is conducted. The information, sample results and data collected represent the conditions only at the specific times at which and at those specific locations from which the information, samples and data were obtained and the information, sample results and data may vary at other locations and times. To the extent that Cambium's work or report considers any locations or times other than those from which information, sample results and data was specifically received, the work or report is based on a reasonable extrapolation from such information, sample results and data but the actual conditions encountered may vary from those extrapolations.

Only conditions at the site and locations chosen for study by the client are evaluated; no adjacent or other properties are evaluated unless specifically requested by the client. Any physical or other aspects of the site chosen for study by the client, or any other matter not specifically addressed in a report prepared by Cambium, are beyond the scope of the work performed by Cambium and such matters have not been investigated or addressed.

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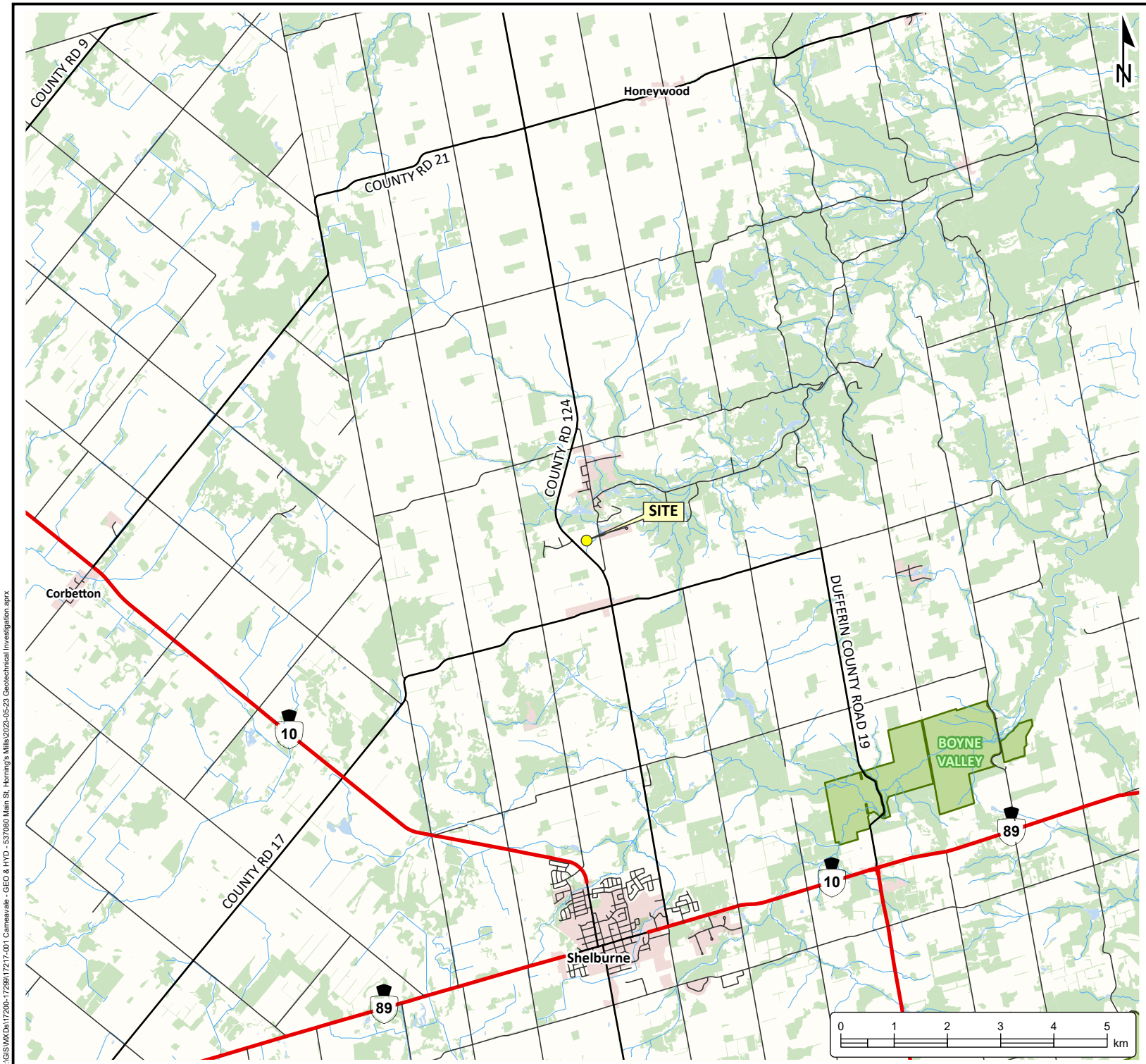
Personal Liability

The client expressly agrees that Cambium employees shall have no personal liability to the client with respect to a claim, whether in contract, tort and/or other cause of action in law. Furthermore, the client agrees that it will bring no proceedings nor take any action in any court of law against Cambium employees in their personal capacity.

Appended Figures



GEOTECHNICAL INVESTIGATION

ANGELO CARNEVALE
537080 Main Street,
Hornings Mills, Ontario

LEGEND

- Highway
- Major Road
- Minor Road
- Watercourse
- Provincial Park
- Water Area
- Wooded Area
- Built Up Area

Notes:
- Base mapping features are © King's Printer of Ontario, 2022 (this does not constitute an endorsement by the Ministry of Natural Resources or the Ontario Government).
- Distances on this plan are in metres and can be converted to feet by dividing by 0.3048.
- Cambium Inc. makes every effort to ensure this map is free from errors but cannot be held responsible for any damages due to error or omissions. This map should not be used for navigation or legal purposes. It is intended for general reference use only.

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SITE LOCATION PLAN

Project No.:	17217-001	Date:	May 2023
		Rev.:	
Scale:	1:100,000	Projection:	NAD 1983 UTM Zone 17N
Created by:	MAT	Checked by:	RG
Figure:	1		

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GEOTECHNICAL INVESTIGATION

ANGELO CARNEVALE
537080 Main Street,
Hornings Mills, Ontario

LEGEND

- Borehole
- Monitoring Well
- Inferred Top of Bank (Cambium, May 2023)
- Site (approximate)

Notes:
- Base mapping features are © King's Printer of Ontario, 2022 (this does not constitute an endorsement by the Ministry of Natural Resources or the Ontario Government).
- Distances on this plan are in metres and can be converted to feet by dividing by 0.3048.
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BOREHOLE LOCATION PLAN

Project No.: 17217-001		Date: June 2023 Rev.:	
Scale: 1:3,000		Projection: NAD 1983 UTM Zone 17N	
Created by: MAT	Checked by: RG	Figure:	2

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Appendix A

Borehole Logs

CAMBIUM

Client: Angelo Carnevale
Contractor: Walker Drilling
Project No.: 17217-001
Location: 537090 Main Street

Project Name: 537090 Main Street, Horning's Mills, ON
Method: Track Mounted Hollow Stem Auger
Elevation: 480.25 mASL
UTM: 17 T **N:** 4888586 **E:** 563201

Log of Borehole: BH101-23
Page: 1 of 1
Date Completed: May 11, 2023

SUBSURFACE PROFILE				SAMPLE							
Elevation (m)	Depth	Lithology	Description	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) LL PL PI / % Moisture (25 50 75)	Shear Strength Cu, kPa (nat V. rem V.) / SPT (N) (20 40 60 80)	Well Installation	Log Notes
480.2	0		**TOPSOIL:** (~125mm thick) 480.12	1A	SS			18.6%		Cap	Monitoring well dry when measured on June 6, 2023.
			0.13 **(SM) SILTY SAND:** trace clay, trace gravel, trace organic matter; brown; non-cohesive, moist, loose 479.49	1B	SS	30	5	18.0%	5	Bentonite Plug	
479.8	0.5										
479.2	1		0.76 **(SW) SAND:** some silt, trace gravel; brown; non-cohesive, moist, compact 478.73	2	SS	60	13	9.7%	13	Riser	
478.8	1.5		1.52 **(ML) SILT:** some clay, some sand, trace gravel; brown; cohesive, moist, hard 477.96	3	SS	60	36	22.3%	36		
478.2	2										
477.8	2.5		2.29 **(GW) GRAVEL:** AND SAND: trace silt; brown; non-cohesive, moist, very dense 475.68	4	SS	70	64	3.4%	64	Sand Pack	
477.2	3			5	SS	40	72	3.8%	72	PVC Screen	
476.8	3.5										
476.2	4										
475.8	4.5		4.57 **(SM) SILTY SAND:** some gravel; brown; non-cohesive, dry, compact 475.07	6	SS	70	20	3.5%	20	Cap	
475.2	5		5.18 Borehole terminated @ 5.2 mbgs due to target depth achieved.								
474.8	5.5										
474.2	6										
473.8	6.5										
473.2	7										
472.8											

GRAINSIZE DISTRIBUTION

SAMPLE	GRAVEL	SAND	SILT	CLAY
3	1	11	74	14

1m = 24 units

Logged By: WA **Input By:** WA

Peterborough, Barrie, Oshawa, Kingston, Ottawa

CAMBIUM

Client: Angelo Carnevale
Contractor: Walker Drilling
Project No.: 17217-001
Location: 537090 Main Street

Project Name: 537090 Main Street, Horning's Mills, ON
Method: Track Mounted Solid Stem Auger
Elevation: 478.2 mASL
UTM: 17 T **N:** 4888617 **E:** 563305

Log of Borehole: BH102-23
Page: 1 of 1
Date Completed: May 11, 2023

Elevation (m)	Depth	Description	Elevation / Depth	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) LL PL PI — 25 50 75 / % Moisture 25 50 75	Shear Strength Cu, kPa (nat V., rem V.) — 20 40 60 80 / SPT (N) 20 40 60 80	Well Installation	Log Notes
478.2	0	**TOPSOIL:** (~150mm thick)	478.05	1A	SS			24.0%			
		(SM) SILTY SAND: trace clay, trace gravel; brown; non-cohesive, moist, compact	0.15	1B	SS	60	12	10.6%	12		
477.7	0.5		477.44								
		(SW) SAND: some silt, some gravel; brown; non-cohesive, moist, very dense	0.76	2	SS	70	56	5.4%	56		
477.2	1		476.68								
476.7	1.5	**(GW) GRAVEL:** Silty GRAVEL and SAND, trace clay; trace organic matter; brown; non-cohesive, moist, very dense	1.52	3	SS	70	57	5.8%	57		
476.2	2										
475.7	2.5	- less to no organic matter		4	SS	70	71	4.4%	71		
475.2	3										
				5	SS	70	100	5.2%	100		
474.7	3.5										
474.2	4										
473.7	4.5		473.63								
		(SM) SILTY SAND: some gravel; brown; non-cohesive, moist to dry, very dense	4.57	6	SS	70	71	4.0%	71		
473.2	5		473.17								Borehole was open and dry upon completion of drilling
		Borehole terminated @ 5 mbgs due to target depth achieved.	5.03								
472.7	5.5										
472.2	6										
471.7	6.5										
471.2	7										
470.7											

1m = 24 units

GRAINSIZE DISTRIBUTION

SAMPLE	GRAVEL	SAND	SILT	CLAY
4	36	36	21	7

Logged By: WA **Input By:** WA

CAMBIUM

Client: Angelo Carnevale
Contractor: Walker Drilling
Project No.: 17217-001
Location: 537090 Main Street

Project Name: 537090 Main Street, Horning's Mills, ON
Method: Track Mounted Solid Stem Auger
Elevation: 470.05 mASL
UTM: 17 T **N:** 4888687 **E:** 563505

Log of Borehole: BH103-23
Page: 1 of 1
Date Completed: May 11, 2023

Elevation (m)	Depth	Description	Elevation / Depth	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) LL PL PI	% Moisture	Shear Strength Cu, kPa (nat V. / rem V.)	SPT (N)	Well Installation	Log Notes
								25 50 75	25 50 75	20 40 60 80	20 40 60 80		
470	0	**TOPSOIL:** (~125mm thick)	469.92	1A	SS				21.0%				
		(SM) SILTY SAND: trace clay, trace gravel, trace organic matter; brown; non-cohesive, moist, compact	0.13	1B	SS	60	11		15.3%		11		
469.6	0.5		469.29										
		(SW) SAND: and SILT, trace gravel, trace clay; brown; non-cohesive, moist to wet, loose	0.76	2	SS	70	8		17.2%		8		
469	1												
468.6	1.5	- dense		3	SS	60	43		12.5%		43		
468	2		467.76										
		(SW) SAND: some silt, some gravel; brown; non-cohesive, moist to dry, very dense	2.29	4	SS	60	58		7.6%		58		
467.6	2.5												
467	3		467										
		(SW) gravelly SAND: some silt; brown; non-cohesive, moist to dry, very dense	3.05	5	SS	70	50		4.3%		50		
466.6	3.5												
466	4												
465.6	4.5		465.48										
		(SM) SILTY SAND: some gravel; brown; non-cohesive, moist to dry, very dense	4.57	6	SS	50	100		5.5%		100		Borehole was open and dry upon completion of drilling
465	5		465.33										Spoon bouncing at depth of 4.7mbgs
		Borehole terminated @ 4.7 mbgs due to SPT refusal encountered.	4.72										
464.6	5.5												
464	6												
463.6	6.5												
463	7												
462.6													

1m = 24 units

GRAINSIZE DISTRIBUTION

SAMPLE	GRAVEL	SAND	SILT	CLAY
3	9	44	40	7

Logged By: WA **Input By:** WA

CAMBIUM

Client: Angelo Carnevale
Contractor: Walker Drilling
Project No.: 17217-001
Location: 537090 Main Street

Project Name: 537090 Main Street, Horning's Mills, ON
Method: Track Mounted Solid Stem Auger
Elevation: 464.45 mASL
UTM: 17 T **N:** 4888732 **E:** 563621

Log of Borehole: BH104-23
Page: 1 of 1
Date Completed: May 11, 2023

SUBSURFACE PROFILE				SAMPLE							
Elevation (m) / Depth	Lithology	Description	Elevation / Depth	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) LL PL PI; % Moisture 25 50 75	Shear Strength Cu, kPa (nat V. ✦, rem V. ⊕); SPT (N) 20 40 60 80	Well Installation	Log Notes
464.4 / 0		**TOPSOIL:** (~125mm thick)	464.32 / 0.13	1A	SS			23.3%		Cap	Water level measured within monitoring well at a depth of 4.3 mbgs (460.15 mASL) on June 6, 2023.
464 / 0.5		**(SM) SILTY SAND:** trace clay, trace organic matter; brown; non-cohesive, moist, compact	463.69 / 0.76	1B	SS	50	18	8.4%	18	Bentonite Plug	
463.4 / 1		**(SW) SAND:** some silt, trace gravel; brown; non-cohesive, moist, compact		2	SS	60	11	4.7%	11	Riser	
463 / 1.5		- some gravel; very dense		3	SS	70	61	8.9%	61		
462.4 / 2											
462 / 2.5				4	SS	50	50	7.1%	50	Sand Pack	
461.4 / 3											
461 / 3.5		- trace gravel		5	SS	60	53	8.0%	53	PVC Screen	
460.4 / 4											
460 / 4.5			459.88							Cap	
459.4 / 5		**(SM) gravelly SILTY SAND:** trace clay; brown; non-cohesive, wet, very dense	4.57 / 459.5	6	SS	70	100	10.3%	100		
459 / 5.5		Borehole terminated @ 5 mbgs due to target depth achieved.	4.95								
458.4 / 6											
458 / 6.5											
457.4 / 7											
457											

GRAINSIZE DISTRIBUTION: SAMPLE | GRAVEL | SAND | SILT | CLAY

1m = 24 units

Logged By: WA **Input By:** WA

Peterborough, Barrie, Oshawa, Kingston, Ottawa

CAMBIUM

Client: Angelo Carnevale
Contractor: Walker Drilling
Project No.: 17217-001
Location: 537090 Main Street

Project Name: 537090 Main Street, Horning's Mills, ON
Method: Track Mounted Solid Stem Auger
Elevation: 472.6 mASL
UTM: 17 T **N:** 4888533 **E:** 563517

Log of Borehole: BH105-23
Page: 1 of 1
Date Completed: May 12, 2023

Elevation (m)	Depth	Description	Elevation / Depth	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) LL PL PI — 25 50 75 / % Moisture 25 50 75	Shear Strength Cu, kPa (nat V., rem V.) — 20 40 60 80 / SPT (N) 20 40 60 80	Well Installation	Log Notes
472.6	0	**TOPSOIL:** (~150mm thick)	472.45	1A	SS			22.2%			
		(SM) SILTY SAND: trace clay, trace organic matter; brown; non-cohesive, moist, loose	0.15	1B	SS	60	8	21.1%	8		
472.1	0.5		471.84								
		(SW) SAND: and GRAVEL: some silt, trace clay; brown; non-cohesive, moist, compact	0.76	2	SS	70	25	6.2%	25		
471.6	1										
471.1	1.5	- very dense		3	SS	60	100	5.6%	100		
470.6	2										
470.1	2.5	- moist to dry		4	SS	40	61	7.2%	61		Auger shaking at depth of 2.3mbgs to depth of 3.0mbgs
469.6	3		469.55								
		(SM) gravelly SILTY SAND: brown; non-cohesive, moist to dry, very dense	3.05	5	SS	50	55	5.7%	55		Spoon bouncing
469.1	3.5										
468.6	4										
468.1	4.5		468.1	6	SS	20	50	4.7%	50		Spoon bouncing
		Borehole terminated @ 4.5 mbgs due to SPT refusal encountered.	4.5								Borehole caved to depth of 3.6mbgs and was dry upon completion of drilling
467.6	5										
467.1	5.5										
466.6	6										
466.1	6.5										
465.6	7										
465.1											

1m = 24 units

GRAINSIZE DISTRIBUTION

SAMPLE	GRAVEL	SAND	SILT	CLAY
2	35	44	18	3

Logged By: WA **Input By:** WA

Peterborough, Barrie, Oshawa, Kingston, Ottawa

CAMBIUM

Client: Angelo Carnevale
Contractor: Walker Drilling
Project No.: 17217-001
Location: 537090 Main Street

Project Name: 537090 Main Street, Horning's Mills, ON
Method: Track Mounted Solid Stem Auger
Elevation: 474.35 mASL
UTM: 17 T **N:** 4888425 **E:** 563458

Log of Borehole: BH106-23
Page: 1 of 1
Date Completed: May 12, 2023

Elevation (m)	Depth	Description	Elevation / Depth	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) LL PL PI — 25 50 75 / % Moisture 25 50 75	Shear Strength Cu, kPa (nat V. rem V.) 20 40 60 80 / SPT (N) 20 40 60 80	Well Installation	Log Notes
474.4	0	**TOPSOIL:** (~125mm thick)	474.22	1A	SS			25.4%		Cap	Monitoring well dry when measured on June 6, 2023.
		(SM) SILTY SAND: trace clay, trace gravel; trace organic matter; brown; non-cohesive, moist, compact	0.13 / 473.59	1B	SS	50	11	18.4%	11	Bentonite Plug	
473.8	0.5										
473.4	1	**(SM) SILTY SAND:** trace gravel; brown; non-cohesive, moist, compact	0.76	2	SS	80	19	15.6%	19	Riser	
472.8	1.5										
		- some gravel; dense		3	SS	60	33	8.8%	33		
472.4	2										
			471.91	4A	SS			4.2%			
471.8	2.5	**(SW) SAND:** trace gravel; light grey to white; transparent, moist to dry, very dense	2.44	4B	SS	70	100	2.8%	100	Sand Pack	
471.4	3		471.3								
		(SM) SILTY SAND: trace gravel; brown; non-cohesive, moist to dry, dense	3.05	5	SS	70	50	6.1%	50	PVC Screen	Spoon bouncing at depth of 3.2mbgs
470.8	3.5										
470.4	4										Auger shaking at depth of 3.2mbgs to depth of 4.4mbgs
			469.93								
469.8	4.5	**(GW) GRAVEL:** AND SAND: trace silt; brown; non-cohesive, moist to dry, dense	4.42 / 469.83	6	SS	40	50		50	Cap	Spoon bouncing at depth of 4.5mbgs.
469.4	5	Borehole terminated @ 4.5 mbgs due to SPT refusal encountered.	4.52								
468.8	5.5										
468.4	6										
467.8	6.5										
467.4	7										
466.8											

GRAINSIZE DISTRIBUTION: SAMPLE | GRAVEL | SAND | SILT | CLAY

1m = 24 units

Logged By: WA **Input By:** WA

Peterborough, Barrie, Oshawa, Kingston, Ottawa

CAMBIUM

Client: Angelo Carnevale
Contractor: Walker Drilling
Project No.: 17217-001
Location: 537090 Main Street

Project Name: 537090 Main Street, Horning's Mills, ON
Method: Track Mounted Solid Stem Auger
Elevation: 480.9 mASL
UTM: 17 T **N:** 4888538 **E:** 563305

Log of Borehole: BH107-23
Page: 1 of 1
Date Completed: May 12, 2023

Elevation (m)	Depth	Description	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) / % Moisture	Shear Strength Cu, kPa / SPT (N)	Well Installation	Log Notes
480.9	0	**TOPSOIL:** (~125mm thick) 480.77	1A	SS			25.4%			
		0.13 **(SM) SILTY SAND:** trace organic matter; brown; non-cohesive, moist, compact	1B	SS	50	13	19.3%	13		
480.4	0.5	480.14								
		0.76 **(SM) SILTY SAND:** trace gravel, trace clay; brown; non-cohesive, moist, compact	2	SS	80	25	6.6%	25		
479.9	1									
		- very dense	3	SS	50	100	6.5%	100		
479.4	1.5									
478.9	2	478.61								
		2.29 **(SW) SAND:** some gravel, some silt, brown; non-cohesive, moist to dry, very dense	4	SS	70	89	3.6%	89		Spoon bouncing at depth of 2.6mbgs
478.4	2.5									
477.9	3		5	SS	60	50	4.7%	50		Spoon bouncing at depth of 3.2mbgs
477.4	3.5									
476.9	4									
476.4	4.5		6	SS	70	65	3.2%	65		
475.9	5	475.85								Spoon bouncing ad depth of 5.0mbgs
		5.05 Borehole terminated @ 5.1 mbgs due to SPT refusal encountered.								Borehole caved to depth of 3.9mbgs and was dry upon completion of drilling
475.4	5.5									
474.9	6									
474.4	6.5									
473.9	7									
473.4										

Atterberg Limits (%) LL PL PI — 25 50 75
% Moisture 25 50 75
Shear Strength Cu, kPa nat V. rem V. — 20 40 60 80
SPT (N) 20 40 60 80

GRAINSIZE DISTRIBUTION

SAMPLE	GRAVEL	SAND	SILT	CLAY
2	7	68	20	5

1m = 24 units

Logged By: WA **Input By:** WA

Appendix B

Physical Laboratory Testing Results

Grain Size Distribution Chart

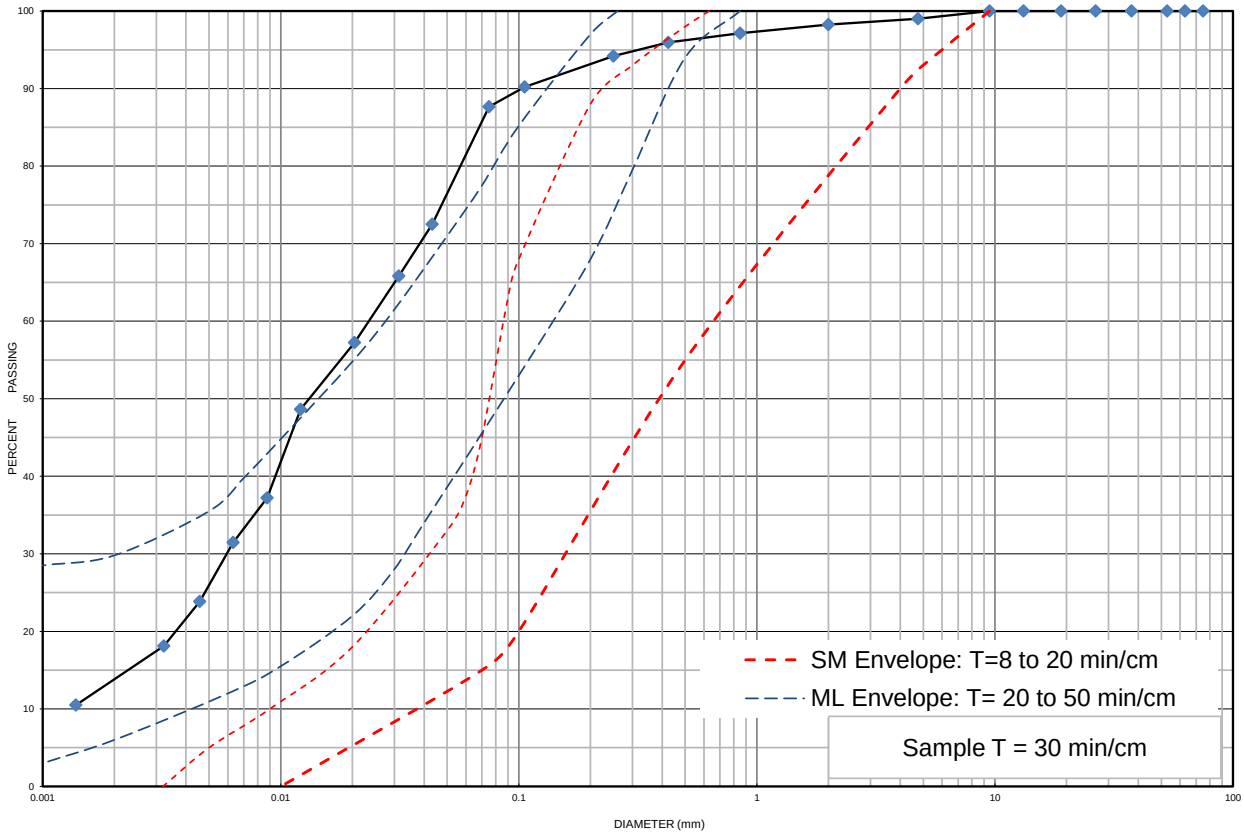
Project Number: *17217-001* **Client:** *Angelo Carnevale*

Project Name: *537090 Main Street Horning's Mills*

Sample Date: *May 11-12, 2023* **Sampled By:** *Waleed El-Taweel - Cambium Inc.*

Location: *BH 101-23 SS 3* **Depth:** *1.5 m to 2.1 m* **Lab Sample No:** *S-23-0825*

UNIFIED SOIL CLASSIFICATION SYSTEM					
CLAY & SILT (<0.075 mm)	SAND (<4.75 mm to 0.075 mm)			GRAVEL (>4.75 mm)	
	FINE	MEDIUM	COARSE	FINE	COARSE



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
BH 101-23	SS 3	1.5 m to 2.1 m	1	11	74	14	22.3

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Silt some Clay some Sand trace Gravel	ML	0.0240	0.0059	-	-	-

Additional information availabe upon request

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(Senior Project Manager)

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Grain Size Distribution Chart

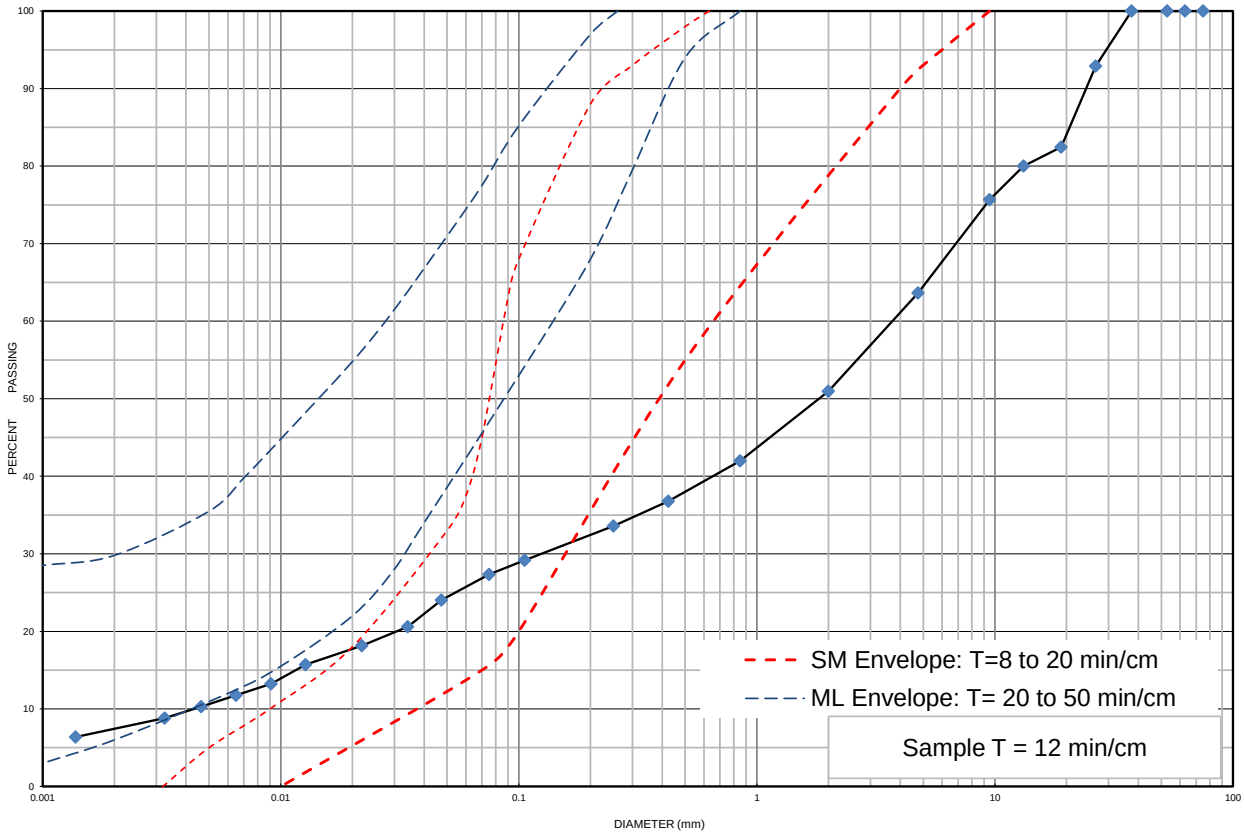
Project Number: *17217-001* **Client:** *Angelo Carnevale*

Project Name: *537090 Main Street Horning's Mills*

Sample Date: *May 11-12, 2023* **Sampled By:** *Waleed El-Taweel - Cambium Inc.*

Location: *BH 102-23 SS 4* **Depth:** *2.3 m to 2.9 m* **Lab Sample No:** *S-23-0826*

UNIFIED SOIL CLASSIFICATION SYSTEM					
CLAY & SILT (<0.075 mm)	SAND (<4.75 mm to 0.075 mm)			GRAVEL (>4.75 mm)	
	FINE	MEDIUM	COARSE	FINE	COARSE



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
BH 102-23	SS 4	2.3 m to 2.9 m	36	36	21	7	4.4

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Silty Gravel and Sand trace Clay	SM	3.7000	0.1300	0.0042	880.95	1.09

Additional information availabe upon request

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Grain Size Distribution Chart

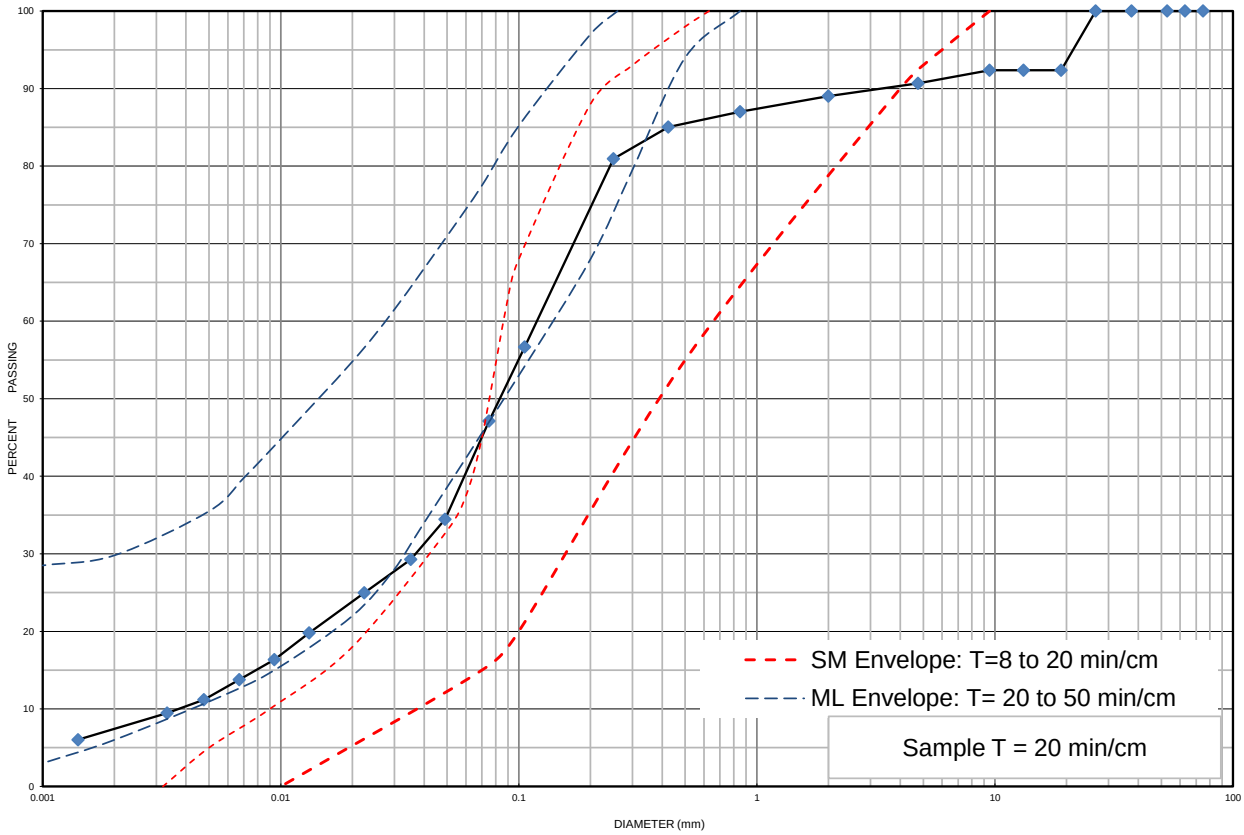
Project Number: *17217-001* **Client:** *Angelo Carnevale*

Project Name: *537090 Main Street Horning's Mills*

Sample Date: *May 11-12, 2023* **Sampled By:** *Waleed El-Taweel - Cambium Inc.*

Location: *BH 103-23 SS 3* **Depth:** *1.5 m to 2.1 m* **Lab Sample No:** *S-23-0827*

UNIFIED SOIL CLASSIFICATION SYSTEM					
CLAY & SILT (<0.075 mm)	SAND (<4.75 mm to 0.075 mm)			GRAVEL (>4.75 mm)	
	FINE	MEDIUM	COARSE	FINE	COARSE



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
BH 103-23	SS 3	1.5 m to 2.1 m	9	44	40	7	12.5

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Sand and Silt trace Gravel trace Clay	SM	0.1300	0.0370	0.0038	34.21	2.77

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Grain Size Distribution Chart

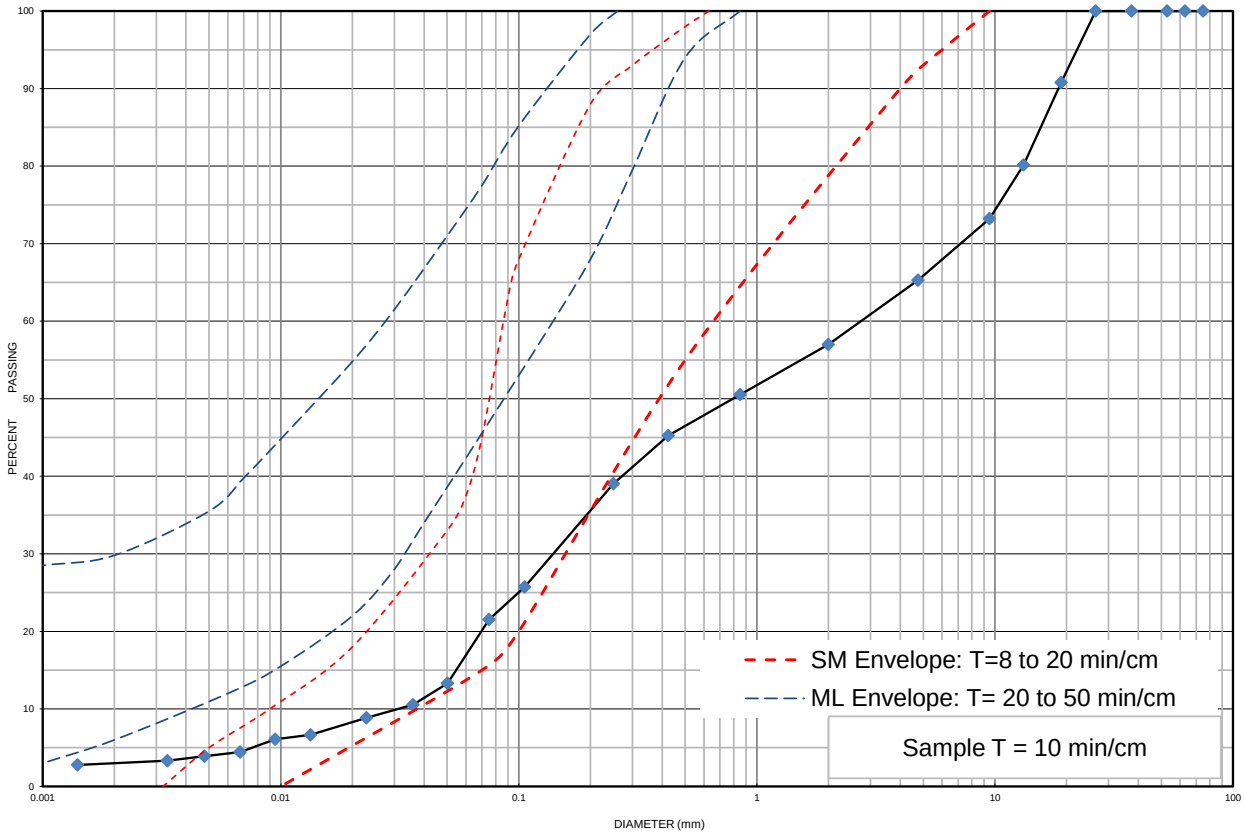
Project Number: *17217-001* **Client:** *Angelo Carnevale*

Project Name: *537090 Main Street Horning's Mills*

Sample Date: *May 11-12, 2023* **Sampled By:** *Waleed El-Taweel - Cambium Inc.*

Location: *BH 105-23 SS 2* **Depth:** *0.8 m to 1.4 m* **Lab Sample No:** *S-23-0828*

UNIFIED SOIL CLASSIFICATION SYSTEM					
CLAY & SILT (<0.075 mm)	SAND (<4.75 mm to 0.075 mm)			GRAVEL (>4.75 mm)	
	FINE	MEDIUM	COARSE	FINE	COARSE



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
BH 105-23	SS 2	0.8 m to 1.4 m	35	44	18	3	6.2

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Sand and Gravel some Silt trace Clay	SM	2.700	0.145	0.030	90.00	0.26

Additional information availabe upon request

Issued By: _____ *Date Issued:* *May 24, 2023*

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Grain Size Distribution Chart

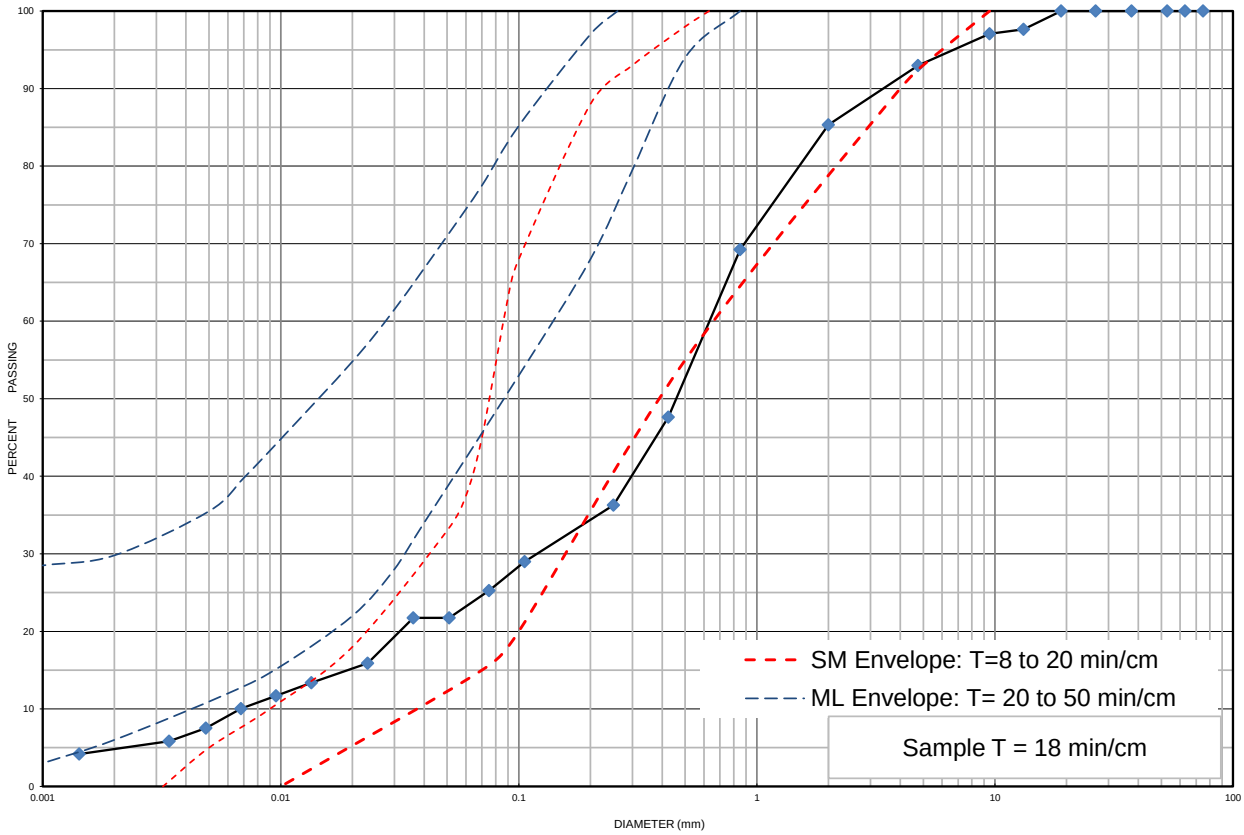
Project Number: *17217-001* **Client:** *Angelo Carnevale*

Project Name: *537090 Main Street Horning's Mills*

Sample Date: *May 11-12, 2023* **Sampled By:** *Waleed El-Taweel - Cambium Inc.*

Location: *BH 107-23 SS 2* **Depth:** *0.8 m to 1.4 m* **Lab Sample No:** *S-23-0829*

UNIFIED SOIL CLASSIFICATION SYSTEM					
CLAY & SILT (<0.075 mm)	SAND (<4.75 mm to 0.075 mm)			GRAVEL (>4.75 mm)	
	FINE	MEDIUM	COARSE	FINE	COARSE



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
BH 107-23	SS 2	0.8 m to 1.4 m	7	68	20	5	6.6

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Silty Sand trace Gravel trace Clay	SM	0.6400	0.1250	0.0068	94.12	3.59

Additional information availabe upon request

Issued By: _____ *Date Issued:* *May 24, 2023*

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Moisture Content

Project Number: 17217-001
Project Name: 537090 Main St, Horning's Mills
Client: Angelo Carnevale
Date Taken: 2023-05-11

Lab Number: S-23-0824
Date Tested: 2023-05-16
Tested By: D. Rock

Borehole Number	Sample Number	Sample Depth (m)	Water Weight (g)	Water Content (%)	Additional Observations
101	1A	0.00-0.13	15.2	18.6	NR,1
101	1B	0.13-0.61	14.4	18.0	NR,1
101	2	0.76-1.37	25.9	9.7	NR
101	3	1.52-2.13	81.1	22.3	NR
101	4	2.29-2.90	11.2	3.4	NR
101	5	3.05-3.20	6.3	3.8	NR
101	6	4.57-5.18	11.5	3.5	NR
102	1A	0.00-0.20	26.5	24.0	NR,1
102	1B	0.15-0.61	27.5	10.6	NR,1
102	2	0.76-1.37	15.2	5.4	
102	3	1.52-2.13	21.2	5.8	NR
102	4	2.29-2.90	20.5	4.4	NR
102	5	3.05-3.51	11.5	5.2	NR
102	6	4.57-5.03	8.6	4.0	
103	1A	0.00-0.13	30.2	21.0	NR,1
103	1B	0.13-0.61	28.5	15.3	NR
103	2	0.76-1.37	38.4	17.2	
103	3	1.52-2.13	53.2	12.5	NR
103	4	2.29-2.59	23.9	7.6	NR
103	5	3.05-3.35	11.5	4.3	NR
103	6	4.57-4.72	9.5	5.5	NR
104	1A	0.00-0.13	31.8	23.3	NR,1
104	1B	0.13-0.61	8.5	8.4	NR
104	2	0.76-1.37	13.4	4.7	NR
104	3	1.52-1.98	24.9	8.9	
104	4	2.29-2.59	18.9	7.1	NR
104	5	3.05-3.66	23.7	8.0	NR

1 – Contains organics
2 – Contains rubble
3 – Hydrocarbon Odour
4 – Unknown Chemical Odour
5 – Saturated – free water visible
6 – Very moist – near optimum moisture content
7 – Moist – below optimum moisture
8 – Dry – dry texture – powdery
9 – Very small – caution may not be representative
10 – Hold sample for gradation analysis

Moisture Content

Project Number: 17217-001
Project Name: 537090 Main St, Horning's Mills
Client: Angelo Carnevale
Date Taken: 2023-05-11

Lab Number: S-23-0824
Date Tested: 2023-05-16
Tested By: D. Rock

Borehole Number	Sample Number	Sample Depth (m)	Water Weight (g)	Water Content (%)	Additional Observations
104	6	4.57-5.03	35.8	10.3	
105	1A	0.00-0.15	14.2	22.2	NR,1
105	1B	0.15-0.61	36.7	21.1	NR,1
105	2	0.76-1.37	34.2	6.2	NR
105	3	1.52-1.98	19.4	5.6	NR
105	4	2.29-2.59	12.2	7.2	NR
105	5	3.05-3.35	18.7	5.7	NR
105	6	4.57-4.65	6.4	4.7	NR
106	1A	0.00-0.13	23.7	25.4	NR,1
106	1B	0.13-0.61	17.1	18.4	NR,1
106	2	0.76-1.37	42.5	15.6	
106	3	1.52-2.13	30.7	8.8	NR
106	4A	2.29-2.59	7.5	4.2	NR
106	4B	2.44-2.74	5.9	2.8	NR
106	5	3.05-3.35	15.7	6.1	
107	1A	0.00-0.13	30.4	25.4	NR,1
107	1B	0.13-0.61	44.0	19.3	NR
107	2	0.76-1.37	53.2	6.6	NR
107	3	1.52-1.98	14.0	6.5	
107	4	2.29-2.74	14.0	3.6	NR
107	5	3.05-3.25	16.0	4.7	NR
107	6	4.57-5.03	9.4	3.2	

1 – Contains organics
2 – Contains rubble
3 – Hydrocarbon Odour
4 – Unknown Chemical Odour
5 – Saturated – free water visible
6 – Very moist – near optimum moisture content
7 – Moist – below optimum moisture
8 – Dry – dry texture – powdery
9 – Very small – caution may not be representative
10 – Hold sample for gradation analysis

Appendix C

Slope Stability Rating Charts

SLOPE STABILITY RATING CHART

Site Location:	537080 Main St. - ***Eastern Slope Area (Main St.)***	File No.	17217-001
Property Owner:	Angelo Carnevale	Inspection Date:	2023-05-09
Inspected By:	JS/RG	Weather:	partly cloudy

Inspection Task		Rating Value
1. SLOPE INCLINATION		
Degrees	**Horizontal:Vertical**	
a) 18 or less	3:1 or flatter	**0**
b) 18 to 26	2:1 to more than 3:1	6
c) more than 26	Steeper than 2:1	16
2. SOIL STRATIGRAPHY		
a) Shale, Limestone, Granite (Bedrock)		0
b) Sand, Gravel		**6**
c) Glacial Till		**9**
d) Clay, Silt		12
e) Fill		16
f) Leda Clay		24
3. SEEPAGE FROM SLOPE FACE		
a) None or near bottom only		**0**
b) Near mid-slope only		6
c) Near crest only or from several levels		12
4. SLOPE HEIGHT		
a) 2 m or less		0
b) 2.1 to 5 m		**2**
c) 5.1 to 10 m		4
d) more than 10 m		8
5. VEGETATION COVER ON SLOPE FACE		
a) Well vegetated, heavy shrubs or forested with mature trees		**0**
b) Light Vegetation; Mostly grass, weeds, occasional trees, shrubs		4
c) No vegetaion, bare		8
6. TABLE LAND DRAINAGE		
a) Table land flat, no apparent drainage over slope		0
b) Minor drainage over slope, no active erosion		**2**
c) Drainage over slope, active erosion, gullies		4
7. PROXIMITY OF WATERCOURSE TO SLOPE TOE		
a) 15 m or more from slope toe		0
b) Less than 15 m from slope toe		**6**
8. PREVIOUS LANDSLIDE ACTIVITY		
a) No		**0**
b) Yes		6
	RATING VALUES TOTAL	**16…19**

SLOPE INSTABILITY RATING		INVESTIGATION REQUIREMENTS
1. Low Potential	<24	Site inspection only, confirmation, report letter
2. Slight Potential	25 - 35	Site inspection and surveying, preliminary study, detailed report
3. Moderate Potential	>35	Boreholes, piezometers, lab tests, surveying detailed report

Notes:

a) Choose only one rating value from each category; compare total rating value with above requirements

b) If there is a waterbody (stream, creek, river, pond, bay, lake) at the slope toe, the potential for toe erosion and undercutting should be evaluated in detail and protection provided if required.

c) For leda clay and rock slopes, additional evaluation must be carried out

Source: Table 8.1 Geotechnical Principles for Stable Slopes (June 1998), Ontario Ministry of Natural Resources

SLOPE STABILITY RATING CHART

Site Location:	537080 Main St. - *SE Slope Area (Creek)*	File No.	17217-001
Property Owner:	Angelo Carnevale	Inspection Date:	2023-05-09
Inspected By:	JS/RG	Weather:	partly cloudy

Inspection Task		Rating Value
1. SLOPE INCLINATION		
Degrees	**Horizontal:Vertical**	
a) 18 or less	3:1 or flatter	**0**
b) 18 to 26	2:1 to more than 3:1	6
c) more than 26	Steeper than 2:1	16
2. SOIL STRATIGRAPHY		
a) Shale, Limestone, Granite (Bedrock)		0
b) Sand, Gravel		**6**
c) Glacial Till		**9**
d) Clay, Silt		12
e) Fill		16
f) Leda Clay		24
3. SEEPAGE FROM SLOPE FACE		
a) None or near bottom only		**0**
b) Near mid-slope only		6
c) Near crest only or from several levels		12
4. SLOPE HEIGHT		
a) 2 m or less		0
b) 2.1 to 5 m		**2**
c) 5.1 to 10 m		4
d) more than 10 m		8
5. VEGETATION COVER ON SLOPE FACE		
a) Well vegetated, heavy shrubs or forested with mature trees		**0**
b) Light Vegetation; Mostly grass, weeds, occasional trees, shrubs		**4**
c) No vegetaion, bare		8
6. TABLE LAND DRAINAGE		
a) Table land flat, no apparent drainage over slope		0
b) Minor drainage over slope, no active erosion		**2**
c) Drainage over slope, active erosion, gullies		4
7. PROXIMITY OF WATERCOURSE TO SLOPE TOE		
a) 15 m or more from slope toe		0
b) Less than 15 m from slope toe		**6**
8. PREVIOUS LANDSLIDE ACTIVITY		
a) No		**0**
b) Yes		6
	RATING VALUES TOTAL	**16…23**

SLOPE INSTABILITY RATING		INVESTIGATION REQUIREMENTS
1. Low Potential	<24	Site inspection only, confirmation, report letter
2. Slight Potential	25 - 35	Site inspection and surveying, preliminary study, detailed report
3. Moderate Potential	>35	Boreholes, piezometers, lab tests, surveying detailed report

Notes:

a) Choose only one rating value from each category; compare total rating value with above requirements

b) If there is a waterbody (stream, creek, river, pond, bay, lake) at the slope toe, the potential for toe erosion and undercutting should be evaluated in detail and protection provided if required.

c) For leda clay and rock slopes, additional evaluation must be carried out

Source: Table 8.1 Geotechnical Principles for Stable Slopes (June 1998), Ontario Ministry of Natural Resources

Appendix D

Site Photographs

Eastern Slope Area bordering Main Street

Photograph 1: Views of table land, with stakes indicating inferred top of bank

Photograph 2: View of stake inferring top of bank, with existing dwelling visible

Photograph 3: View downslope, with mature trees on slope and Main Street visible

Photograph 4: Alternate view of slope, looking north

Photograph 5: View of bench area in slope, looking north

Photograph 6: View of ditch area and Main Street, looking north

Photograph 7: View of ditch area and Main Street, looking south

Photograph 8: View looking east across Main Street, with pond on neighbouring property

Southeastern Slope Area near Horning's Mills Creek

Photograph 9: View of table land

Photograph 10: View looking down (L) and up (R) slope area with grass vegetation

Photograph 11: View of slope with vegetation, and top of bank visible

Photograph 12: Alternative view of slope with grass vegetation, from top of bank

Photograph 13: View of slope with mature trees

Photograph 14: View of toe area of slope with vegetation

Photograph 15: Alternate view of toe area of slope

Photograph 16: View towards Main Street from toe area of slope

Appendix H

HEC-RAS Modelling Results

PEARSON ENGINEERING

530708 Driveway Weir & Main St. Culvert Crossing

Elevation	Culvert 1		Weir 1		Total Flow
	Head	Flow	Head	Flow	
(m)	(m)	(m^3/s)	(m)	(m^3/s)	(m^3/s)
461.89	1.09	1.090	0.00	0.000	1.090
461.90	1.10	1.100	0.01	0.012	1.112
461.95	1.15	1.150	0.06	0.215	1.365
462.00	1.20	1.200	0.11	0.606	1.806
462.05	1.25	1.250	0.16	1.191	2.441
462.10	1.30	1.300	0.21	1.982	3.282
462.15	1.35	1.350	0.26	2.994	4.344
462.20	1.40	1.400	0.31	4.240	5.640
462.25	1.45	1.450	0.36	5.736	7.186
462.26	1.46	1.460	0.37	6.066	7.526
462.27	**1.47**	**1.470**	**0.38**	**6.406**	**7.876**
462.28	1.48	1.480	0.39	6.758	8.238

Culvert 1 - Crossing West-East under Main St	
Diameter	900 mm
Invert Elevation	460.80

Overflow Weir 1	
Width	7.20 m
Invert of Weir	461.89 m

PEARSON ENGINEERING

Ex. Farmers Field / Proposed Road
Driveway Access Location

Elevation	Culvert 2		Weir 2		Total Flow
	Head	Flow	Head	Flow	
(m)	(m)	(m^3/s)	(m)	(m^3/s)	(m^3/s)
460.66	1.05	0.48	0.00	0.000	0.480
460.67	1.06	0.48	0.01	0.007	0.487
460.68	1.07	0.48	0.02	0.023	0.503
460.69	1.08	0.49	0.03	0.045	0.535
460.70	1.09	0.49	0.04	0.073	0.563
460.71	1.10	0.49	0.05	0.107	0.597
460.72	1.11	0.50	0.06	0.147	0.647
460.73	1.12	0.50	0.07	0.193	0.693
460.74	1.13	0.50	0.08	0.246	0.746
460.75	1.14	0.51	0.09	0.305	0.815
460.76	1.15	0.51	0.10	0.371	0.881
460.77	1.16	0.51	0.11	0.444	0.954
460.78	1.17	0.52	0.12	0.524	1.044
460.79	1.18	0.52	0.13	0.612	1.132
460.80	1.19	0.52	0.14	0.706	1.226
460.81	1.20	0.53	0.15	0.809	1.339
460.82	1.21	0.53	0.16	0.919	1.449
460.83	1.22	0.53	0.17	1.037	1.567
460.84	1.23	0.53	0.18	1.163	1.693
460.85	1.24	0.54	0.19	1.297	1.837
460.86	1.25	0.54	0.20	1.439	1.979
460.87	1.26	0.54	0.21	1.591	2.131
460.88	1.27	0.55	0.22	1.750	2.300
460.89	1.28	0.55	0.23	1.919	2.469
460.90	1.29	0.55	0.24	2.097	2.647
460.91	1.30	0.55	0.25	2.284	2.834
460.92	1.31	0.56	0.26	2.480	3.040
460.93	1.32	0.56	0.27	2.685	3.245
460.94	1.33	0.56	0.28	2.900	3.460
460.95	1.34	0.57	0.29	3.125	3.695
460.96	1.35	0.57	0.30	3.359	3.929
460.97	1.36	0.57	0.31	3.604	4.174
460.98	1.37	0.57	0.32	3.858	4.428

Culvert 2 - Crossing Under Ex. Site Entrance	
Diameter	550 mm
Invert Elevation	459.61

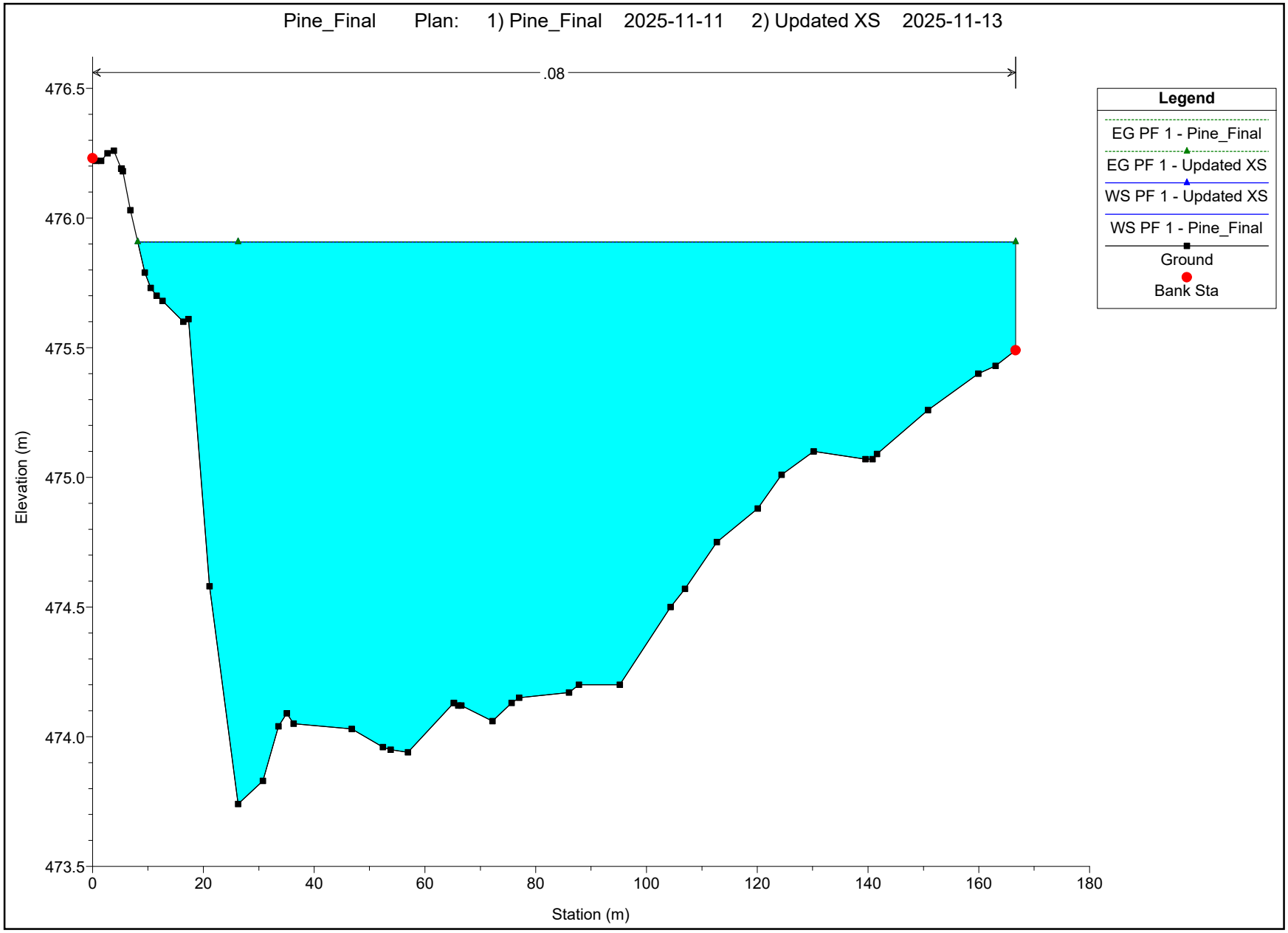
Overflow Weir 2	
Width	4.35 m
Invert of Weir	460.66 m

GSP Inc., Horning's Mill
Adjustment Factor Calculations

Point Number	NVCA Elevations (m)	Van Harten (2023) Elevations (m)	Difference (m)	Adjusted VAN Harten Elevations (m)
1	480.04	480.47	-0.43	479.97
2	479.13	479.67	-0.54	479.17
3	478.91	480.01	-1.10	479.51
4	478.66	478.99	-0.33	478.49
5	477.25	477.64	-0.39	477.14
6	476.70	477.15	-0.45	476.65
7	475.89	476.20	-0.31	475.70
8	474.98	475.24	-0.26	474.74
9	472.91	473.50	-0.59	473.00
10	470.58	470.50	0.08	470.00
11	468.95	469.48	-0.53	468.98
12	465.85	466.55	-0.70	466.05
13	464.54	465.25	-0.71	464.75
14	461.06	461.67	-0.61	461.17
15	458.70	459.50	-0.80	459.00
16	480.67	480.84	-0.17	480.34
17	480.28	480.84	-0.56	480.34
18	479.49	479.75	-0.26	479.25
19	478.67	478.75	-0.08	478.25
20	478.28	478.76	-0.48	478.26
21	476.75	477.75	-1.00	477.25
22	474.99	475.49	-0.50	474.99
23	472.73	473.25	-0.52	472.75
24	470.69	471.00	-0.31	470.50
25	468.87	469.75	-0.88	469.25
		Median:	**-0.50**	**m**

HEC-RAS River: PIN-N2A1 Reach: 1 Profile: PF 1

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
1	1431.12 0	PF 1	Pine_Final	7.76	473.74	475.91		475.91	0.000006	0.04	208.39	158.51	0.01
1	1431.12 0	PF 1	Updated XS	7.76	473.74	475.91		475.91	0.000006	0.04	208.39	158.51	0.01
1	1416.201 0	PF 1	Pine_Final	7.76	475.62	475.87	475.84	475.90	0.060251	0.79	9.84	75.45	0.70
1	1416.201 0	PF 1	Updated XS	7.76	475.62	475.87	475.84	475.90	0.060251	0.79	9.84	75.45	0.70
1	1397.292 0	PF 1	Pine_Final	7.76	473.89	474.29	474.29	474.37	0.114560	1.23	6.34	40.35	0.99
1	1397.292 0	PF 1	Updated XS	7.76	473.89	474.29	474.29	474.37	0.114560	1.23	6.34	40.35	0.99
1	1235.505 0	PF 1	Pine_Final	7.76	470.54	471.19		471.26	0.006521	1.13	6.85	19.85	0.62
1	1235.505 0	PF 1	Updated XS	7.76	470.54	471.19		471.26	0.006521	1.13	6.85	19.85	0.62
1	1101.924 0	PF 1	Pine_Final	7.76	468.35	468.90	468.90	469.02	0.104857	1.53	5.06	21.64	1.01
1	1101.924 0	PF 1	Updated XS	7.76	468.35	468.90	468.90	469.02	0.104857	1.53	5.06	21.64	1.01
1	992.4937 0	PF 1	Pine_Final	7.76	464.43	464.87	464.87	464.98	0.015377	1.49	5.23	24.24	1.02
1	992.4937 0	PF 1	Updated XS	7.76	464.43	464.87	464.87	464.98	0.015377	1.49	5.23	24.24	1.02
1	861.7521 0	PF 1	Pine_Final	7.76	460.80	462.36	460.92	462.36	0.000006	0.07	111.88	87.06	0.02
1	861.7521 0	PF 1	Updated XS	7.76	460.80	462.36	460.92	462.36	0.000006	0.07	111.88	87.06	0.02
1	833.6683			Culvert									
1	820.3592 0	PF 1	Pine_Final	7.76	460.21	460.71	460.71	460.89	0.023383	1.84	4.21	12.41	1.01
1	820.3592 0	PF 1	Updated XS	7.76	460.21	460.71	460.71	460.89	0.023383	1.84	4.21	12.41	1.01
1	708.895 0	PF 1	Pine_Final	7.76	457.36	458.81		458.81	0.000018	0.12	65.29	54.61	0.03
1	708.895 0	PF 1	Updated XS	7.76	457.36	458.81		458.81	0.000018	0.12	65.29	54.61	0.03
1	629.5018 0	PF 1	Pine_Final	7.76	457.26	458.81		458.81	0.000058	0.16	47.25	58.25	0.06
1	629.5018 0	PF 1	Updated XS	7.76	457.26	458.81		458.81	0.000058	0.16	47.25	58.25	0.06
1	591.3686 0	PF 1	Pine_Final	7.76	455.56	458.81	456.35	458.81	0.000002	0.06	134.66	74.00	0.01
1	591.3686 0	PF 1	Updated XS	7.76	455.56	458.81	456.35	458.81	0.000002	0.06	134.66	74.00	0.01
1	574.6378			Culvert									
1	550.5031 0	PF 1	Pine_Final	7.76	454.83	455.38	455.38	455.52	0.025397	1.61	4.82	18.76	1.01
1	550.5031 0	PF 1	Updated XS	7.76	454.83	455.38	455.38	455.52	0.025397	1.61	4.82	18.76	1.01
1	279.8791 0	PF 1	Pine_Final	7.76	451.51	452.63	452.14	452.65	0.004508	0.58	13.33	22.97	0.24
1	279.8791 0	PF 1	Updated XS	7.76	451.51	452.63	452.14	452.65	0.004508	0.58	13.33	22.97	0.24
1	215.13 0	PF 1	Pine_Final	7.76	451.44	451.73	451.73	451.82	0.112810	1.36	5.71	31.06	1.01
1	215.13 0	PF 1	Updated XS	7.76	451.44	451.73	451.73	451.82	0.112810	1.36	5.71	31.06	1.01
1	102.2909 0	PF 1	Pine_Final	7.76	450.49	450.97		450.97	0.000548	0.17	44.89	98.38	0.08
1	102.2909 0	PF 1	Updated XS	7.76	450.49	450.97		450.97	0.000548	0.17	44.89	98.38	0.08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EG PF 1 - Updated XS
WS PF 1 - Updated XS
WS PF 1 - Pine_Final
Ground
Bank Sta
Elevation (m)
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476.0
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80
100
120
140
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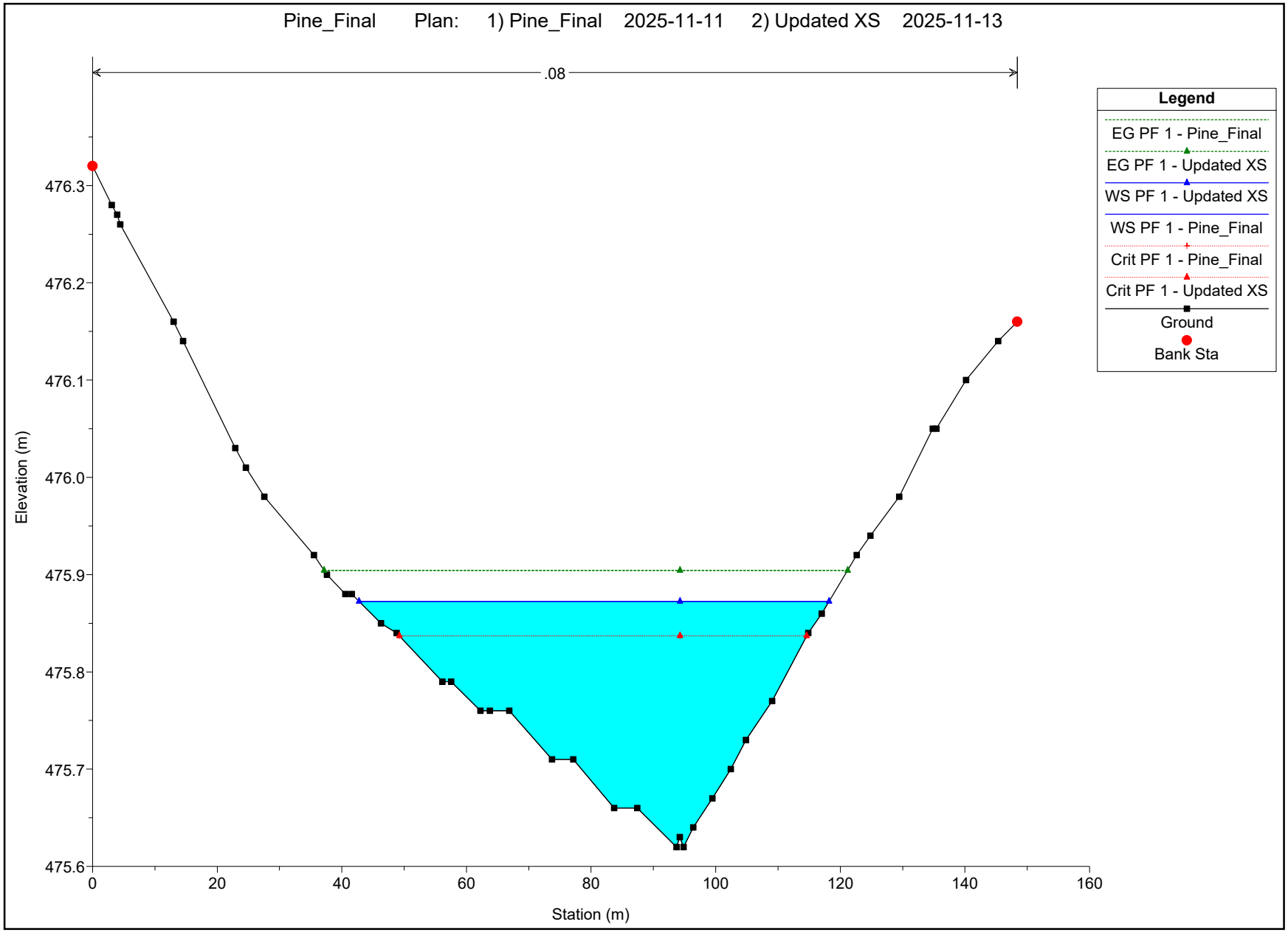
Station (m)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EG PF 1 - Updated XS
WS PF 1 - Updated XS
WS PF 1 - Pine_Final
Crit PF 1 - Pine_Final
Crit PF 1 - Updated XS
Ground
Bank Sta
Elevation (m)
476.3
476.2
476.1
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140
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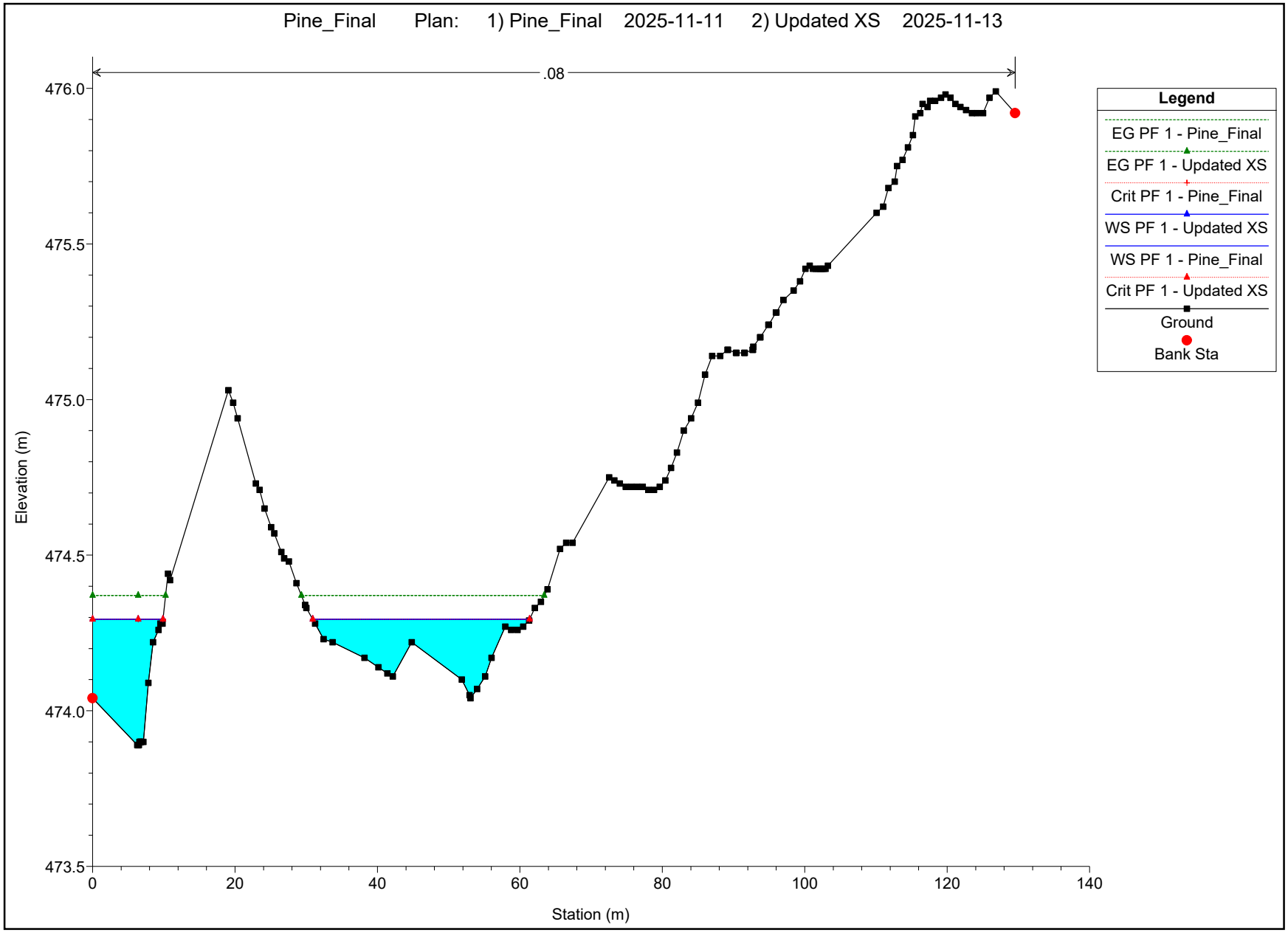
Station (m)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475.0
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100
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140
Station (m)
Legend
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WS PF 1 - Updated XS
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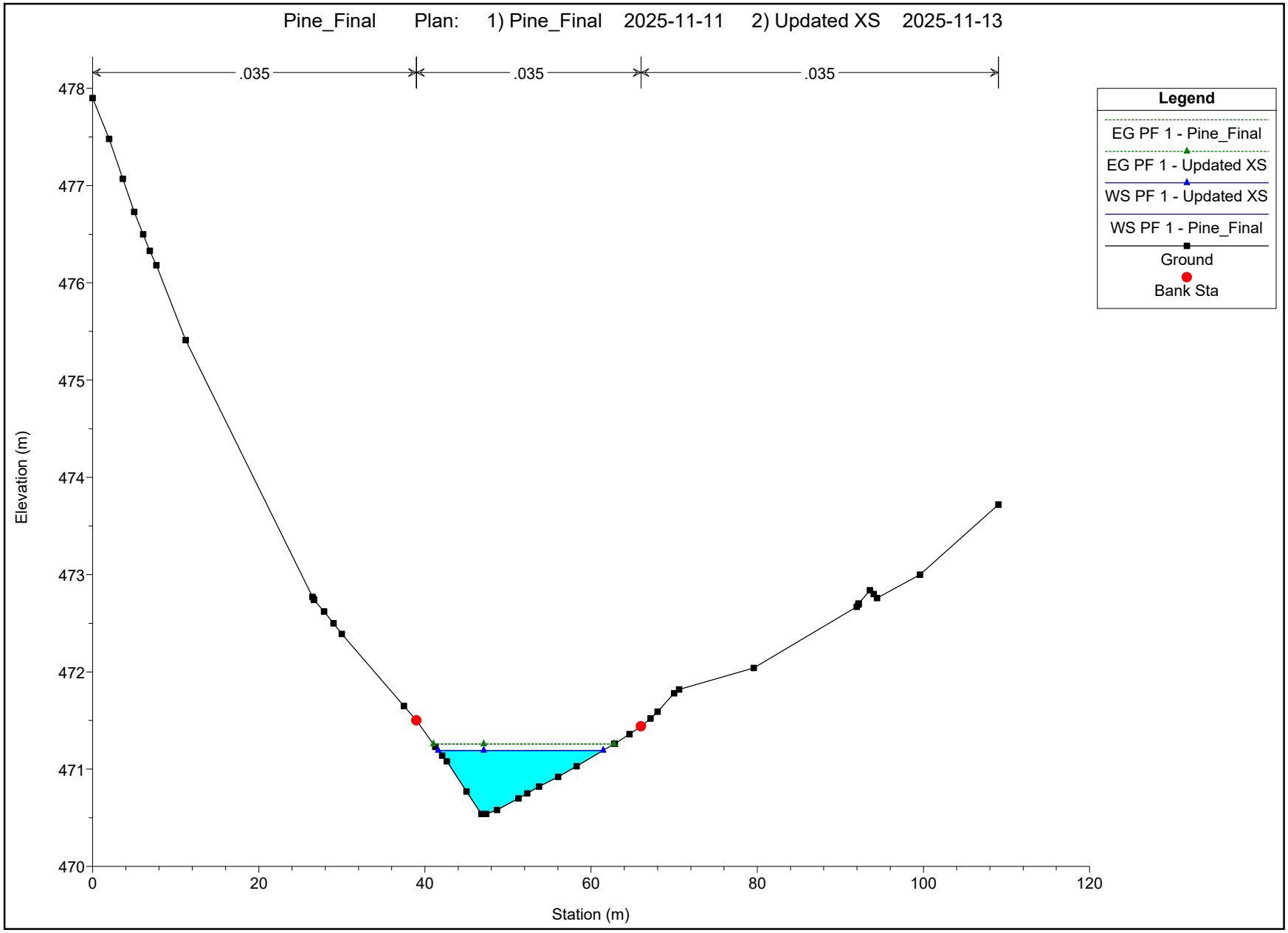
Bank Sta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WS PF 1 - Updated XS
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Ground
Bank Sta
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100
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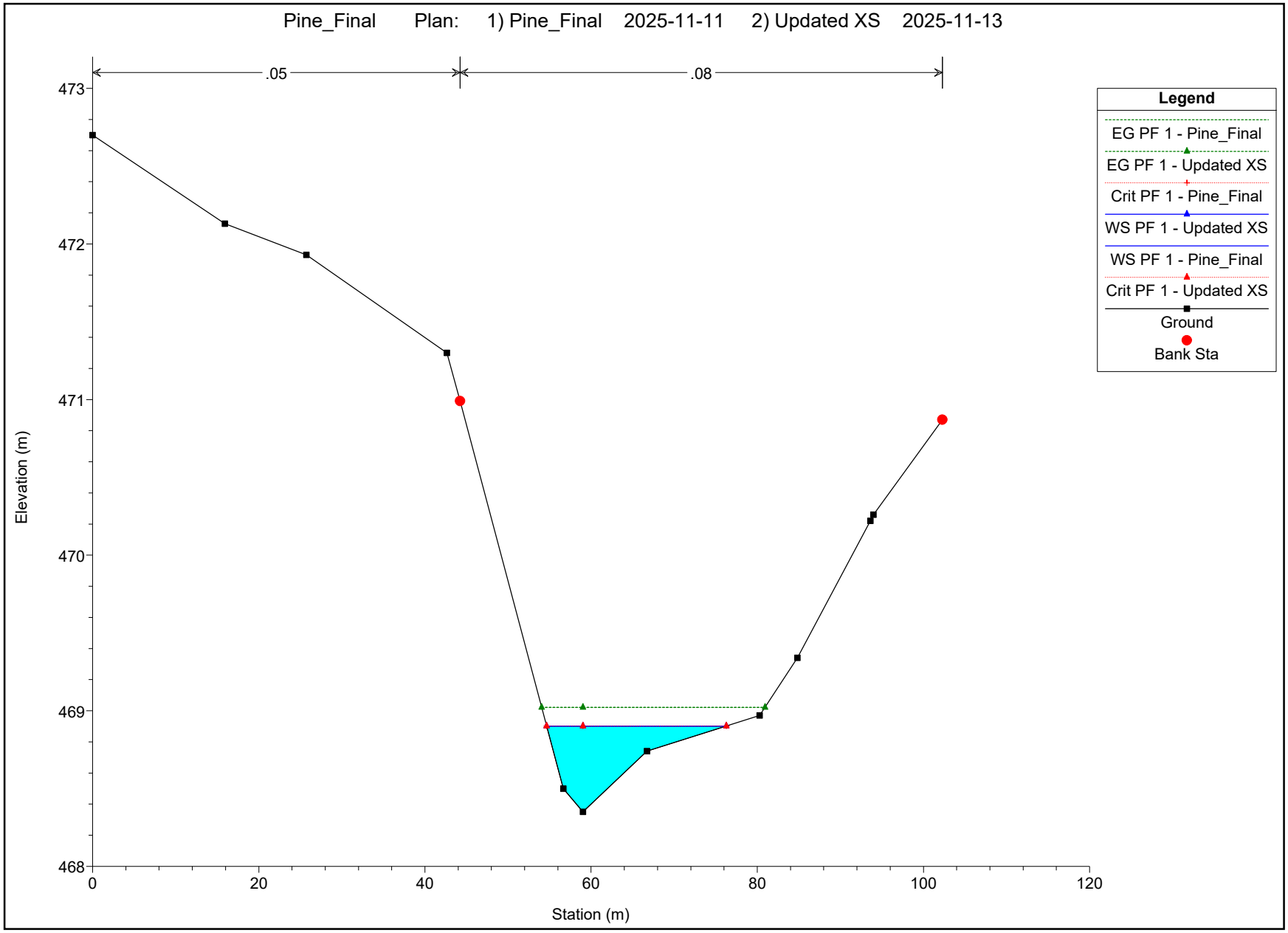
Station (m)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Station (m)
Legend
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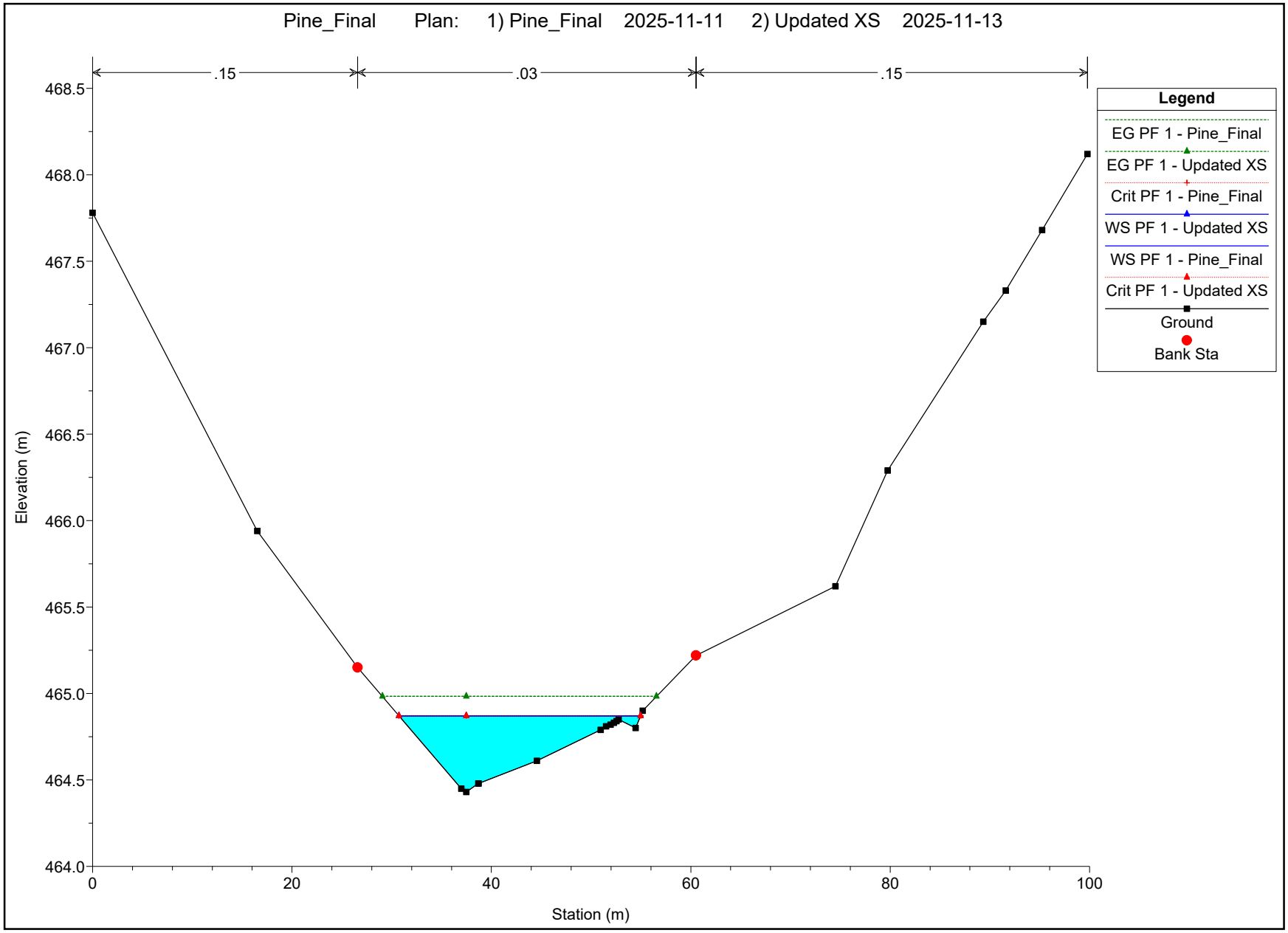
Bank Sta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Crit PF 1 - Updated XS
Ground
Bank Sta
Elevation (m)
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467.5
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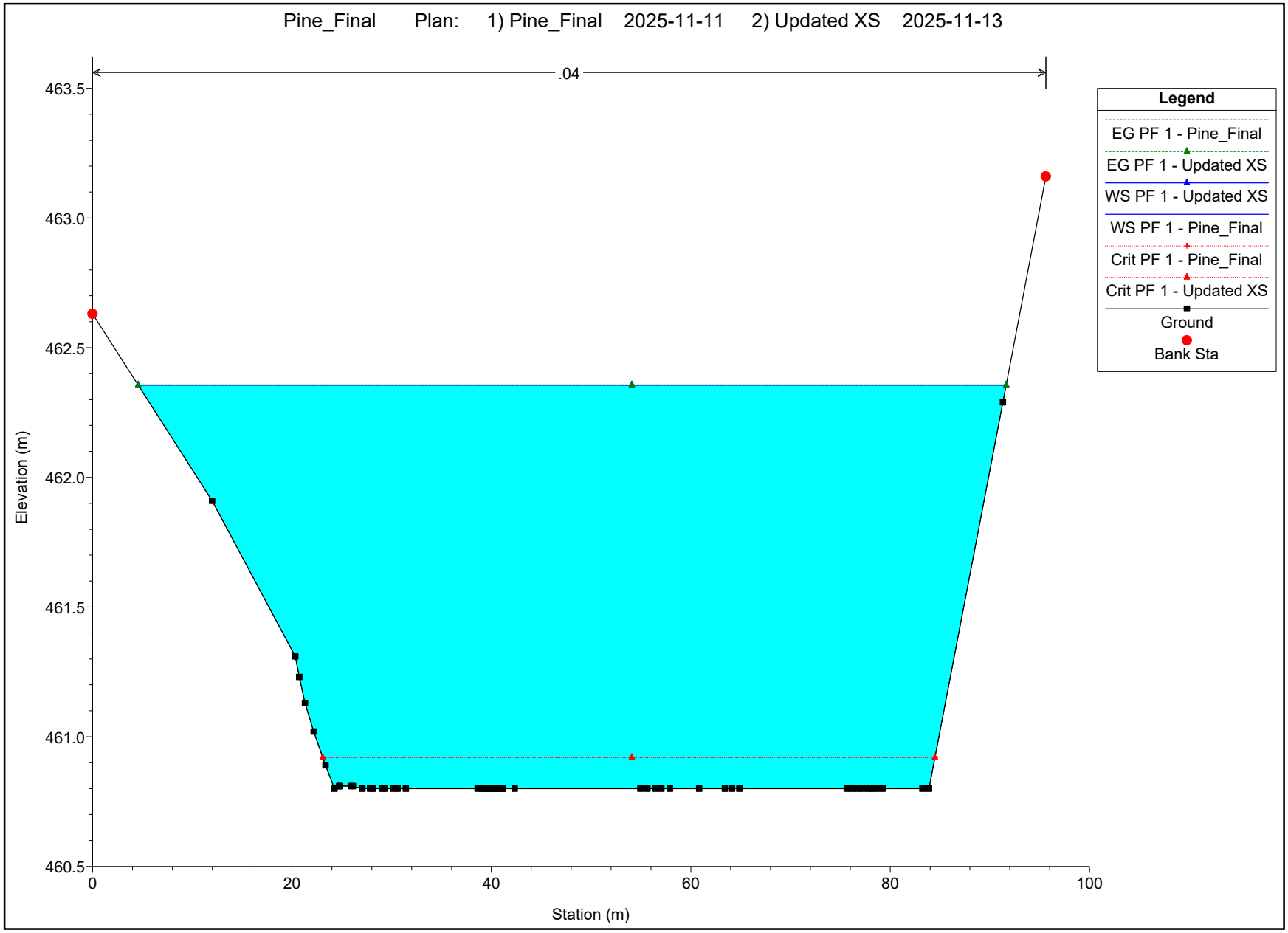
60
80
100
Station (m)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Ground
Bank Sta
Elevation (m)
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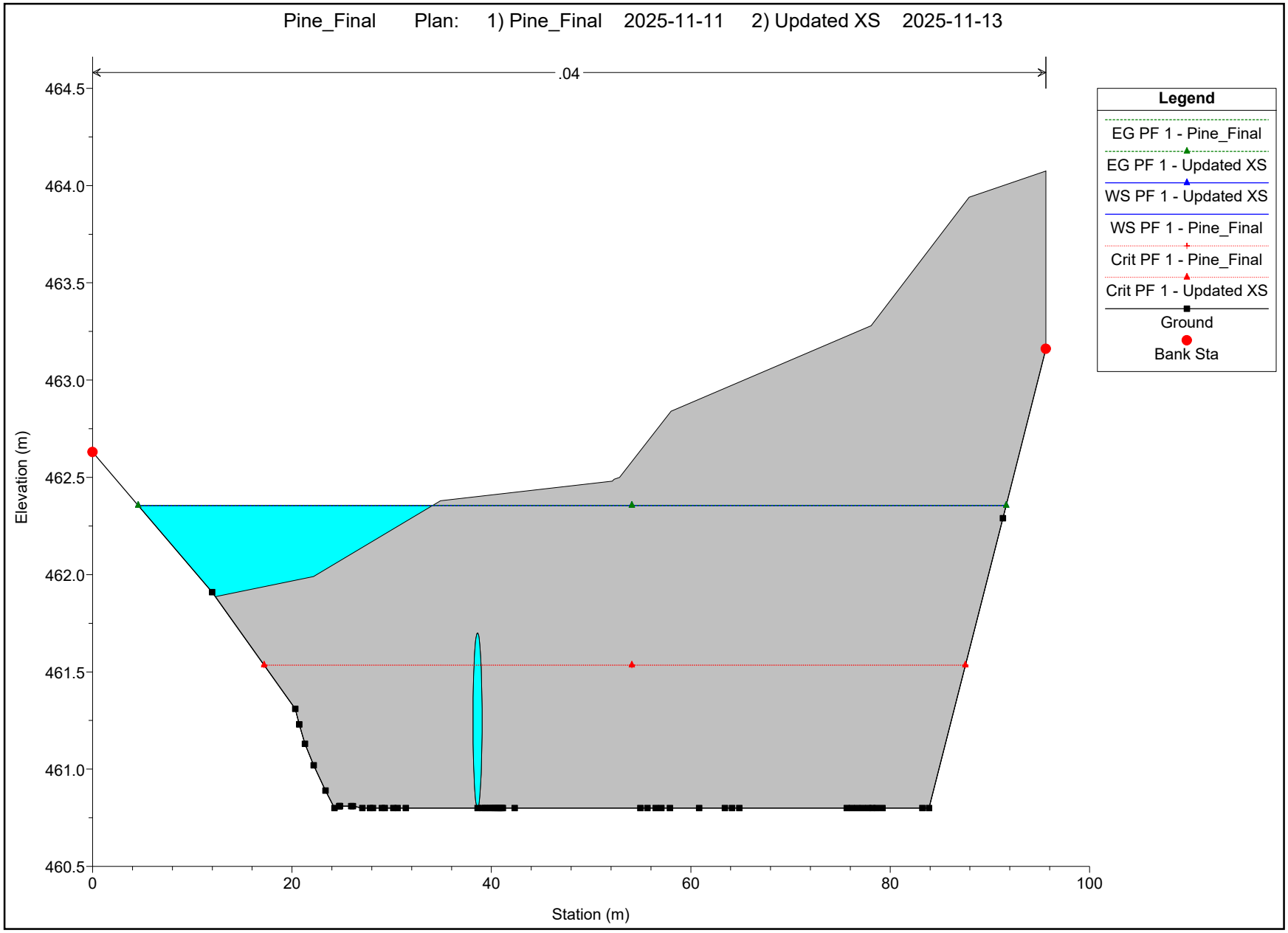
60
80
100
Station (m)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Ground
Bank Sta
Elevation (m)
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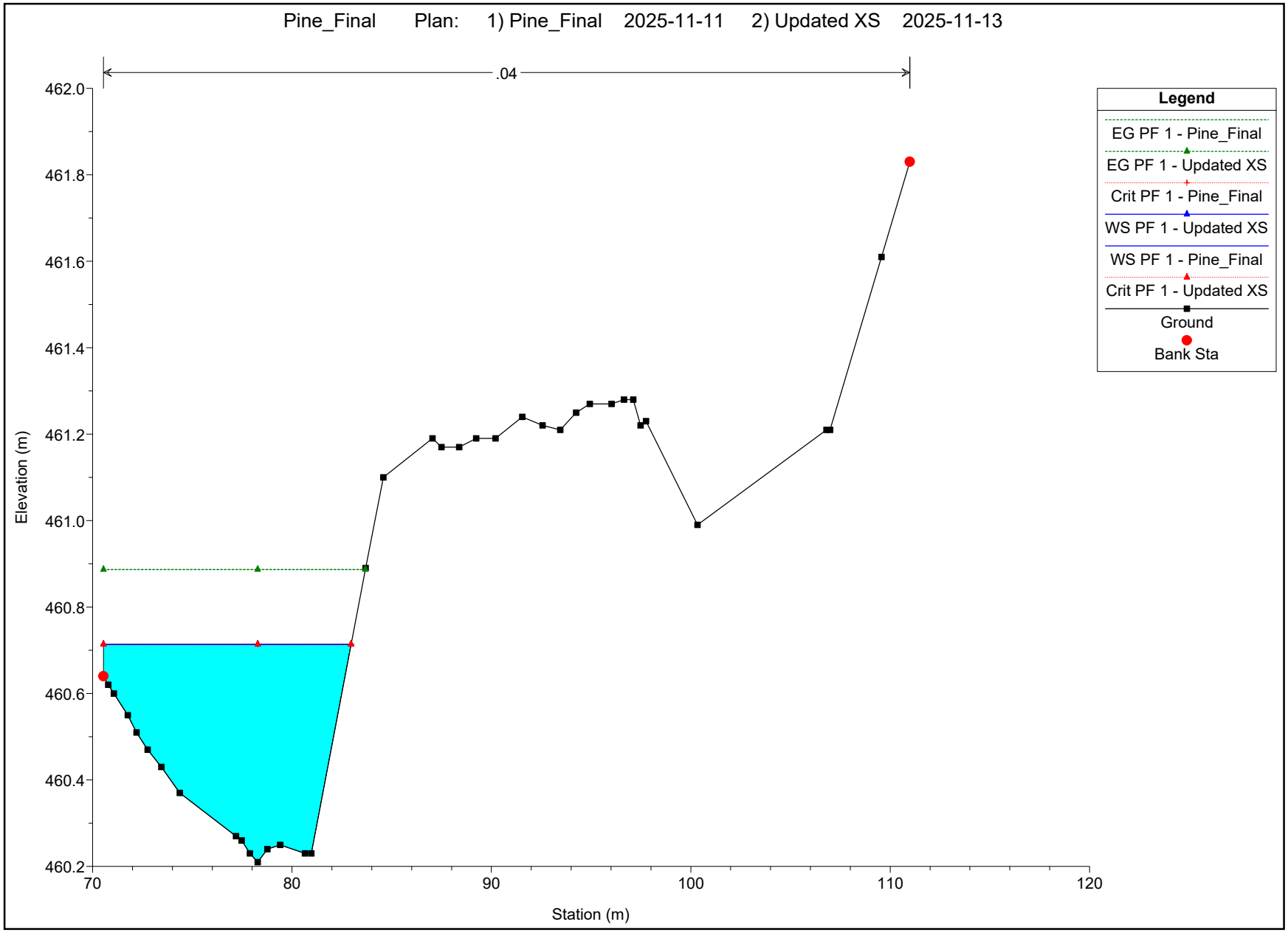
Station (m)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WS PF 1 - Pine_Final
Crit PF 1 - Updated XS
Ground
Bank Sta
Elevation (m)
462.0
461.8
461.6
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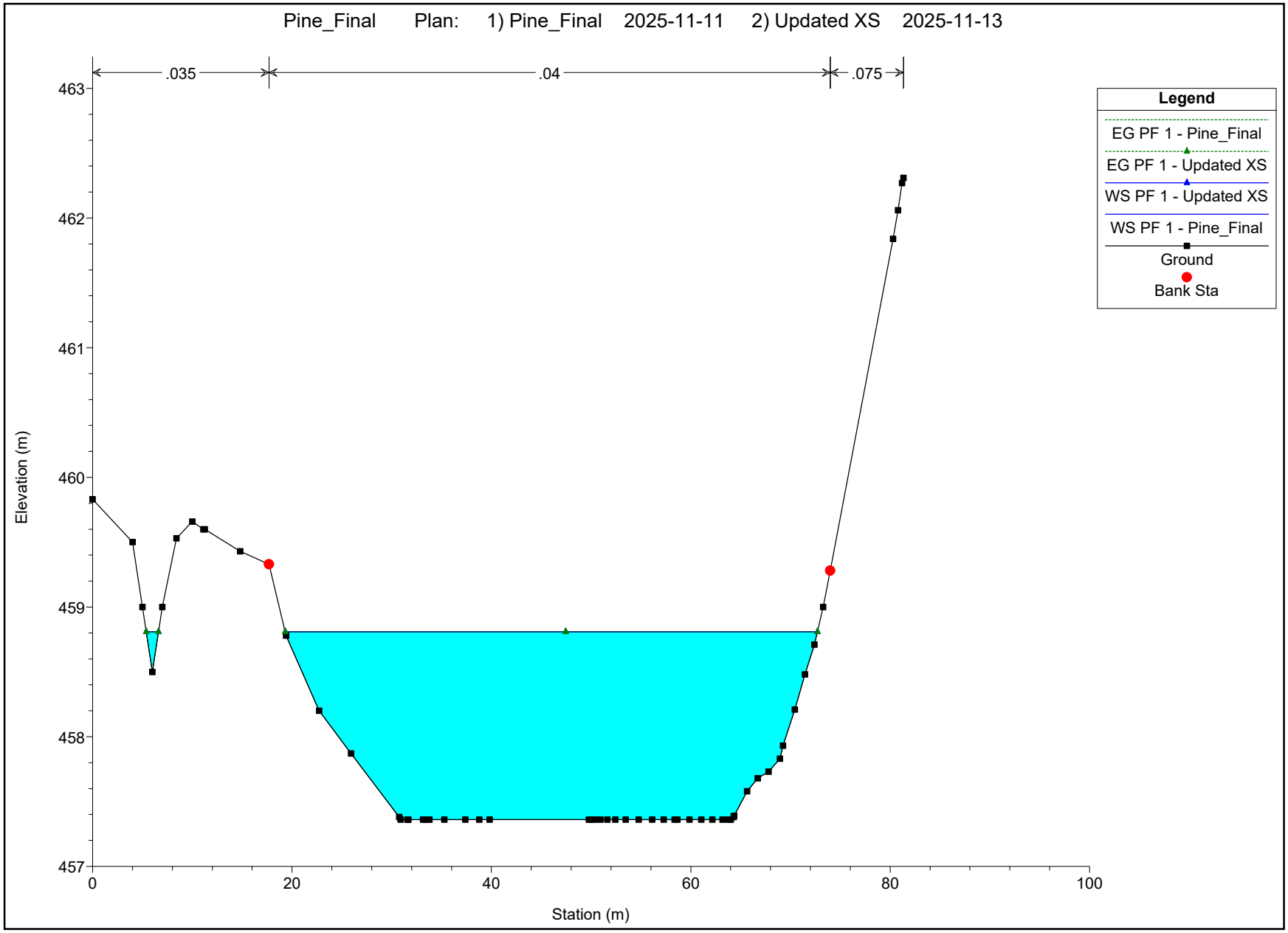
460.8
460.6
460.4
460.2
70
80
90
100
110
120
Station (m)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.04
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WS PF 1 - Updated XS
WS PF 1 - Pine_Final
Ground
Bank Sta
Elevation (m)
463
462
461
460
459
458
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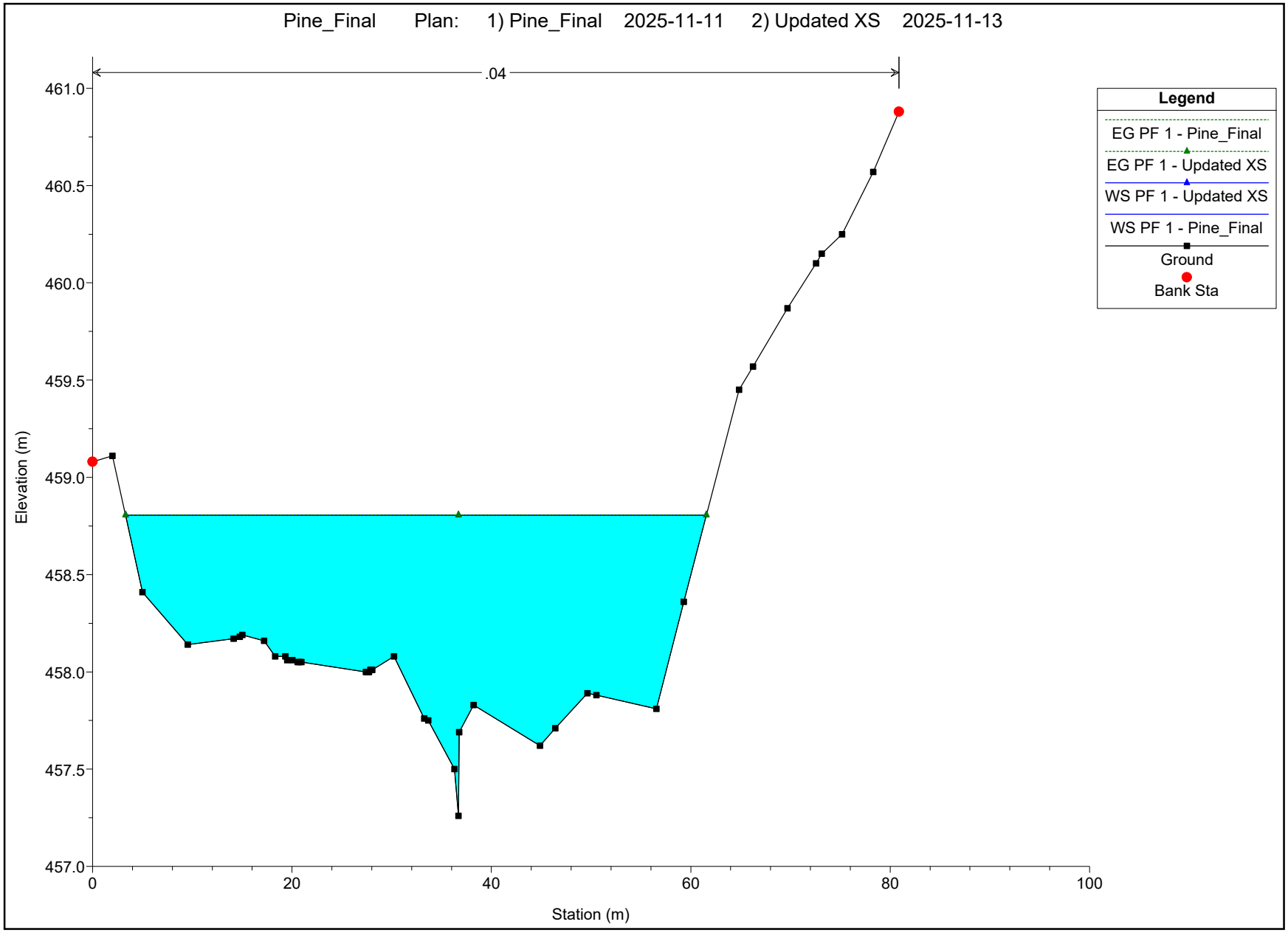
0
20
40
60
80
100
Station (m)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Legend
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EG PF 1 - Updated XS
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WS PF 1 - Pine_Final
Ground
Bank Sta
Elevation (m)
461.0
460.5
460.0
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458.5
458.0
457.5
457.0
0
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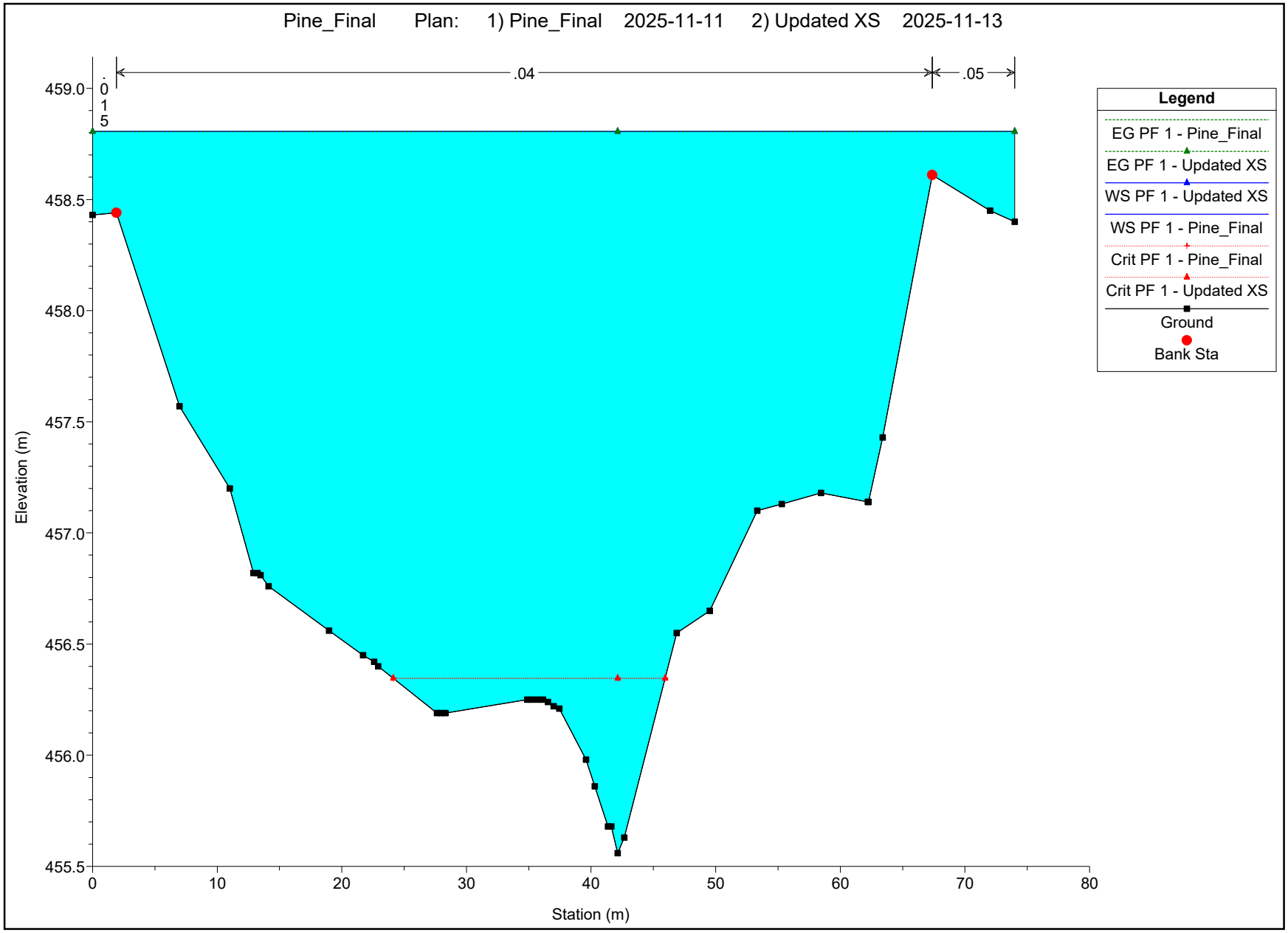
40
60
80
100
Station (m)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Legend
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WS PF 1 - Updated XS
WS PF 1 - Pine_Final
Crit PF 1 - Pine_Final
Crit PF 1 - Updated XS
Ground
Bank Sta
Elevation (m)
459.0
458.5
458.0
457.5
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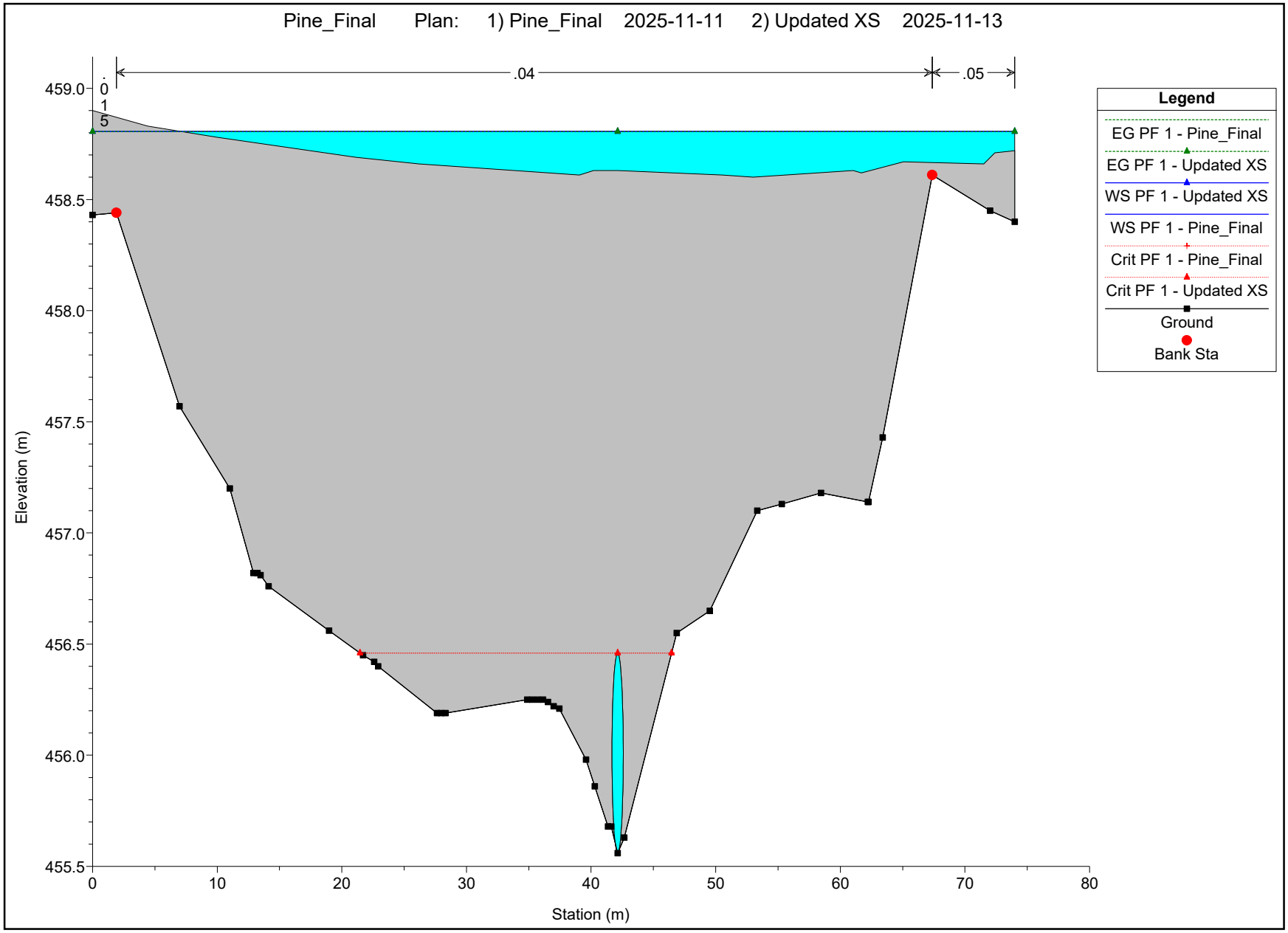
456.5
456.0
455.5
0
10
20
30
40
50
60
70
80
Station (m)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Legend
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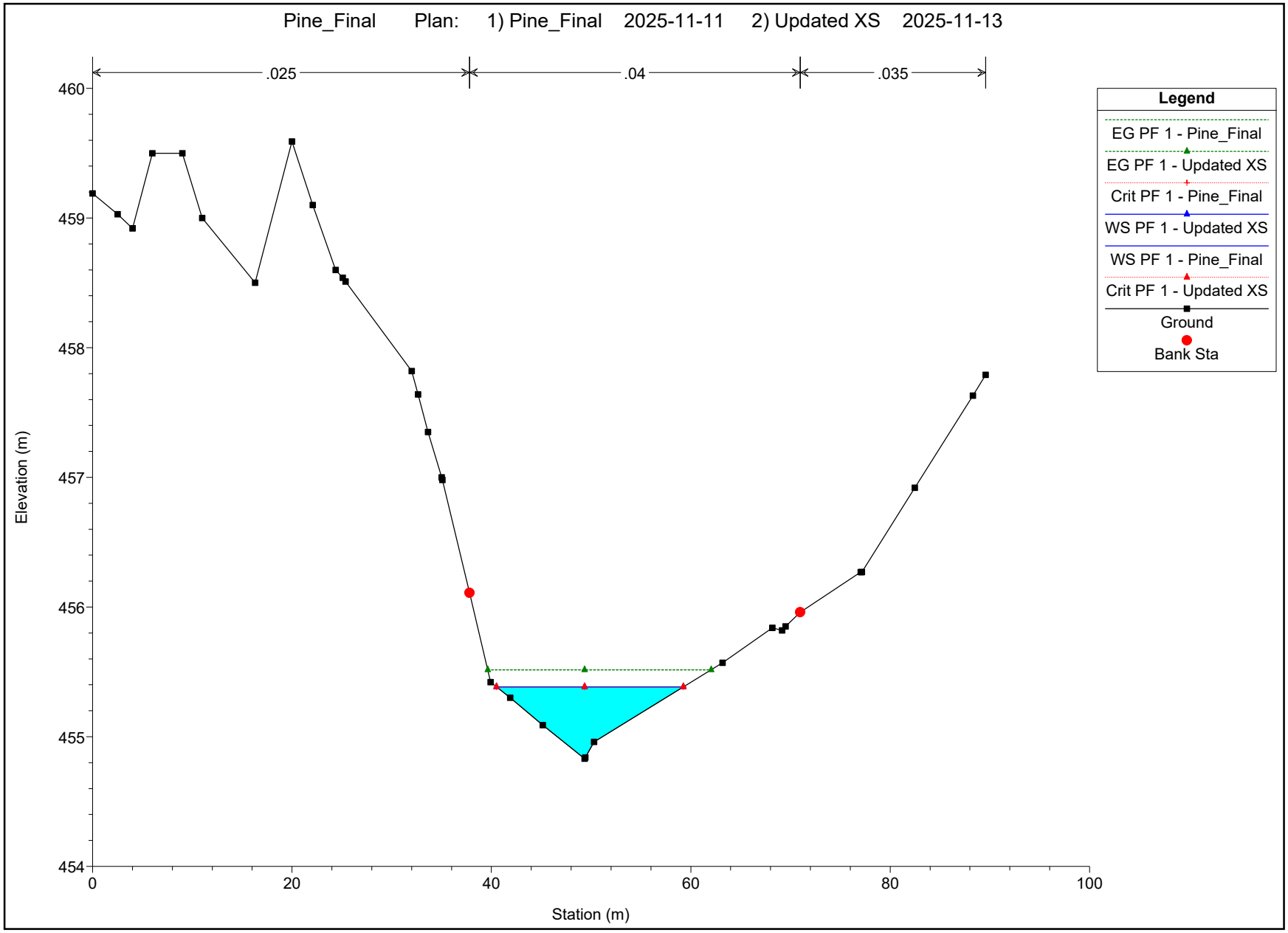
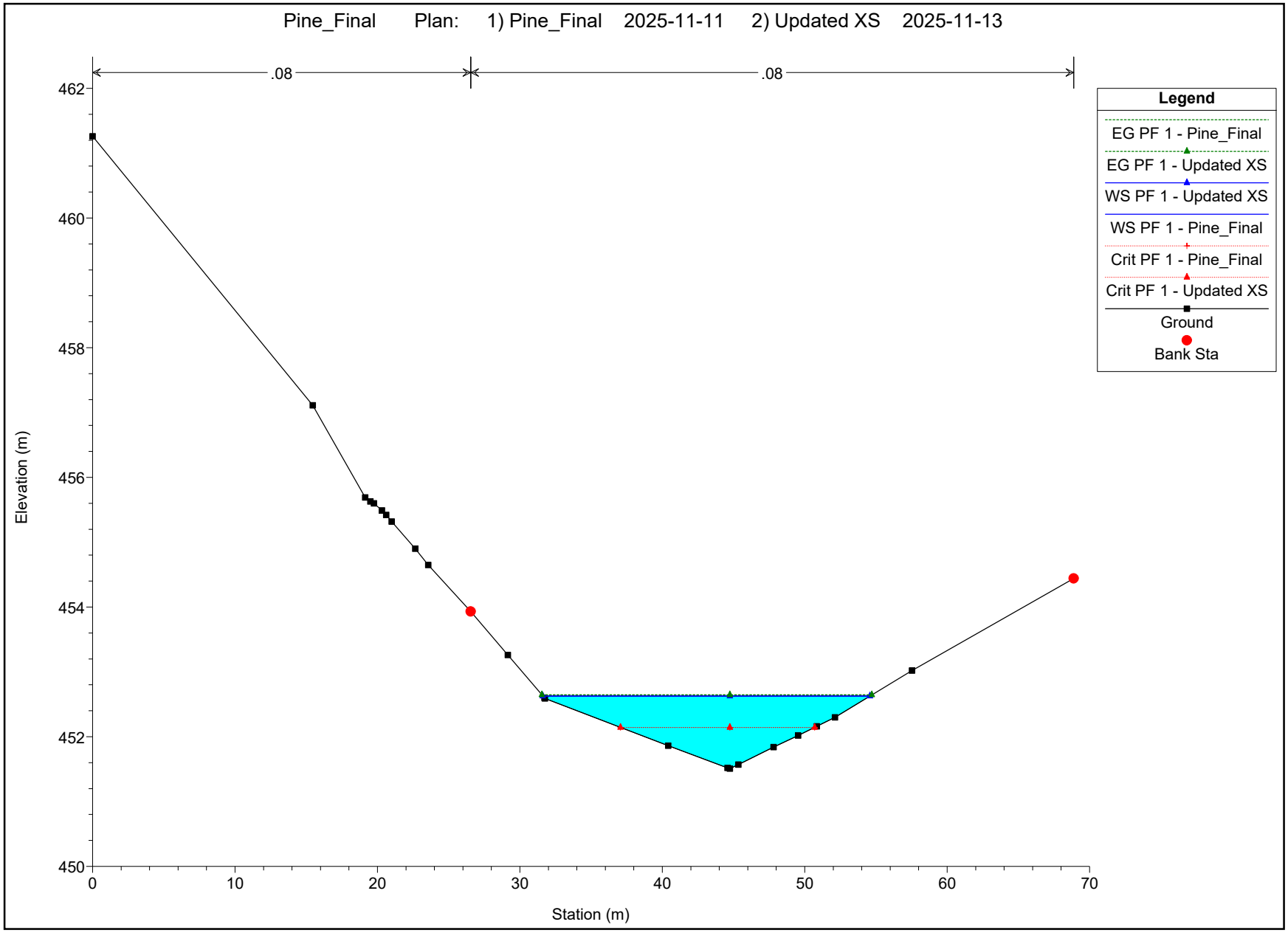
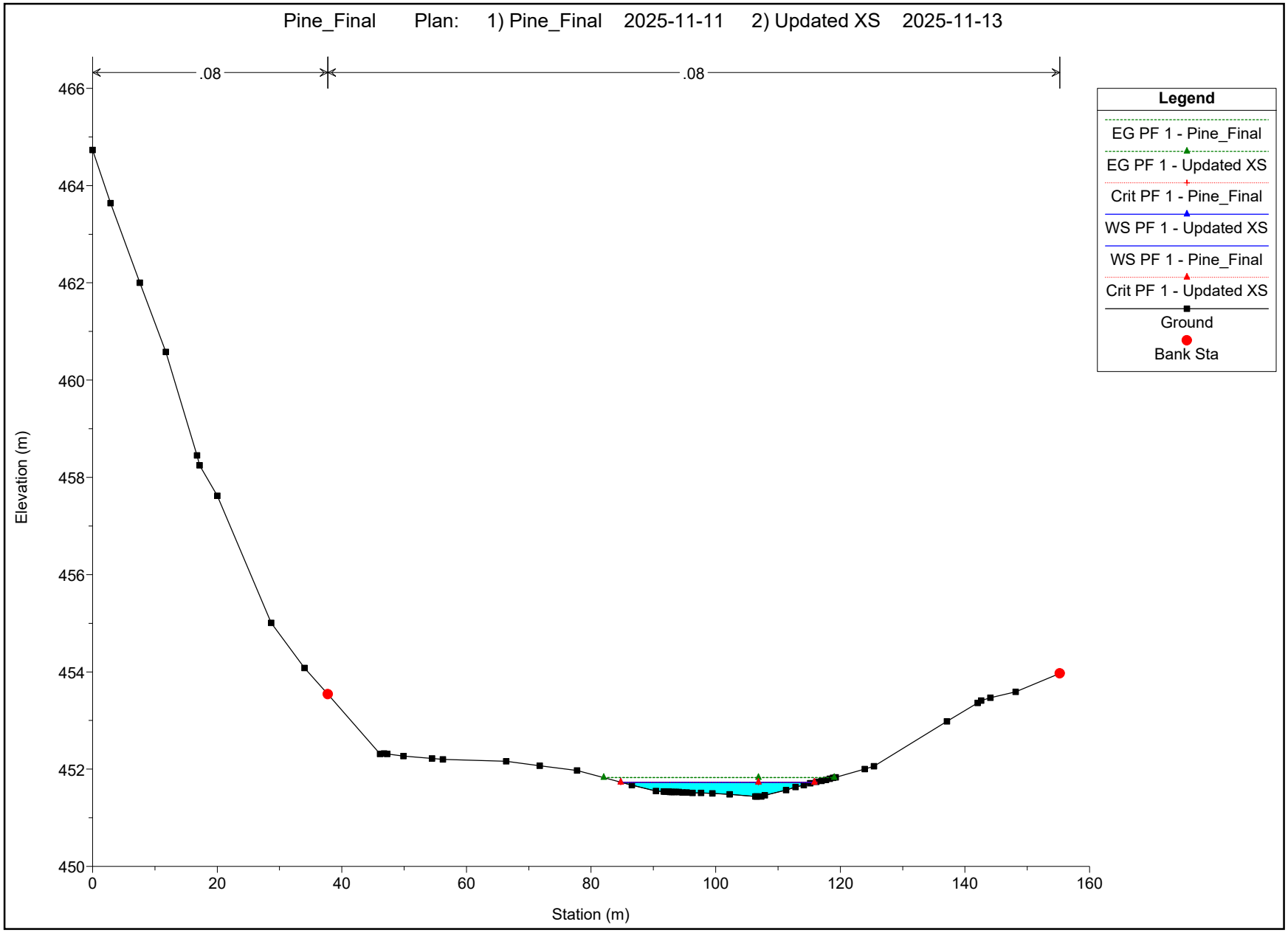
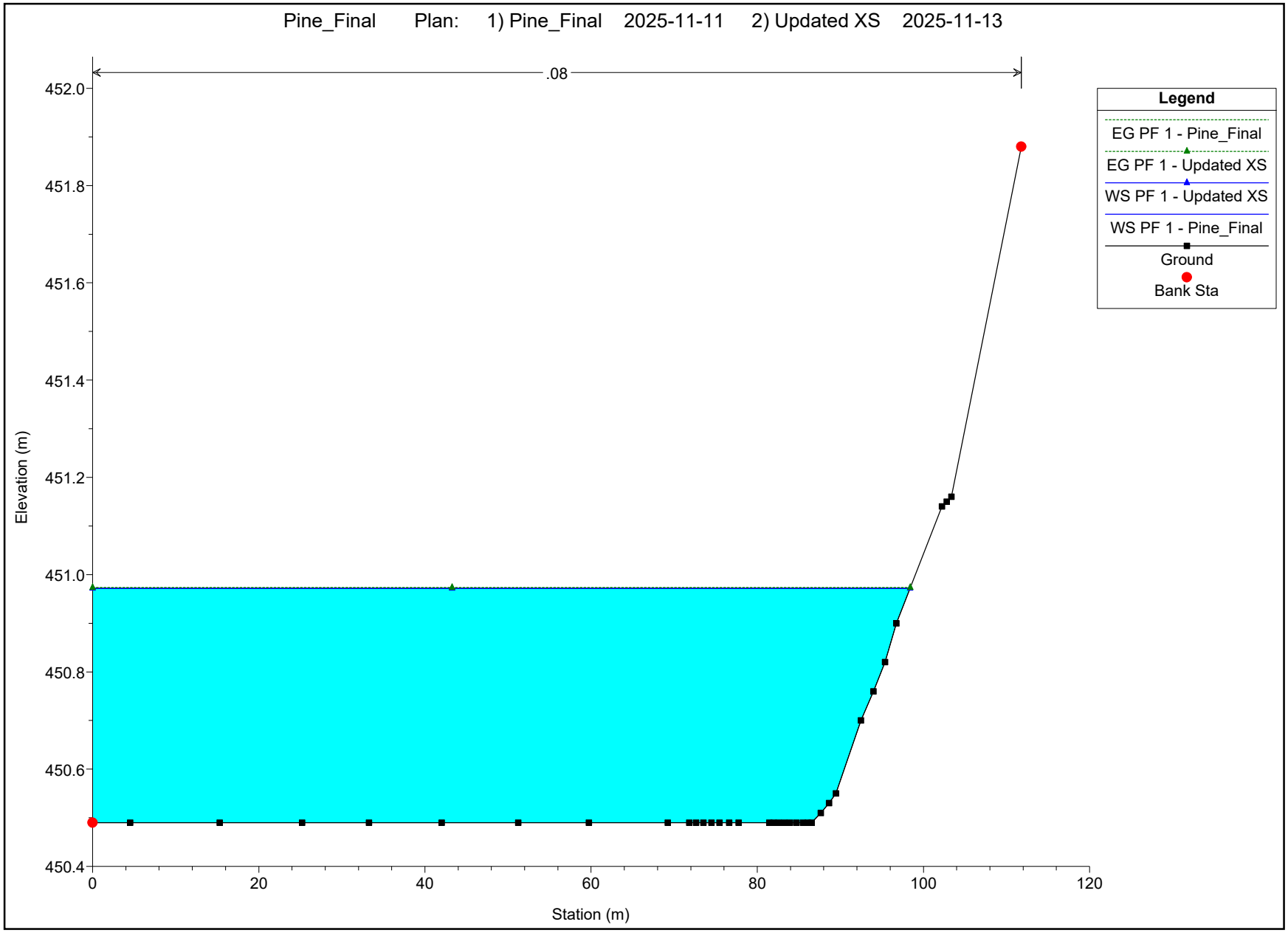
WS PF 1 - Updated XS
WS PF 1 - Pine_Final
Crit PF 1 - Pine_Final
Crit PF 1 - Updated XS
Ground
Bank Sta
Elevation (m)
459.0
458.5
458.0
457.5
457.0
456.5
456.0
455.5
0
10
20
30
40
50
60
70
80
Station (m)


Pine_Final Plan: 1) Pine_Final 2025-11-11 2) Updated XS 2025-11-13
.025
.04
.035
Legend
EG PF 1 - Pine_Final
EG PF 1 - Updated XS
Crit PF 1 - Pine_Final
WS PF 1 - Updated XS
WS PF 1 - Pine_Final
Crit PF 1 - Updated XS
Ground
Bank Sta
Elevation (m)
460
459
458
457
456
455
454
0
20
40
60
80
100
Station (m)

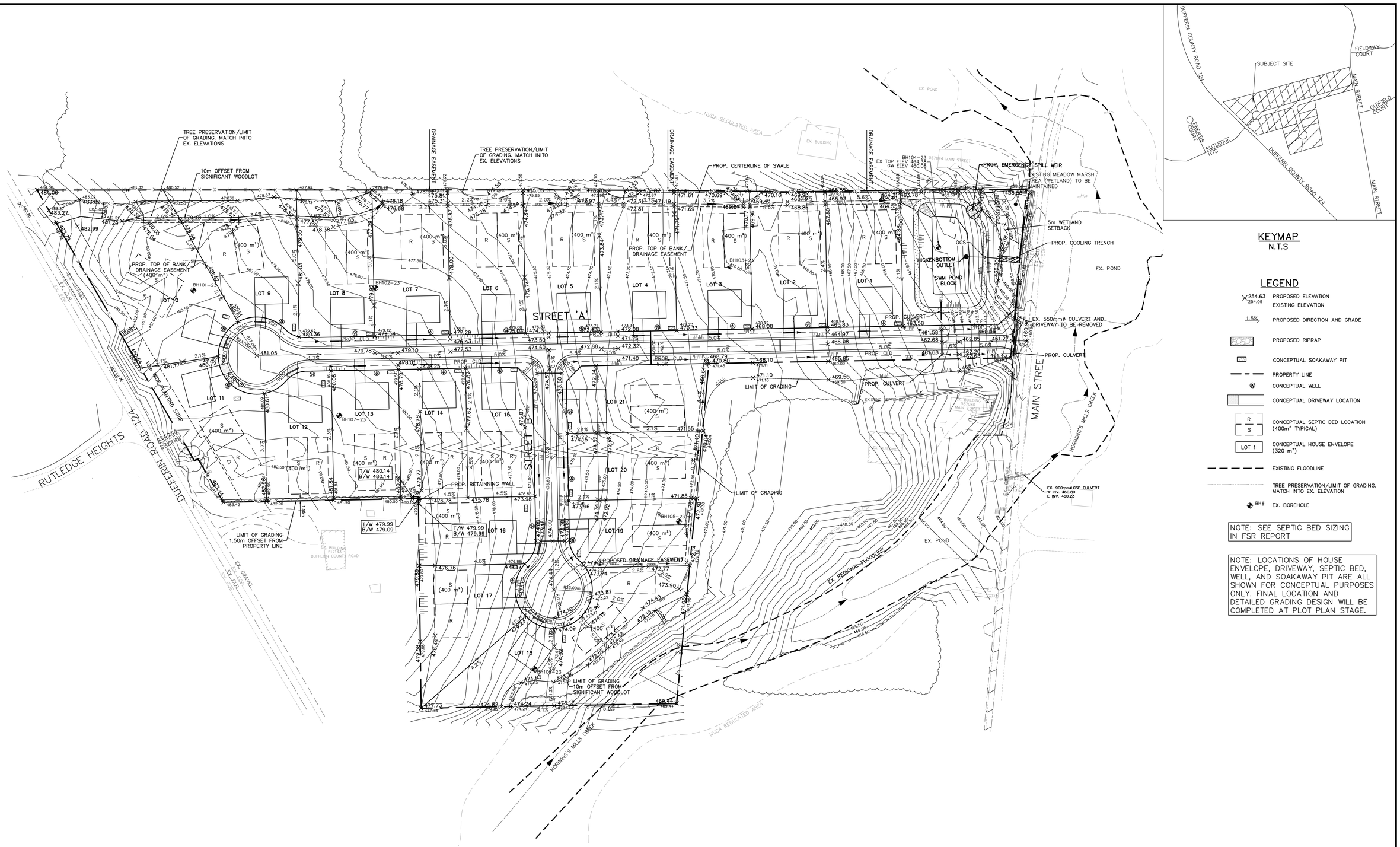

Pine_Final Plan: 1) Pine_Final 2025-11-11 2) Updated XS 2025-11-13
.08
.08
Legend
EG PF 1 - Pine_Final
EG PF 1 - Updated XS
WS PF 1 - Updated XS
WS PF 1 - Pine_Final
Crit PF 1 - Pine_Final
Crit PF 1 - Updated XS
Ground
Bank Sta
Elevation (m)
462
460
458
456
454
452
450
0
10
20
30
40
50
60
70
Station (m)


Pine_Final Plan: 1) Pine_Final 2025-11-11 2) Updated XS 2025-11-13
.08
.08
Legend
EG PF 1 - Pine_Final
EG PF 1 - Updated XS
Crit PF 1 - Pine_Final
WS PF 1 - Updated XS
WS PF 1 - Pine_Final
Crit PF 1 - Updated XS
Ground
Bank Sta
Elevation (m)
Station (m)
450
452
454
456
458
460
462
464
466
0
20
40
60
80
100
120
140
160


Pine_Final Plan: 1) Pine_Final 2025-11-11 2) Updated XS 2025-11-13
.08
Legend
EG PF 1 - Pine_Final
EG PF 1 - Updated XS
WS PF 1 - Updated XS
WS PF 1 - Pine_Final
Ground
Bank Sta
Elevation (m)
452.0
451.8
451.6
451.4
451.2
451.0
450.8
450.6
450.4
0
20
40
60
80
100
120
Station (m)

Appendix I

Pearson Engineering Drawings



KEYMAP
N.T.S

LEGEND

- 254.63 / 254.09 — PROPOSED ELEVATION / EXISTING ELEVATION
- 1.5% — PROPOSED DIRECTION AND GRADE
- PROPOSED RIPRAP
- CONCEPTUAL SOAKAWAY PIT
- PROPERTY LINE
- W — CONCEPTUAL WELL
- CONCEPTUAL DRIVEWAY LOCATION
- R / S — CONCEPTUAL SEPTIC BED LOCATION (400m² TYPICAL)
- LOT 1 — CONCEPTUAL HOUSE ENVELOPE (320 m²)
- EXISTING FLOODLINE
- TREE PRESERVATION/LIMIT OF GRADING. MATCH INTO EX. ELEVATION
- BH# — EX. BOREHOLE

NOTE: SEE SEPTIC BED SIZING IN FSR REPORT

NOTE: LOCATIONS OF HOUSE ENVELOPE, DRIVEWAY, SEPTIC BED, WELL, AND SOAKAWAY PIT ARE ALL SHOWN FOR CONCEPTUAL PURPOSES ONLY. FINAL LOCATION AND DETAILED GRADING DESIGN WILL BE COMPLETED AT PLOT PLAN STAGE.

NO.	REVISION NOTE	DATE	BY
2.	REVISED AS PER TOWNSHIP COMMENTS	11/12/25	IR
1.	REVISED AS PER TOWNSHIP COMMENTS	08/05/25	WT

BENCHMARK
ELEVATIONS ARE BASED ON GPS OBSERVATION TO PERMANENT REFERENCE STATION IN THE NAD83(CSRS-2010) COORDINATE SYSTEM AND HAVE BEEN CORRECTED TO ORTHOMETRIC ELEVATION ON THE CGVD28 DATUM (1978 ADJUSTMENT) WITH GEOID MODEL HTv2.0, AS SUPPLIED BY NATURAL RESOURCES CANADA.

TBM1, SPIKE IN HYDRO POLE, 458.51m.

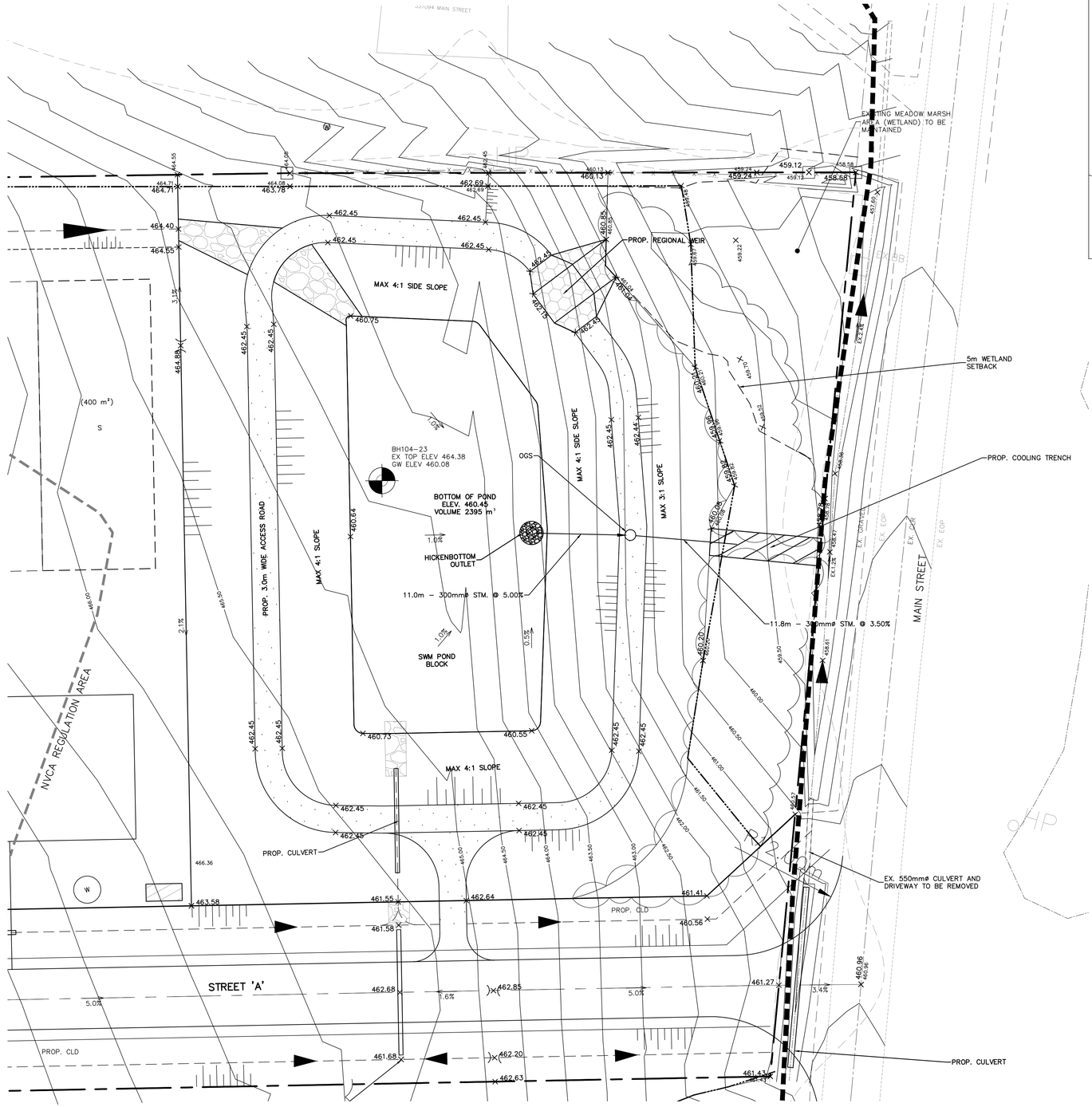
LICENCED PROFESSIONAL ENGINEER
M.W. DEJEAN
Nov 17, 2025
PROVINCE OF ONTARIO

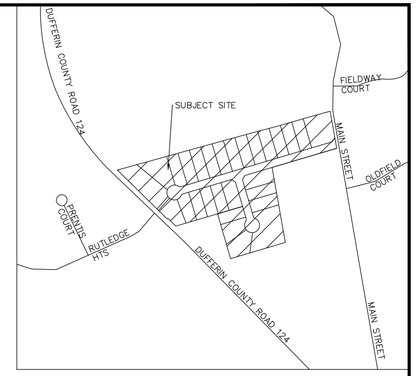
CARNEVALE RESIDENTIAL SUBDIVISION
537086 MAIN ST., HORNING'S MILLS
TOWNSHIP OF MELANCTHON

PRELIMINARY SITE SERVICING & GRADING PLAN

PEARSON ENGINEERING
PEARSONENG.COM PH. 705.719.4785

DESIGNED BY	AMC/IR	HORIZ SCALE	1:1000
DRAWN BY	NP/IR	VERT SCALE	N/A
CHECKED BY	MWD/GMP	DATE	APRIL 2023
PROJECT #	23008		
DRAWING #	SSG-1		
REVISION #	2		





KEYMAP
N.T.S

LEGEND

- 254.63 / 254.09 — PROPOSED ELEVATION / EXISTING ELEVATION
- 1.5% — PROPOSED DIRECTION AND GRADE
- MH — STORM MANHOLE
-) (— HIGH POINT
- PROPOSED RIPRAP
- EXISTING WELL
- PROPERTY LINE
- EXISTING FLOODLINE
- TREE PRESERVATION/LIMIT OF GRADING. MATCH INTO EX. ELEVATION
- BH# — EX. BOREHOLE

NO.	REVISION NOTE	DATE	BY
2.	REVISED AS PER TOWNSHIP COMMENTS	11/12/25	IR
1.	REVISED AS PER TOWNSHIP COMMENTS	08/05/25	WT

BENCHMARK
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TBM1, SPIKE IN HYDRO POLE, 458.51m.

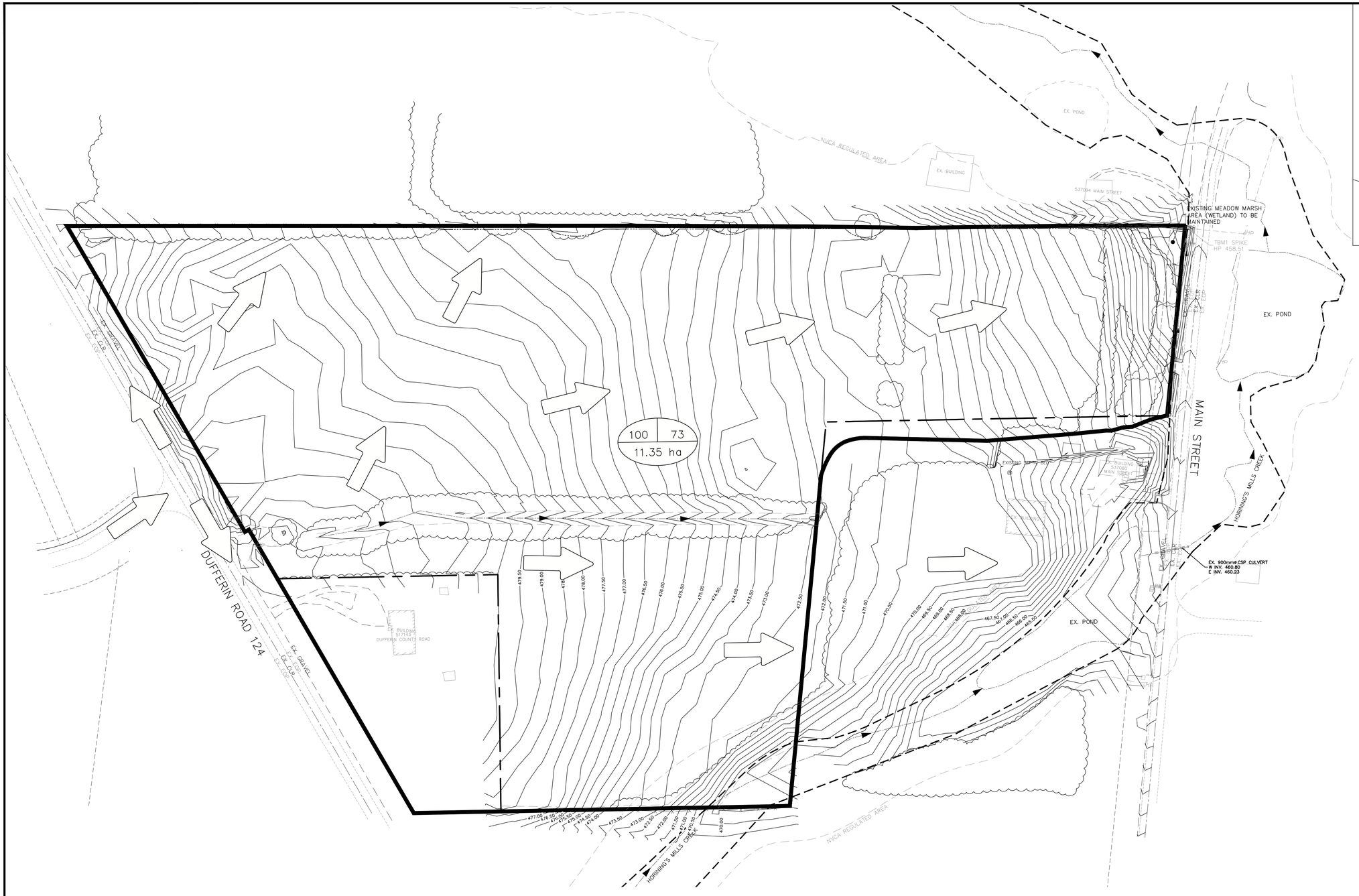
LICENCED PROFESSIONAL ENGINEER
M.W. DEJEAN
Nov 17, 2025
PROVINCE OF ONTARIO

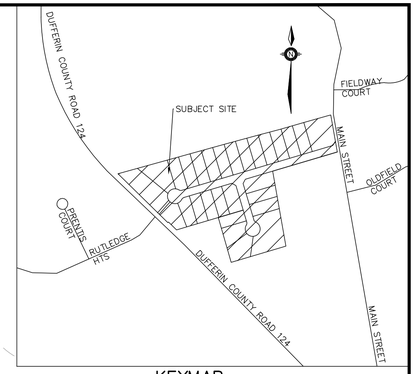
CARNEVALE RESIDENTIAL SUBDIVISION
537086 MAIN ST., HORNING'S MILLS
TOWNSHIP OF MELANCTHON

STORMWATER MANAGEMENT POND

PEARSON ENGINEERING
PEARSONENG.COM PH. 705.719.4785

DESIGNED BY	AMC/IR	HORIZ SCALE	1:250
DRAWN BY	NP/IR	VERT SCALE	N/A
CHECKED BY	MWD/GMP	DATE	APRIL 2023
PROJECT #	23008		
DRAWING #	PND-1		
REVISION #	2		





KEYMAP
N.T.S

LEGEND

- OVERLAND FLOW DIRECTION
- CATCHMENT AREA (1 | 0.75 / 1.00 ha) CN NUMBER OR IMPERVIOUSNESS
- AREA IN HECTARES
- CATCHMENT BOUNDARY
- EXISTING FLOODLINE
- PROPERTY LINE

NO.	REVISION NOTE	DATE	BY
2.	REVISED AS PER TOWNSHIP COMMENTS	11/12/25	IR
1.	REVISED AS PER TOWNSHIP COMMENTS	08/05/25	WT

BENCHMARK
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TBM1, SPIKE IN HYDRO POLE, 458.51m.

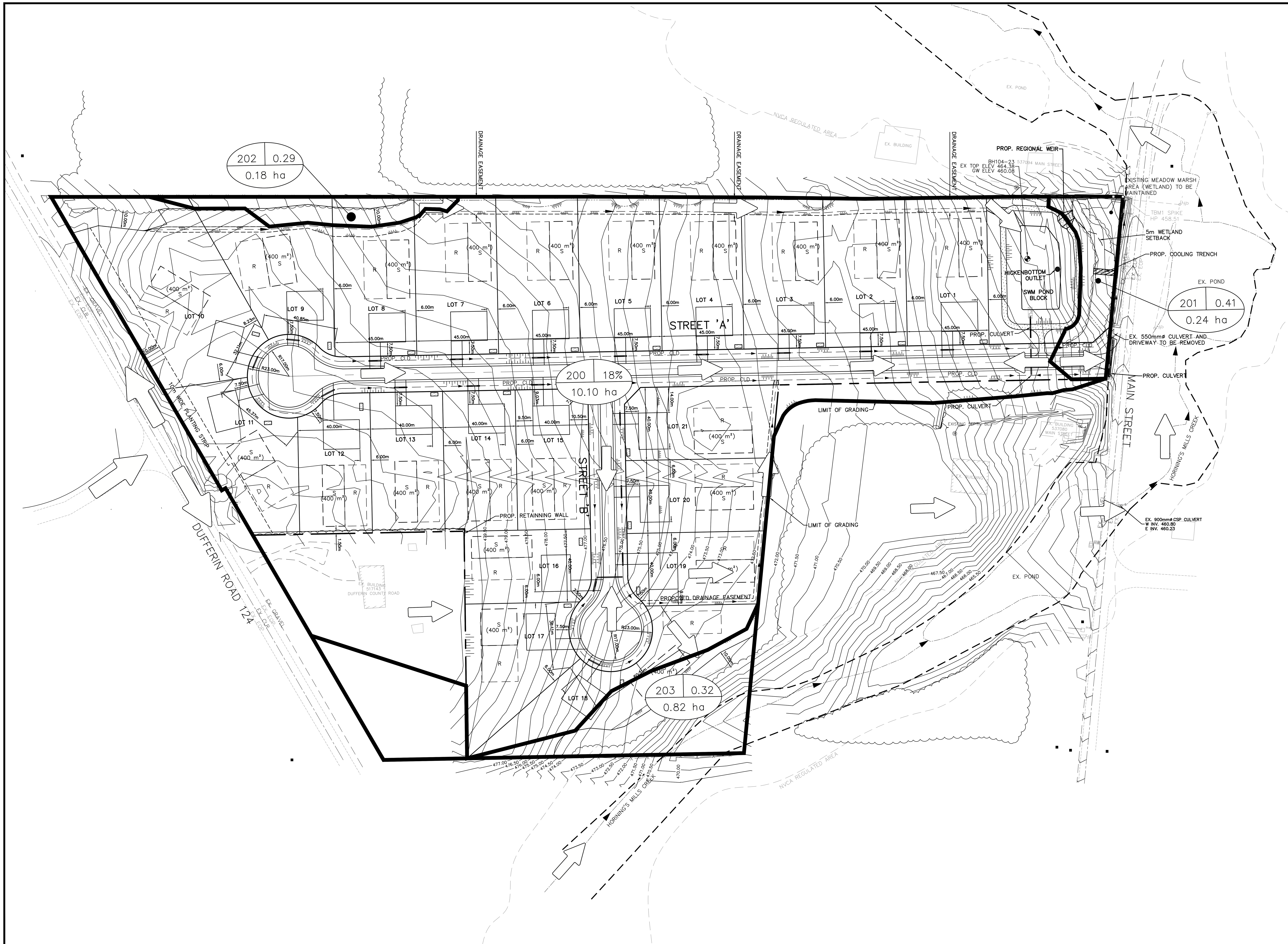
LICENCED PROFESSIONAL ENGINEER
M.W. DEJEAN
Nov 17, 2025
PROVINCE OF ONTARIO

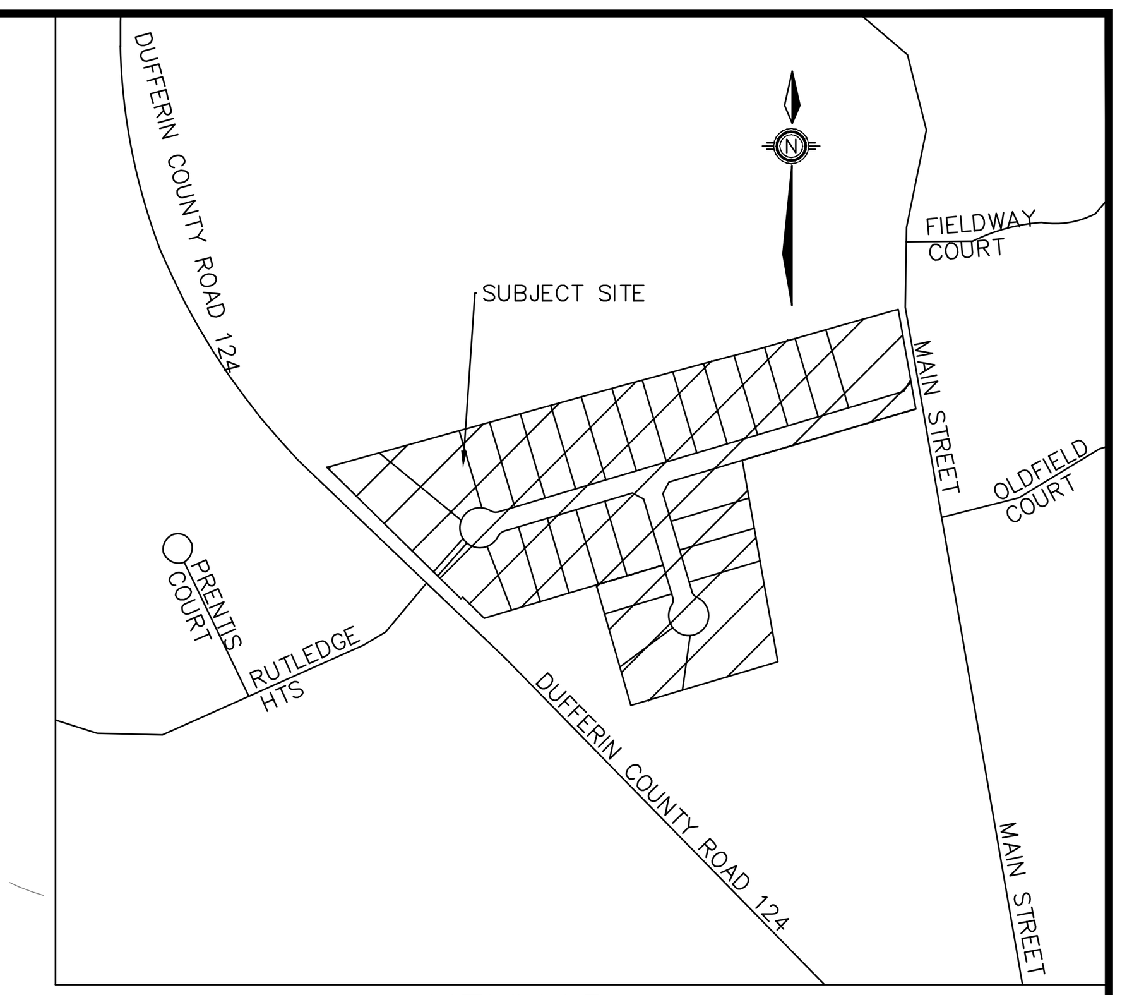
CARNEVALE RESIDENTIAL SUBDIVISION
537086 MAIN ST., HORNING'S MILLS
TOWNSHIP OF MELANCTHON

PRE-DEVELOPMENT STORM CATCHMENT PLAN

PEARSON ENGINEERING
PEARSONENG.COM PH. 705.719.4785

DESIGNED BY	AMC/IR	HORIZ SCALE	1:1000
DRAWN BY	NP/IR	VERT SCALE	N/A
CHECKED BY	MWD/GMP	DATE	APRIL 2023
PROJECT #	23008		
DRAWING #	STM-1		
REVISION #	2		





KEYMAP
N.T.S

LEGEND

- OVERLAND FLOW DIRECTION
- CATCHMENT AREA / CN NUMBER OR IMPERVIOUSNESS / AREA IN HECTARES (1 | 0.75 | 1.00 ha)
- CATCHMENT BOUNDARY
- PROPOSED RIPRAP
- CONCEPTUAL SOAKAWAY PIT
- EXISTING FLOODLINE
- PROPERTY LINE
- BH# EX. BOREHOLE (FOR SWM POND ONLY)

NO.	REVISION NOTE	DATE	BY
2.	REVISED AS PER TOWNSHIP COMMENTS	11/12/25	IR
1.	REVISED AS PER TOWNSHIP COMMENTS	08/05/25	WT

BENCHMARK
ELEVATIONS ARE BASED ON GPS OBSERVATION TO PERMANENT REFERENCE STATION IN THE NAD83(CSRS-2010) COORDINATE SYSTEM AND HAVE BEEN CORRECTED TO ORTHOMETRIC ELEVATION ON THE CGVD28 DATUM (1978 ADJUSTMENT) WITH GEOID MODEL HTv2.0, AS SUPPLIED BY NATURAL RESOURCES CANADA.

TBM1, SPIKE IN HYDRO POLE, 458.51m.

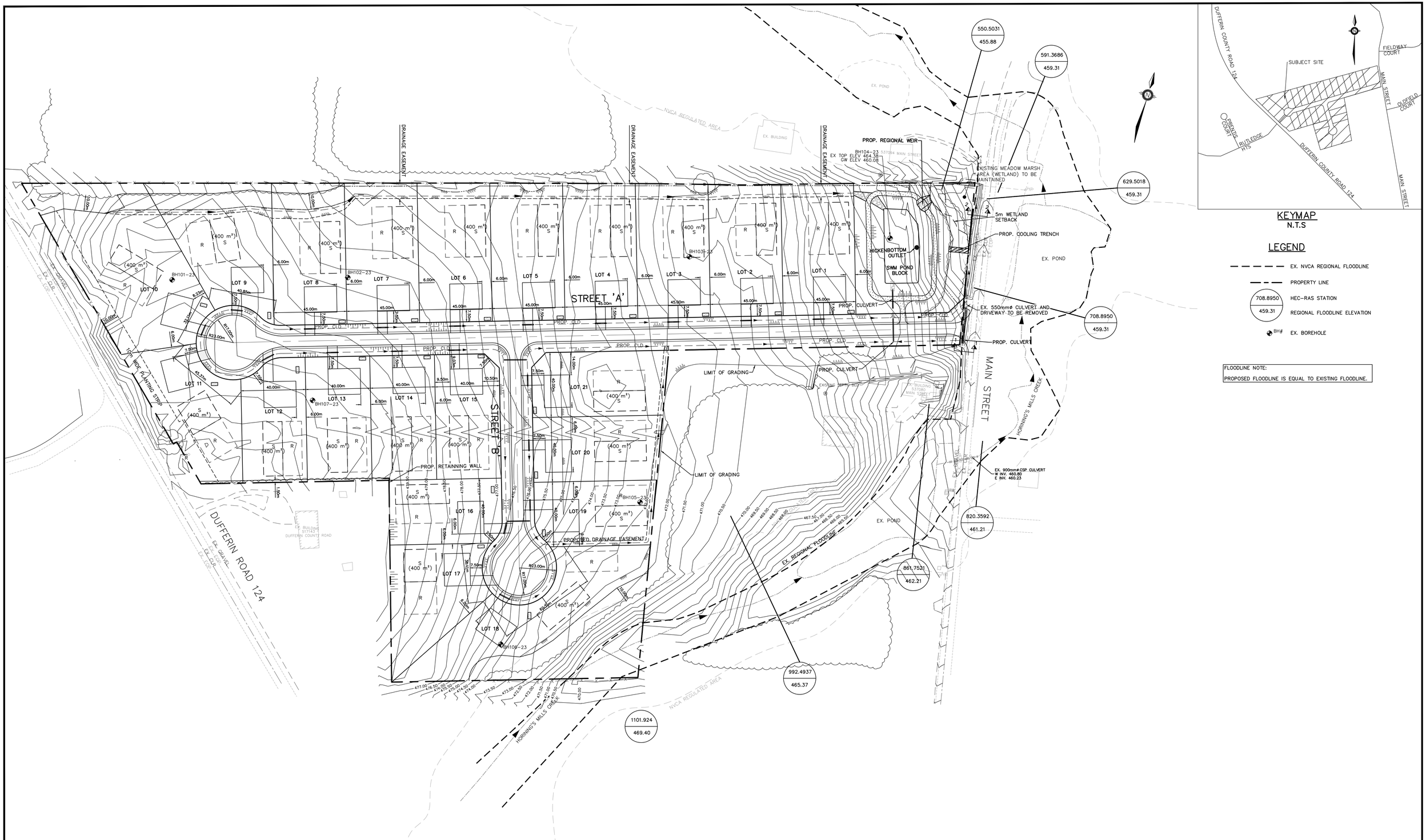
LICENCED PROFESSIONAL ENGINEER
M.W. DEJEAN
Nov 17, 2025
PROVINCE OF ONTARIO

CARNEVALE RESIDENTIAL SUBDIVISION
537086 MAIN ST., HORNING'S MILLS
TOWNSHIP OF MELANCTHON

POST–DEVELOPMENT STORM CATCHMENT PLAN

PEARSON ENGINEERING
PEARSONENG.COM PH. 705.719.4785

DESIGNED BY	AMC/IR	HORIZ SCALE	1:1000	PROJECT #	23008
DRAWN BY	NP/IR	VERT SCALE	N/A	DRAWING #	STM–2
CHECKED BY	MWD/GMP	DATE	APRIL 2023	REVISION #	2



KEYMAP
N.T.S

LEGEND

- EX. NVCA REGIONAL FLOODLINE
- PROPERTY LINE
- 708.8950 / 459.31 — HEC-RAS STATION / REGIONAL FLOODLINE ELEVATION
- BH# — EX. BOREHOLE

FLOODLINE NOTE:
PROPOSED FLOODLINE IS EQUAL TO EXISTING FLOODLINE.

NO.	REVISION NOTE	DATE	BY
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1.	REVISED AS PER TOWNSHIP COMMENTS	08/05/25	WT

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TBM1, SPIKE IN HYDRO POLE, 458.51m.

LICENCED PROFESSIONAL ENGINEER
M.W. DEJEAN
Nov 17, 2025
PROVINCE OF ONTARIO

CARNEVALE RESIDENTIAL SUBDIVISION
537086 MAIN ST., HORNING'S MILLS
TOWNSHIP OF MELANCTHON

FLOODLINE LOCATION PLAN

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PEARSONENG.COM PH. 705.719.4785

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DRAWN BY	NP/IR	VERT SCALE	N/A
CHECKED BY	MWD/GMP	DATE	APRIL 2023
PROJECT #	23008		
DRAWING #	FL-1		
REVISION #	2		

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