

**FUNCTIONAL SERVICING AND STORMWATER
MANAGEMENT REPORT
SKEOCH SITE
PART OF LOT 8, CONCESSION 1, WEST GARAFRAXA
TOWNSHIP OF CENTRE WELLINGTON
WELLINGTON COUNTY**

Prepared for: Sorbara Development Group

Prepared by: Sabourin Kimble & Associates Ltd.
110 Old Kingston Road
Ajax, Ontario
L1T 2Z9

File: 26:524

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1 INTRODUCTION

Sabourin Kimble & Associates Ltd. has been retained by Sorbara Development Group to carry out a Functional Servicing and Stormwater Management analysis for the lands known as the Skeoch property, which is located on Part of Lot 8, Concession 1, West Garafraxa, within the Township of Centre Wellington. This Functional Servicing and Stormwater Management Report has been prepared in support of Draft Plan of Subdivision and Re-Zoning applications for the proposed development.

This report identifies how servicing and stormwater management will be provided and how that will fit into the overall development framework. This investigation includes an examination of site grading, water supply, and storm and sanitary drainage, including preliminary designs for each service internal to the site. A complete stormwater management analysis has been carried out including the identification of site constraints and criteria, and preliminary designs for the overall stormwater management concept.

2 STUDY AREA

As shown in **Figure 1**, the Subject Site is approximately 39.1ha in size and is bounded by woodlands, wetlands, the Fergus Business Park and agricultural lands to the northwest, First Line to the northeast, Wellington County Road No. 19 (Garafraxa Street East) to the southeast, and the Eastwood residential subdivision to the southwest. The Elora Cataract Trailway runs north-to-south and passes through the west corner of the site. An unnamed creek also passes through the west corner of the site and flows southerly to an existing culvert on Garafraxa Street East. The creek continues to flow southerly through an existing residential area to the Grand River. The west corner of the site is occupied by approximately 8.8ha of environmental lands. A heritage house is located on Garafraxa Street East, and the balance of the site is agricultural land. The legal description of the Study Area is Part of Lot 8, Concession 1, West Garafraxa, Part 1 on Plan 61R-11802, Township of Centre Wellington in Wellington County.

CAD FILE: P:\26\524\Drawing Files\Phase 1\Figures\524-FSR Fig1 Study Area.dwg



3 DEVELOPMENT CONCEPT

The proposed draft plan has been prepared by Weston Consulting. As shown in the Concept Plan (**Figure 2**), the proposed land use is mainly a mix of single family and on-street townhouse units, with a proposed maximum unit count of 695. The heritage house located on Garafraxa Street East will be preserved. The remainder of the proposed development consists of a park, a stormwater management pond, and blocks allocated for the existing environmental lands and the unnamed creek which is tributary to the Grand River. The development limits were set based on the most conservative limit of buffers from the staked driplines, wetlands and watercourse.

The proposed development will have storm, sanitary and water supply services. Quantity, quality and erosion control of major and minor system flows from the subject site will be provided by a stormwater management pond located at the south corner of the Study Area, which will ultimately discharge directly to the unnamed creek.

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4 SUPPORTING STUDIES

4.1 Stormwater Management Master Plan for Centre Wellington (Elora, Salem and Fergus)

In April 2024, WSP Canada Inc. completed a stormwater management master plan for Centre Wellington. The plan recommended that the Township update their stormwater management criteria to include a requirement to capture and retain runoff, as a minimum, from the first 5mm of runoff on-site.

4.2 Township of Centre Wellington Water and Wastewater Servicing Master Plan

In June 2025, R.V. Anderson Associates Limited (RVA) to complete a water and wastewater servicing master plan for the current Official Plan boundary (OPA126) of the Elora/Salem and Fergus settlement areas. The plan outlines the necessary water and wastewater improvements required by 2051 for the areas included in the Official Plan boundary as of 2024. The proposed development is referenced as FE5 in the report.

4.3 Environmental Impact Study

Envision Consultants Ltd. completed an Environmental Impact Study, dated April 2026 and updated June 2026, which identified significant woodland and wetland features within the subject site, and defined buffer and constraint lines for the proposed development. These features are discussed in Section 6.6.

4.4 Preliminary Geotechnical Investigation

A preliminary geotechnical investigation was conducted by Soil Engineers Ltd., and their findings are included in their report dated May 2026. Their report identifies the on-site soils and groundwater characteristics and provides recommendations for construction. The report is included in **Appendix A**.

4.5 Pre- and Post-Development Water Balance Assessment for the Proposed Residential Development

A preliminary water balance assessment was conducted by Soil Engineers Ltd., and their findings are included in their report dated June 2026. Their report provides a comparison of the existing conditions annual site water balance to the annual water balance which would result from the proposed development without mitigation. These findings are discussed in Section 7.6 and are enclosed in **Appendix E**.

5 MUNICIPAL SERVICES

5.1 Site Grading

5.1.1 Existing Site Conditions

As shown in **Figure 3** (back pocket), under existing conditions the majority of the Subject Site, which consists of agricultural land and the heritage house, generally falls southwesterly from First Line to the unnamed creek at elevations ranging from approximately 431.85 to 417.50. The site has an existing draw generally running from north to south that collects a large portion of the existing drainage. The eastern corner of the site at the intersection of Garafraxa and First Line is the highest point with drainage splitting to the west and southwest towards the draw and unnamed creek respectively. The environmental lands which are located west of the creek are also gently sloping towards the creek. The creek itself falls from approximately 420.85 to 415.88 from north to south.

5.1.2 Flood Lines

The Grand River Conservation Authority has not established any floodlines on the unnamed creek upstream (north) of the Garafraxa Street East culvert (2130mm x 1400mm diameter CSP as shown on Figure 3). For the purpose of establishing an outfall elevation for a proposed stormwater management pond to be constructed near the south corner of the site, the existing 100-year storm flood line elevation was determined in the vicinity of the proposed outfall. The methodology is described in Section 7.1.3.

5.1.3 Proposed Site Grading

The Subject Site will be graded such that the existing drainage patterns are maintained. The proposed street layout will be graded to slope toward proposed stormwater management pond located at the south corner of the site. Roads will be graded at 0.5% to 3.3% in accordance with Township of Centre Wellington design criteria. Existing grades will be matched at the property limits along Garafraxa Street East and First Line, as well as the northwest portion of the site. To convey drainage from the rear lots along the northwest of the site and the existing drainage from the headwall south of the trail, a swale has been graded at the rear of the lots to convey this drainage to the creek. To match existing elevations, 3:1 sloping will be required between the existing trail and the

swale, as well as along the environmental lands at the southwest of the site. This will be further investigated during detailed design.

All proposed grades are illustrated on the Site Grading Plan (Drawing SG, back pocket).

5.2 Storm Drainage

5.2.1 Existing Conditions

As shown on **Figure 3** (back pocket), under existing conditions the large agricultural portion of the Subject Site, which lies east of the unnamed creek, drains southwesterly from First Line to the creek. The environmental lands which are located west of the creek drain easterly toward the creek. A small portion of the agricultural lands, environmental lands and the creek lie north of the Elora Cataract Trailway. The portions of the creek which are upstream and downstream of the trailway are connected by a culvert. The creek drains southerly through the site to its only outlet, which is west of the south corner of the site. The creek continues to drain southerly to a 2130x1400 CSP arch culvert located on Garafraxa Street East, then through existing residential lands and ultimately outlets to the Grand River.

There is an external drainage area consisting of approximately 6.0ha of agricultural land on the northeast side of First Line. This drainage enters the Subject Site via an existing culvert located near the middle of its First Line frontage.

5.2.2 Proposed Storm Servicing

As shown on the Site Servicing Plan (Drawing SS, back pocket) and the Storm Drainage Plan (Drawing STM, back pocket), the site will be serviced with a major system consisting of municipal roads and a minor system consisting of municipal storm sewers. Both systems will drain southerly to the proposed stormwater management block, which has been identified at the south corner of the site and adjacent to the unnamed creek in keeping with existing drainage characteristics. The external agricultural drainage area, which is located on the northeast side of First Line, will continue to drain across First Line via the existing culvert located midway along the Subject Site's First Line frontage. The culvert drainage will be captured by the subdivision's storm sewer system through a DICB on First Line and connection to the Street H sewers.

Appropriate depth has been provided on the storm sewers to provide gravity connections to the residential dwellings. The storm sewers have been sized to convey the 5-year storm in accordance with Township of Centre Wellington design criteria. Storm runoff will be captured in the storm sewer system using street catchbasins; rear-yard catchbasins will be used for areas where rear lot drainage cannot be conveyed overland to adjacent roads.

The design of the storm sewer system will be based on design standards for a 5-year return frequency storm. Design flows are calculated using the Rational formula,

$Q = 0.002778 \times A \times I \times R$, Where,

Q is the peak runoff rate (m^3/s)

A is the contributing area in (ha);

I is the rainfall intensity (mm/hr); and

R is the run-off coefficient

Rainfall intensities are based on Township of Centre Wellington IDF curves and are expressed as follows:

$$I = \frac{A}{(t_c + B)^C}$$

where t_c is the time of concentration in minutes and the IDF parameters are outlined in **Table 1**.

Table 1: Centre Wellington IDF Parameters (2 Parameter Format)

Parameter	Return Period					
	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
A(hr)	25.39	32.79	37.71	43.85	48.46	52.97
B	-0.682	-0.686	-0.687	-0.690	-0.691	-0.691

The parameters provided by Centre Wellington were converted into a three-parameter format to be used in our storm design sheet, as shown in **Table 2**.

Table 2: Centre Wellington IDF Parameters (3 Parameter Format)

Parameter	Return Period					
	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
A(min)	414.345	543.943	628.126	739.425	820.514	896.876
B	0	0	0	0	0	0
C	0.682	0.686	0.687	0.690	0.691	0.691

Run-off coefficients in accordance with Township of Centre Wellington criteria will be utilized when detailed calculations have not been completed, and are shown in **Table 3**.

Table 3: Centre Wellington Standard Runoff Coefficients by Land Use

Land Use	Run-off Coefficient
Parks > 4ha	0.20
Parks < 4ha	0.25
Single Family Residential (Frontage >18m)	0.55
Single Family Residential (Frontage 12m-18m)	0.60
Single Family Residential (Frontage < 12m)	0.65
Semi-detached Residential	0.70
Townhouses	0.75
Apartments	0.75
Schools and Churches	0.75
Industrial and Commercial	0.90
Heavily Developed Areas	0.90
Paved Areas	0.90

Total storm flows to the stormwater management pond are indicated in the Storm Design Sheet, included in **Appendix B**.

5.3 Sanitary Drainage

5.3.1 Existing Conditions

There are no existing sanitary sewers within the subject site. There is an existing gravity sewer located on Garafraxa Street East approximately 15m northeast of the intersection of Tom Street, south of the site. This existing sewer extends south on Tom Street to the existing St. Andrew Street Pumping Station. As per the Township of Centre Wellington Water and Wastewater Servicing Master Plan prepared by RVA (dated June 30, 2025), there is currently available capacity for this development (referenced as FE-5 in the Master Plan Report).

5.3.2 Proposed Sanitary Servicing

As shown on the Site Servicing Plan (Drawing SS, back pocket) the site will be serviced with sanitary sewers which will generally follow the property gradient and flow from north to south. As shown in **Drawing SS** the sanitary sewer will require external works along Garafraxa Street East to provide a gravity connection. The sanitary sewers will be sized in accordance with Township of Centre Wellington design criteria:

- Minimum pipe size: 200mm diameter
- Minimum slope: 0.5%
- Minimum full-flow velocity: 0.8m/s
- Maximum full-flow velocity: 3.0m/s
- Average daily flow for new development: 350 L/person/day
- Peaking factor as per the Harmon Formula (Shall be between 2.0-4.0)
- Infiltration flow: 0.15 L/s/ha (12.96 m³/ha/day)

The proposed external works on Garafraxa Street East will consist of extending the existing sanitary sewer northeast of Tom Street, approximately 300m to the southern limit of the sites park block where a connection will be made. In order to connect to the existing sewer by gravity, the proposed sewer extension will be made under the existing 2130x1400 CSP arch culvert. Due to the limited separation between the CSP culvert and the proposed sewer, a 300mm diameter concrete sanitary sewer has been specified at a reduced slope of 0.4%.

Appropriate depth on local sewers has been provided to allow gravity connections to basements of residential dwellings.

The total population of the site at this time is not known, so PPU assumptions were made based on the maximum unit counts provided on the Draft Plan. The site consists only of single family and townhouse units, where it was assumed a density of 4.0 persons/unit and 3.5 persons/unit respectively. Assumptions have been made on local sewer sizing until lot lines are available. These numbers will be further refined through the detailed design process.

Total flow to the Garafraxa Street East connection is indicated in the Sanitary Design Sheet in **Appendix B**.

5.4 Water Supply

5.4.1 Existing Conditions

There is an existing 300mm diameter watermain on Garafraxa Street East that currently terminates approximately 70m southwest of the site. The existing watermain terminates on the north side of the 2130x1400 CSP arch culvert, so the crossing of the culvert has already been completed.

5.4.2 Proposed Water System

The watermain must be extended along Garafraxa Street East by approximately 400m to provide multiple connections to the subject lands. Connections will be made through the Street D cul-de-sac and the Street A intersection. The watermain will be looped through the development, with an additional connection required to the west across the rail trail. A cul-de-sac was constructed as part of the Centre Wellington Business Park where a 300mm diameter watermain plug was provided for future connection. The watermain will need to be extended approximately 160m northwest from the site to the rail trail and across to the existing plug. The preliminary watermain design is illustrated on the Site Servicing Plan (Drawing SS, back pocket).

6 STORMWATER MANAGEMENT STRATEGY

6.1 Stormwater Management Criteria

The stormwater management criteria for the subject site was determined as a combination of criteria established by the Ministry of the Environment, Conservation and Parks (MECP), the Grand River Conservation Authority, and the Township of Centre Wellington.

6.2 Quality Control

Enhanced fisheries protection, as per MECP guidelines, is to be provided for all development areas. The requirement is 80% total suspended solids (TSS) removal from stormwater effluent.

6.3 Erosion Control

As per Grand River Conservation Authority guidelines, stormwater management ponds are required to provide erosion control for the receiving watercourses. The applicable criterion requires extended detention of a minimum 24 hours of the erosion control event, which is a 25mm, 4-hour Chicago storm distribution.

6.4 Quantity Control

Post development peak flows are to be controlled to the level of existing conditions peak flows for the 2-year through 100-year storms. The Grand River Conservation Authority advised that either a 3 or 4-hour Chicago storm distribution and a 12-hour SCS storm distribution be analysed, with the more stringent distribution being applied to the proposed development. A, B and C values for the IDF curves in mm/hr were derived from the Township's IDF parameters for mm/min as described in Section 5.2.2.

6.4.1 Allowable Peak Flow Assessment

In accordance with the quantity control criteria, a Visual Otthymo model (VO6) was prepared for existing conditions to determine the allowable peak flows for the outlet from the development portion of the site. This peak flow assessment includes the agricultural drainage area located northeast of the site. For the 2-year through 100-year storms, 4-hour Chicago and 12-hour SCS distributions were used and compared. Allowable peak flows for the development portion of the site were determined by modeling the existing

conditions flows to the point where the proposed stormwater management pond outfall will be located (outlet of NASHYD 4 in the VO model). The tributary area includes existing agricultural land on the east side of First Line which will flow through the subject site's storm sewer system. The tributary area does not include any external areas which will bypass the proposed storm sewer system. The time of concentration was determined using the uplands method, and CN numbers are based on soil type and existing ground cover. Model parameters are included in **Appendix C**, and the resulting flows are summarized in **Table 4**.

Table 4 – Existing Conditions Peak Flows

Storm Event	Subject Site Peak Flows by Storm Distribution NASHYD 4 (m ³ /s)	
	4-Hour Chicago	12-Hour SCS
2-Year	0.418	0.402
5-Year	0.687	0.656
10-Year	0.890	0.848
25-Year	1.162	1.104
50-Year	1.381	1.304
100-Year	1.605	1.513

6.5 Overall Site Water Balance

The Grand River Conservation Authority requires that a water balance be calculated for the site to determine if remedial measures are required.

6.6 Wetland Feature Balance

Through the Official Plan Amendment review process, the Grand River Conservation Authority commented that the proposed development shall maintain the existing drainage characteristics for wetland and woodland features within the subject site. The EIS identified a significant woodland and wetland that together occupy approximately 8.8ha along the northwestern and southwestern limits of the subject site. This area is indicated on the proposed draft plan as environmental lands. The woodland and wetland extend beyond the western limit of the subject site and are shown on **Figure 3** (back pocket). The Elora Cataract Trailway passes through the subject site and bisects the environmental lands. The unnamed creek flows southerly along the eastern limit of

the environmental lands, largely isolating them from the development portion of the subject site. Drainage from the development area of the site is intercepted by the creek. The wetland and woodland mainly receive surface drainage from the existing commercial and industrial lands that surround their western extremities. Groundwater springs found within the wetland limits also feed the wetland. There is no anticipated impact to the existing drainage catchment for the woodland and wetland as a result of the proposed development, and therefore, no additional mitigation measures are required.

7 PROPOSED STORMWATER MANAGEMENT STRATEGY

7.1 Overall Stormwater Management Strategy

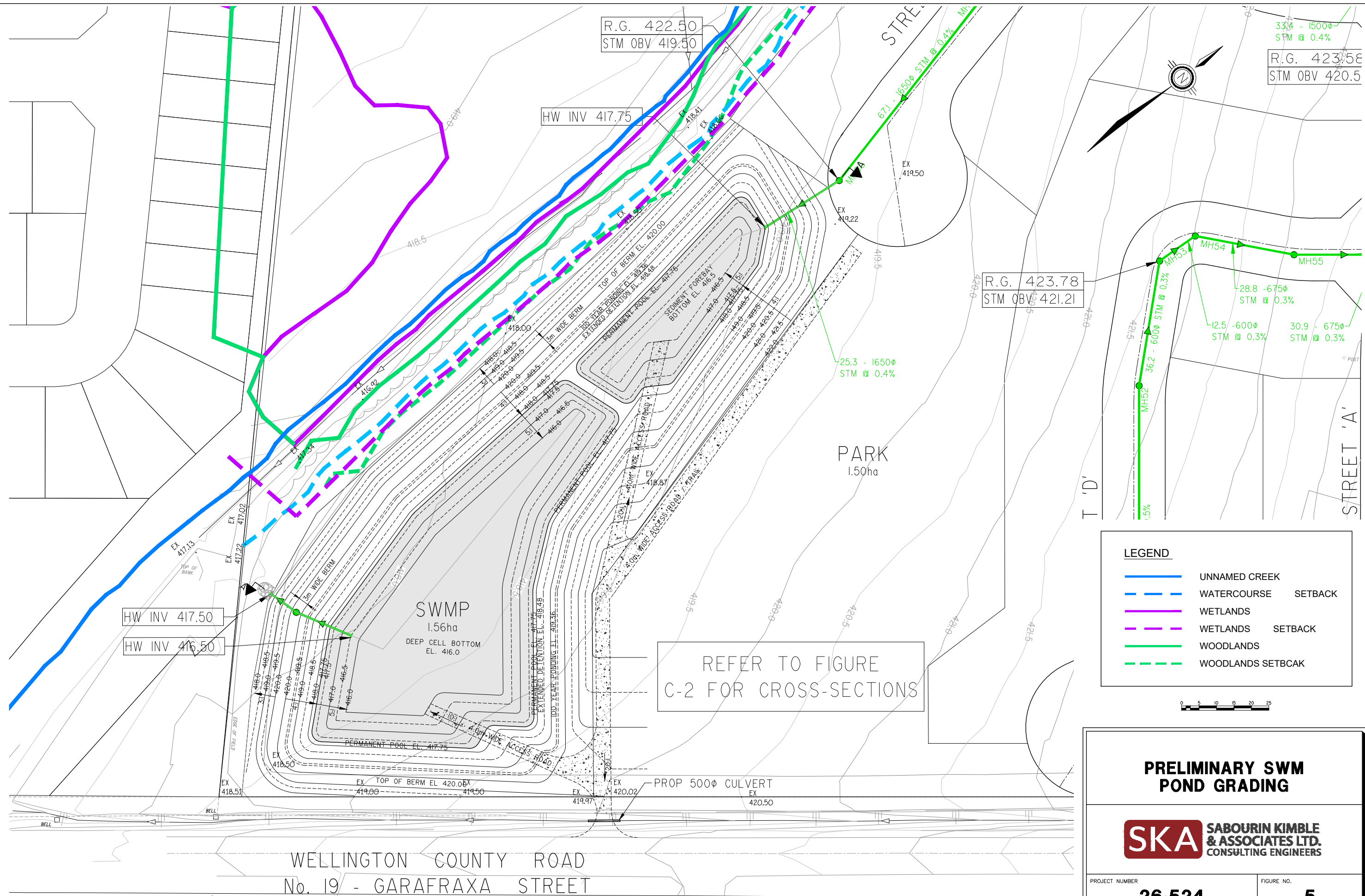
The stormwater management strategy as shown on **Figure 4** (back pocket) is as follows:

- A wet pond will be located in the south corner of the Subject Site. 29.2ha of the proposed development will drain to the pond. 1.1ha of back yard and rear roofs along the western periphery of the development will discharge uncontrolled to the unnamed creek.
- 6.1ha of external agricultural drainage from the northeast side of First Line will be collected by developments storm drainage system and conveyed to the pond.
- External drainage from commercial/industrial and agricultural areas northwest of the site will be captured by an interceptor swale and directed around the proposed development area to the unnamed creek. This drainage will not be captured by the development's internal storm drainage system.
- External drainage from woodland/wetland areas, commercial/industrial and residential areas west of the unnamed creek will continue to drain to the creek and will not be part of the development's storm drainage system.
- The pond will discharge westerly towards the unnamed creek that passes through the site. The outfall will be located above the 100-year storm flood line of the creek.
- A hierarchy of Low Impact Development (LID) measures will be considered to address the on-site annual water balance. Measures will be chosen as the design of the proposed subdivision advances, and will be selected through consultation with the hydrogeological consultant.

7.1.1 Stormwater Management Facility Details

The discharge and storage volume requirements outlined in Sections 7.2 to 7.4 have been used to prepare a preliminary design for the proposed pond. A preliminary stormwater management pond plan (**Figure 5**) and cross section (**Figure 6**) for the facility have been prepared based on the preliminary storm sewer inverts and existing elevations. The pond has been designed as a wet pond with a sediment forebay, permanent pool, erosion control storage, and quantity control storage. Per MECP, Grand River Conservation and Centre Wellington design criteria, the sloping above the permanent pool has been graded at 4:1 with 5:1 sloping below the permanent pool.

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PRELIMINARY SWM POND GRADING

SKA SABOURIN KIMBLE & ASSOCIATES LTD. CONSULTING ENGINEERS

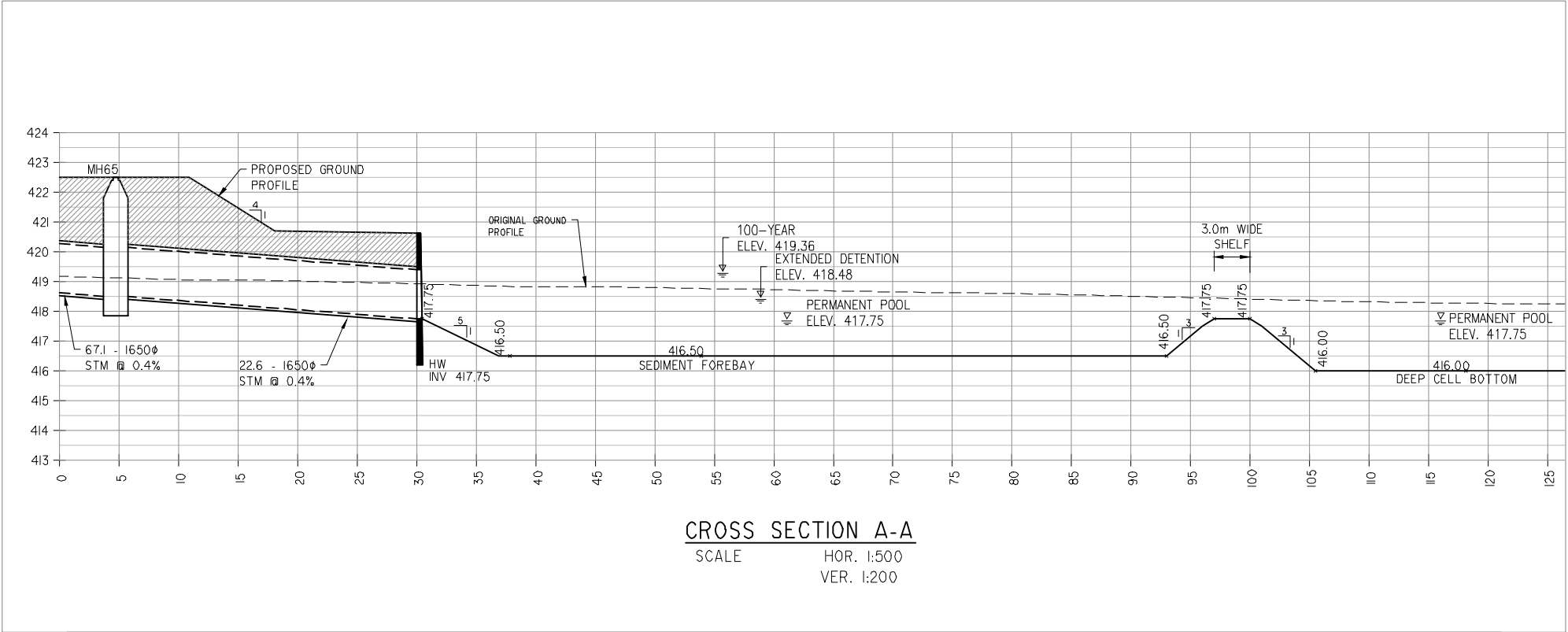
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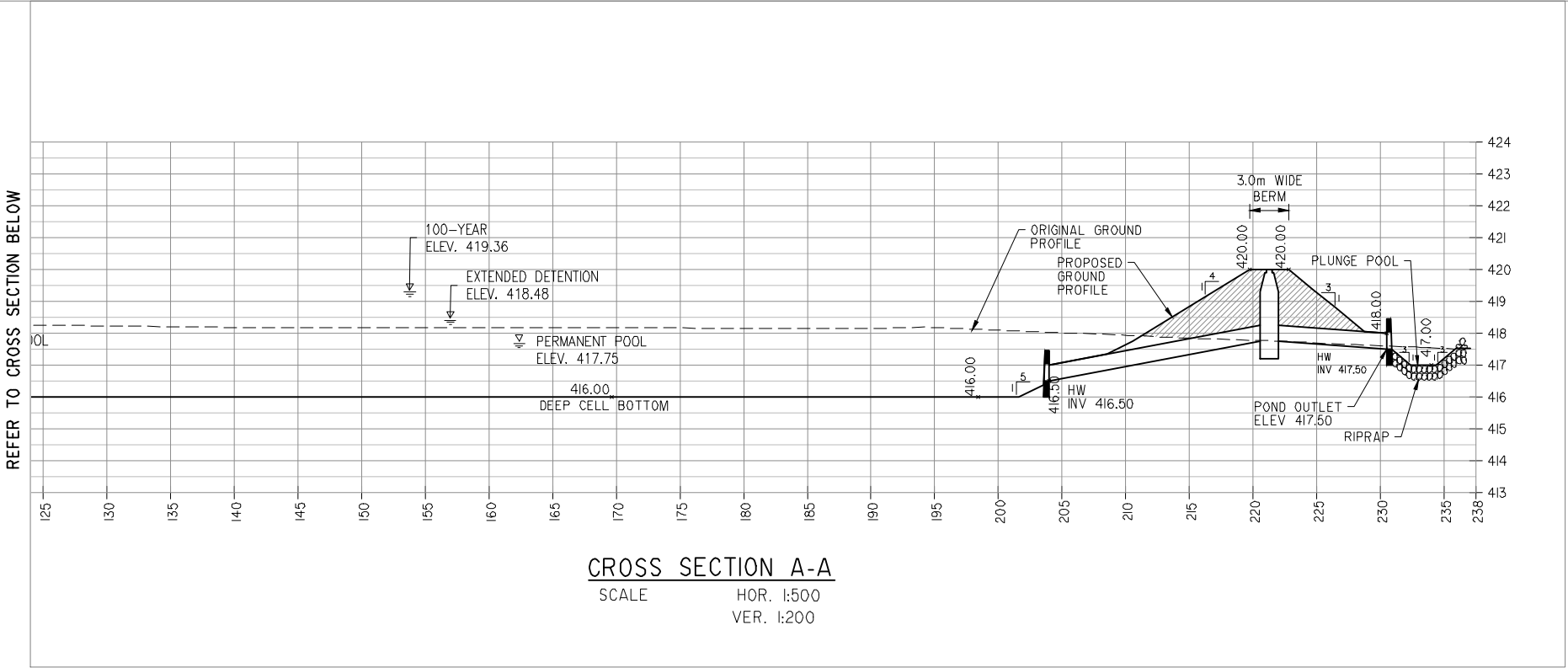
FIGURE NO.

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REFER TO CROSS SECTION BELOW



PRELIMINARY SWM POND SECTIONS



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FIGURE NO.
6

At detailed design, the pond grading and control structure design will be re-examined and detailed to a level appropriate for construction.

7.1.2 Stormwater Management Planting Strategies

In order to ensure proper operation and performance of the stormwater management facility, a comprehensive planting strategy must be prepared as part of the detailed design. The strategy should include submergent and emergent vegetation in the permanent pool areas, vegetation which is tolerant to the frequent wet/dry cycle of the extended detention zone, and vegetation that tolerates less frequent inundation for the flood fringe and upland areas. In all cases the vegetation must be native to the area and form a seamless extension of the surrounding features.

7.1.3 Stormwater Management Facility Outfall

The pond will outlet to the unnamed creek, on the east side of the creek at the south corner of the Subject Site, via a control structure and headwall. The outlet will have sufficient capacity to convey the controlled 100-year flow from the pond and sufficient erosion protection at the outfall.

Under the emergency scenario, the pond will discharge towards the unnamed creek via an emergency overflow weir located at the western limit of the pond block. The emergency overflow weir will be sized to pass the greater of the uncontrolled 100-year storm flow or the Regional storm flow. The configuration of the weir will be specified at detailed design.

The pond outfall will be located above the 100-year flood elevation of the unnamed creek. The Grand River Conservation Authority does not have storm flows or a hydraulic model of the creek, therefore SKA prepared an analysis to estimate the 100-year storm elevation at the proposed location of the outfall adjacent to the creek. A VO hydrology model was prepared for the tributary area upstream of the outfall location to determine the existing conditions 100-year flows to this point for both a 4-hour Chicago and a 12-hour SCS distribution. The SCS 100-year flow was found to be the higher of the two flows (7.53 m³/s) and was used for further analysis. Three cross sections of the creek were plotted in the vicinity of the proposed outfall location and are included in **Appendix C**. The average longitudinal and side slopes were calculated, and a Manning's V-

shaped channel calculator was used to determine the resulting flow depth. The 100-year flood line was estimated to be 417.47m and the headwall elevation will be set at 417.60m. Calculations are enclosed in **Appendix C**.

7.2 Quality Control

The SWM pond will be constructed as a wet pond with sufficient permanent pool volume to satisfy the MOE enhanced level of protection (80% TSS removal) to provide appropriate quality control for the subject site. The resulting permanent pool requirement is summarized in **Table 5**. Preliminary calculations can be found in **Appendix C**.

Table 5 – SWM Pond Water Quality Volume

Urban Drainage Area (ha)	Percent Impervious	Unit Volume (m ³ /ha)	Permanent Pool		
			Required Volume (m ³)	Provided Volume (m ³)	Elevation (m)
29.18	61	164	4,775	6,948	417.75

7.3 Erosion Control

In order to satisfy the erosion control criteria, the facility will provide 24 hour extended detention of the runoff generated by a 25mm storm event. The extended detention volume was calculated utilizing runoff volumes from a 25mm 4-hour Chicago storm using the VO6 hydrologic model for the contributing drainage areas. The erosion control volume is summarized in **Table 6**, and preliminary calculations can be found in **Appendix C**.

Table 6 – SWM Pond Erosion Control Parameters

Extended Detention Volume (m ³)	Extended Detention Water Surface Elevation (m)	Orifice Diameter (mm)	Drawdown Time (hours)	Target Peak Flow Rate (m ³ /s)
4,472	418.48	244	24	0.110

7.4 Quantity Control

The reservoir routing capabilities of the VO6 hydrologic model were utilized to determine the water quantity storage volumes for the facilities. The target peak discharges were determined for the pond outlet utilizing the existing conditions peak flows from the area tributary to the proposed pond outlet as identified in Section 6.4.1. As discussed previously, two storm distributions were used for the 2-year through 100-year storms; a

4-hour Chicago storm and a 12-hour SCS storm. The proposed conditions VO model was created to demonstrate that the sums of the flows from controlled areas and uncontrolled areas (ADDHYD 16) of the proposed conditions model are less than the existing conditions flows to the same pond outlet point. As shown in **Figure 4**, and **Appendix C**, runoff coefficients for each proposed land use and unit type were calculated from the builder's proposed house models, and a composite coefficient was calculated for uncontrolled and pond tributary areas. The tributary agricultural area located west of First Line is also routed through the pond. Any external areas which drain to the channel without passing through the development portion of the site are not included in this flow comparison as they remain unchanged by the proposed development. Proposed conditions flows are compared to existing conditions flow in **Table 7**.

Table 7 – Site Quantity Control Release Rate Targets

Storm Event	4-Hour Chicago Storm			12-Hour SCS Storm		
	Target Flow (m ³ /s)	Proposed Flow (m ³ /s)	Difference (m ³ /s)	Target Flow (m ³ /s)	Proposed Flow (m ³ /s)	Difference (m ³ /s)
2-year	0.418	0.413	-0.006	0.402	0.395	-0.007
5-year	0.687	0.680	-0.007	0.656	0.648	-0.008
10-year	0.890	0.882	-0.008	0.848	0.838	-0.010
25-year	1.162	1.153	-0.009	1.104	1.088	-0.016
50-year	1.381	1.368	-0.013	1.304	1.292	-0.012
100-year	1.605	1.587	-0.018	1.513	1.494	-0.019

Required storage volumes were determined for each storm return period using each of the two storm distributions. As shown in **Table 8**, the more stringent storage volumes were generated by the 4-hour Chicago distribution, therefore, the results of the Chicago storms were used for the preliminary pond design. Catchment summaries, a model schematic, and the hydrologic modelling outputs can be found in **Appendix D**.

Table 8 – Proposed Quantity Control Characteristics

Storm Event	4-Hour Chicago Storm		12-Hour SCS Storm		Chicago Storm Ponding Elevation (m)
	Pond Discharge (m ³ /s)	Pond Storage (m ³)	Pond Discharge (m ³ /s)	Pond Storage (m ³)	
2-year	0.400	6,221	0.383	6,159	418.64
5-year	0.659	7,733	0.628	6,938	418.83
10-year	0.856	8,831	0.814	7,894	418.97
25-year	1.120	10,205	1.057	10,108	419.12
50-year	1.329	11,276	1.255	11,150	419.24
100-year	1.542	12,350	1.450	12,171	419.36

As shown in the above tables, the proposed stormwater management pond will provide adequate overcontrol to ensure that the proposed flows from controlled and uncontrolled areas will be less than existing conditions flows for all storms.

7.5 Overall Water Balance Low Impact Development Measures (LIDs)

Based on the existing site conditions and the composition of the proposed development, Soil Engineers Ltd. prepared a comparison of the existing conditions water balance for the site and proposed conditions without remediation. As shown in **Appendix E**, the proposed development is expected to reduce annual on-site infiltration by 46%. The infiltration deficit may be reduced by implementing LIDs, however infiltration-based LIDs may be constrained to certain areas of the subject site due to a shallow groundwater table. Furthermore, the hydraulic conductivity of the on-site soils is currently not known pending further study. Therefore, a variety of LIDs will be evaluated as the subdivision design progresses and more hydrogeological parameters become known. LID options are discussed in further detail in Section 8.

7.6 Wetland Feature Water Balance

As discussed in Section 6.6, under existing conditions, the woodland and wetland features located within the environmental lands are mostly fed by runoff from the existing commercial and industrial lands, and by groundwater springs located within the wetland. The EIS further stated that water balance for the wetland feature would be best maintained through an overall LID strategy for the proposed subdivision. As discussed in Section 8.0, specific LID measures will be identified during the design process as more hydrogeologic information is gathered about the subject site. At a minimum, the residential lots that back onto the wetland and the unnamed creek will be graded such that clean drainage from the backs of the lots and roofs will sheet drain to the creek in a diffuse manner.

8 LOW IMPACT DEVELOPMENT MEASURES

LID measures are required to maintain overall ground water balance and surface water runoff reductions in the developed areas. Additionally, the Stormwater Management Master Plan for Centre Wellington recommended that development provides collection and retention on-site of the runoff from the first 5mm of rainfall per event. An LID strategy will be developed as the design of the subdivision progresses and more hydrogeological information for the site becomes available. The strategy will consider the following options and recommend measures which are beneficial for the site.

8.1 Alternative LID Works

8.1.1 Rear Yard Infiltration Galleries

These facilities are intended to service individual roof areas and will be constructed in the rear yard of residential lots. The gallery will consist of clear stone with sufficient void space to store at 5mm of runoff from the roof. They will be designed to drain down within a 24 to 48-hour period. The gallery will receive drainage from the roofs via direct connection of roof downspouts to the gallery. An overflow pipe discharging to the surface will be provided in the event that the infiltration gallery becomes full or clogged.

8.1.2 Rear Yard Surface Enhanced Grass Swales

Enhanced grass swales with infiltration galleries proposed within the subject site will intercept and harvest rear yard and rooftop runoff from split draining and walkout lots. As an enhanced grass swale conveys the surface flows, the runoff will have an opportunity to infiltrate through the topsoil and collect in the granulars, which have been sized to drain down within 48 hours. If the gallery becomes saturated and surface runoff is unable to infiltrate, the flows will spill into rear lot catch basins located at the low points and be conveyed to the storm sewer system.

8.1.3 Rain Barrels

These facilities are intended to service individual roof areas and will be constructed along the rear lot line of any given residential lot. The rain barrel can be used at the roof leader header and intercept roof drainage prior to draining to the storm sewer and used for re-use.

8.1.4 Extra Depth Topsoil

This LID involves the placement of engineered extra depth topsoil at a depth of 250mm within boulevards and 250mm or more within residential lots. The topsoil must consist of a combination of sand or other approved additives and topsoil with sufficient organic composition to promote growth. The intent of this LID is to provide a porous growing medium that will store storm runoff for an extended period and make it available for plant uptake or infiltration into shallow ground water.

8.2 LID Hierarchy

In order to establish a hierarchy for consideration of use for the LIDs outlined previously, a qualitative, performance matrix was developed as shown in **Table 9**.

Table 9 - LID Performance Matrix

Performance Factor (1 is poor 5 is ideal)	PROPOSED LID METHOD				
	Enhanced Grass Swales in Open Space	Rear Yard Enhanced Grass Swales	Rear Yard infiltration Galleries	Extra Depth Topsoil on Residential Lot	Rain Barrels
Municipal Access Available	4	1	1	1	1
Satisfies Design Criteria	4	4	4	3	1
Ease of Maintenance	4	3	1	1	1
Operational Lifespan	3	3	3	3	3
Ease of Replacement	4	1	1	2	3
Contributes to Environmental Enhancement	4	4	2	2	2
Interpretive or Educational Benefit	4	4	1	1	2
TOTAL	27	20	13	13	13

Based on the performance matrix shown in **Table 9**, the following hierarchy of LID methods was assumed.

1. Bioswales in Open Space (environmental land buffers)
2. Rear Yard Surface Bioswales
3. Rear Yard Infiltration Galleries
4. Extra Depth Topsoil
5. Rain Barrels

Specific LIDs or a combination of LIDs will be proposed as more hydrogeological information about the subject site becomes available.

8.3 Operations and Maintenance for LIDs

The LID measures to be considered are generally low maintenance. Once the proposed LIDs are refined during detailed design, an Operations and Maintenance Manual can be provided. It would be appropriate to make the provision of an Operations and Maintenance Manual a condition of Draft Plan Approval.

9 EROSION AND SEDIMENTATION CONTROLS

During construction of any portion of the subject lands, adequate erosion and sedimentation controls must be implemented to safeguard them against potential impacts. The removal of vegetation, grading and soil compaction should be minimized and limited to only those areas that require alteration to existing grades. In support of the detailed design for any development proposal, a comprehensive construction erosion and sedimentation control plan should be prepared. This plan should detail the works proposed to control erosion on-site and sediment transport from the site to match or exceed current Municipal and Provincial standards, as well as the Grand River Conservation Authority's site-specific guidelines. Works such as sediment control fencing, controlled stripping/earthworks practices, undisturbed buffers, filter strips, catchbasin silt sacks and catchbasin/storm sewer sediment traps should be implemented where possible and feasible.

Sedimentation control practices will be implemented for all construction activities within the Study Area, including tree removal, topsoil stripping, underground sewer construction, road construction and house construction. Sedimentation control measures are to be installed and operational prior to any construction activity and are to remain in place until such time as the residential dwellings are constructed and the lot grading complete with established sod.

10 CONCLUSIONS

Based on the findings of this Functional Servicing Study and Stormwater Management Report, the following conclusions are reached:

- The subject lands will be developed as residential land
- The site will be graded for residential uses with a “cut and fill” approach satisfying current Township of Centre Wellington criteria.
- The site will be serviced by a storm sewer system that outlets to a proposed stormwater management pond located at the south corner of the site.
- The site will be serviced by a sanitary sewer system that outlets to an existing plug provided on Garafraxa Street East, approximately 15m northeast of Tom Street. Work will be required on Garafraxa Street East to extend the sewer to the limit site.
- The site will be serviced with local watermain connecting to an existing plug provided on Garafraxa Street East. Work will be required on Garafraxa Street East to extend the watermain approximately 400m northeast to provide multiple connections to the site. The watermain will be looped internally and extended through the walkway block to the watermain stub provided with the Centre Wellington Business Park west of the site.
- The stormwater management pond will provide and meet the Township of Centre Wellington and Grand River Conservation’s design guidelines for water quality, water quantity and erosion controls for the subject area.
- Measures for retention of runoff from the first 5mm of runoff will be examined as further hydrogeological information concerning the on-site soils becomes known.
- During each phase of construction, adequate ESC controls must be provided in accordance with the Grand River Conservation Authority’s site-specific guidelines.

APPENDIX A

GEOTECHNICAL INVESTIGATION



Soil Engineers Ltd.

CONSULTING ENGINEERS

GEOTECHNICAL • ENVIRONMENTAL • HYDROGEOLOGICAL • BUILDING SCIENCE

90 WEST BEAVER CREEK ROAD, SUITE 100, RICHMOND HILL, ONTARIO L4B 1E7 · TEL: (416) 754-8515 · FAX: (905) 881-8335

BARRIE
TEL: (705) 721-7863
FAX: (705) 721-7864

MISSISSAUGA
TEL: (905) 542-7605
FAX: (905) 542-2769

OSHAWA
TEL: (905) 440-2040
FAX: (905) 725-1315

NEWMARKET
TEL: (905) 853-0647
FAX: (905) 881-8335

MUSKOKA
TEL: (705) 721-7863
FAX: (705) 721-7864

HAMILTON
TEL: (905) 777-7956
FAX: (905) 542-2769

A REPORT TO RBS & EJS FERGUS G.P. INC.

A GEOTECHNICAL INVESTIGATION FOR PROPOSED RESIDENTIAL DEVELOPMENT

**6410 FIRST LINE AND 8076 WELLINGTON ROAD 19
TOWNSHIP OF CENTRE WELLINGTON (FERGUS)**

REFERENCE NO. 2603-S021

MAY 2026

DISTRIBUTION

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1.0 **INTRODUCTION**

In accordance with written authorization dated March 6, 2026, from Ms. Catherine Pan, of RBS & EJS Fergus G.P. Inc., a geotechnical investigation was carried out at 6410 First Line and 8076 Wellington Road 19, and along a portion of Wellington Road 19 in the Township of Centre Wellington (Fergus).

The purpose of this investigation was to reveal the subsurface conditions and determine the engineering properties of the disclosed soils for the design and construction of a proposed residential development. The geotechnical findings and resulting recommendations are presented in this Report.

2.0 **SITE AND PROJECT DESCRIPTION**

The Township of Centre Wellington (Fergus) is situated on Guelph Drumlin Field; the area dominantly consists of stoney drift with sand and gravel terraces of meltwater spillways formed during the past glacial retreat. The overburden beds onto limestone bedrock of Guelph Formation at moderate depths.

The subject site, approximately 29.9 hectares in area, is located at the northwest corner of First Line and Wellington Road 19, in the Township of Centre Wellington (Fergus). At the time of investigation, majority of the site was farm land, with tree covers along the southwest limit of the property. A single-detached dwelling with associated garage is located midway along the south limit of the property. A review of the topographic survey of the site indicates that the site gradient generally descends towards the southwest direction.

Based on the Draft Proposed Land Use Plan prepared by Weston Consulting, dated January 23, 2026, the property will be subdivided into lots and blocks for residential uses. The development will be provided with municipal roadways and services, and with blocks reserved for park and a stormwater management facility.

3.0 **FIELD WORK**

The field work, consisting of ten (10) boreholes extending to depths between 6.2 and 8.0 m below the prevailing ground surface, was carried out on March 25, 26 and 27, 2026. Upon completion of the borehole drilling, a monitoring well was installed in nine (9) selected borehole locations to facilitate the hydrogeological assessment, of which the study will be presented under a separate cover. Details of the monitoring wells are shown on the corresponding Borehole Logs.



The boreholes were advanced at intervals to the sampling depths by a track-mounted machine equipped with solid stem augers and split spoon sampler for soil sampling. Standard Penetration Tests, using the procedures described on the enclosed “List of Abbreviations and Terms,” were performed at the sampling depths. The test results are recorded as the Standard Penetration Resistance (or ‘N’ values) of the subsoil. The compactness of the cohesionless strata and the consistency of the cohesive strata are inferred from the ‘N’ values. Split-spoon samples were recovered for soil classification and laboratory testing. The field work was supervised and the findings were recorded by a Geotechnical Technician.

The field work was supervised and the findings were recorded by a Geotechnical Technician. The ground elevation at each of the present borehole location was obtained using the Global Navigation Satellite System (GNSS). All boreholes and monitoring well locations are shown on the Borehole and Monitoring Well Location Plan, Drawing No. 1.

4.0 **SUBSURFACE CONDITIONS**

The investigation revealed that beneath a topsoil veneer, or beneath the pavement structure with a layer of earth fill along Wellington Road 19; the site is underlain by strata of sandy silt till, silt and sandy silt.

Detailed descriptions of the encountered subsurface conditions from the boreholes are presented on the Borehole Logs, comprising Figures 1 to 10, inclusive. The revealed stratigraphy is plotted on the Subsurface Profiles, Drawing No. 2. The engineering properties of the disclosed soils are discussed herein.

4.1 **Topsoil**

A layer of topsoil, approximately 15 to 30 cm in thickness, was contacted in all boreholes except Boreholes 9 and 10 located along Wellington Road 19. Thicker topsoil may be contacted in areas beyond the borehole locations, particularly in low-lying areas.

4.2 **Pavement Structure**

Boreholes 9 and 10 were carried out along Wellington Road 19, which consists of asphalt, approximately 50 mm to 180 mm thick, overlying granular fill, approximately 400 mm to 750 mm in thickness.



4.3 **Earth Fill**

Beneath the pavement structure on Wellington Road 19, a layer of earth fill was contacted in Boreholes 9 and 10, extending to depths of 1.4 m to 1.5 m below the existing ground surface. It consists of a mixture of sandy silt or gravelly sand with occasional organics inclusion. Deeper earth fill may exist beyond the borehole locations, especially in the vicinity of existing underground utilities.

One must be aware that the samples retrieved from the borehole may not be truly representative of the geotechnical quality of the earth fill. The extent of the fill and the quality of the fill can be assessed by laboratory testing and/or test pits if necessary.

4.4 **Sandy Silt Till**

The sandy silt till predominates the soil stratigraphy within the investigated depth of all boreholes except Boreholes 1, 2, 4 and 6, generally along First Line and Wellington Road 19. It consists of a random mixture of soil particle sizes ranging from clay to gravel with the silt and sand being the predominant fractions. Grain size analyses were performed on 2 representative samples of the sandy silt till; the results are plotted on Figure 11.

The recorded 'N' values range from 15 to over 100, with a median of 56 blows per 30 cm of penetration, indicating the sandy silt till is compact to very dense, being generally very dense in compactness. The natural water content values range from 8% to 16%, with a median of 10%, indicating that the sandy silt till is generally in moist to very moist, generally moist condition.

The engineering properties of the sandy silt till are given below:

- High frost susceptibility and high soil-adfreezing potential.
- Low water erodibility.
- In excavation, the sandy silt till will be relatively stable in steep cut and may slough under prolonged exposure as water seepage percolates from the sand or silt seams in the till.

4.5 **Silt**

The native silt deposit was contacted at various depths in Boreholes 1, 3, 4 and 5. It contains traces of sand and clay. Grain size analysis was performed on 3 representative samples of the silt; the results are plotted on Figure 12.



The recorded 'N' values range from 4 to 21, with a median of 12 blows per 30 cm of penetration, indicating the silt is very loose to compact, generally being compact in compactness. The surficial silt deposit is weathered, generally extending to a depth of 0.6 to 1.2 m below the prevailing ground surface.

The natural water content values of the silt deposit range from 16% to 28%, with a median of 20%, indicating that the silt is in a very moist to wet, generally wet condition.

The engineering properties of silt are listed below:

- High frost susceptibility, with high soil-adfreezing potential.
- High water erodibility; it is susceptible to migration through small openings, particularly under seepage pressure.
- The wet silt is susceptible to impact disturbance, which will induce a build-up of pore pressure, resulting in soil dilation and a reduction in shear strength.
- In excavation, the silt will slowly slump, run with groundwater seepage, and boil under a piezometric head of 0.4 m.

4.6 **Sandy Silt**

The native sandy silt deposit was contacted at various depths in Boreholes 1 to 8, inclusive. The sandy silt contains a trace of clay. Grain size analysis was performed on 2 representative samples of the sandy silt; the results are plotted in Figure 13.

The recorded 'N' values range from 0 (i.e. weight of hammer) to 33, with a median of 15 blows per 30 cm of penetration, indicating the sand is very loose to dense, being generally compact in compactness. Low 'N' values of 0 and 2 blows observed in Borehole 2, was due to disturbance from the hydrostatic pressure.

The natural water content values range from 10% to 27%, with a median of 19%, indicating that the sandy silt is generally in a moist to wet, generally wet condition.

The engineering properties of the sandy silt are presented below:

- High frost susceptibility, with high soil-adfreezing potential.
- High water erodibility; its fine particles are susceptible to migration through small openings, particularly under seepage pressure.
- The strength of the wet silt is susceptible to impact disturbance, which will induce a build-up of pore pressure within the soil mantle, resulting in soil dilation and a reduction in shear strength.



- In excavation, the silt will slough readily, run with seepage and boil under a piezometric head of 0.3 m

4.7 **Compaction Characteristics of the Revealed Soils**

The obtainable degree of compaction is primarily dependent on the soil moisture and, to a lesser extent, on the type of compactor used and the effort applied. As a general guide, the typical water content values of the revealed soils for Standard Proctor compaction are presented in Table 1.

Table 1 - Estimated Water Content for Compaction

Soil Type	Determined Natural Water Content (%)	Water Content (%) for Standard Proctor Compaction	
		100% (optimum)	Range for 95% or +
Earth Fill	6 to 14 (median 10)	12	9 to 15
Sandy Silt Till	8 to 16 (median 10)	13	8 to 17
Silt	16 to 28 (median 20)	13	8 to 17
Sandy Silt	10 to 27 (median 19)	12	8 to 16

* The above values are provided as a guideline. Standard Proctor Tests must be performed on bulk samples collected from site during construction prior to backfill and compaction.

5.0 **GROUNDWATER CONDITION**

The boreholes were checked for the presence of groundwater on the completion of drilling. The groundwater levels observed on borehole completion are summarized in Table 2.

Table 2 - Groundwater Levels on Completion

Borehole No.	Ground Elevation (m)	Borehole Depth (m)	Monitoring Well Depth (m)	Groundwater Levels on Completion	
				Depth (m)	Elevation (m)
1	425.5	6.6	6.1	1.8	423.7
2	427.1	6.6	4.6	2.1	425.0
3	423.7	6.6	6.1	Dry on completion	
4	424.3	6.6	5.0	0.9	423.4
5	420.5	6.2	6.1	1.2	419.3
6	425.7	6.6	6.1	5.5	420.2
7	419.1	6.6	No Well	4.6	414.5

**Table 2 - Groundwater Levels on Completion (Cont'd)**

BH No.	Ground Elevation (m)	Borehole Depth (m)	Monitoring Well Depth (m)	Groundwater Levels on Completion	
				Depth (m)	Elevation (m)
8	419.3	8.0	7.6	7.3	412.0
9	422	7.9	7.6	Dry on completion	
10	419.7	7.7	7.6	Dry on completion	

The observed groundwater level in 7 of the 10 boreholes ranges from 0.9 to 7.3 m below the prevailing ground surface, or between El. 412.0 m and El. 425.0 m. The remaining 3 boreholes remained dry and open on completion of the boreholes. The groundwater level on the property is subject to seasonal fluctuations.

Groundwater level was recorded in the monitoring wells on 2 occasions and summarized in Table 3.

Table 3 - Groundwater Levels in Monitoring Wells

BH/MW No.	Ground El. (m)	Well Depth (m)	January 24, 2025		July 24, 2025	
			Depth (m)	El. (m)	Depth (m)	El. (m)
1	425.5	5.9	0.3	425.2	0.2	425.3
2	427.1	4.5	1.1	426.0	0.8	426.3
3	423.7	5.7	0.9	422.8	0.2	423.5
4	424.3	4.0	0.0	424.3	-0.1*	424.4
5	420.5	5.7	0.4	420.1	0.2	420.3
6	425.7	5.8	2.9	422.9	2.1	423.7
8	419.3	7.3	0.4	418.9	0.5	418.8
9	422.0	7.6	0.9	421.1	0.9	421.1
10	419.8	7.6	1.4	418.3	1.3	418.4

* Above ground level

The groundwater level measured in the monitoring wells ranges from 0.1 m above the ground surface to 2.9 m below the ground surface, or between El. 418.3 m and El. 426.3 m. Further groundwater monitoring data and the groundwater level interpretation will be presented in the hydrogeological assessment under separate cover.



6.0 **DISCUSSION AND RECOMMENDATIONS**

The investigation revealed that beneath a topsoil veneer within the farm land, or beneath the pavement structure with a layer of earth fill within the existing road; the site is underlain by strata of sandy silt till, silt and sandy silt.

The groundwater level was measured in the monitoring wells on 2 occasions. The recorded water level ranges from 0.1 m above the ground surface to 2.9 m below the ground surface, or between El. 418.3 m and El. 426.3 m.

A review of the Draft Proposed Land Use Plan indicates that the land will be subdivided into residential lots and blocks which will be provided with municipal services and roadways with blocks reserved for park and stormwater management facility. A new external service connection will also be completed along Wellington Road 19. The geotechnical findings which warrant special consideration are presented below:

1. The topsoil must be removed from the area of construction. It can be stockpiled and reused in landscaping areas only. Any surplus will have to be disposed off-site.
2. The cavity of any demolished structure must be properly backfilled with compacted inorganic soil prior to site grading. All debris must be removed off-site.
3. The existing earth fill and weathered soils, in their present state, are not suitable to support any structure sensitive to moment. It must be subexcavated, sorted free of organics and other deleterious material before reusing for structural backfill or engineered fill construction. If they cannot be sorted, they must be removed off site.
4. Where the site will be graded with additional fill, the earth fill can be constructed in an engineered manner for foundation, site services and pavement construction.
5. The proposed structures can be constructed on conventional spread and strip footings founded on the undisturbed native soils or on engineered fill.
6. A Class 'B' bedding, consisting of compacted 19-mm Crusher Run Limestone (CRL) or equivalent, is recommended for the construction of the underground services, where erodible soils or extensive dewatering is required, a Class 'A' concrete bedding can be considered.
7. Any excavation must be carried out in accordance with the O. Reg. 213/91.

The recommendations appropriate for the project described in Section 2.0 are presented herein. One must be aware that the subsurface conditions may vary between boreholes. Should this become apparent during construction, a geotechnical engineer must be consulted to determine whether the following recommendations require revision.



6.1 **Site Preparation**

Topsoil must be stripped for site development and can be used for landscaping purpose only. Any surplus must be removed off-site. Any existing structures must be demolished and the cavities should be properly backfilled with inorganic soil, compacted to engineered fill specifications.

Where additional fill is required for site grading, the earth fill should be constructed in an engineered manner for foundation support, pavement and underground services constructions. The engineering requirements for a certifiable fill are presented below:

1. After removal of topsoil and unsuitable material, the exposed soil subgrade must be inspected and proof-rolled prior to any fill placement. Any badly weathered or soft soils should also be subexcavated to competent ground. The excavated material must be sorted free of topsoil inclusions and deleterious materials, if any, aerated before reusing for engineered fill construction.
2. Inorganic soils must be used for engineered fill construction, and they must be uniformly compacted in 20 cm thick lifts to at least 98% Standard Proctor Maximum dry density (SPMDD) up to the proposed finished grade. The soil moisture must be properly controlled near the optimum. If the foundations are to be built soon after the fill placement, the densification process for the engineered fill must be increased to 100% SPMDD.
3. If the engineered fill is compacted with the moisture content on the wet side of the optimum, the underground services and pavement construction should not begin until the pore pressure within the fill mantle has completely dissipated. This must be further assessed at the time of the engineered fill construction.
4. If imported fill is to be used, it should be inorganic soils, free of deleterious or any material with environmental issue (contamination). Any potential imported earth fill from off site must be reviewed for geotechnical and environmental quality by the appropriate personnel as authorized by the developer or agency, before it is hauled to the site.
5. The engineered fill must not be placed during the period where freezing ambient temperatures occur either persistently or intermittently. This is to ensure that the fill is free of frozen soils, ice and snow.
6. The fill operation must be supervised and monitored on a full-time basis by a technician under the direction of a geotechnical engineer.
7. The engineered fill envelope and finished elevations must be clearly and accurately defined in the field, and they must be precisely documented.



8. The footing and underground services subgrade must be inspected by the geotechnical consulting firm that supervised the engineered fill placement. This is to ensure that the foundations are placed within the engineered fill envelope, and the integrity of the fill has not been compromised by interim construction, environmental degradation and/or disturbance by the footing excavation.
9. Any excavation carried out in certified engineered fill must be reported to the geotechnical consultant who supervised the fill placement in order to document the locations of the excavation and/or to supervise reinstatement of the excavated areas to engineered fill status. If construction on the engineered fill does not commence within a period of 2 years from the date of certification, the condition of the engineered fill must be assessed for re-certification.
10. Foundations founded on engineered fill must be reinforced and designed by a structural engineer to allow distribution of stress induced by the abrupt differential settlement in engineered fill.

6.2 **Foundations**

The property will be subdivided into lots and blocks for a residential development. With consideration of the groundwater level and saturated silt in areas, it is prudent that the basement of the residential dwellings must be found at least 1.0 m above the recorded groundwater level to allow conventional basement construction.

These structures with basement placed at least 1.0 m above the groundwater can be supported on conventional footings founded on engineered fill or sound native soils. The recommended soil bearing pressures for the design of footings are provided below:

- Maximum Soil Bearing Pressure, at Serviceability Limit State (SLS) = 75 to 150 kPa
- Factored Ultimate Bearing Pressure, at Ultimate Limit State (ULS) = 120 to 225 kPa

The total and differential settlements of the conventional spread and strip footings, designed for the bearing pressure at SLS, are estimated to be 25 mm and 20 mm, respectively.

It should be noted that the above values are provided for general guidance for the design of foundations for the residential dwellings. Additional review of the grading plan and underside of footings should be carried out at later stage for verification of design bearing pressure as necessary.

The footing subgrade must be inspected by a geotechnical engineer, or a geotechnical technician under the supervision of a geotechnical engineer, to assess its suitability for bearing the designed foundations.



Footings exposed to weathering, or in unheated areas, should have at least 1.4 m of earth cover for protection against frost action, or must be properly insulated.

The foundations should meet the requirements specified in the latest Ontario Building Code, and the structure should be designed to resist an earthquake force using Site Classification 'D' (stiff soil).

6.3 **Basement Structures**

The proposed basement should be at least 1.0 m above the stabilized groundwater level profile as established by the hydrogeologist on record.

The perimeter walls should be designed to sustain a lateral earth pressure calculated using the soil parameters stated in Table 6. Any applicable surcharge loads adjacent to the basement must also be considered in the wall design.

In conventional design of a basement, the foundation walls must be provided with perimeter subdrain at wall base, connected to a positive outlet. The subdrains should be encased in fabric filter and connected into a positive outlet. Details of the perimeter subdrains are illustrated on Drawing No. 3.

The basement floor subgrade should consist of sound native soils or engineered fill. The subgrade must be inspected prior to the placement of granular bedding. Any soft/weak subgrade encountered, it must be subexcavated and replaced with approved inorganic soils compacted to 98% SPMDD.

Where the basement is less than 1.0 m but remain at least 0.5 m above the stabilized groundwater level profile, an underfloor subdrain system should be provided beneath the basement slab, connected to a positive outlet. Details of underfloor subdrain system layouts are presented in Drawing No. 4.

6.4 **Underground Services**

The subgrade for the underground services should be founded on sound native soil or properly compacted inorganic earth fill. A Class 'B' bedding, consisting of 19-mm CRL or equivalent, is recommended for construction of the underground services. Where erodible wet silt subgrade is encountered or where extensive dewatering is required, a Class 'A' concrete bedding should be considered.



The pipe joints connecting into manholes and catch basins should be leak-proof or wrapped with an appropriate waterproof membrane to prevent the subgrade migration. Openings to subdrains and catch basins should be shielded with a fabric filter to prevent blockage by silting.

In order to prevent pipe floatation when the service trench is deluged with water, a soil cover with a thickness equal to the diameter of the pipe should be in place at all times after completion of the pipe installation.

All metal fittings for the underground services should be protected against soil corrosion. For estimation of anode weight requirements, the estimated electrical resistivity of the disclosed soils presented in Table 6 can be used. The proposed anode weight must meet the minimum requirement as specified by the Township standard.

6.5 **Backfilling in Trenches and Excavated Areas**

The backfill in service trenches should be compacted to at least 95% SPMDD in 20 cm layers, or the lift thickness should be determined by test strips. Below slab-on-grade and in the zone within 1.0 m below the pavement subgrade, the material should be compacted to at least 98% SPMDD with the water content at 2% to 3% drier than the optimum.

The in-situ native soils are generally suitable for 95% or + Standard Proctor compaction. Any wet soil will require aeration prior to compaction. Aeration can be achieved by spreading the wet soil thinly on the ground in the dry and warm weather. All soils must be sorted free of concentrated topsoil and organics inclusions, before aeration for reuse as structural backfill. The existing fill must be sorted free of topsoil inclusions and deleterious materials, if any, prior to its use as structural backfill.

When compacting the till on the dry side of the optimum, the compactive energy will frequently bridge over the chunks in the soil and be transmitted laterally into the soil mantle. Therefore, the lifts must be limited to 20 cm or less (before compaction). Boulders over 15 cm in size must be sorted and removed from the backfill.

In normal construction practice, the problem areas of settlement largely occur adjacent to manholes, catch basins, service crossings, foundation walls and columns. In areas which are inaccessible to a heavy compactor, sand backfill should be used for compaction with a smaller vibratory compactor.

One must be aware of the possible consequences during trench backfilling and exercise caution as described below:



- To backfill a deep trench, one must be aware that future settlement is to be expected, unless the sides are flattened to 2H:1V, and the lifts of the fill and its moisture content are stringently controlled; i.e., lifts should be no more than 20 cm (or less if the backfilling conditions dictate) and uniformly compacted to achieve at least 98% SPDD, with the moisture content on the wet side of the optimum. In confined areas where the desired slope cannot be achieved or the proper operation of a kneading-type roller cannot be facilitated, imported sand fill, which can be appropriately compacted by using a smaller vibratory compactor, must be used.
- It is often difficult to achieve uniform compaction of the backfill in the lower vertical section of a trench which is an open cut or is stabilized by a trench box, particularly in the sector close to the trench walls or the sides of the box. These sectors must be backfilled with sand and the compaction must be carried out diligently prior to the placement of the backfill above this sector, i.e., in the upper sloped trench section. This measure is necessary in order to prevent consolidation of inadvertent voids and loose backfill which will compromise the compaction of the backfill in the upper section.
- In areas where groundwater movement is expected in the pipe bedding or trench backfill mantle, anti-seepage collars (OPSS 802.095) should be provided.
- When construction is carried out in freezing weather, frozen soil layers may inadvertently be mixed with the structural trench backfill. Should the in situ soils have a water content on the dry side of the optimum, it would be impossible to wet the soils due to the freezing condition, rendering difficulties in obtaining uniform and proper compaction. Furthermore, the freezing condition will prevent wetting of the backfill or when it is required, such as when the trench box is removed. The above will invariably cause backfill settlement in the next few years.
- In areas where the underground services construction is carried out during winter months, prolonged exposure of the trench walls will result in frost heave within the soil mantle of the walls. This may result in some settlement as the frost recedes, and repair costs will be incurred prior to final surfacing of the new pavement.

6.6 **Pavement Design**

The recommended pavement design for local and collector residential roads is presented in Table 4.

**Table 4 - Pavement Design (Town Road)**

Course	Thickness (mm)	OPS Specifications
Asphalt Surface	40	HL3
Asphalt Binder Local Collector	50 60*	HL4
Granular Base	150	Granular 'A'
Granular Sub-base Local Collector	450 600	Granular 'B'

* If the road is designated as a transit route, the asphalt binder must be thickened to 100 mm.

In preparation of pavement subgrade, all topsoil and compressible material should be removed. The final subgrade must be proof-rolled. Any soft spot as identified must be rectified by subexcavation and replacing with selected dry inorganic material. The subgrade within 1.0 m below the underside of the granular sub-base must be compacted to at least 98% SPMDD, with the water content at 2% to 3% drier than its optimum.

All the granular bases should be compacted in 150 to 200 mm lifts to 100% SPMDD. The pavement subgrade will suffer a strength regression if water is allowed to saturate the mantle. The following measures should, therefore, be incorporated in the construction procedures and road design:

- The subgrade should be properly crowned and smooth-rolled to allow interim precipitation to be properly drained prior to pavement construction.
- Lot areas adjacent to the roads should be properly graded to prevent ponding of large amounts of water. Otherwise, the water will seep into the subgrade mantle and induce a regression of the subgrade strength, with costly consequences for the pavement construction.
- Fabric filter-encased curb subdrains connecting to a positive outlet of catch basin, will be required on both sides of the roadway.
- If the pavement is to be constructed during wet seasons and extensively soft subgrade occurs, the granular sub-base should be thickened in order to compensate for the inadequate strength of the subgrade. This can be assessed during construction.

Wellington Road 19

Following the completion of the services installing along Wellington Road 19, the road is expected to be restored. The pavement structure should match the existing pavement along



the roadway. Otherwise, if a new design is required, the recommended pavement design is presented in Table 5.

Table 5 - Pavement Design (County Road)

Course	Thickness (mm)	OPS Specifications
Asphalt Surface	50	HL1
Asphalt Binder	100	HL8 (2 lifts)
Granular Base	150	Granular 'A'
Granular Sub-base	450	Granular 'B'

At the transition between the existing pavement structure and the new structure, the surface and binder courses must overlap the existing pavement to avoid water penetration at the pavement joint. A 300 mm longitudinal step joint should be provided to ensure proper transition when paving the new lane along the road.

6.7 **Stormwater Management Facilities**

At the time of report preparation, detailed design of the SWM facilities were not available for review; however, it is understood that SWM facilities are proposed in the southeast portion of the property. A summary of the subsurface condition at each of the proposed SWM block are summarized in Table 6.

Table 6 - Summary of Subsurface Condition at SWM Block

Borehole No.	Revealed Soils	Highest Groundwater Levels	
		Depth (m)	El (m)
8	Sandy Silt and Sandy Silt Till	0.4	418.9

The estimated coefficient of permeability for revealed soils can be found in Table 6. Subject to the design of the SWM pond, where the bottom and sides of the pond consist of significant sand or silt deposit, an impervious liner (clay liner or a geosynthetic clay liner) will be required for water retention purposes. Detailed design for the SWM pond should be further reviewed once the design becomes available.

Where a clay liner is proposed, it should consist of inorganic material having at least 30% in clay content. The liner thickness must be reviewed based on the proposed pond bottom and the groundwater level in the area. Where the source of clay is not available, geosynthetic clay liner (GCL) should be used instead. A ballast should be placed on top of the GCL to



hold the GCL in place. The thickness of the ballast should match the thickness of the clay liner to withstand the uplift pressure.

The clay should be compacted to 98% SPMDD in lifts no more than 20 cm thick, while the ballast should be compacted in accordance with the GCL's manufacturer or supplier specifications. Where lighter material is to be used for liner construction, the thickness of the clay/ballast must be increased accordingly.

The side slopes of the SWM facility should be designed in accordance with the 2002 Stormwater Management Design Manual prepared by Ministry of Environment.

Where earth berm is proposed around the SWM facility, topsoil must be removed prior to construction. The subgrade must be proof-rolled before placement of earth fill for the berm. Selected on site material, free of organics, can be used for the berm compacted to 98% SPMDD in 20 cm layers.

All exposed side slopes must be vegetated and/or sodded to prevent surface erosion.

Where inlet, outlet and control structures are proposed, they should be designed according to the recommendations in Sections 6.2.

It is recommended that additional review must be performed once the design of the SWM facilities is available.

6.8 **Soil Parameters**

The recommended soil parameters for the project design are given in Table 7.

Table 7 - Soil Parameters

<u>Unit Weight and Bulk Factor</u>	Unit Weight γ (kN/m³)		Estimated Bulk Factor	
	Bulk	Submerged	Loose	Compacted
Earth Fill/Weathered Soils	20.5	10.5	1.25	1.00
Silty Silt Till	22.5	12.5	1.30	1.05
Sandy Silt	20.5	10.8	1.20	1.00
Silt	21.0	11.0	1.20	1.00

**Table 7 - Soil Parameters (Cont'd)**

<u>Lateral Earth Pressure Coefficients</u>	Active K_a	At Rest K_o	Passive K_p
Earth Fill	0.39	0.56	2.56
Sandy Silt Till	0.32	0.48	3.12
Sandy Silt/Silt	0.33	0.50	3.00
<u>Estimated Coefficient of Permeability (K) and Percolation Time (T)</u>	K (cm/sec)	T (min/cm)	
Sandy Silt Till	10^{-4} to 10^{-6}	12 to 50	
Sandy Silt	10^{-4}	12	
Silt	10^{-4} to 10^{-5}	12 to 20	
<u>Estimated Electrical Resistivity</u>	ohm·cm		
Sandy Silt Till	3500 ohm.cm		
Silt	5000 ohm.cm		
Sandy Silt	5500 ohm.cm		
<u>Coefficients of Friction</u>			
Between Concrete and Granular Base			0.50
Between Concrete and Sound Native Soils			0.35
<u>Maximum Allowable Soil Pressure (SLS) For Thrust Block Design</u>			
Engineered Fill and Sound Native Soils			75 kPa

6.9 **Excavation**

Excavation should be carried out in accordance with Ontario Regulation 213/91. The types of soils are classified in Table 8.

Table 8 - Classification of Soils for Excavation

Material	Type
Sandy Silt Till	2
Earth Fill, Weathered Soils, drained Silt and Sand	3
Saturated Silt and Sand	4

Excavation into the till containing boulders may require extra effort and the use of a heavy-duty excavator.



The groundwater yield from the sandy silt till may be small and limited and can be controlled by pumping from sumps. However, the yield from the silt and sand will likely be moderate to appreciable and persistent. Vigorous pumping from closely spaced sumps or, if necessary, the use of a well-point dewatering system, should be considered. Further the dewatering requirement will be presented in the hydrogeological assessment under separate cover.

External Servicing

It is understood that a sanitary sewer and watermain connection will be carried out along Wellington Road 19 from an existing connection at the watercourse crossing to the development.

If the services are to be cut close to existing underground services. One must be aware that the backfill for the existing services is amorphous in structure, and is susceptible to sloughing and sudden side collapse. Extreme caution must be exercised when excavating the existing backfilled services trenches; the sides of the cuts in the backfill will readily slough and may collapse suddenly.

Where safe sloped excavation is not feasible, or in areas where a vertical cut is necessary, the use of trench boxes will be required. The recommended lateral earth pressure distribution for the revealed soils is given in Diagrams 1 and 2:

Diagram 1 - Lateral Earth Pressure (Drained Earth Fill, Sandy Silt Till and Silts)

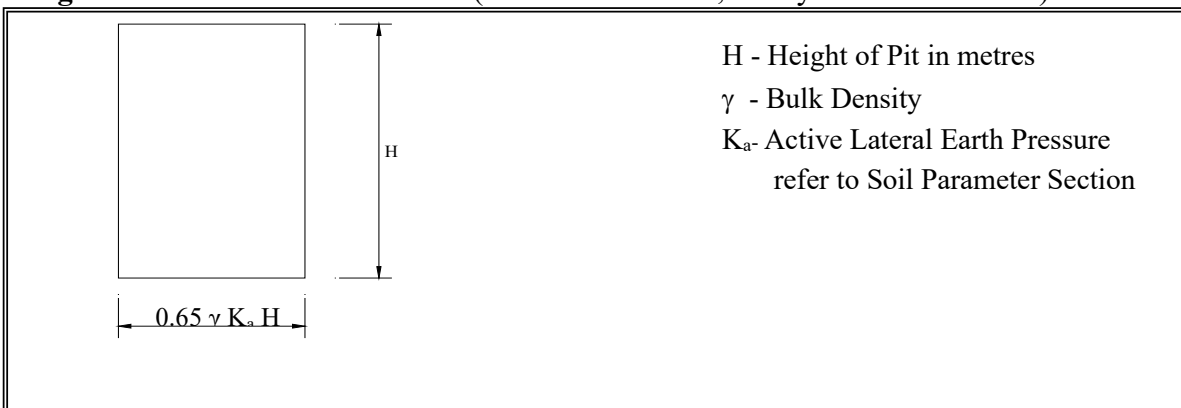
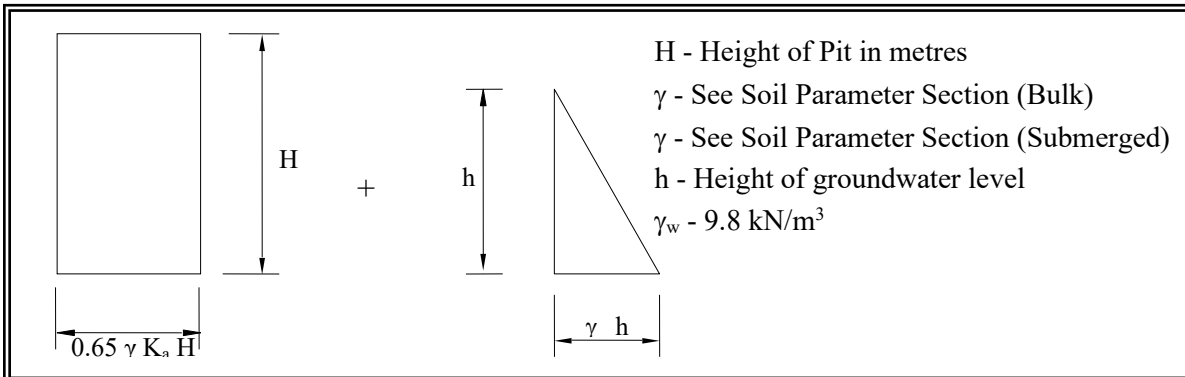


**Diagram 2 - Lateral Earth Pressure (Silts below groundwater)**

In calculating the lateral earth pressure for the shoring structure, the soil parameters are provided in the soil parameter table below. The soils above the trench box must be cut at 1.5 Horizontal (H):1 Vertical (V). The stability of adjacent structures and utilities should also be considered in the excavation.

In order to provide a stable subgrade for construction, the groundwater should be depressed to at least 1.0 m below the subgrade. The appropriate method of dewatering should be determined by a test pit program or test pumping to be carried out by a contractor prior to tendering and construction of the project when the intended bottom of excavation is determined. Additional recommendations will be presented in the hydrogeological assessment, to be presented under separate cover.

Prospective contractors must be asked to assess the in situ subsurface conditions for soil cuts by digging test pits to at least 1.0 m below the intended bottom of the excavation. These test pits should be allowed to remain open for a few hours to assess the stability and trenching conditions.

7.0 **LIMITATIONS OF REPORT**

This report was prepared by Soil Engineers Ltd. for the account of RBS & EJS Fergus G.P. Inc., and for review by its designated consultants and government agencies. Use of this report is subject to the conditions and limitations of the contractual agreement.



The material in the report reflects the judgement of Poh Fung Kwok, M.Sc. and Kelvin Hung, P.Eng., in light of the information available to it at the time of preparation. Any use which a Third Party makes of this report, or any reliance on decisions to be made based on it, is the responsibility of such Third Parties. Soil Engineers Ltd. accepts no responsibility for damages, if any, suffered by any Third Party as a result of decisions made or actions based on this report.

SOIL ENGINEERS LTD.


Poh Fung Kwok, M.Sc.


Kelvin Hung, P.Eng.
PFK/KH



LIST OF ABBREVIATIONS AND DESCRIPTION OF TERMS

The abbreviations and terms commonly employed on the borehole logs and figures, and in the text of the report, are as follows:

SAMPLE TYPES

AS	Auger sample
CS	Chunk sample
DO	Drive open (split spoon)
DS	Denison type sample
FS	Foil sample
RC	Rock core (with size and percentage recovery)
ST	Slotted tube
TO	Thin-walled, open
TP	Thin-walled, piston
WS	Wash sample

PENETRATION RESISTANCE

Standard Penetration Resistance or 'N' Value:

The number of blows of a 63.5 kg hammer falling from a height of 76 cm required to advance a 51 mm outer diameter drive open sampler 30 cm into undisturbed soil, after an initial penetration of 15 cm.

Plotted as '○'

Dynamic Cone Penetration Resistance:

A continuous profile showing the number of blows per each 30 cm of penetration of a 51 mm diameter, 90° point cone driven by a 63.5 kg hammer falling from a height of 76 cm.

Plotted as '—●—'

WH	Sampler advanced by static weight
PH	Sampler advanced by hydraulic pressure
PM	Sampler advanced by manual pressure
NP	No penetration

SOIL DESCRIPTION

Cohesionless Soils:

<u>'N' (blows/30 cm)</u>	<u>Compactness</u>
0 to 4	very loose
4 to 10	loose
10 to 30	compact
30 to 50	dense
> 50	very dense

Cohesive Soils:

<u>Undrained Shear Strength (kPa)</u>	<u>'N' (blows/30 cm)</u>	<u>Consistency</u>
<12	<2	very soft
12 to <25	2 to <4	soft
25 to <50	4 to <8	firm
50 to <100	8 to <15	stiff
100 to 200	15 to 30	very stiff
>200	>30	hard

Method of Determination of Undrained Shear Strength of Cohesive Soils:

x 0.0 Field vane test in borehole; the number denotes the sensitivity to remoulding

△ Laboratory vane test

METRIC CONVERSION FACTORS

1 ft	= 0.3048 m
1 inch	= 25.4 mm
1 lb	= 0.454 kg
1 ksf	= 47.88 kPa

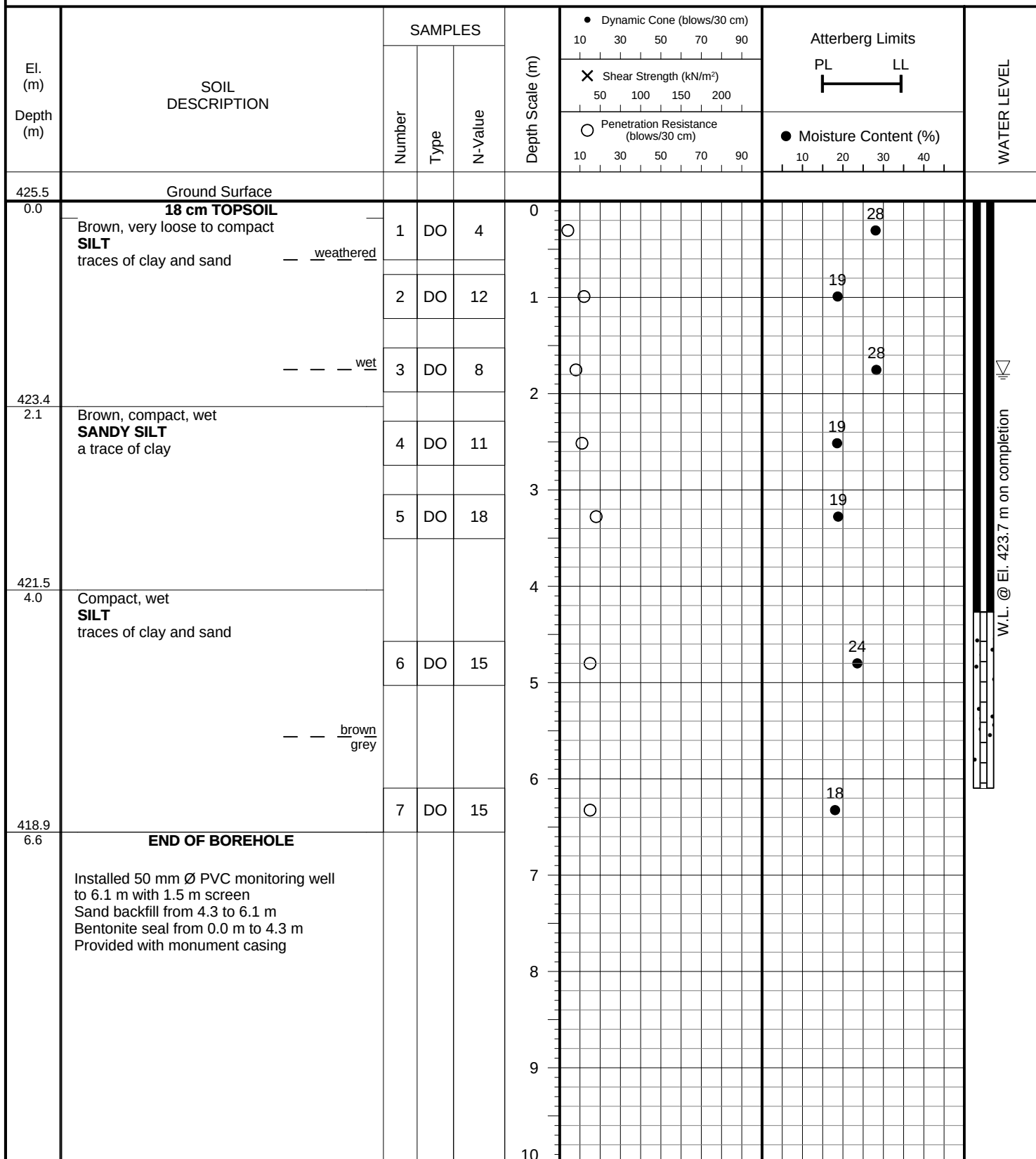


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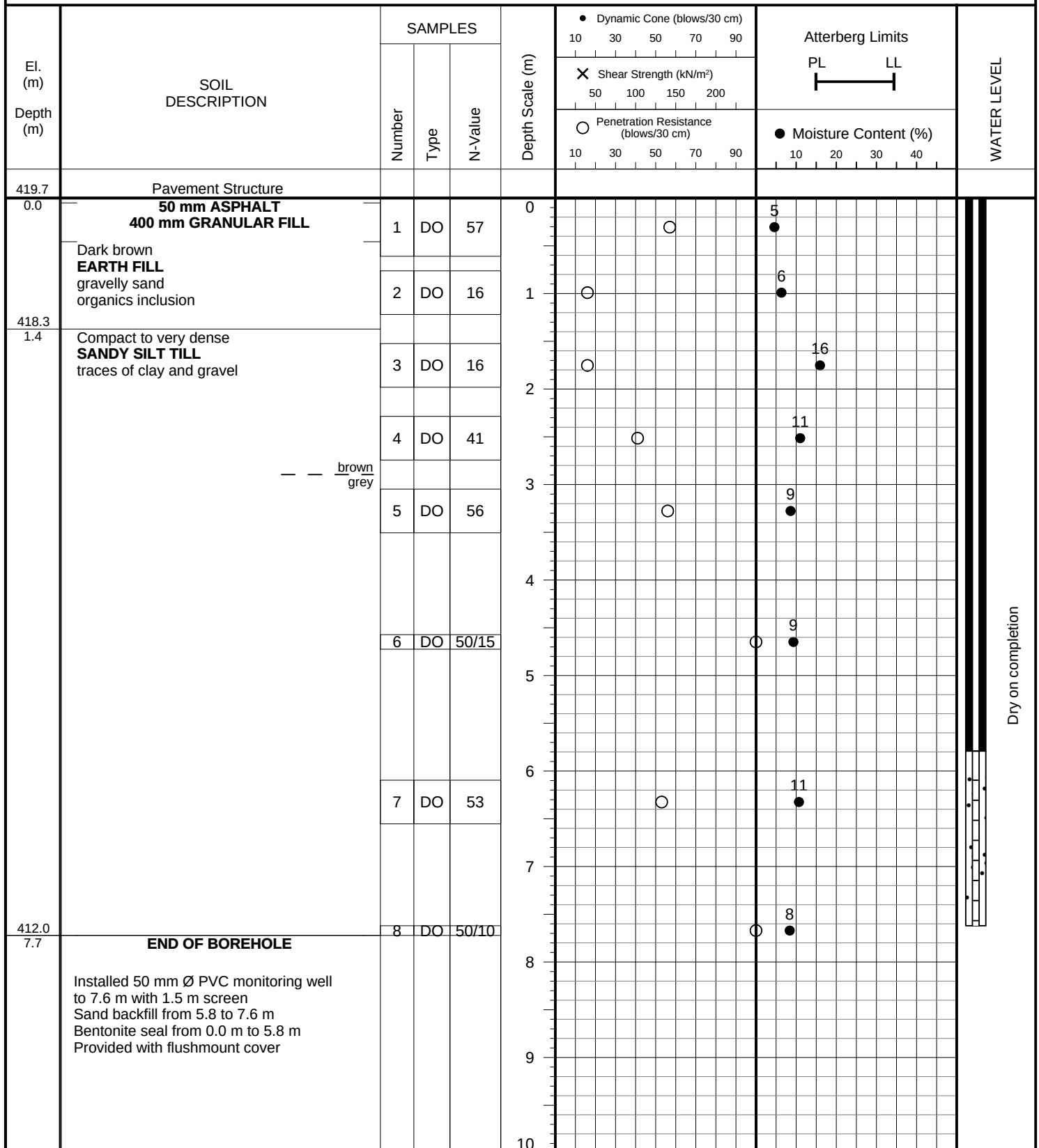
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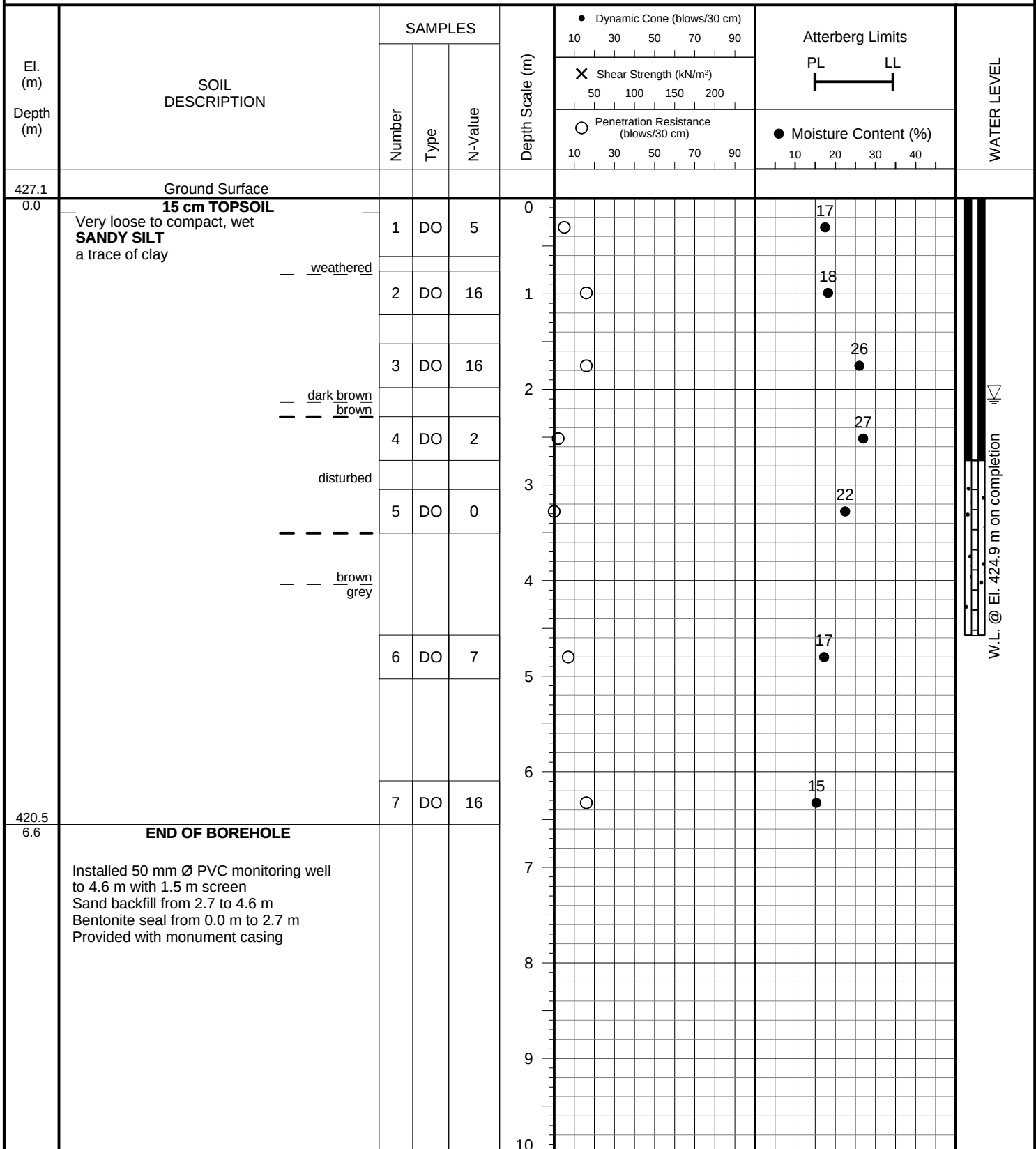
JOB NO.: 2603-S021

LOG OF BOREHOLE:**1****FIGURE NO.: 1****PROJECT DESCRIPTION:** Proposed Residential Development**METHOD OF BORING:** Solid Stem Augers**PROJECT LOCATION:** 6410 First Line and 8076 Wellington Road 19
Township of Centre Wellington (Fergus)**DRILLING DATE:** March 26, 2026**Soil Engineers Ltd.**

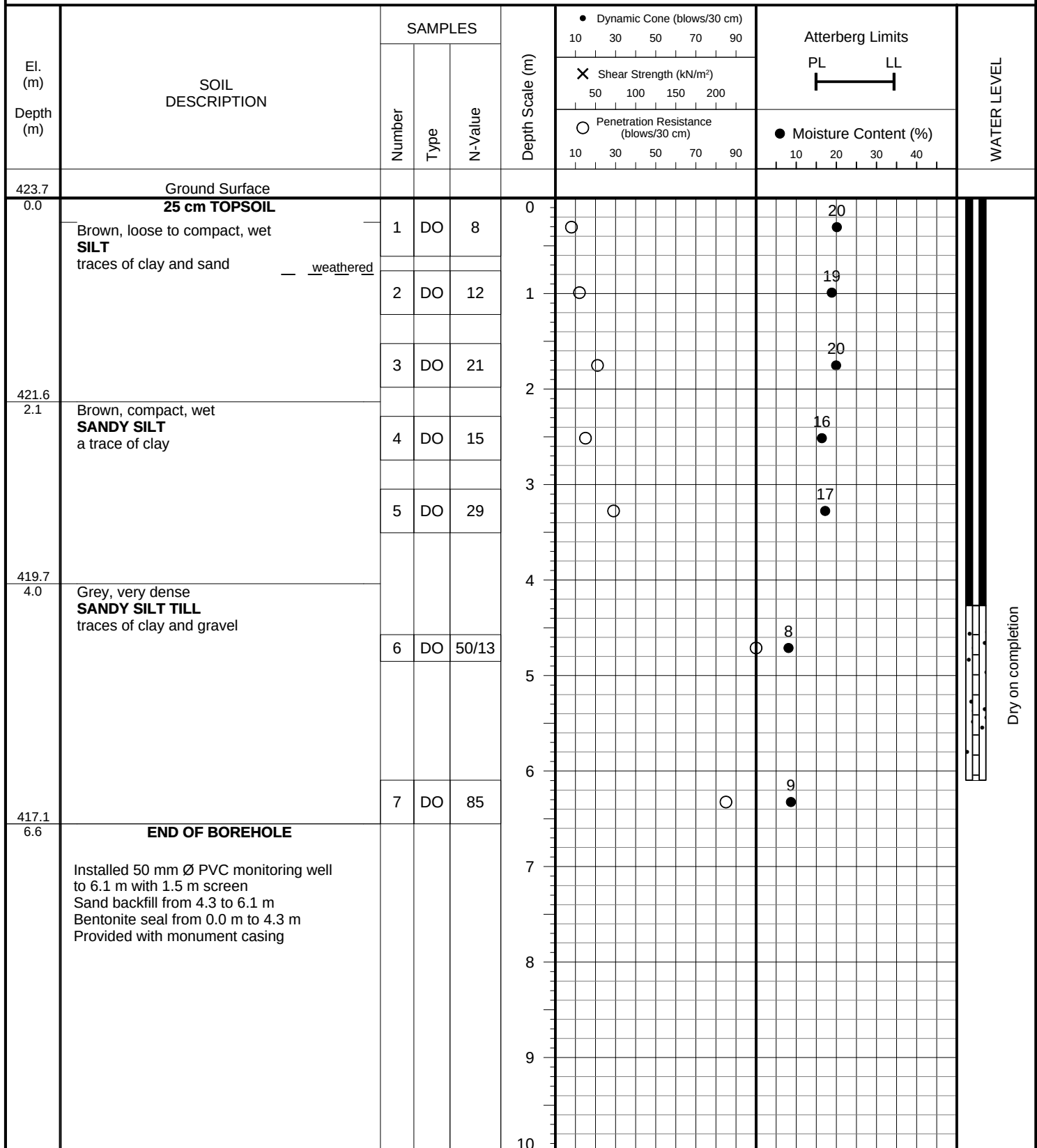
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LOG OF BOREHOLE:**10****FIGURE NO.: 10****PROJECT DESCRIPTION:** Proposed Residential Development**METHOD OF BORING:** Solid Stem Augers**PROJECT LOCATION:** 6410 First Line and 8076 Wellington Road 19
Township of Centre Wellington (Fergus)**DRILLING DATE:** March 27, 2026**Soil Engineers Ltd.**

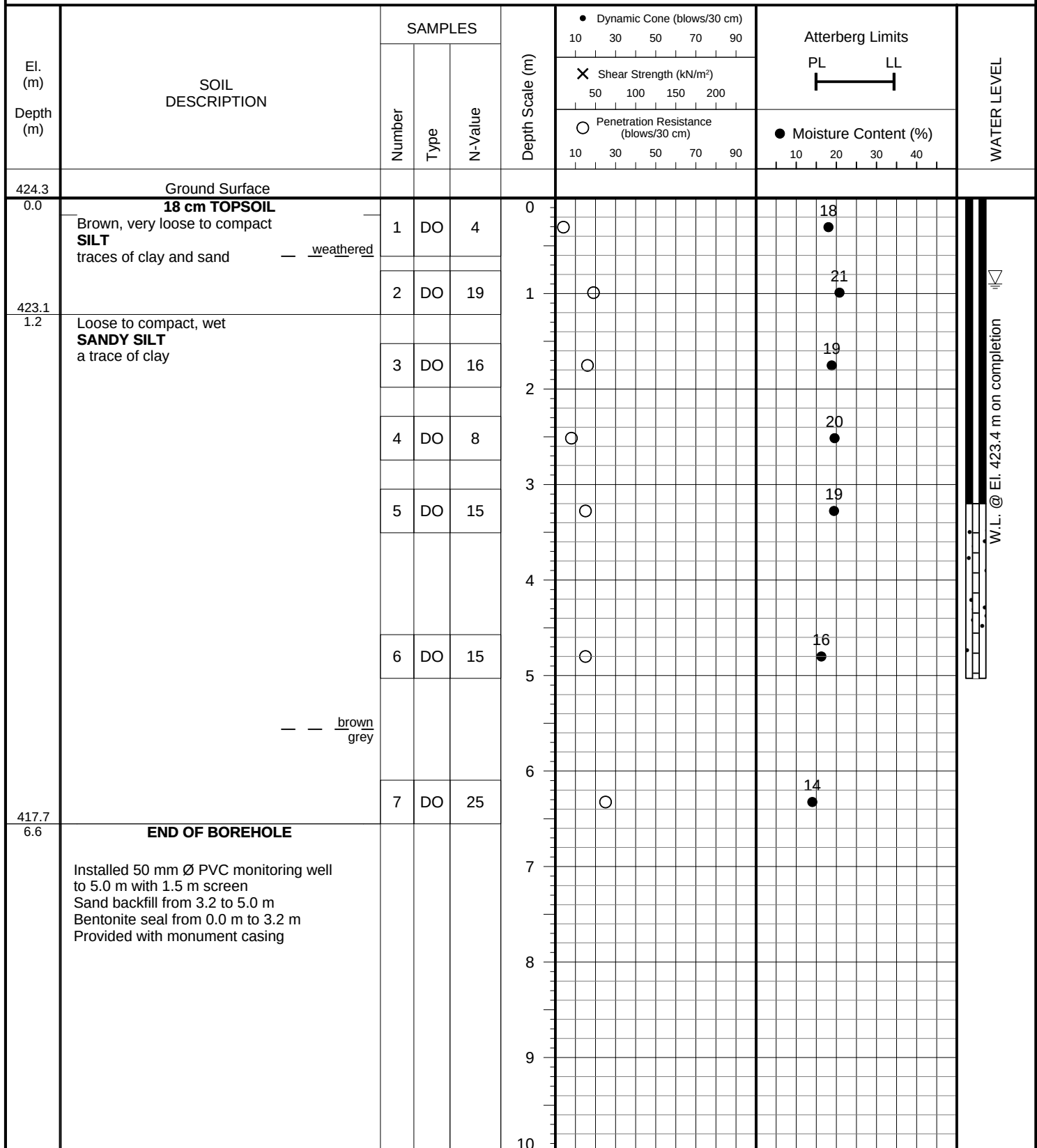
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LOG OF BOREHOLE:**2****FIGURE NO.: 2****PROJECT DESCRIPTION:** Proposed Residential Development**METHOD OF BORING:** Solid Stem Augers**PROJECT LOCATION:** 6410 First Line and 8076 Wellington Road 19
Township of Centre Wellington (Fergus)**DRILLING DATE:** March 26, 2026**Soil Engineers Ltd.**

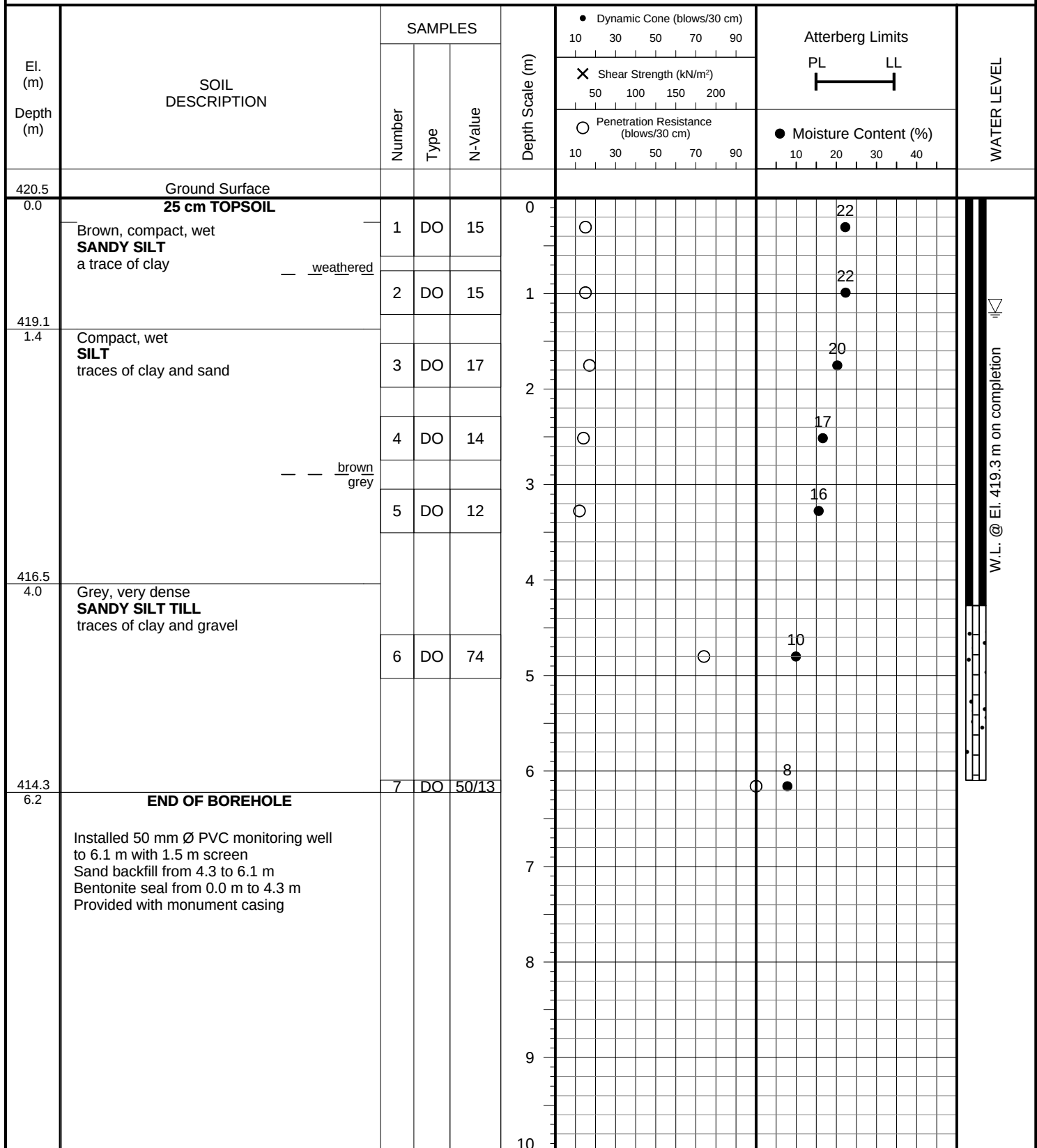
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LOG OF BOREHOLE:**3****FIGURE NO.: 3****PROJECT DESCRIPTION:** Proposed Residential Development**METHOD OF BORING:** Solid Stem Augers**PROJECT LOCATION:** 6410 First Line and 8076 Wellington Road 19
Township of Centre Wellington (Fergus)**DRILLING DATE:** March 25, 2026**Soil Engineers Ltd.**

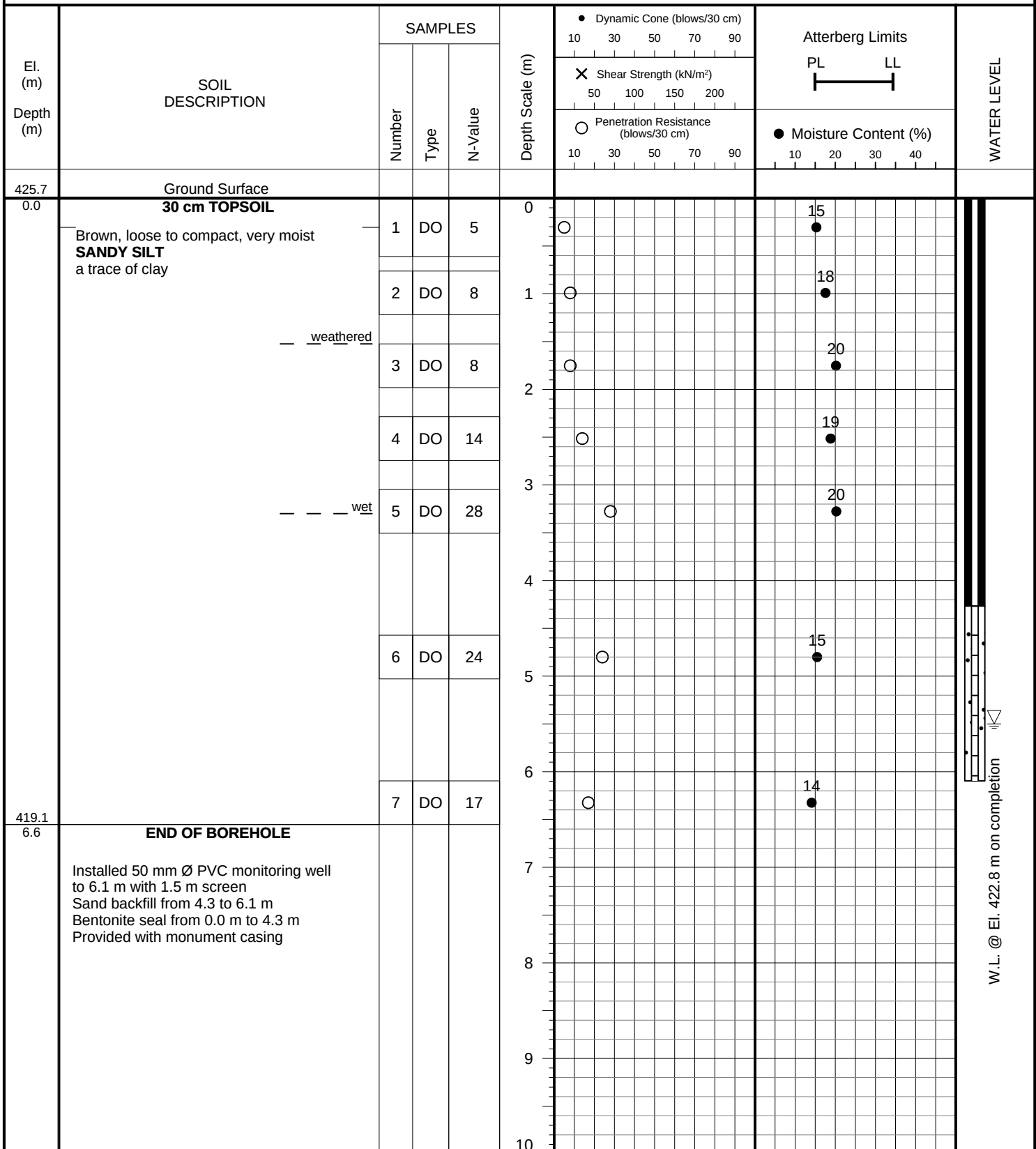
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LOG OF BOREHOLE:**4****FIGURE NO.: 4****PROJECT DESCRIPTION:** Proposed Residential Development**METHOD OF BORING:** Solid Stem Augers**PROJECT LOCATION:** 6410 First Line and 8076 Wellington Road 19
Township of Centre Wellington (Fergus)**DRILLING DATE:** March 26, 2026**Soil Engineers Ltd.**

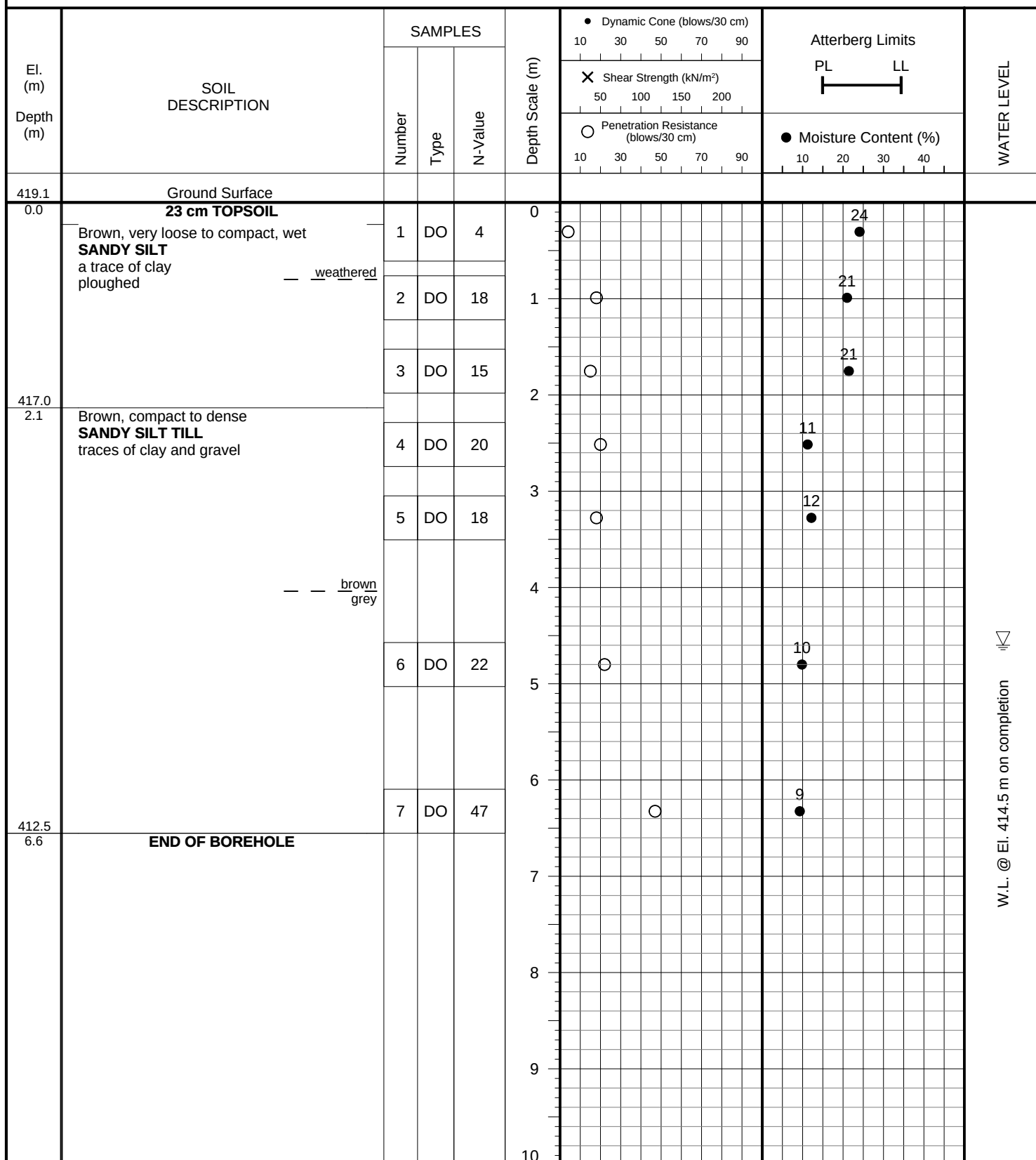
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LOG OF BOREHOLE:**5****FIGURE NO.: 5****PROJECT DESCRIPTION:** Proposed Residential Development**METHOD OF BORING:** Solid Stem Augers**PROJECT LOCATION:** 6410 First Line and 8076 Wellington Road 19
Township of Centre Wellington (Fergus)**DRILLING DATE:** March 25, 2026**Soil Engineers Ltd.**

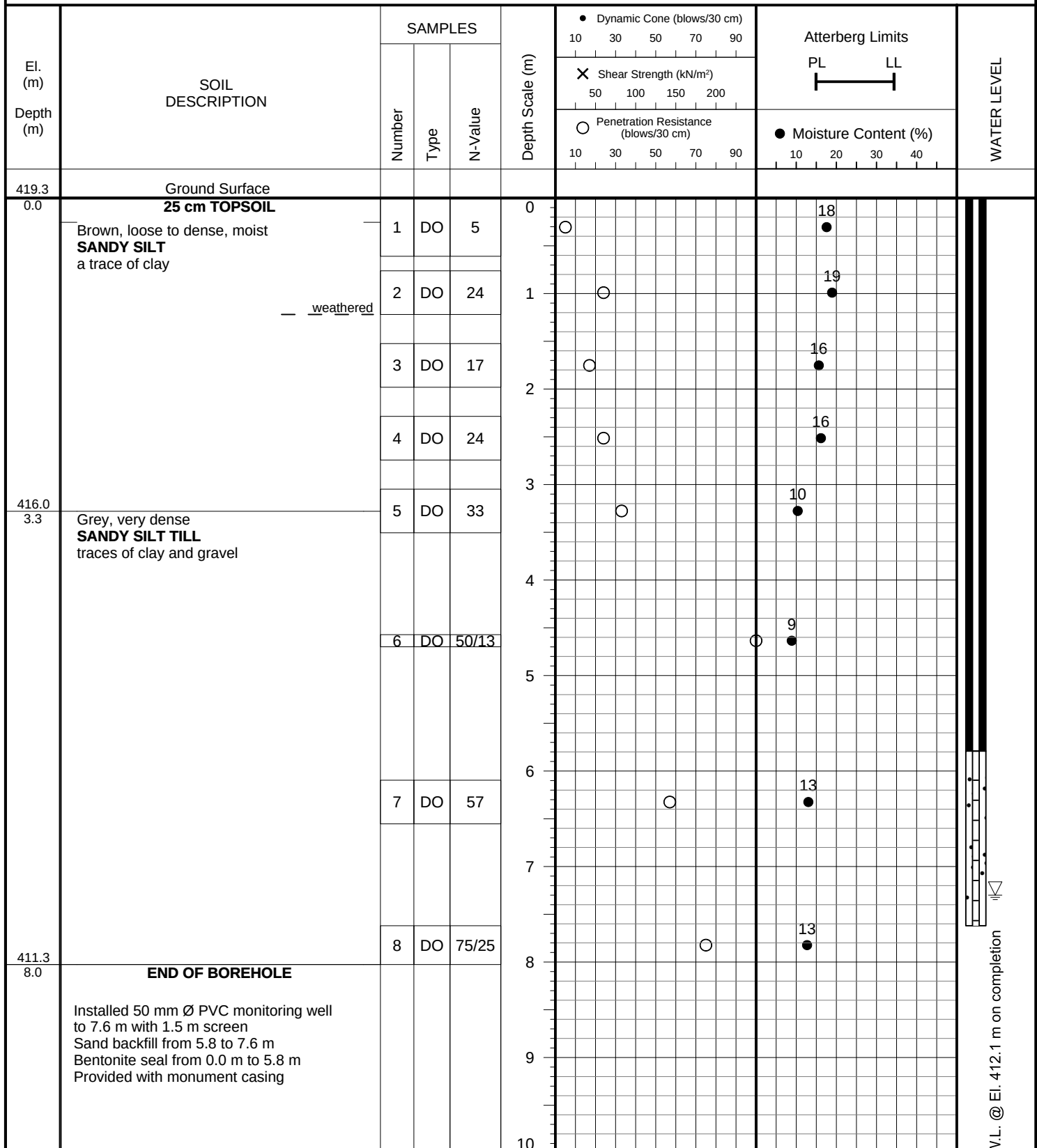
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LOG OF BOREHOLE:**6****FIGURE NO.: 6****PROJECT DESCRIPTION:** Proposed Residential Development**METHOD OF BORING:** Solid Stem Augers**PROJECT LOCATION:** 6410 First Line and 8076 Wellington Road 19
Township of Centre Wellington (Fergus)**DRILLING DATE:** March 26, 2026**Soil Engineers Ltd.**

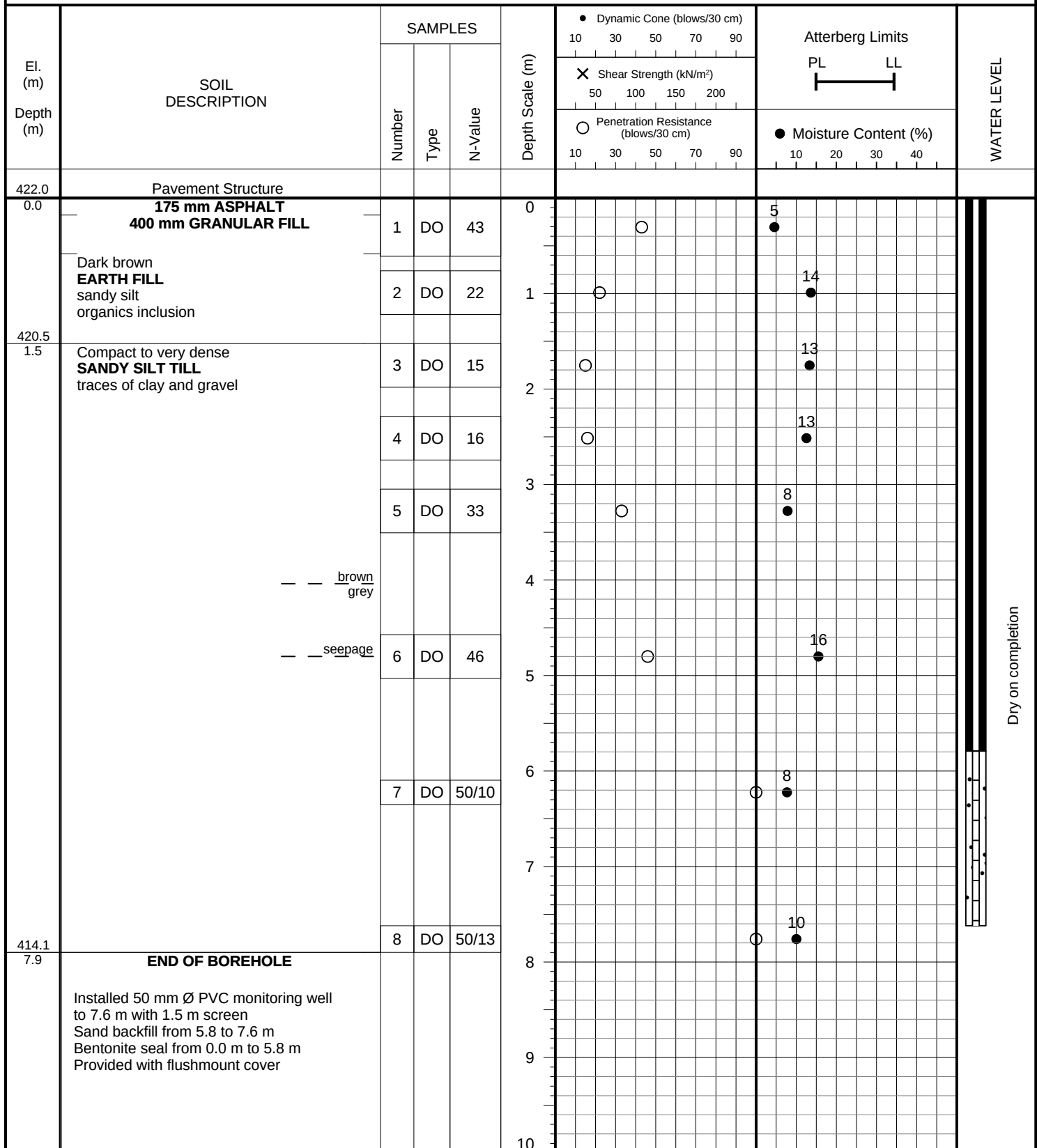
JOB NO.: 2603-S021

LOG OF BOREHOLE:**7****FIGURE NO.: 7****PROJECT DESCRIPTION:** Proposed Residential Development**METHOD OF BORING:** Solid Stem Augers**PROJECT LOCATION:** 6410 First Line and 8076 Wellington Road 19
Township of Centre Wellington (Fergus)**DRILLING DATE:** March 26, 2026**Soil Engineers Ltd.**

JOB NO.: 2603-S021

LOG OF BOREHOLE:**8****FIGURE NO.: 8****PROJECT DESCRIPTION:** Proposed Residential Development**METHOD OF BORING:** Solid Stem Augers**PROJECT LOCATION:** 6410 First Line and 8076 Wellington Road 19
Township of Centre Wellington (Fergus)**DRILLING DATE:** March 25, 2026**Soil Engineers Ltd.**

JOB NO.: 2603-S021

LOG OF BOREHOLE:**9****FIGURE NO.: 9****PROJECT DESCRIPTION:** Proposed Residential Development**METHOD OF BORING:** Solid Stem Augers**PROJECT LOCATION:** 6410 First Line and 8076 Wellington Road 19
Township of Centre Wellington (Fergus)**DRILLING DATE:** March 27, 2026**Soil Engineers Ltd.**

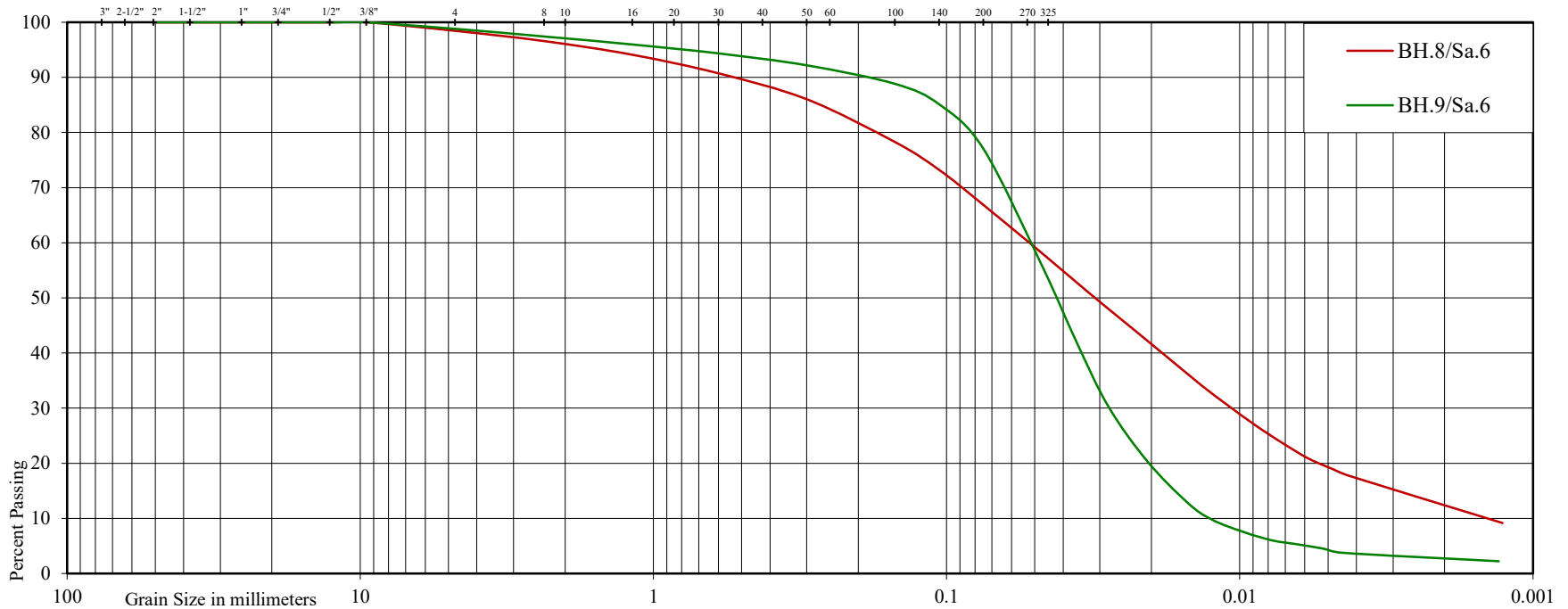


U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project: Proposed Residential Development

Location: 6410 First Line and 8076 Wellington Road 19, Township of Centre Wellington (Fergus)

Borehole No: 8 9

Sample No: 6 6

Depth (m): 4.6 4.6

Elevation (m): 414.8 417.4

BH./Sa. 8/6 9/6

Liquid Limit (%) = - -

Plastic Limit (%) = - -

Plasticity Index (%) = - -

Moisture Content (%) = 9 16

Estimated Permeability (cm./sec.) = 10^{-6} 10^{-4}

Classification of Sample [& Group Symbol]: SANDY SILT TILL
a trace to some clay, a trace of gravel

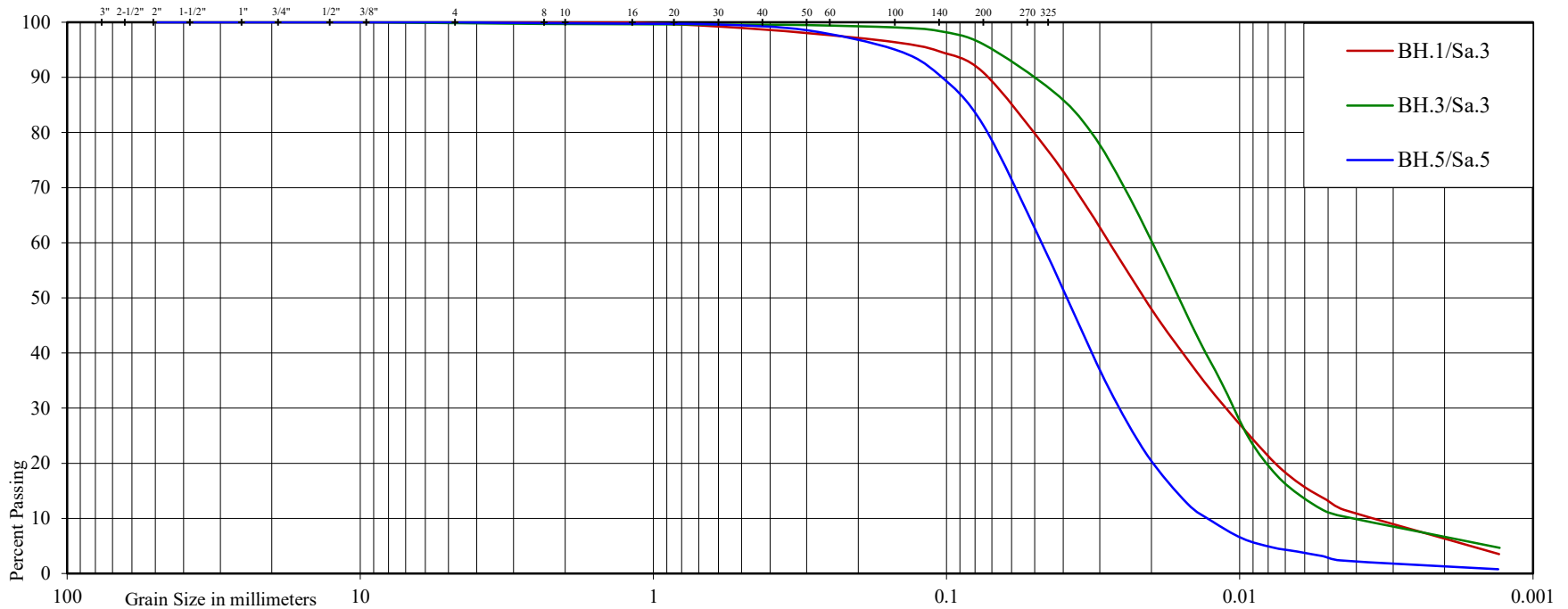


U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project: Proposed Residential Development

Location: 6410 First Line and 8076 Wellington Road 19, Township of Centre Wellington (Fergus)

Borehole No: 1 3 5

Sample No: 3 3 5

Depth (m): 1.5 1.5 3.0

Elevation (m): 424.0 422.2 417.4

BH./Sa. 1/3 3/3 5/5

Liquid Limit (%) = - - -

Plastic Limit (%) = - - -

Plasticity Index (%) = - - -

Moisture Content (%) = 28 20 16

Estimated Permeability (cm./sec.) = 10^{-5} 10^{-5} 10^{-4}

Classification of Sample [& Group Symbol]: SILT
traces of clay and sand

Figure: 12

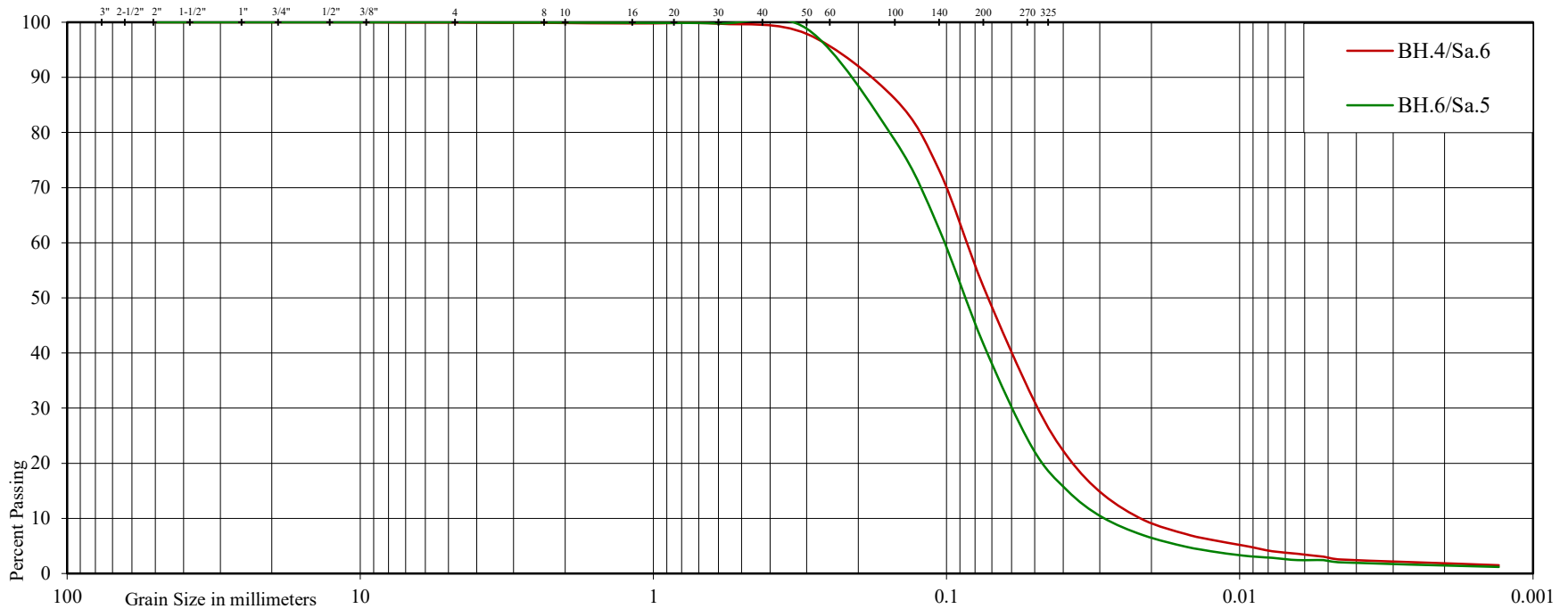


U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project: Proposed Residential Development

Location: 6410 First Line and 8076 Wellington Road 19, Township of Centre Wellington (Fergus)

Borehole No: 4 6

Sample No: 6 5

Depth (m): 4.6 3.0

Elevation (m): 419.8 422.7

BH./Sa. 4/6 6/5

Liquid Limit (%) = - -

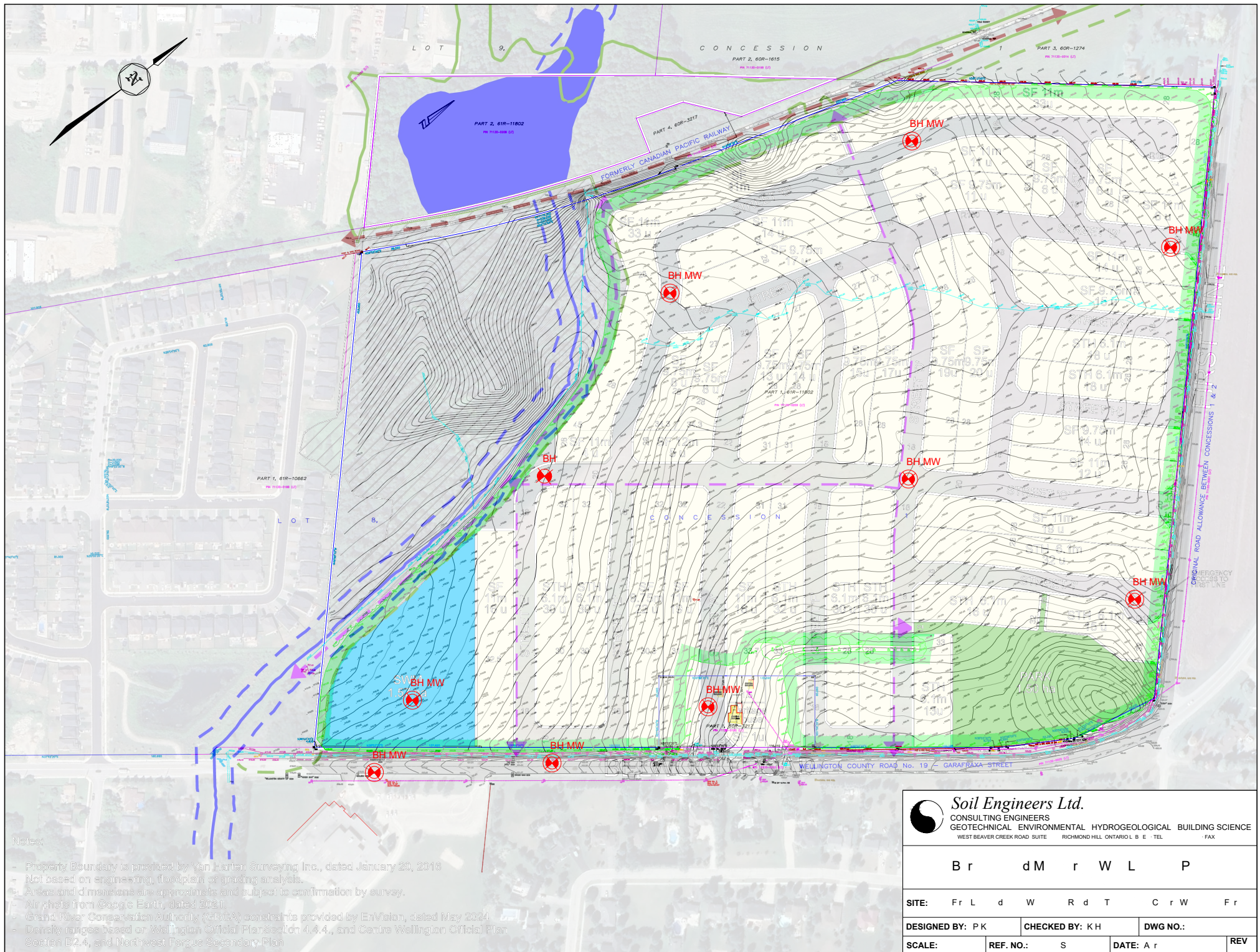
Plastic Limit (%) = - -

Plasticity Index (%) = - -

Moisture Content (%) = 16 20

Estimated Permeability (cm./sec.) = 10^{-4} 10^{-4}

Classification of Sample [& Group Symbol]: SANDY SILT
a trace of clay



Notes:

- Property Boundary is provided by Van Harten Surveying Inc., dated January 20, 2016
- Not based on engineering, floodplain or grading analysis.
- Areas and dimensions are approximate and subject to confirmation by survey.
- Air photo from Google Earth, dated 2021.
- Grand River Conservation Authority (GRCA) constraints provided by EnVision, dated May 2024.
- Density ranges based on Wellington Official Plan Section 4.4.4., and Centre Wellington Official Plan Section D2.4, and Northwest Fergus Secondary Plan



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CONSULTING ENGINEERS
GEOTECHNICAL ENVIRONMENTAL HYDROGEOLOGICAL BUILDING SCIENCE
WEST BEAVER CREEK ROAD, SUITE 101 RICHMOND HILL, ONTARIO L4B 1E7 TEL: (905) 882-1111 FAX: (905) 882-1112

B r d M r W L P

SITE: Fr L d W R d T C r W Fr

DESIGNED BY: P K CHECKED BY: K H DWG NO.:

SCALE: REF. NO.: S DATE: A r REV

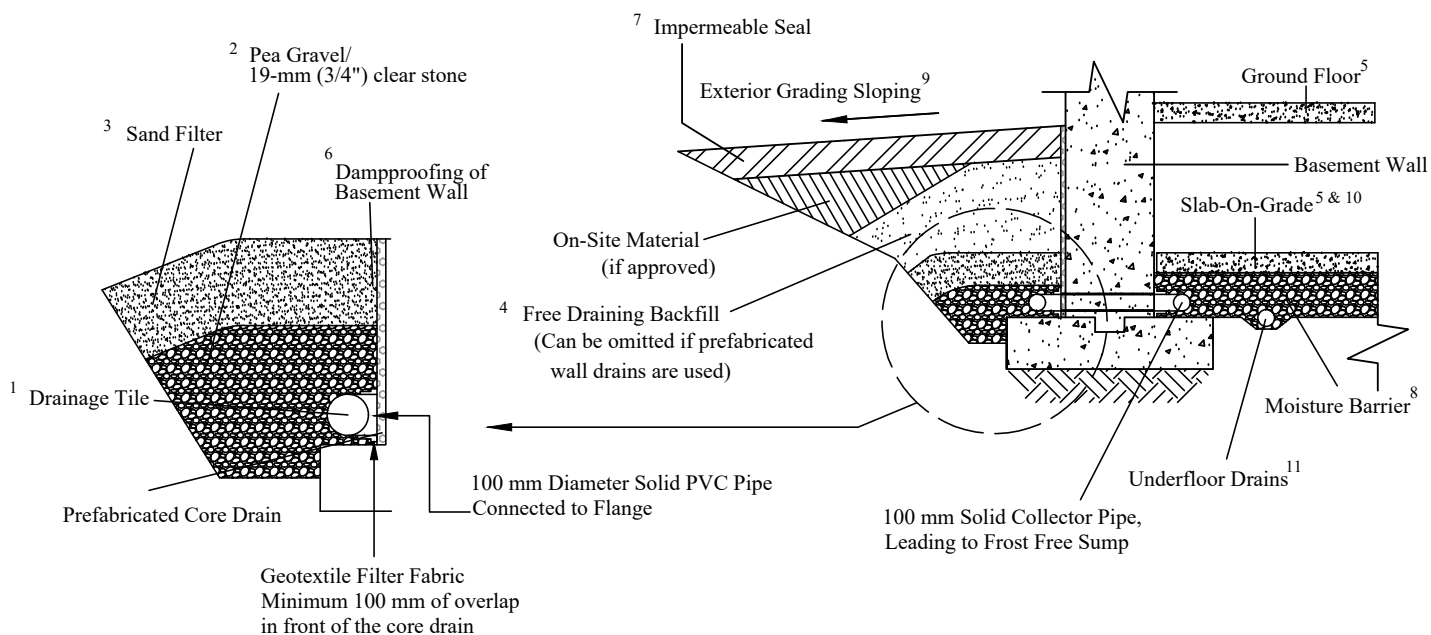


SCALE: AS SHOWN

Geological cross-section showing boreholes 1 through 10. The vertical axis represents Elevation (m) from 412 to 427. The horizontal axis lists Borehole (BH) numbers and their corresponding elevations (El. (m)).

Borehole Data Summary:

BH No.	El. (m)	Layer 1 (m)	Layer 2 (m)	Layer 3 (m)	Layer 4 (m)	Layer 5 (m)	Layer 6 (m)	Layer 7 (m)	Layer 8 (m)	Layer 9 (m)	Layer 10 (m)	Layer 11 (m)	Layer 12 (m)	Layer 13 (m)	Layer 14 (m)	Layer 15 (m)	Layer 16 (m)	Layer 17 (m)	Layer 18 (m)	Layer 19 (m)	Layer 20 (m)	Layer 21 (m)	Layer 22 (m)	Layer 23 (m)	Layer 24 (m)	Layer 25 (m)	Layer 26 (m)	Layer 27 (m)	Layer 28 (m)	Layer 29 (m)	Layer 30 (m)	Layer 31 (m)	Layer 32 (m)	Layer 33 (m)	Layer 34 (m)	Layer 35 (m)	Layer 36 (m)	Layer 37 (m)	Layer 38 (m)	Layer 39 (m)	Layer 40 (m)	Layer 41 (m)	Layer 42 (m)	Layer 43 (m)	Layer 44 (m)	Layer 45 (m)	Layer 46 (m)	Layer 47 (m)	Layer 48 (m)	Layer 49 (m)	Layer 50 (m)	Layer 51 (m)	Layer 52 (m)	Layer 53 (m)	Layer 54 (m)	Layer 55 (m)	Layer 56 (m)	Layer 57 (m)	Layer 58 (m)	Layer 59 (m)	Layer 60 (m)	Layer 61 (m)	Layer 62 (m)	Layer 63 (m)	Layer 64 (m)	Layer 65 (m)	Layer 66 (m)	Layer 67 (m)	Layer 68 (m)	Layer 69 (m)	Layer 70 (m)	Layer 71 (m)	Layer 72 (m)	Layer 73 (m)	Layer 74 (m)	Layer 75 (m)	Layer 76 (m)	Layer 77 (m)	Layer 78 (m)	Layer 79 (m)	Layer 80 (m)	Layer 81 (m)	Layer 82 (m)	Layer 83 (m)	Layer 84 (m)	Layer 85 (m)	Layer 86 (m)	Layer 87 (m)	Layer 88 (m)	Layer 89 (m)	Layer 90 (m)	Layer 91 (m)	Layer 92 (m)	Layer 93 (m)	Layer 94 (m)	Layer 95 (m)	Layer 96 (m)	Layer 97 (m)	Layer 98 (m)	Layer 99 (m)	Layer 100 (m)	Layer 101 (m)	Layer 102 (m)	Layer 103 (m)	Layer 104 (m)	Layer 105 (m)	Layer 106 (m)	Layer 107 (m)	Layer 108 (m)	Layer 109 (m)	Layer 110 (m)	Layer 111 (m)	Layer 112 (m)	Layer 113 (m)	Layer 114 (m)	Layer 115 (m)	Layer 116 (m)	Layer 117 (m)	Layer 118 (m)	Layer 119 (m)	Layer 120 (m)	Layer 121 (m)	Layer 122 (m)	Layer 123 (m)	Layer 124 (m)	Layer 125 (m)	Layer 126 (m)	Layer 127 (m)	Layer 128 (m)	Layer 129 (m)	Layer 130 (m)	Layer 131 (m)	Layer 132 (m)	Layer 133 (m)	Layer 134 (m)	Layer 135 (m)	Layer 136 (m)	Layer 137 (m)	Layer 138 (m)	Layer 139 (m)	Layer 140 (m)	Layer 141 (m)	Layer 142 (m)	Layer 143 (m)	Layer 144 (m)	Layer 145 (m)	Layer 146 (m)	Layer 147 (m)	Layer 148 (m)	Layer 149 (m)	Layer 150 (m)	Layer 151 (m)	Layer 152 (m)	Layer 153 (m)	Layer 154 (m)	Layer 155 (m)	Layer 156 (m)	Layer 157 (m)	Layer 158 (m)	Layer 159 (m)	Layer 160 (m)	Layer 161 (m)	Layer 162 (m)	Layer 163 (m)	Layer 164 (m)	Layer 165 (m)	Layer 166 (m)	Layer 167 (m)	Layer 168 (m)	Layer 169 (m)	Layer 170 (m)	Layer 171 (m)	Layer 172 (m)	Layer 173 (m)	Layer 174 (m)	Layer 175 (m)	Layer 176 (m)	Layer 177 (m)	Layer 178 (m)	Layer 179 (m)	Layer 180 (m)	Layer 181 (m)	Layer 182 (m)	Layer 183 (m)	Layer 184 (m)	Layer 185 (m)	Layer 186 (m)	Layer 187 (m)	Layer 188 (m)	Layer 189 (m)	Layer 190 (m)	Layer 191 (m)	Layer 192 (m)	Layer 193 (m)	Layer 194 (m)	Layer 195 (m)	Layer 196 (m)	Layer 197 (m)	Layer 198 (m)	Layer 199 (m)	Layer 200 (m)	Layer 201 (m)	Layer 202 (m)	Layer 203 (m)	Layer 204 (m)	Layer 205 (m)	Layer 206 (m)	Layer 207 (m)	Layer 208 (m)	Layer 209 (m)	Layer 210 (m)	Layer 211 (m)	Layer 212 (m)	Layer 213 (m)	Layer 214 (m)	Layer 215 (m)	Layer 216 (m)	Layer 217 (m)	Layer 218 (m)	Layer 219 (m)	Layer 220 (m)	Layer 221 (m)	Layer 222 (m)	Layer 223 (m)	Layer 224 (m)	Layer 225 (m)	Layer 226 (m)	Layer 227 (m)	Layer 228 (m)	Layer 229 (m)	Layer 230 (m)	Layer 231 (m)	Layer 232 (m)	Layer 233 (m)	Layer 234 (m)	Layer 235 (m)	Layer 236 (m)	Layer 237 (m)	Layer 238 (m)	Layer 239 (m)	Layer 240 (m)	Layer 241 (m)	Layer 242 (m)	Layer 243 (m)	Layer 244 (m)	Layer 245 (m)	Layer 246 (m)	Layer 247 (m)	Layer 248 (m)	Layer 249 (m)	Layer 250 (m)	Layer 251 (m)	Layer 252 (m)	Layer 253 (m)	Layer 254 (m)	Layer 255 (m)	Layer 256 (m)	Layer 257 (m)	Layer 258 (m)	Layer 259 (m)	Layer 260 (m)	Layer 261 (m)	Layer 262 (m)	Layer 263 (m)	Layer 264 (m)	Layer 265 (m)	Layer 266 (m)	Layer 267 (m)	Layer 268 (m)	Layer 269 (m)	Layer 270 (m)	Layer 271 (m)	Layer 272 (m)	Layer 273 (m)	Layer 274 (m)	Layer 275 (m)	Layer 276 (m)	Layer 277 (m)	Layer 278 (m)	Layer 279 (m)	Layer 280 (m)	Layer 281 (m)	Layer 282 (m)	Layer 283 (m)	Layer 284 (m)	Layer 285 (m)	Layer 286 (m)	Layer 287 (m)	Layer 288 (m)	Layer 289 (m)	Layer 290 (m)	Layer 291 (m)	Layer 292 (m)	Layer 293 (m)	Layer 294 (m)	Layer 295 (m)	Layer 296 (m)	Layer 297 (m)	Layer 298 (m)	Layer 299 (m)	Layer 300 (m)	Layer 301 (m)	Layer 302 (m)	Layer 303 (m)	Layer 30



NOTES:

1. **Drainage tile:** consists of 100 mm (4") diameter weeping tile or equivalent perforated pipe leading to a positive sump or outlet.
Invert to be at minimum of 150 mm (6") below underside of basement floor slab.
2. **Pea gravel:** at 150 mm (6") on the top and sides of drain. If drain is not placed on concrete footing, provide 100 mm (4") of pea gravel below drain.
The pea gravel may be replaced by 19-mm (3/4") clear stone provided that the drain is covered by a porous geotextile membrane of Terrafix 270R or equivalent.
3. **Filter material:** consists of C.S.A. fine concrete aggregate. A minimum of 300 mm (12") on the top and sides of gravel.
This may be replaced by an approved porous geotextile membrane of Terrafix 270R or equivalent.
4. **Free-draining backfill:** OPSS Granular 'B' or equivalent, compacted to 95% to 98% (maximum) Standard Proctor dry density.
Do not compact closer than 1.8 m (6') from wall with heavy equipment.
This may be replaced by on-site material if prefabricated wall drains (Miradrain) extending from the finished grade to the bottom of the basement wall are used.
5. **Do not backfill** until the wall is supported by the basement floor slab and ground floor framing, or adequate bracing.
6. **Dampproofing** of the basement wall is required before backfilling
7. **Impermeable backfill seal** of compacted clay, clayey silt or equivalent. If the original soil in the vicinity is a free-draining sand, the seal may be omitted.
8. **Moisture barrier:** 19-mm (3/4") clear stone. The thickness of this layer should be 150 mm (6") minimum.
9. **Exterior Grade:** slope away from basement wall on all the sides of the building.
10. **Slab-On-Grade** should not be structurally connected to walls or foundations.
11. **Underfloor drains*** should be placed in parallel rows at 6 to 8 m (20'-25') centre, on 100 mm (4") of pea gravel with 150 mm (6") of pea gravel on top and sides. The spacing should be at least 300 mm (12") between the underside of the floor slab and the top of the pipe.
The drains should be connected to positive sumps or outlets. Do not connect the underfloor drains to the perimeter drains.

* Underfloor drains can be omitted where not required.

 Soil Engineers Ltd. CONSULTING ENGINEERS GEOTECHNICAL ENVIRONMENTAL HYDROGEOLOGICAL BUILDING SCIENCE WEST BEAVER CREEK ROAD SUITE RICHMOND HILL ONTARIO L 4 B 1 E 7 TEL 905 882 1111 FAX 905 882 1112			
P r P r r Dr S			
SITE: Fr L d W R d T C r W F r			
DESIGNED BY: K L		CHECKED BY: B L	
SCALE: N T S		REF. NO.: S	
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	CONSULTING ENGINEERS GEOTECHNICAL ENVIRONMENTAL HYDROGEOLOGICAL BUILDING SCIENCE WEST BEAVER CREEK ROAD SUITE RICHMOND HILL ONTARIO L B E TEL FAX			
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SITE: F r L d W R d T C r W F r				
DESIGNED BY: K L		CHECKED BY: B L		DWG NO.:
SCALE: N T S	REF. NO.: S	DATE: M		REV

APPENDIX B

PRELIMINARY DESIGN SHEETS

PROJECT TITLE:		SKEOTCH SITE		STORM SEWER DESIGN SHEET 5 - YEAR STORM TOWNSHIP OF CENTRE WELLINGTON - WELLINGTON COUNTY DATE: JUNE 2026																	ENGINEER'S SEAL							PREPARED BY: SKA SABOURIN KIMBLE & ASSOCIATES LTD. CONSULTING ENGINEERS										
PROJECT No.:		26:524																																				
CLIENT:		SORBARA DEVELOPMENT GROUP																																				
ISSUED FOR:		1st SUBMISSION FSSR																																				
NOTES, STANDARDS AND DESIGN INPUT PARAMETERS																																						
Captured Overland Flow = Q(100yr) - Q(5yr)				IDF Parameters:				Formula:				Note:																										
Inlet Time (mins): 10.00				Storm: A B C				$I_{VR} = \frac{A}{(t + B)^C}$				PVC pipe is manufactured in metric dimensions, therefore, the pipe diameter stated is used to calculate capacity and velocity. However, since concrete pipe is manufactured in imperial dimensions, standard imperial equivalent sizes for the diameter stated have been used to calculate capacity and velocity.																										
Run-off Coefficients:				5 - Year 543.943 0.000 0.686				where; I= Intensity (mm/hr)																														
Park/Open Space 0.25				25 - Year 739.425 0.000 0.690																																		
Single Family Res. (>12.2m) 0.60				100 - Year 896.876 0.000 0.691				t= Time of Concentration (mins)																														
Single Family Res. (<12.2m) 0.65																																						
Street Townhouses 0.75																																						
Laneway Townhouses 0.85																																						
Institutional 0.75																																						
Commercial 0.90																																						
Asphalt 0.95																																						
Township of Centre Wellington Design Criteria																																						
PROPERTY/ OWNER	STREET	Upstream Manhole	Downstream Manhole	Park/ Open Space (ha)	Single Family >12.2m (ha)	Single Family <12.2m (ha)	Street Townhouses (ha)	Laneway Townhouses (ha)	Institutional (ha)	Commercial (ha)	Asphalt (ha)	A x R This Section (ha)	Acc. AR (ha)	t (min)	I (5yr) (mm/hr)	Q (5yr) (l/s)	I (25yr) (mm/hr)	Q (25yr) (l/s)	I (100yr) (mm/hr)	Q (100yr) (l/s)	Captured Overland Flow (l/s)	Acc. Captured Overland Flow (l/s)	Q(design) (l/s)	Q(HGL) (l/s)	Type	Pipe (mm)	Grade (%)	Capacity (l/s)	Length (m)	Velocity (m/s)	Down- stream Velocity (m/s)	Change in Velocity (m/s)	Time (min)	Total Time (min)	Downstream Invert	Upstream Invert	Capacity (%)	
		1	2			0.88						0.572	0.572	10.00	112.09	178.09	150.97	239.88	182.70	290.29		0.00	178.09	0.00	CONC	450	1.00	297.43	75.0	1.81	1.39	0.42	0.69	10.69	0.00	0.75	60%	
		2	3			0.64						0.416	0.988	10.69	107.07	293.86	144.18	395.69	174.47	478.82		0.00	293.86	0.00	CONC	600	0.40	405.13	95.2	1.39	1.50	0.11	1.14	11.83	0.00	0.38	73%	
		3	4			0.36						0.234	1.222	11.83	99.86	338.99	134.42	456.28	162.64	552.07		0.00	338.99	0.00	CONC	675	0.40	554.62	47.0	1.50	1.50	0.00	0.52	12.35	0.00	0.19	61%	
		4	5			0.58						0.377	1.599	12.35	96.95	430.63	130.48	579.53	157.86	701.17		0.00	430.63	0.00	CONC	675	0.40	554.62	110.0	1.50	1.61	0.11	1.22	13.58	0.00	0.44	78%	
		5	6			0.52						0.338	1.937	13.58	90.88	489.00	122.26	657.83	147.91	795.83		0.00	489.00	0.00	CONC	750	0.40	734.54	112.0	1.61	1.61	0.00	1.16	14.73	0.00	0.45	67%	
		6	7			0.09						0.059	1.996	14.73	85.92	476.24	115.54	640.46	139.77	774.75		0.00	476.24	0.00	CONC	750	0.40	734.54	16.0	1.61	1.61	0.00	0.17	14.90	0.00	0.06	65%	
		7	8			0.12						0.078	2.074	14.90	85.26	491.07	114.65	660.38	138.69	798.84		0.00	491.07	0.00	CONC	750	0.40	734.54	33.1	1.61	1.61	0.00	0.34	15.24	0.00	0.13	67%	
		8	9			0.09						0.059	2.132	15.24	83.94	497.12	112.87	668.45	136.53	808.58		0.00	497.12	0.00	CONC	750	0.40	734.54	28.6	1.61	1.92	0.31	0.30	15.54	0.00	0.11	68%	
		11	12			0.66						0.429	0.429	10.00	112.09	133.57	150.97	179.91	182.70	217.72		0.00	133.57	0.00	PVC	375	1.00	175.33	100.0	1.59	1.55	0.04	1.05	11.05	0.00	1.00	76%	
		2S	10			0.22						0.143	0.143	10.00	112.09	44.52	150.97	59.97	182.70	72.57		0.00	44.52	0.00	PVC	300	1.00	96.70	35.6	1.37	1.28	0.09	0.43	10.43	0.00	0.36	46%	
		10	12			0.38						0.247	0.390	10.43	108.87	117.94	146.61	158.83	177.42	192.20		0.00	117.94	0.00	CONC	450	0.50	210.32	60.0	1.28	1.55	0.27	0.78	11.21	0.00	0.30	56%	
		12	13			0.66						0.429	1.248	11.05	104.67	362.85	140.92	488.53	170.52	591.14		0.00	362.85	0.00	CONC	600	0.50	452.95	108.5	1.55	1.68	0.13	1.17	12.22	0.00	0.54	80%	
		13	14			0.26						0.169	1.417	12.22	97.71	384.60	131.50	517.61	159.11	626.26		0.00	384.60	0.00	CONC	675	0.50	620.09	42.3	1.68	1.61	0.07	0.42	12.64	0.00	0.21	62%	
		14	15			0.74						0.481	1.898	12.64	95.47	503.35	128.47	677.33	155.43	819.48		0.00	503.35	0.00	CONC	750	0.40	734.54	86.0	1.61	1.72	0.11	0.89	13.52	0.00	0.34	69%	
		15	16			0.79						0.514	2.412	13.52	91.12	610.35	122.58	821.10	148.29	993.36		0.00	610.35	0.00	CONC	825	0.40	947.10	85.7	1.72	1.72	0.00	0.83	14.36	0.00	0.34	64%	
		16	9			0.15						0.098	2.509	14.36	87.46	609.55	117.63	819.82	142.30	991.74		0.00	609.55	0.00	CONC	825	0.40	947.10	39.8	1.72	1.92	0.20	0.39	14.74	0.00	0.16	64%	
		9	62			0.24						0.156	4.797	15.54	82.84	1103.86	111.38	1484.19	134.73	1795.29		0.00	1103.86	0.00	CONC	975	0.40	1478.65	46.5	1.92	1.92	0.00	0.40	15.94	0.00	0.19	75%	
		62	63			0.31						0.202	4.999	15.94	81.39	1130.15	109.43	1519.39	132.36	1837.82		0.00	1130.15	0.00	CONC	975	0.40	1478.65	61.5	1.92	2.72	0.81	0.53	16.48	0.00	0.25	76%	
		Ext1	DICB1												10.00							397.58	397.58	397.58	0.00	CONC	600	1.00	640.56	0.0	2.19	2.19	0.00	0.00	10.00	0.00	0.00	62%
		DICB1	66									0.000	0.000	10.00	112.09	0.00	150.97	0.00	182.70	0.00			397.58	397.58	0.00	CONC	600	1.00	640.56	22.0	2.19	2.19	0.00	0.17	10.17	0.00	0.22	62%
		66	18									0.000	0.000	10.17	110.82	0.00	149.26	0.00	180.62	0.00			397.58	397.58	0.00	CONC	600	1.00	640.56	9.0	2.19	1.80	0.39	0.07	10.24	0.00	0.09	62%
		18	19									0.578	0.578	10.24	110.31	176.96	148.57	238.33	179.78	288.40			397.58	574.54	0.00	CONC	750	0.50	821.24	90.0	1.80	1.92	0.12	0.83	11.07	0.00	0.45	70%
		19	20									0.458	1.035	11.07	104.55	300.58	140.76	404.69	170.32	489.68			397.58	698.16	0.00	CONC	825	0.50	1058.90	90.0	1.92	1.92	0.00	0.78	11.85	0.00	0.45	66%
		20	21									0.120	1.155	11.85	99.77	320.08	134.29	430.83	162.48	521.28			397.58	717.66	0.00	CONC	825	0.50	1058.90	44.4	1.92	1.82	0.10	0.39	12.24	0.00	0.22	68%
		14S	17			0.15						0.098	0.098	10.00	112.09	30.36	150.97	40.89	182.70	49.48		0.00	30.36	0.00	PVC	300	0.50	68.38	38.8	0.97	1.12	0.16	0.67	10.67	0.00	0.19	44%	
		17	21			0.18						0.117	0.215	10.67	107.22	63.89	144.38	86.03	174.71	104.10		0.00	63.89	0.00	PVC	375	0.50	123.98	32.9	1.12	1.82	0.70	0.49	11.16	0.00	0.16	52%	
		21	24			0.36						0.234	1.604	12.24	97.60	434.72	131.35	585.06	158.92	707.87			397.58	832.30	0.00	CONC	900	0.40	1194.45	64.5	1.82	2.02	0.20	0.59	12.83	0.00	0.26	70%
		22	23									0.600	0.600	10.00	112.09	186.81	150.97	251.62	182.70	304.50		0.00	186.81	0.00	CONC	450	1.00	297.43	110.0	1.81	1.55	0.26	1.01	11.01	0.00	1.10	63%	
		23	24									0.465	1.065	11.01	104.91	310.37	141.26	417.89	170.92	505.66		0.00	310.37	0.00	CONC	600	0.50	452.95	110.0	1.55	2.02	0.46	1.18	12.19	0.00	0.55	69%	
		24	27			0.40						0.260	2.929	12.83	94.49	768.66	127.14	1034.29	153.82	1251.33			397.58	1166.24	0.00	CONC	1050	0.40	1801.74	75.0	2.02	2.38	0.37	0.62	13.45	0.00	0.30	65%
		25	26			1.07						0.913	0.913	10.00	112.09	284.27	150.97	382.88	182.70	463.34		0.00	284.27	0.00	CONC	525	1.00	448.66	110.0	2.01	1.96	0.04	0.91	10.91	0.00	1.10	63%	
		26	27			0.77						0.643	1.556	10.91	105.57	456.28	142.14	614.36	171.99	743.40		0.00	456.28	0.00	CONC	600	0.80	572.94	110.0	1.96	2.38	0.42	0.93	11.85	0.00	0.88	80%	
		28S	33			0.14						0.105	0.105	10.00	112.09	32.69	150.97	44.03	182.70	53.29		0.00	32.69	0.00	PVC	300	1.00	96.70	10.9	1.37	1.94	0.58	0.13	10.13	0.00	0.11	34%	
		33	34			0.59						0.443	0.548	10.13	111.08	168.93	149.60	227.52	181.04	275.33		0.00	168.93	0.00	PVC	375	1.50	214.74	89.3	1.94	2.22	0.27	0.77	10.90	0.00	1.34	79%	
		34	37			0.38						0.285	0.833	10.90	105.66	244.35	142.27	329.00	172.15	398.11		0.00	244.35	0.00	CONC	450	1.50	364.28	80.8	2.22	3.14	0.92	0.61	11.51	0.00	1.21	67%	
		35	36									0.180	0.180	10.00	112.09	56.04	150.97	75.49	182.70	91.35		0.00	56.04	0.00	PVC	300	1.00	96.70	17.4	1.37	1.68	0.31	0.21	10.21	0.00	0.1		

PROJECT TITLE:		SKEOTCH SITE		STORM SEWER DESIGN SHEET 5 - YEAR STORM TOWNSHIP OF CENTRE WELLINGTON - WELLINGTON COUNTY DATE: JUNE 2026																		ENGINEER'S SEAL					PREPARED BY:										
PROJECT No.:		26:524																																			
CLIENT:		SORBARA DEVELOPMENT GROUP																																			
ISSUED FOR:		1st SUBMISSION FSSR																																			
NOTES, STANDARDS AND DESIGN INPUT PARAMETERS																																					
Captured Overland Flow = Q(100yr) - Q(5yr)												IDF Parameters:				Formula:				Note:																	
Inlet Time (mins): 10.00												Storm: A B C				$I_{YR} = \frac{A}{(t + B)^C}$				PVC pipe is manufactured in metric dimensions, therefore, the pipe diameter stated is used to calculate capacity and velocity. However, since concrete pipe is manufactured in imperial dimensions, standard imperial equivalent sizes for the diameter stated have been used to calculate capacity and velocity.																	
Run-off Coefficients: Park/Open Space 0.25 Single Family Res. (>12.2m) 0.60 Single Family Res. (<12.2m) 0.65 Street Townhouses 0.75 Laneway Towhouses 0.85 Institutional 0.75 Commercial 0.90 Asphalt 0.95												5 - Year 543.943 0.000 0.686 25 - Year 739.425 0.000 0.690 100 - Year 896.876 0.000 0.691				where; I= Intensity (mm/hr) t= Time of Concentration (mins)																					
Township of Centre Wellington Design Criteria																																					
PROPERTY/ OWNER	STREET	Upstream Manhole	Downstream Manhole	Park/ Open Space (ha)	Single Family >12.2m (ha)	Single Family <12.2m (ha)	Street Townhouses (ha)	Laneway Townhouses (ha)	Institutional (ha)	Commercial (ha)	Asphalt (ha)	A x R This Section (ha)	Acc. AR (ha)	t (min)	I (5yr) (mm/hr)	Q (5yr) (l/s)	I (25yr) (mm/hr)	Q (25yr) (l/s)	I (100yr) (mm/hr)	Q (100yr) (l/s)	Captured Overland Flow (l/s)	Acc. Captured Overland Flow (l/s)	Q(design) (l/s)	Q(HGL) (l/s)	Type	Pipe (mm)	Grade (%)	Capacity (l/s)	Length (m)	Velocity (m/s)	Down- stream Velocity (m/s)	Change in Velocity (m/s)	Time (min)	Total Time (min)	Downstream Invert	Upstream Invert	Capacity (%)
		27	44			0.12						0.078	7.210	13.45	91.48	1832.13	123.07	2464.81	148.89	2981.90		397.58	2229.71	0.00	CONC	1350	0.40	3521.63	74.0	2.38	2.38	0.00	0.52	13.96	0.00	0.30	63%
		40	41				0.22					0.165	0.165	10.00	112.09	51.37	150.97	69.20	182.70	83.74		0.00	51.37	0.00	PVC	300	2.00	136.76	15.7	1.93	2.25	0.31	0.14	10.14	0.00	0.31	38%
		41	42				0.46					0.345	0.510	10.14	111.06	157.33	149.58	211.90	181.01	256.43		0.00	157.33	0.00	PVC	375	2.00	247.95	72.6	2.25	2.56	0.32	0.54	10.67	0.00	1.45	63%
		42	43				0.65					0.488	0.998	10.67	107.18	296.98	144.33	399.90	174.64	483.91		0.00	296.98	0.00	CONC	450	2.00	420.64	90.0	2.56	2.84	0.28	0.59	11.26	0.00	1.80	71%
		43	44				0.27					0.203	1.200	11.26	103.33	344.42	139.10	463.69	168.32	561.06		0.00	344.42	0.00	CONC	525	2.00	634.50	45.1	2.84	2.38	0.46	0.26	11.52	0.00	0.90	54%
		45	46			0.57						0.371	0.371	10.00	112.09	115.36	150.97	155.38	182.70	188.03		0.00	115.36	0.00	CONC	450	0.50	210.32	87.0	1.28	1.27	0.01	1.13	11.13	0.00	0.44	55%
		46	44			0.45						0.293	0.663	11.13	104.14	191.79	140.20	258.21	169.65	312.44		0.00	191.79	0.00	CONC	525	0.40	283.76	68.0	1.27	2.38	1.11	0.89	12.02	0.00	0.27	68%
		44	47			0.07						0.046	9.119	13.96	89.14	2257.85	119.90	3037.08	145.05	3674.09		397.58	2655.43	0.00	CONC	1350	0.40	3521.63	44.7	2.38	2.38	0.00	0.31	14.28	0.00	0.18	75%
		47	50			0.06						0.039	9.158	14.28	87.80	2233.33	118.09	3003.83	142.85	3633.79		397.58	2630.91	0.00	CONC	1350	0.40	3521.63	37.7	2.38	2.56	0.17	0.26	14.54	0.00	0.15	75%
		51	52			1.13						0.735	0.735	10.00	112.09	228.69	150.97	308.03	182.70	372.76		0.00	228.69	0.00	CONC	525	0.50	317.25	110.0	1.42	1.20	0.22	1.29	11.29	0.00	0.55	72%
		52	53			0.23						0.150	0.884	11.29	103.13	253.23	138.84	340.92	167.99	412.51		0.00	253.23	0.00	CONC	600	0.30	350.85	36.2	1.20	1.20	0.00	0.50	11.79	0.00	0.11	72%
		53	54			0.08						0.052	0.936	11.79	100.10	260.25	134.73	350.30	163.02	423.85		0.00	260.25	0.00	CONC	600	0.30	350.85	12.5	1.20	1.30	0.10	0.17	11.97	0.00	0.04	74%
		54	55			0.18						0.117	1.053	11.97	99.10	289.87	133.38	390.14	161.38	472.05		0.00	289.87	0.00	CONC	675	0.30	480.32	28.8	1.30	1.30	0.00	0.37	12.34	0.00	0.09	60%
		55	59			0.15						0.098	1.151	12.34	97.05	310.17	130.61	417.43	158.03	505.04		0.00	310.17	0.00	CONC	675	0.30	480.32	30.9	1.30	1.49	0.19	0.40	12.73	0.00	0.09	65%
		56	57			0.60						0.390	0.390	10.00	112.09	121.43	150.97	163.55	182.70	197.92		0.00	121.43	0.00	PVC	375	1.80	235.23	60.0	2.13	2.56	0.43	0.47	10.47	0.00	1.08	52%
		57	58			0.58						0.377	0.767	10.47	108.61	231.41	146.27	311.63	177.00	377.10		0.00	231.41	0.00	CONC	450	2.00	420.64	65.0	2.56	2.07	0.50	0.42	10.89	0.00	1.30	55%
		58	59			0.20						0.130	0.897	10.89	105.70	263.38	142.32	354.63	172.22	429.12		0.00	263.38	0.00	CONC	450	1.30	339.13	26.6	2.07	1.49	0.58	0.21	11.11	0.00	0.35	78%
		59	50			0.49						0.319	2.366	12.73	94.97	624.19	127.80	839.92	154.62	1016.18		0.00	624.19	0.00	CONC	825	0.30	820.22	75.3	1.49	2.56	1.07	0.84	13.58	0.00	0.23	76%
		48	49			0.52						0.338	0.338	10.00	112.09	105.24	150.97	141.75	182.70	171.53		0.00	105.24	0.00	CONC	450	0.50	210.32	60.0	1.28	1.27	0.01	0.78	10.78	0.00	0.30	50%
		49	50			0.29						0.189	0.527	10.78	106.45	155.69	143.34	209.64	173.45	253.67		0.00	155.69	0.00	CONC	525	0.40	283.76	45.5	1.27	2.56	1.29	0.60	11.38	0.00	0.18	55%
		50	60			0.17						0.111	12.161	14.54	86.70	2928.71	116.60	3938.83	141.06	4764.78		397.58	3326.29	0.00	CONC	1500	0.40	4664.06	33.4	2.56	2.56	0.00	0.22	14.76	0.00	0.13	71%
		60	61			0.49						0.319	12.479	14.76	85.82	2974.93	115.41	4000.76	139.61	4839.62		397.58	3372.51	0.00	CONC	1500	0.40	4664.06	40.4	2.56	2.56	0.00	0.26	15.02	0.00	0.16	72%
		61	63									0.000	12.479	15.02	84.79	2939.06	114.01	3952.23	137.92	4780.83		397.58	3336.64	0.00	CONC	1500	0.40	4664.06	33.5	2.56	2.72	0.17	0.22	15.24	0.00	0.13	72%
		63	64			0.21						0.137	17.614	16.48	79.58	3893.46	106.97	5233.70	129.38	6330.39		397.58	4291.04	0.00	CONC	1650	0.40	6013.74	46.5	2.72	2.72	0.00	0.28	16.76	0.00	0.19	71%
		64	65			0.47						0.306	17.920	16.76	78.65	3914.75	105.71	5261.96	127.86	6364.46		397.58	4312.33	0.00	CONC	1650	0.40	6013.74	67.1	2.72	2.72	0.00	0.41	17.17	0.00	0.27	72%
		65	HW1									0.000	17.920	17.17	77.35	3850.32	103.96	5174.85	125.74	6258.95		397.58	4247.90	0.00	CONC	1650	0.40	6013.74	25.3	2.72	N/A		0.15	17.33	0.00	0.10	71%

[illegible]

APPENDIX C

STORMWATER MANAGEMENT CALCULATIONS AND FIGURES

26:524

SORBARA - WELLINGTON-CENTRE

NASHYD Catchment Characteristics - Areas Tributary to Unnamed Creek Site Outlet

Agricultural Catchment Tributary to Proposed Pond Outlet

Area (ha)	Development area of site =	30.26
	External area to continue to drain through site =	6.09
	Total	36.35

CN Calculations

Soil	Soil Type	Cover	CN (II)	CN (III)
Harriston Loam	B/BC	Crop	78	90
Listowel Loam	BC	Crop	74 - 78	87 - 90
Overall			77	89

Time of Concentration **Reach 1 - Roadside ditches on First Line**

Upper elevation (m) =	432
Lower elevation (m) =	425.23
Overall fall (m) =	6.77
Flow length (m) =	575
Slope (%) =	1.18%

Uplands Characteristics =	Grassed waterway
Velocity (m/s) =	0.5
Tc (min) =	19.17
Tc (hr) =	0.32

Reach 2 - Grassed waterway within site

Upper elevation (m) =	425.23
Lower elevation (m) =	418.66
Overall fall (m) =	6.57
Flow length (m) =	525
Slope (%) =	1.25%

Uplands Characteristics =	Grassed waterway
Velocity (m/s) =	0.55
Tc (min) =	15.91
Tc (hr) =	0.27

Reach 3 - Unnamed creek

Upper elevation (m) =	418.66
Lower elevation (m) =	416.41
Overall fall (m) =	2.25
Flow length (m) =	330
Slope (%) =	0.68%

Uplands Characteristics = Grassed waterway
 Velocity (m/s) = 0.4
 Tc (min) = 13.75
 Tc (hr) = 0.23

 Overall Tc (hr) = 0.81

Agricultural Catchment Bypassing Proposed Pond Outlet

Area (ha) = 2.52

CN Calculations

Soil	Soil Type	Cover	CN (II)	CN (III)
Harriston Loam	B/BC	Crop	78	90

Time of Concentration Reach 1 - Field

Upper elevation (m) = 429
 Lower elevation (m) = 425
 Overall fall (m) = 4
 Flow length (m) = 285
 Slope (%) = 1.40%

Uplands Characteristics = Pasture
 Velocity (m/s) = 0.35
 Tc (min) = 13.57
 Tc (hr) = 0.23

Woodland / Wetland Catchment

Area (ha) = 14.66

CN AMCII Calculations

Soil	Soil Type	Cover	CN (II)	CN (III)
Parkhill Loam	BC	Woodlot	65	82

Time of Concentration Reach 1-Unnamed creek

Upper elevation (m) = 424
 Lower elevation (m) = 418.66
 Overall fall (m) = 5.34
 Flow length (m) = 580
 Slope (%) = 0.92%

Uplands Characteristics = Grassed waterway
 Velocity (m/s) = 0.45
 Tc (min) = 21.48
 Tc (hr) = 0.36

Reach 2 - Unnamed creek

Upper elevation (m) = 418.66
Lower elevation (m) = 416.41
Overall fall (m) = 2.25
Flow length (m) = 330
Slope (%) = 0.68%

Uplands Characteristics = Grassed waterway
Velocity (m/s) = 0.4
Tc (min) = 13.75
Tc (hr) = 0.23

Overall Tc (hr) = 0.59

**STANDHYD Catchment Characteristics - Areas Tributary to Unnamed Creek Site Outlet,
Bypassing Pond**

Industrial/Commercial Catchment Bypassing Proposed Pond Outlet

Area (ha) = 16.82

CN Calculations

Soil	Soil Type	Cover	CN (II)	CN (III)
Harriston Loam	B/BC	Lawns	79 - 86	90 - 95
SAY			84	93

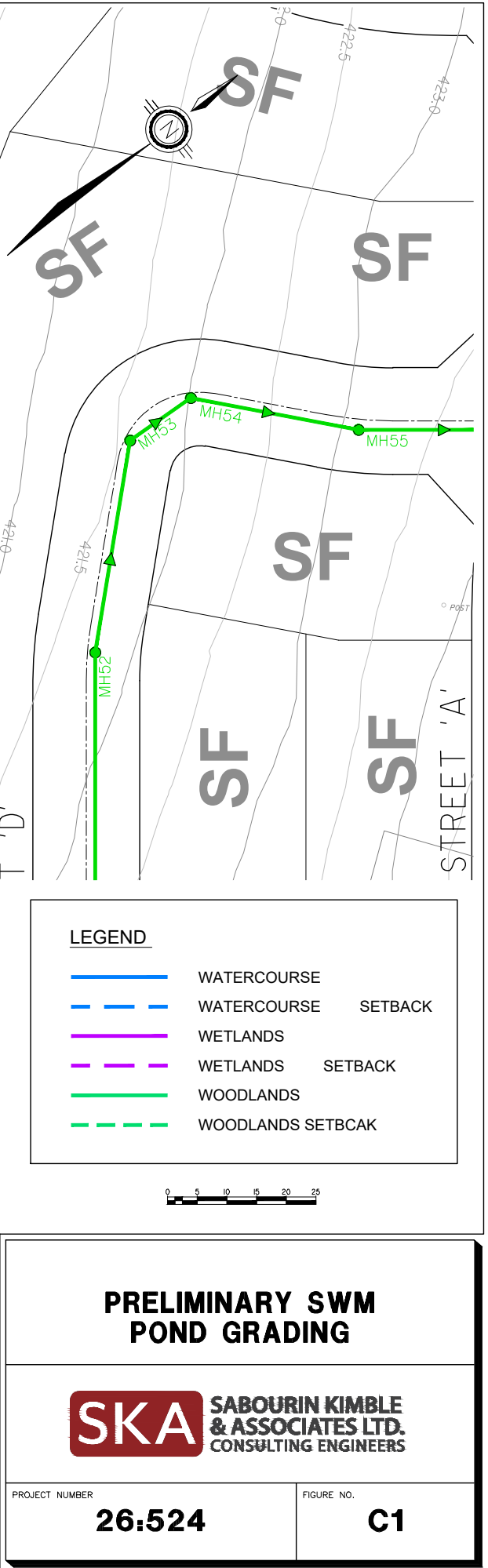
Eastwood Subdivision Backyards Bypassing Proposed Pond Outlet

Area (ha) = 0.41

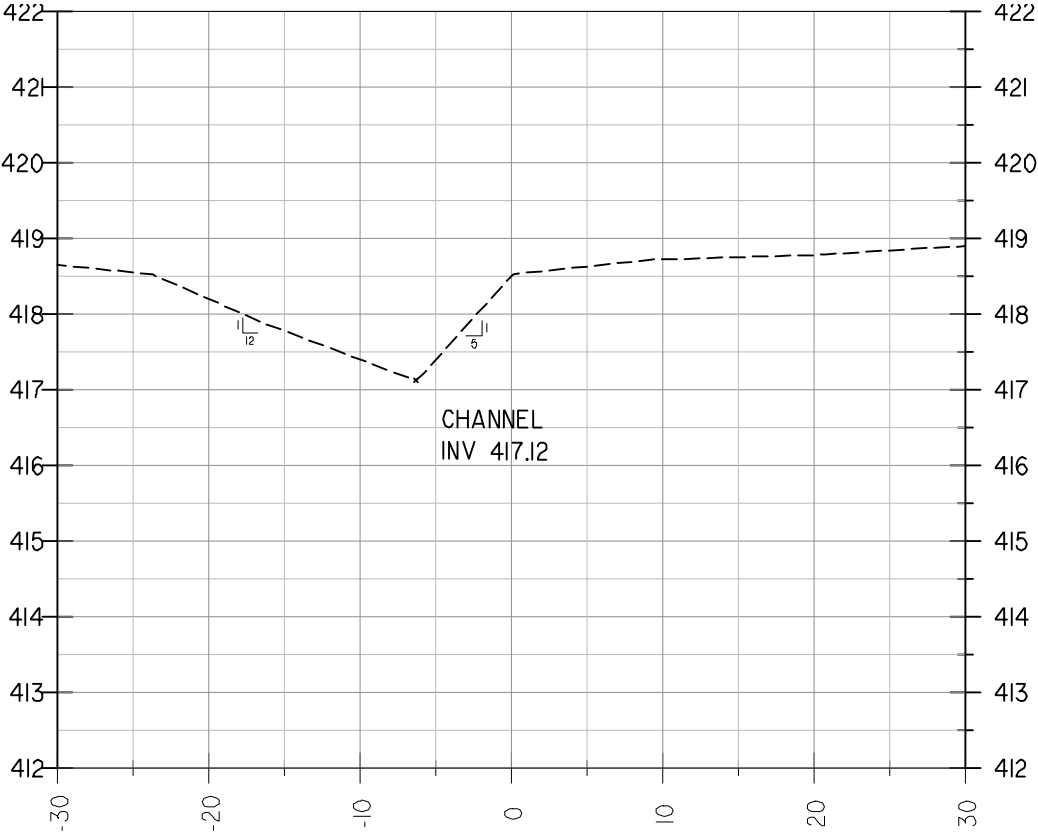
CN Calculations

Soil	Soil Type	Cover	CN (II)	CN (III)
Harriston Loam	B/BC	Lawns	79 - 86	90 - 95
SAY			84	93

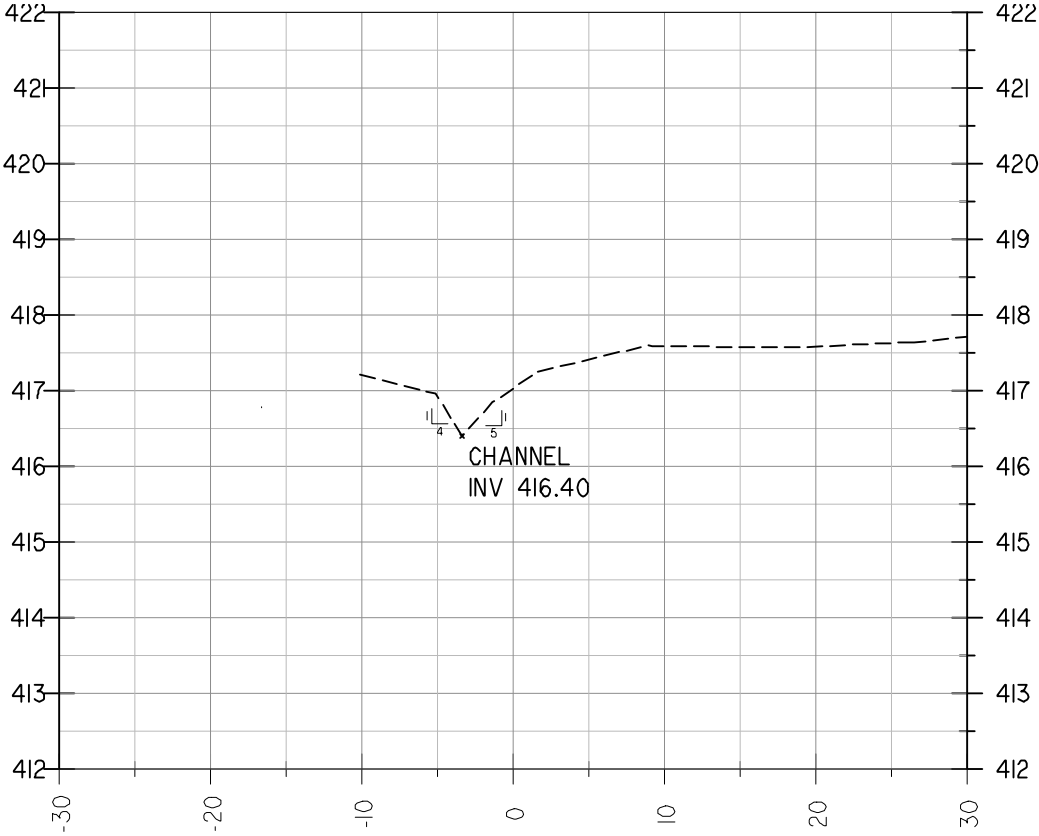
EXISTING CONDITIONS CHANNEL CALCULATIONS



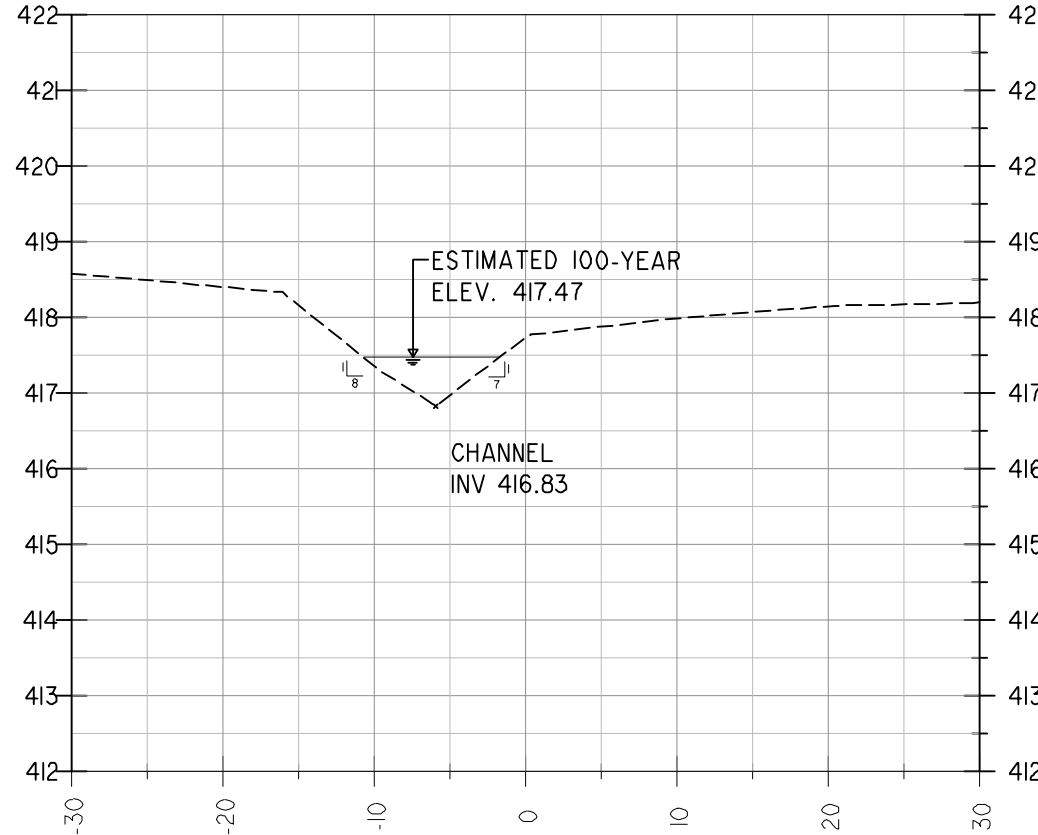
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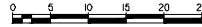
SECTION A-A
SCALE: H 1:500 V 1:100



SECTION C-C
SCALE: H 1:500 V 1:100



SECTION B-B
SCALE: H 1:500 V 1:100



**EXISTING CHANNEL
CROSS SECTIONS
NEAR PROPOSED POND OUTFALL**



PROJECT NUMBER
26.524

FIGURE NO.
C2

Manning's Calculator**(Triangular Flow)****Input:**

Discharge	7.51	m ³ /s
Depth	1.06	m
Slope	0.41%	
Manning's n	0.04	
Side Slopes	6.5	:1 (H:V)

Job Number: **24:524:P1**

Description: Existing 100-Year Storm Depth in
Receiving Channel, Invert = 416.41 m
Depth = 1.06 m
100-Year Flood Line = 417.47 m

Solve for:

Depth

Velocity	1.04	m/s
Flow Area	7.26	m ²
Flow Top Width	13.74	m
Wetted Perimeter	13.90	m
Critical Depth	0.77	m
Critical Slope	2.18%	
Froude Number	0.46	

Mannings N estimate: From HEC-RAS Hydraulic Reference Manual

1. Main Channels	c: Clean, winding, some pools and shoals	Normal n =	0.040
2. Flood Plains	b.3. Mature field crops	Normal n =	0.040

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SORBARA - WELLINGTON-CENTRE

SWM Pond Outfall Elevation Calculations

Based on estimate of 100-Year storm flood line in unnamed creek.

3 cross sections were plotted of the unnamed creek to estimate the 100-year flood elevation at the pond outlet.

Section No	Invert (m)	Distance (m)	Slope (%)	Left Side Slope	Right Side Slope	Avg Side Slope
A - A	417.12	86	0.34%	10	5	7.5
B - B	416.83			8	7	7.5
C - C	416.4			4	5	4.5
Overall		175	0.41%	7.3	5.7	6.5

The existing conditions 100-year storm flow at the point where the channel leaves the site at the south corner was determined using VO. (Worst case scenario of 4 Hour Chicago storm, 12 Hour SCS storm.)

100-Year flow (m³/s) = 7.51

The above characteristics were entered into a Mannings V shaped channel calculator.

100-Year flow depth (m) = 1.06 (From Manning calculator)

Channel invert at site outlet (m) = 416.41 (From topographic survey)

100-Year Flood Line (m) = 417.47

Outlet headwall elevation (m) = 417.60

Therefore the outlet will be above the 100-Year storm flood line.

PROPOSED CONDITIONS HYDROLOGY CALCULATIONS

26:524
SORBARA - WELLINGTON-CENTRE
SWM POND

NASHYD Catchment Characteristics - Proposed Areas Tributary to Proposed Pond Outlet Location

Agricultural Catchment

Area (ha) = 6.09

CN Calculations

Soil	Soil Type	Cover	CN (II)	CN (III)
Harriston Loam	B/BC	Crop	74 - 78	87 - 90
Listowel Loam	BC	Crop	78	90
SAY			77	89

Time of Concentration Reach 1 - Roadside ditches on First Line

Upper elevation (m) = 432
Lower elevation (m) = 425.23
Overall fall (m) = 6.77
Flow length (m) = 575
Slope (%) = 1.18%

Grassed waterway

Velocity (m/s) = 0.5
Tc (min) = 19.17
Tc (hr) = 0.32

NASHYD Catchment Characteristics - Areas Tributary to Unnamed Creek Site Outlet, Bypassing Pond

Agricultural Catchment Bypassing Proposed Pond Outlet

Area (ha) = 2.52

CN Calculations

Soil	Soil Type	Cover	CN (II)	CN (III)
Harriston Loam	B/BC	Crop	74 - 78	87 - 90
SAY			77	89

Time of Concentration Reach 1 - Field

Upper elevation (m) = 429
Lower elevation (m) = 425
Overall fall (m) = 4
Flow length (m) = 285
Slope (%) = 1.40%

Uplands Characteristics = Pasture
 Velocity (m/s) = 0.35
 Tc (min) = 13.57
 Tc (hr) = 0.23

Woodland / Wetland Catchment

Area (ha) = 14.66

CN AMCII Calculations

Soil	Soil Type	Cover	CN (II)	CN (III)
Parkhill Loam	BC	Woodlot	65	82

Time of Concentration Reach 1-Unnamed watercourse

Upper elevation (m) = 424
 Lower elevation (m) = 418.66
 Overall fall (m) = 5.34
 Flow length (m) = 580
 Slope (%) = 0.92%

Uplands Characteristics = Grassed waterway
 Velocity (m/s) = 0.45
 Tc (min) = 21.48
 Tc (hr) = 0.36

Reach 2 - Unnamed creek

Upper elevation (m) = 418.66
 Lower elevation (m) = 416.41
 Overall fall (m) = 2.25
 Flow length (m) = 330
 Slope (%) = 0.68%

Uplands Characteristics = Grassed waterway
 Velocity (m/s) = 0.4
 Tc (min) = 13.75
 Tc (hr) = 0.23

Overall Tc (hr) = 0.59

STANDHYD Catchment Characteristics - Areas Tributary to Unnamed Creek Site Outlet, Bypassing Pond

Industrial/Commercial Catchment Bypassing Proposed Pond Outlet

Area (ha) = 16.82

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SORBARA CENTRE-WELLINGTON

IMPERVIOUS COVERAGE CALCULATIONS

Lot Width (m)	Lot Depth (m)	Typical Lot Area (m ²)	Typical Setbacks (m)			Max. Building Envelope By Max Coverage (m ²)	Max Coverage By Bylaw %
			Rear Yard	Front Yard	Side Yard		
12.2	28.0	341.6	7.5	6.0	1.2/0.6	166.4	40%
11.0	28.0	308.0	7.5	6.0	1.2/0.6	147.2	40%
9.1	28.0	254.8	7.5	6.0	1.2/0.6	116.8	40%
6.1	28.0	170.8	7.5	6.0	0/0	97.6	45%

Lot Type	Lot Size (m)	Road Area (m ²)	Roof Area (m ²)	Driveway Apron (m ²)	Driveway Area (m ²)	Sidewalk Area (m ²)	Total Area Incl ROW (m ²)	Total Imp Area Incl ROW (m ²)	% Total Impervious
Freehold Single (20m ROW)	12.20x28.00	46.8	147.2	23.4	24.8	16.5	418.0	258.6	62%
Freehold Single (20m ROW)	11.00x28.00	46.8	147.2	23.4	24.8	16.5	418.0	258.6	62%
Freehold Single (20m ROW)	9.10x28.00	38.7	116.8	23.4	24.8	13.7	345.8	217.3	63%
Freehold Townhome (18m ROW)	6.10x28.00	25.9	97.6	14.0	15.8	4.6	225.7	157.9	70%

Overall	(Per above Calculations)	64%

CN Calculations

Soil	Soil Type	Cover	CN (II)	CN (III)
Harriston Loam	B/BC	Lawns	79 - 86	90 - 95
SAY			84	93

Eastwood Subdivision Backyards Bypassing Proposed Pond Outlet

Area (ha) = 0.41

CN Calculations

Soil	Soil Type	Cover	CN (II)	CN (III)
Harriston Loam	B/BC	Lawns	79 - 86	90 - 95
SAY			85	95

STANDHYD Catchment Characteristics - Proposed Development Areas

Residential Area Tributary to Pond Outlet

Area (ha) = 29.18

CN Calculations

Soil	Soil Type	Cover	CN (II)	CN (III)
Harriston Loam	B/BC	Lawns	79 - 86	90 - 95
Listowell Loam	BC	Lawns	86	95
SAY			85	93

Uncontrolled Backyards, to be Overcontrolled by Pond

Area (ha) = 1.08

CN Calculations

Soil	Soil Type	Cover	CN (II)	CN (III)
Harriston Loam	B/BC	Lawns	79 - 86	90 - 95
Listowell Loam	BC	Lawns	86	95
SAY			85	93

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SORBARA - WELLINGTON-CENTRE

Calculation of Target Flows from Development Portion of Site

Existing Conditions (Target) Flows for Pond Outlet, Proposed Conditions Flows Including Pond and Uncontrolled Rear Yards

Storm	Ex. Cond Peak Flows (m ³ /s)		Proposed Site Outflow (m ³ /s)		Discharge Difference (m ³ /s)	
	4 Hour Chicago	12 Hour SCS II	4 Hour Chicago	12 Hour SCS II	4 Hour Chicago	12 Hour SCS II
2-Year	0.418	0.402	0.413	0.395	-0.005	-0.007
5-Year	0.687	0.656	0.680	0.648	-0.007	-0.008
10-Year	0.890	0.848	0.882	0.838	-0.008	-0.010
25-Year	1.162	1.104	1.153	1.088	-0.009	-0.016
50-Year	1.381	1.304	1.368	1.292	-0.013	-0.012
100-Year	1.605	1.513	1.587	1.494	-0.018	-0.019

VO Model Required Pond Discharge Rates and Storage Volumes

Storm	Proposed Pond Outflow (m ³ /s)		Required Storage (m ³)	
	4 Hour Chicago	12 Hour SCS II	4 Hour Chicago	12 Hour SCS II
2-Year	0.400	0.383	6,221	6,159
5-Year	0.659	0.628	7,733	7,683
10-Year	0.856	0.814	8,831	8,740
25-Year	1.120	1.057	10,205	10,108
50-Year	1.329	1.255	11,276	11,154
100-Year	1.542	1.453	12,350	12,180

The 4 Hour Chicago storms produce the larger storage values, therefore these volumes are used for the pond design.

DRAINAGE AREA COMPOSITION			
LOCATION	AREA (ha)	TIMP (%)	XIMP (%)
Heritage House	0.14	50%	50%
Singles 11.0 - 12.2	8.94	62%	52%
Singles 9.1	9.56	63%	53%
Townhouses 6.1	7.48	70%	60%
SWM Pond	1.56	50%	50%
Park	1.50	7%	1%
Total	29.18	61%	52%

PERMANENT POOL REQUIREMENTS

Type of Pond

Wet Pond

Protection Level

Level 1 - Enhanced

Using Table 3.2 in MOE *Stormwater Management Planning and Design Manual*

Storage Volume (m³/ha) for Impervious Level

35%	55%	70%	85%
140	190	225	250

Unit Volume (m³/ha) = $\left(\frac{61\% - 85\%}{89\% - 85\%} \right) \left(225 - 190 \right) + 190$

= 204 m³/ha

- 40 m³/ha of extended detention

= 164 m³/ha

Permanent Pool Storage Required = $\left(164 \text{ m}^3/\text{ha} \right) \left(29.18 \text{ ha} \right)$

= 4,775 m³

FOREBAY PERMANENT POOL					
Elevation (m)	Depth (m)	Area (m ²)	Avg. Area (m ²)	Volume (m ³)	Total Volume (m ³)
416.50		364			0
	0.50		538	269	
417.00		711			269
	0.50		905	452	
417.50		1,098			721
	0.25		1,203	301	
417.75		1,307			1,022
MAIN CELL PERMANENT POOL					
Elevation (m)	Depth (m)	Area (m ²)	Avg. Area (m ²)	Volume (m ³)	Total Volume (m ³)
416.00		2,170			0
	0.50		2,503	1,252	
416.50		2,836			1,252
	0.50		3,190	1,595	
417.00		3,543			2,846
	0.50		3,917	1,958	
417.50		4,290			4,805
	0.25		4,486	1,121	
417.75		4,681			5,926
TOTAL PERMANENT POOL VOLUME (m ³)					6,948
ACTIVE VOLUME INCL EXTENDED DETENTION AND QUANTITY CONTROL					
Elevation (m)	Depth (m)	Area (m ²)	Avg. Area (m ²)	Volume (m ³)	Total Volume (m ³)
417.75		6,063			0
	0.25		6,303	1,576	
418.00		6,543			1,576
	0.50		7,032	3,516	
418.50		7,521			5,092
	0.50		8,029	4,014	
419.00		8,536			9,106
	0.50		9,060	4,530	
419.50		9,583			13,636
	0.50		10,121	5,061	
420.00		10,659			18,696
TOTAL ACTIVE VOLUME (m ³)					18,696

26:522
SORBARA - WELLINGTON-CENTRE
PONDING ELEVATIONS

	Volume Required (m³)	Forebay	Deep Cell	Total Available	Elevation (m)
Permanent Pool	4,775	1,022	5,926	6,948	417.75

STORM EVENT	Storage Volume (m³)	Elevation (m)	Flux (m)
Erosion Control	4,972	418.48	0.73
2-year	6,221	418.64	0.89
5-year	7,733	418.83	1.08
10-year	8,831	418.97	1.22
25-year	10,205	419.12	1.37
50-year	11,276	419.24	1.49
100-year	12,350	419.36	1.61

26:522

SORBARA - WELLINGTON-CENTRE

EXTENDED DETENTION CALCULATIONS

25mm RUNOFF EROSION CONTROL

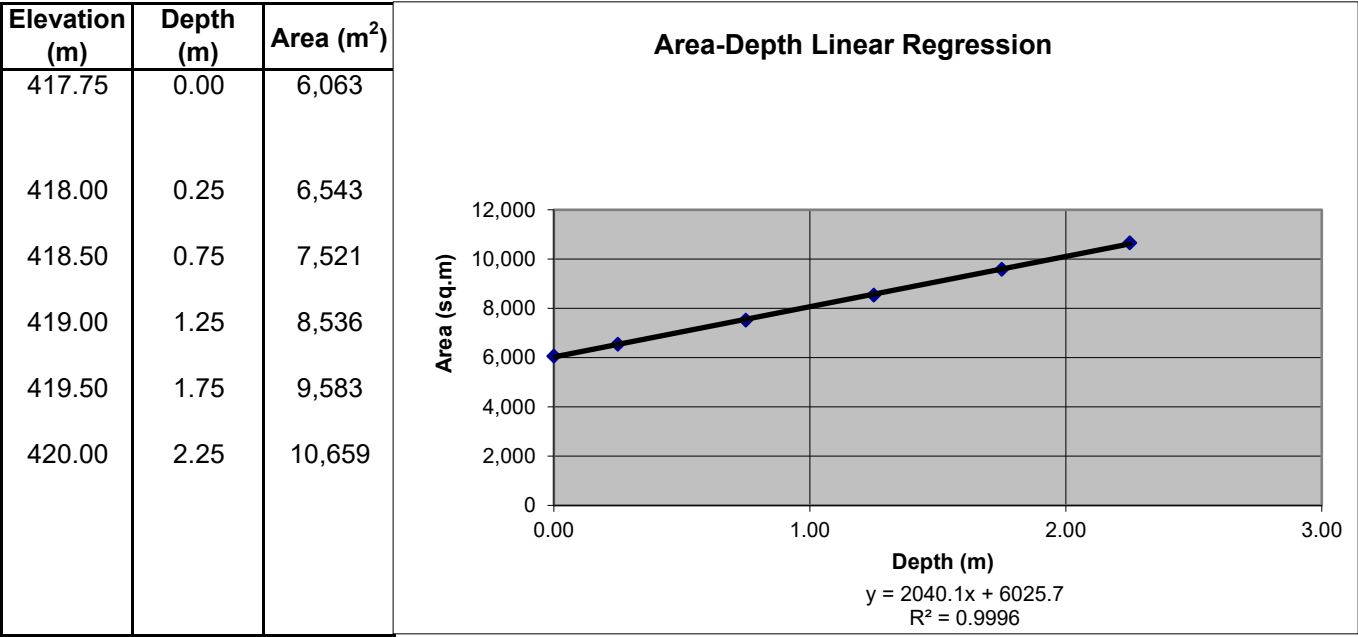
Drainage Area =	29.18 ha
Impervious Coverage =	61%
Impervious Area =	<u>17.76 ha</u>

25mm Runoff Volume = 4,439 m³

Drainage Area =	29.18 ha
VO 25mm Runoff Depth :	<u>17.04 mm</u>

25mm Runoff Volume = 4,972 m³

26:522
SORBARA - WELLINGTON-CENTRE
EXTENDED DETENTION CALCULATIONS



Using Equation 4.11 in MOE Stormwater Management Planning and Design Manual

$$t = \frac{0.66C_2h^{1.5} + 2C_3h^{0.5}}{2.75Ao}$$

t = 86811 s
t = 24 hr

where:

$C_2 = 2040.1$
 $h = 0.73$ m
 $C_3 = 6025.7$
 $Ao = 0.04676$ m²
dia. Orifice = 244 mm

$$Q_{peak} = CA\sqrt{2gh}$$

$$Q_{peak} = (0.62)(0.0102)\sqrt{2(9.81)(0.59)}$$

$Q_{peak} = 0.1099$

where:

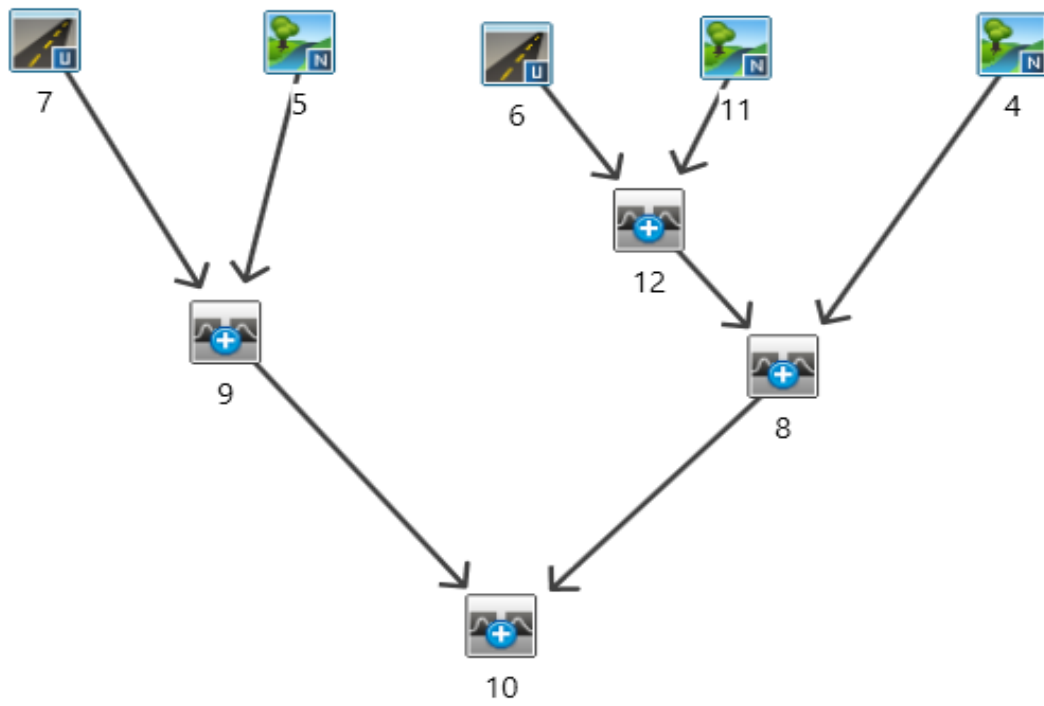
$C = 0.62$
 $h = 0.73$ m
 $Ao = 0.04676$ m²
dia. Orifice = 244 mm

APPENDIX D

HYDROLOGY OUTPUT

EXISTING CONDITIONS HYDROLOGY CALCULATIONS

EXISTING CONDITIONS VO MODEL



=====

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

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat

Output filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\da5c7511-0da9-4331-92d9-1c56d9bcddc4\s

Summary filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\da5c7511-0da9-4331-92d9-1c56d9bcddc4\s

DATE: 06-29-2026

TIME: 03:46:20

USER:

COMMENTS: _____

** SIMULATION : 10 Year 12 Hour AES (Bloor, T **

| READ STORM |

Filename: C:\Users\dmurchison\AppData\Local\Temp\

	96f6e017-39ec-4dd5-9feb-e3727c87678c\600770b3
Ptotal= 62.71 mm	Comments: 10 Year 12 Hour AES (Bloor, TRCA)

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	10.66	6.50	4.39	9.75	0.63
0.25	0.63	3.50	10.66	6.75	4.39	10.00	0.63
0.50	0.63	3.75	10.66	7.00	4.39	10.25	0.63
0.75	0.63	4.00	10.66	7.25	2.51	10.50	0.63
1.00	0.63	4.25	28.84	7.50	2.51	10.75	0.63
1.25	0.63	4.50	28.84	7.75	2.51	11.00	0.63
1.50	0.63	4.75	28.84	8.00	2.51	11.25	0.63
1.75	0.63	5.00	28.84	8.25	1.25	11.50	0.63
2.00	0.63	5.25	8.15	8.50	1.25	11.75	0.63
2.25	3.76	5.50	8.15	8.75	1.25	12.00	0.63
2.50	3.76	5.75	8.15	9.00	1.25		
2.75	3.76	6.00	8.15	9.25	0.63		
3.00	3.76	6.25	4.39	9.50	0.63		

CALIB	
NASHYD (0004)	Area (ha)= 36.35 Curve Number (CN)= 77.0
ID= 1 DT= 5.0 min	Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
-----	U.H. Tp(hrs)= 0.81

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	3.167	3.76	6.250	8.15	9.33	0.63
0.167	0.00	3.250	3.76	6.333	4.39	9.42	0.63
0.250	0.00	3.333	10.66	6.417	4.39	9.50	0.63
0.333	0.63	3.417	10.66	6.500	4.39	9.58	0.63
0.417	0.63	3.500	10.66	6.583	4.39	9.67	0.63
0.500	0.63	3.583	10.66	6.667	4.39	9.75	0.63
0.583	0.63	3.667	10.66	6.750	4.39	9.83	0.63
0.667	0.63	3.750	10.66	6.833	4.39	9.92	0.63
0.750	0.63	3.833	10.66	6.917	4.39	10.00	0.63
0.833	0.63	3.917	10.66	7.000	4.39	10.08	0.63
0.917	0.63	4.000	10.66	7.083	4.39	10.17	0.63
1.000	0.63	4.083	10.66	7.167	4.39	10.25	0.63
1.083	0.63	4.167	10.66	7.250	4.39	10.33	0.63
1.167	0.63	4.250	10.66	7.333	2.51	10.42	0.63
1.250	0.63	4.333	28.84	7.417	2.51	10.50	0.63
1.333	0.63	4.417	28.84	7.500	2.51	10.58	0.63
1.417	0.63	4.500	28.84	7.583	2.51	10.67	0.63

1.500	0.63	4.583	28.84	7.667	2.51	10.75	0.63
1.583	0.63	4.667	28.84	7.750	2.51	10.83	0.63
1.667	0.63	4.750	28.84	7.833	2.51	10.92	0.63
1.750	0.63	4.833	28.84	7.917	2.51	11.00	0.63
1.833	0.63	4.917	28.84	8.000	2.51	11.08	0.63
1.917	0.63	5.000	28.84	8.083	2.51	11.17	0.63
2.000	0.63	5.083	28.84	8.167	2.51	11.25	0.63
2.083	0.63	5.167	28.84	8.250	2.51	11.33	0.63
2.167	0.63	5.250	28.84	8.333	1.25	11.42	0.63
2.250	0.63	5.333	8.15	8.417	1.25	11.50	0.63
2.333	3.76	5.417	8.15	8.500	1.25	11.58	0.63
2.417	3.76	5.500	8.15	8.583	1.25	11.67	0.63
2.500	3.76	5.583	8.15	8.667	1.25	11.75	0.63
2.583	3.76	5.667	8.15	8.750	1.25	11.83	0.63
2.667	3.76	5.750	8.15	8.833	1.25	11.92	0.63
2.750	3.76	5.833	8.15	8.917	1.25	12.00	0.63
2.833	3.76	5.917	8.15	9.000	1.25	12.08	0.63
2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
3.083	3.76	6.167	8.15	9.250	1.25		

Unit Hyd Qpeak (cms)= 1.714

PEAK FLOW (cms)= 0.848 (i)

TIME TO PEAK (hrs)= 5.833

RUNOFF VOLUME (mm)= 24.932

TOTAL RAINFALL (mm)= 62.710

RUNOFF COEFFICIENT = 0.398

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

CALIB			
NASHYD (0011)	Area (ha)=	2.52	Curve Number (CN)= 78.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
-----		U.H. Tp(hrs)=	0.23

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	3.167	3.76	6.250	8.15	9.33	0.63
0.167	0.00	3.250	3.76	6.333	4.39	9.42	0.63
0.250	0.00	3.333	10.66	6.417	4.39	9.50	0.63
0.333	0.63	3.417	10.66	6.500	4.39	9.58	0.63
0.417	0.63	3.500	10.66	6.583	4.39	9.67	0.63
0.500	0.63	3.583	10.66	6.667	4.39	9.75	0.63

0.583	0.63	3.667	10.66	6.750	4.39	9.83	0.63
0.667	0.63	3.750	10.66	6.833	4.39	9.92	0.63
0.750	0.63	3.833	10.66	6.917	4.39	10.00	0.63
0.833	0.63	3.917	10.66	7.000	4.39	10.08	0.63
0.917	0.63	4.000	10.66	7.083	4.39	10.17	0.63
1.000	0.63	4.083	10.66	7.167	4.39	10.25	0.63
1.083	0.63	4.167	10.66	7.250	4.39	10.33	0.63
1.167	0.63	4.250	10.66	7.333	2.51	10.42	0.63
1.250	0.63	4.333	28.84	7.417	2.51	10.50	0.63
1.333	0.63	4.417	28.84	7.500	2.51	10.58	0.63
1.417	0.63	4.500	28.84	7.583	2.51	10.67	0.63
1.500	0.63	4.583	28.84	7.667	2.51	10.75	0.63
1.583	0.63	4.667	28.84	7.750	2.51	10.83	0.63
1.667	0.63	4.750	28.84	7.833	2.51	10.92	0.63
1.750	0.63	4.833	28.84	7.917	2.51	11.00	0.63
1.833	0.63	4.917	28.84	8.000	2.51	11.08	0.63
1.917	0.63	5.000	28.84	8.083	2.51	11.17	0.63
2.000	0.63	5.083	28.84	8.167	2.51	11.25	0.63
2.083	0.63	5.167	28.84	8.250	2.51	11.33	0.63
2.167	0.63	5.250	28.84	8.333	1.25	11.42	0.63
2.250	0.63	5.333	8.15	8.417	1.25	11.50	0.63
2.333	3.76	5.417	8.15	8.500	1.25	11.58	0.63
2.417	3.76	5.500	8.15	8.583	1.25	11.67	0.63
2.500	3.76	5.583	8.15	8.667	1.25	11.75	0.63
2.583	3.76	5.667	8.15	8.750	1.25	11.83	0.63
2.667	3.76	5.750	8.15	8.833	1.25	11.92	0.63
2.750	3.76	5.833	8.15	8.917	1.25	12.00	0.63
2.833	3.76	5.917	8.15	9.000	1.25	12.08	0.63
2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
3.083	3.76	6.167	8.15	9.250	1.25		

Unit Hyd Qpeak (cms)= 0.418

PEAK FLOW (cms)= 0.102 (i)

TIME TO PEAK (hrs)= 5.250

RUNOFF VOLUME (mm)= 25.719

TOTAL RAINFALL (mm)= 62.710

RUNOFF COEFFICIENT = 0.410

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

CALIB			
STANDHYD (0006)	Area (ha)=	16.82	
ID= 1 DT= 5.0 min	Total Imp(%)=	90.00	Dir. Conn.(%)= 75.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	15.14	1.68

Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	334.86	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	3.76	6.250	8.15	9.33	0.63
0.167	0.00	3.250	3.76	6.333	4.39	9.42	0.63
0.250	0.00	3.333	10.66	6.417	4.39	9.50	0.63
0.333	0.63	3.417	10.66	6.500	4.39	9.58	0.63
0.417	0.63	3.500	10.66	6.583	4.39	9.67	0.63
0.500	0.63	3.583	10.66	6.667	4.39	9.75	0.63
0.583	0.63	3.667	10.66	6.750	4.39	9.83	0.63
0.667	0.63	3.750	10.66	6.833	4.39	9.92	0.63
0.750	0.63	3.833	10.66	6.917	4.39	10.00	0.63
0.833	0.63	3.917	10.66	7.000	4.39	10.08	0.63
0.917	0.63	4.000	10.66	7.083	4.39	10.17	0.63
1.000	0.63	4.083	10.66	7.167	4.39	10.25	0.63
1.083	0.63	4.167	10.66	7.250	4.39	10.33	0.63
1.167	0.63	4.250	10.66	7.333	2.51	10.42	0.63
1.250	0.63	4.333	28.84	7.417	2.51	10.50	0.63
1.333	0.63	4.417	28.84	7.500	2.51	10.58	0.63
1.417	0.63	4.500	28.84	7.583	2.51	10.67	0.63
1.500	0.63	4.583	28.84	7.667	2.51	10.75	0.63
1.583	0.63	4.667	28.84	7.750	2.51	10.83	0.63
1.667	0.63	4.750	28.84	7.833	2.51	10.92	0.63
1.750	0.63	4.833	28.84	7.917	2.51	11.00	0.63
1.833	0.63	4.917	28.84	8.000	2.51	11.08	0.63
1.917	0.63	5.000	28.84	8.083	2.51	11.17	0.63
2.000	0.63	5.083	28.84	8.167	2.51	11.25	0.63
2.083	0.63	5.167	28.84	8.250	2.51	11.33	0.63
2.167	0.63	5.250	28.84	8.333	1.25	11.42	0.63
2.250	0.63	5.333	8.15	8.417	1.25	11.50	0.63
2.333	3.76	5.417	8.15	8.500	1.25	11.58	0.63
2.417	3.76	5.500	8.15	8.583	1.25	11.67	0.63
2.500	3.76	5.583	8.15	8.667	1.25	11.75	0.63
2.583	3.76	5.667	8.15	8.750	1.25	11.83	0.63
2.667	3.76	5.750	8.15	8.833	1.25	11.92	0.63
2.750	3.76	5.833	8.15	8.917	1.25	12.00	0.63
2.833	3.76	5.917	8.15	9.000	1.25	12.08	0.63
2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
3.083	3.76	6.167	8.15	9.250	1.25		

Max.Eff.Inten.(mm/hr)=	28.84	64.80

over (min)	10.00	20.00	
Storage Coeff. (min)=	8.67 (ii)	17.07 (ii)	
Unit Hyd. Tpeak (min)=	10.00	20.00	
Unit Hyd. peak (cms)=	0.12	0.06	
			TOTALS
PEAK FLOW (cms)=	1.01	0.28	1.287 (iii)
TIME TO PEAK (hrs)=	5.25	5.25	5.25
RUNOFF VOLUME (mm)=	61.71	47.35	58.12
TOTAL RAINFALL (mm)=	62.71	62.71	62.71
RUNOFF COEFFICIENT =	0.98	0.76	0.93

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 84.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0012)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0011):	2.52	0.102	5.25	25.72
+ ID2= 2 (0006):	16.82	1.287	5.25	58.12
=====				
ID = 3 (0012):	19.34	1.389	5.25	53.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0008)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0012):	19.34	1.389	5.25	53.90
+ ID2= 2 (0004):	36.35	0.848	5.83	24.93
=====				
ID = 3 (0008):	55.69	1.985	5.25	34.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0005)	Area (ha)=	14.66	Curve Number (CN)= 65.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.59	

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	3.167	3.76	6.250	8.15	9.33	0.63
0.167	0.00	3.250	3.76	6.333	4.39	9.42	0.63
0.250	0.00	3.333	10.66	6.417	4.39	9.50	0.63
0.333	0.63	3.417	10.66	6.500	4.39	9.58	0.63
0.417	0.63	3.500	10.66	6.583	4.39	9.67	0.63
0.500	0.63	3.583	10.66	6.667	4.39	9.75	0.63
0.583	0.63	3.667	10.66	6.750	4.39	9.83	0.63
0.667	0.63	3.750	10.66	6.833	4.39	9.92	0.63
0.750	0.63	3.833	10.66	6.917	4.39	10.00	0.63
0.833	0.63	3.917	10.66	7.000	4.39	10.08	0.63
0.917	0.63	4.000	10.66	7.083	4.39	10.17	0.63
1.000	0.63	4.083	10.66	7.167	4.39	10.25	0.63
1.083	0.63	4.167	10.66	7.250	4.39	10.33	0.63
1.167	0.63	4.250	10.66	7.333	2.51	10.42	0.63
1.250	0.63	4.333	28.84	7.417	2.51	10.50	0.63
1.333	0.63	4.417	28.84	7.500	2.51	10.58	0.63
1.417	0.63	4.500	28.84	7.583	2.51	10.67	0.63
1.500	0.63	4.583	28.84	7.667	2.51	10.75	0.63
1.583	0.63	4.667	28.84	7.750	2.51	10.83	0.63
1.667	0.63	4.750	28.84	7.833	2.51	10.92	0.63
1.750	0.63	4.833	28.84	7.917	2.51	11.00	0.63
1.833	0.63	4.917	28.84	8.000	2.51	11.08	0.63
1.917	0.63	5.000	28.84	8.083	2.51	11.17	0.63
2.000	0.63	5.083	28.84	8.167	2.51	11.25	0.63
2.083	0.63	5.167	28.84	8.250	2.51	11.33	0.63
2.167	0.63	5.250	28.84	8.333	1.25	11.42	0.63
2.250	0.63	5.333	8.15	8.417	1.25	11.50	0.63
2.333	3.76	5.417	8.15	8.500	1.25	11.58	0.63
2.417	3.76	5.500	8.15	8.583	1.25	11.67	0.63
2.500	3.76	5.583	8.15	8.667	1.25	11.75	0.63
2.583	3.76	5.667	8.15	8.750	1.25	11.83	0.63
2.667	3.76	5.750	8.15	8.833	1.25	11.92	0.63
2.750	3.76	5.833	8.15	8.917	1.25	12.00	0.63
2.833	3.76	5.917	8.15	9.000	1.25	12.08	0.63
2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
3.083	3.76	6.167	8.15	9.250	1.25		

Unit Hyd Qpeak (cms)= 0.949

PEAK FLOW (cms)= 0.273 (i)

TIME TO PEAK (hrs)= 5.583

RUNOFF VOLUME (mm)= 17.124

TOTAL RAINFALL (mm)= 62.710

RUNOFF COEFFICIENT = 0.273

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

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-----
| CALIB |
| STANDHYD ( 0007) |
| ID= 1 DT= 5.0 min |
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Area      (ha)=    0.41
Total Imp(%)= 65.00   Dir. Conn.(%)= 10.00

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                        IMPERVIOUS      PERVIOUS (i)
Surface Area      (ha)=      0.27      0.14
Dep. Storage      (mm)=      1.00      1.50
Average Slope      (%)=      1.00      2.00
Length            (m)=     52.28     40.00
Mannings n        =      0.013     0.250

```

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	3.76	6.250	8.15	9.33	0.63
0.167	0.00	3.250	3.76	6.333	4.39	9.42	0.63
0.250	0.00	3.333	10.66	6.417	4.39	9.50	0.63
0.333	0.63	3.417	10.66	6.500	4.39	9.58	0.63
0.417	0.63	3.500	10.66	6.583	4.39	9.67	0.63
0.500	0.63	3.583	10.66	6.667	4.39	9.75	0.63
0.583	0.63	3.667	10.66	6.750	4.39	9.83	0.63
0.667	0.63	3.750	10.66	6.833	4.39	9.92	0.63
0.750	0.63	3.833	10.66	6.917	4.39	10.00	0.63
0.833	0.63	3.917	10.66	7.000	4.39	10.08	0.63
0.917	0.63	4.000	10.66	7.083	4.39	10.17	0.63
1.000	0.63	4.083	10.66	7.167	4.39	10.25	0.63
1.083	0.63	4.167	10.66	7.250	4.39	10.33	0.63
1.167	0.63	4.250	10.66	7.333	2.51	10.42	0.63
1.250	0.63	4.333	28.84	7.417	2.51	10.50	0.63
1.333	0.63	4.417	28.84	7.500	2.51	10.58	0.63
1.417	0.63	4.500	28.84	7.583	2.51	10.67	0.63
1.500	0.63	4.583	28.84	7.667	2.51	10.75	0.63
1.583	0.63	4.667	28.84	7.750	2.51	10.83	0.63
1.667	0.63	4.750	28.84	7.833	2.51	10.92	0.63
1.750	0.63	4.833	28.84	7.917	2.51	11.00	0.63
1.833	0.63	4.917	28.84	8.000	2.51	11.08	0.63
1.917	0.63	5.000	28.84	8.083	2.51	11.17	0.63
2.000	0.63	5.083	28.84	8.167	2.51	11.25	0.63
2.083	0.63	5.167	28.84	8.250	2.51	11.33	0.63
2.167	0.63	5.250	28.84	8.333	1.25	11.42	0.63
2.250	0.63	5.333	8.15	8.417	1.25	11.50	0.63
2.333	3.76	5.417	8.15	8.500	1.25	11.58	0.63

2.417	3.76	5.500	8.15	8.583	1.25	11.67	0.63
2.500	3.76	5.583	8.15	8.667	1.25	11.75	0.63
2.583	3.76	5.667	8.15	8.750	1.25	11.83	0.63
2.667	3.76	5.750	8.15	8.833	1.25	11.92	0.63
2.750	3.76	5.833	8.15	8.917	1.25	12.00	0.63
2.833	3.76	5.917	8.15	9.000	1.25	12.08	0.63
2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
3.083	3.76	6.167	8.15	9.250	1.25		

Max.Eff.Inten.(mm/hr)= 28.84 66.94
over (min) 5.00 15.00
Storage Coeff. (min)= 2.85 (ii) 11.13 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.28 0.09

TOTALS

PEAK FLOW (cms)= 0.00 0.03 0.029 (iii)
TIME TO PEAK (hrs)= 4.83 5.25 5.25
RUNOFF VOLUME (mm)= 61.71 47.69 49.07
TOTAL RAINFALL (mm)= 62.71 62.71 62.71
RUNOFF COEFFICIENT = 0.98 0.76 0.78

***** 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* = 84.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-----
| ADD HYD ( 0009) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0005):  14.66  0.273  5.58  17.12
+ ID2= 2 ( 0007):   0.41  0.029  5.25  49.07
=====
ID = 3 ( 0009):  15.07  0.288  5.50  17.99

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0010) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)

```

ID1= 1 (0008):	55.69	1.985	5.25	34.99
+ ID2= 2 (0009):	15.07	0.288	5.50	17.99
=====				
ID = 3 (0010):	70.76	2.239	5.25	31.37

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

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

```

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat

Output filename:
 C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\fee69fe5-4b1c-4f44-b799-ded837214c6c\s
 Summary filename:
 C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\fee69fe5-4b1c-4f44-b799-ded837214c6c\s

DATE: 06-29-2026

TIME: 03:46:21

USER:

COMMENTS: _____

** SIMULATION : 100 Year 12 Hour AES (Bloor, **

READ STORM Ptotal= 88.54 mm	Filename: C:\Users\dmurchison\AppData Local\Temp\ 96f6e017-39ec-4dd5-9feb-e3727c87678c\ba285abc Comments: 100 Year 12 Hour AES (Bloor, TRCA)

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	15.05	6.50	6.20	9.75	0.89
0.25	0.89	3.50	15.05	6.75	6.20	10.00	0.89
0.50	0.89	3.75	15.05	7.00	6.20	10.25	0.89
0.75	0.89	4.00	15.05	7.25	3.54	10.50	0.89
1.00	0.89	4.25	40.71	7.50	3.54	10.75	0.89
1.25	0.89	4.50	40.71	7.75	3.54	11.00	0.89
1.50	0.89	4.75	40.71	8.00	3.54	11.25	0.89
1.75	0.89	5.00	40.71	8.25	1.77	11.50	0.89
2.00	0.89	5.25	11.51	8.50	1.77	11.75	0.89
2.25	5.31	5.50	11.51	8.75	1.77	12.00	0.89
2.50	5.31	5.75	11.51	9.00	1.77		
2.75	5.31	6.00	11.51	9.25	0.89		
3.00	5.31	6.25	6.20	9.50	0.89		

CALIB NASHYD (0004) ID= 1 DT= 5.0 min	Area (ha)= 36.35 Ia (mm)= 5.00 U.H. Tp(hrs)= 0.81 Curve Number (CN)= 77.0 # of Linear Res.(N)= 3.00

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	3.167	5.31	6.250	11.51	9.33	0.89
0.167	0.00	3.250	5.31	6.333	6.20	9.42	0.89
0.250	0.00	3.333	15.05	6.417	6.20	9.50	0.89
0.333	0.89	3.417	15.05	6.500	6.20	9.58	0.89
0.417	0.89	3.500	15.05	6.583	6.20	9.67	0.89
0.500	0.89	3.583	15.05	6.667	6.20	9.75	0.89
0.583	0.89	3.667	15.05	6.750	6.20	9.83	0.89
0.667	0.89	3.750	15.05	6.833	6.20	9.92	0.89
0.750	0.89	3.833	15.05	6.917	6.20	10.00	0.89
0.833	0.89	3.917	15.05	7.000	6.20	10.08	0.89

0.917	0.89	4.000	15.05	7.083	6.20	10.17	0.89
1.000	0.89	4.083	15.05	7.167	6.20	10.25	0.89
1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89
1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89
1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89
1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89
1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89
1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89
1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89
1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89
1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89
1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89
1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89
2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89
2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89
2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89
2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89
3.083	5.31	6.167	11.51	9.250	1.77		

Unit Hyd Qpeak (cms)= 1.714

PEAK FLOW (cms)= 1.513 (i)

TIME TO PEAK (hrs)= 5.750

RUNOFF VOLUME (mm)= 43.779

TOTAL RAINFALL (mm)= 88.540

RUNOFF COEFFICIENT = 0.494

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

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-----
| CALIB |
| NASHYD ( 0011) | Area (ha)= 2.52 Curve Number (CN)= 78.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
-----
| U.H. Tp(hrs)= 0.23

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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	3.167	5.31	6.250	11.51	9.33	0.89
0.167	0.00	3.250	5.31	6.333	6.20	9.42	0.89
0.250	0.00	3.333	15.05	6.417	6.20	9.50	0.89
0.333	0.89	3.417	15.05	6.500	6.20	9.58	0.89
0.417	0.89	3.500	15.05	6.583	6.20	9.67	0.89
0.500	0.89	3.583	15.05	6.667	6.20	9.75	0.89
0.583	0.89	3.667	15.05	6.750	6.20	9.83	0.89
0.667	0.89	3.750	15.05	6.833	6.20	9.92	0.89
0.750	0.89	3.833	15.05	6.917	6.20	10.00	0.89
0.833	0.89	3.917	15.05	7.000	6.20	10.08	0.89
0.917	0.89	4.000	15.05	7.083	6.20	10.17	0.89
1.000	0.89	4.083	15.05	7.167	6.20	10.25	0.89
1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89
1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89
1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89
1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89
1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89
1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89
1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89
1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89
1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89
1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89
1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89
2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89
2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89
2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89
2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89
3.083	5.31	6.167	11.51	9.250	1.77		

Unit Hyd Qpeak (cms)= 0.418

PEAK FLOW (cms)= 0.176 (i)

TIME TO PEAK (hrs)= 5.250

RUNOFF VOLUME (mm)= 44.923

TOTAL RAINFALL (mm)= 88.540

RUNOFF COEFFICIENT = 0.507

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

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-----
| CALIB |
| STANDHYD ( 0006) |
| ID= 1 DT= 5.0 min |
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Area      (ha)= 16.82
Total Imp(%)= 90.00   Dir. Conn.(%)= 75.00

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                        IMPERVIOUS      PERVIOUS (i)
Surface Area      (ha)=      15.14      1.68
Dep. Storage      (mm)=      1.00      1.50
Average Slope      (%)=      1.00      2.00
Length            (m)=     334.86     40.00
Mannings n        =      0.013     0.250

```

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

```

----- TRANSFORMED HYETOGRAPH -----

```

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	5.31	6.250	11.51	9.33	0.89
0.167	0.00	3.250	5.31	6.333	6.20	9.42	0.89
0.250	0.00	3.333	15.05	6.417	6.20	9.50	0.89
0.333	0.89	3.417	15.05	6.500	6.20	9.58	0.89
0.417	0.89	3.500	15.05	6.583	6.20	9.67	0.89
0.500	0.89	3.583	15.05	6.667	6.20	9.75	0.89
0.583	0.89	3.667	15.05	6.750	6.20	9.83	0.89
0.667	0.89	3.750	15.05	6.833	6.20	9.92	0.89
0.750	0.89	3.833	15.05	6.917	6.20	10.00	0.89
0.833	0.89	3.917	15.05	7.000	6.20	10.08	0.89
0.917	0.89	4.000	15.05	7.083	6.20	10.17	0.89
1.000	0.89	4.083	15.05	7.167	6.20	10.25	0.89
1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89
1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89
1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89
1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89
1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89
1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89
1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89
1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89
1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89
1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89
1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89
2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89
2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89
2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89
2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89

2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89
3.083	5.31	6.167	11.51	9.250	1.77		

Max.Eff.Inten.(mm/hr)= 40.71 95.53
over (min) 10.00 15.00
Storage Coeff. (min)= 7.56 (ii) 12.07 (ii)
Unit Hyd. Tpeak (min)= 10.00 15.00
Unit Hyd. peak (cms)= 0.13 0.09

TOTALS

PEAK FLOW (cms)= 1.43 0.43 1.860 (iii)
TIME TO PEAK (hrs)= 5.25 5.25 5.25
RUNOFF VOLUME (mm)= 87.54 72.08 83.67
TOTAL RAINFALL (mm)= 88.54 88.54 88.54
RUNOFF COEFFICIENT = 0.99 0.81 0.95

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 84.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0012) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0011):    2.52    0.176    5.25    44.92
+ ID2= 2 ( 0006):   16.82    1.860    5.25    83.67
=====
ID = 3 ( 0012):   19.34    2.036    5.25    78.62

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0008) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0012):   19.34    2.036    5.25    78.62
+ ID2= 2 ( 0004):   36.35    1.513    5.75    43.78
=====
ID = 3 ( 0008):   55.69    3.154    5.25    55.88

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB		Area (ha)= 14.66	Curve Number (CN)= 65.0
NASHYD (0005)		Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
ID= 1 DT= 5.0 min		U.H. Tp(hrs)= 0.59	

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	3.167	5.31	6.250	11.51	9.33	0.89
0.167	0.00	3.250	5.31	6.333	6.20	9.42	0.89
0.250	0.00	3.333	15.05	6.417	6.20	9.50	0.89
0.333	0.89	3.417	15.05	6.500	6.20	9.58	0.89
0.417	0.89	3.500	15.05	6.583	6.20	9.67	0.89
0.500	0.89	3.583	15.05	6.667	6.20	9.75	0.89
0.583	0.89	3.667	15.05	6.750	6.20	9.83	0.89
0.667	0.89	3.750	15.05	6.833	6.20	9.92	0.89
0.750	0.89	3.833	15.05	6.917	6.20	10.00	0.89
0.833	0.89	3.917	15.05	7.000	6.20	10.08	0.89
0.917	0.89	4.000	15.05	7.083	6.20	10.17	0.89
1.000	0.89	4.083	15.05	7.167	6.20	10.25	0.89
1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89
1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89
1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89
1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89
1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89
1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89
1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89
1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89
1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89
1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89
1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89
2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89
2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89
2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89
2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89
3.083	5.31	6.167	11.51	9.250	1.77		

Unit Hyd Qpeak (cms)= 0.949

PEAK FLOW (cms)= 0.512 (i)

TIME TO PEAK (hrs)= 5.583

RUNOFF VOLUME (mm)= 31.677

TOTAL RAINFALL (mm)= 88.540

RUNOFF COEFFICIENT = 0.358

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

| CALIB |
| STANDHYD (0007) | Area (ha)= 0.41
| ID= 1 DT= 5.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.27	0.14
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	52.28	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	5.31	6.250	11.51	9.33	0.89
0.167	0.00	3.250	5.31	6.333	6.20	9.42	0.89
0.250	0.00	3.333	15.05	6.417	6.20	9.50	0.89
0.333	0.89	3.417	15.05	6.500	6.20	9.58	0.89
0.417	0.89	3.500	15.05	6.583	6.20	9.67	0.89
0.500	0.89	3.583	15.05	6.667	6.20	9.75	0.89
0.583	0.89	3.667	15.05	6.750	6.20	9.83	0.89
0.667	0.89	3.750	15.05	6.833	6.20	9.92	0.89
0.750	0.89	3.833	15.05	6.917	6.20	10.00	0.89
0.833	0.89	3.917	15.05	7.000	6.20	10.08	0.89
0.917	0.89	4.000	15.05	7.083	6.20	10.17	0.89
1.000	0.89	4.083	15.05	7.167	6.20	10.25	0.89
1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89
1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89
1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89
1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89
1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89
1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89
1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89
1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89
1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89

1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89
1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89
2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89
2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89
2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89
2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89
3.083	5.31	6.167	11.51	9.250	1.77		

Max.Eff.Inten.(mm/hr)= 40.71 98.53
over (min) 5.00 10.00
Storage Coeff. (min)= 2.48 (ii) 9.58 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.29 0.11

TOTALS

PEAK FLOW (cms)= 0.00 0.04 0.043 (iii)
TIME TO PEAK (hrs)= 5.08 5.25 5.25
RUNOFF VOLUME (mm)= 87.54 72.46 73.95
TOTAL RAINFALL (mm)= 88.54 88.54 88.54
RUNOFF COEFFICIENT = 0.99 0.82 0.84

***** 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* = 84.0 Ia = Dep. Storage (Above)

(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.

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

```

-----
| ADD HYD ( 0009) |
| 1 + 2 = 3 |
-----
      AREA      QPEAK      TPEAK      R.V.
      (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0005):  14.66  0.512  5.58  31.68
+ ID2= 2 ( 0007):   0.41  0.043  5.25  73.95
=====
ID = 3 ( 0009):  15.07  0.531  5.50  32.83

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 0010) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0008):  55.69   3.154   5.25   55.88
+ ID2= 2 ( 0009):  15.07   0.531   5.50   32.83
=====
ID = 3 ( 0010):  70.76   3.631   5.25   50.97
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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
```

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYM0 6.2\V02\voin.dat

Output filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\
d1165822-e764-44b3-a1e2-70f2d7ddecdec\s

Summary filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\
d1165822-e764-44b3-a1e2-70f2d7ddecdec\s

DATE: 06-29-2026

TIME: 03:46:20

USER:

COMMENTS: _____

** SIMULATION : 2 Year 12 Hour AES (Bloor, TR **

READ STORM	Filename: C:\Users\dmurchison\AppData\Local\Temp\96f6e017-39ec-4dd5-9feb-e3727c87678c\57bde228
Ptotal= 42.00 mm	Comments: 2 Year 12 Hour AES (Bloor, TRCA)

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	7.14	6.50	2.94	9.75	0.42
0.25	0.42	3.50	7.14	6.75	2.94	10.00	0.42
0.50	0.42	3.75	7.14	7.00	2.94	10.25	0.42
0.75	0.42	4.00	7.14	7.25	1.68	10.50	0.42
1.00	0.42	4.25	19.32	7.50	1.68	10.75	0.42
1.25	0.42	4.50	19.32	7.75	1.68	11.00	0.42
1.50	0.42	4.75	19.32	8.00	1.68	11.25	0.42
1.75	0.42	5.00	19.32	8.25	0.84	11.50	0.42
2.00	0.42	5.25	5.46	8.50	0.84	11.75	0.42
2.25	2.52	5.50	5.46	8.75	0.84	12.00	0.42
2.50	2.52	5.75	5.46	9.00	0.84		
2.75	2.52	6.00	5.46	9.25	0.42		
3.00	2.52	6.25	2.94	9.50	0.42		

CALIB	Area (ha)= 36.35	Curve Number (CN)= 77.0
NASHYD (0004)	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)= 0.81	

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	3.167	2.52	6.250	5.46	9.33	0.42
0.167	0.00	3.250	2.52	6.333	2.94	9.42	0.42
0.250	0.00	3.333	7.14	6.417	2.94	9.50	0.42
0.333	0.42	3.417	7.14	6.500	2.94	9.58	0.42
0.417	0.42	3.500	7.14	6.583	2.94	9.67	0.42
0.500	0.42	3.583	7.14	6.667	2.94	9.75	0.42
0.583	0.42	3.667	7.14	6.750	2.94	9.83	0.42
0.667	0.42	3.750	7.14	6.833	2.94	9.92	0.42
0.750	0.42	3.833	7.14	6.917	2.94	10.00	0.42
0.833	0.42	3.917	7.14	7.000	2.94	10.08	0.42
0.917	0.42	4.000	7.14	7.083	2.94	10.17	0.42
1.000	0.42	4.083	7.14	7.167	2.94	10.25	0.42
1.083	0.42	4.167	7.14	7.250	2.94	10.33	0.42
1.167	0.42	4.250	7.14	7.333	1.68	10.42	0.42
1.250	0.42	4.333	19.32	7.417	1.68	10.50	0.42
1.333	0.42	4.417	19.32	7.500	1.68	10.58	0.42
1.417	0.42	4.500	19.32	7.583	1.68	10.67	0.42
1.500	0.42	4.583	19.32	7.667	1.68	10.75	0.42
1.583	0.42	4.667	19.32	7.750	1.68	10.83	0.42
1.667	0.42	4.750	19.32	7.833	1.68	10.92	0.42
1.750	0.42	4.833	19.32	7.917	1.68	11.00	0.42
1.833	0.42	4.917	19.32	8.000	1.68	11.08	0.42
1.917	0.42	5.000	19.32	8.083	1.68	11.17	0.42
2.000	0.42	5.083	19.32	8.167	1.68	11.25	0.42
2.083	0.42	5.167	19.32	8.250	1.68	11.33	0.42
2.167	0.42	5.250	19.32	8.333	0.84	11.42	0.42
2.250	0.42	5.333	5.46	8.417	0.84	11.50	0.42
2.333	2.52	5.417	5.46	8.500	0.84	11.58	0.42
2.417	2.52	5.500	5.46	8.583	0.84	11.67	0.42
2.500	2.52	5.583	5.46	8.667	0.84	11.75	0.42
2.583	2.52	5.667	5.46	8.750	0.84	11.83	0.42
2.667	2.52	5.750	5.46	8.833	0.84	11.92	0.42
2.750	2.52	5.833	5.46	8.917	0.84	12.00	0.42
2.833	2.52	5.917	5.46	9.000	0.84	12.08	0.42
2.917	2.52	6.000	5.46	9.083	0.84	12.17	0.42
3.000	2.52	6.083	5.46	9.167	0.84	12.25	0.42
3.083	2.52	6.167	5.46	9.250	0.84		

Unit Hyd Qpeak (cms)= 1.714

PEAK FLOW (cms)= 0.402 (i)
TIME TO PEAK (hrs)= 5.917
RUNOFF VOLUME (mm)= 12.129
TOTAL RAINFALL (mm)= 42.000
RUNOFF COEFFICIENT = 0.289

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

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-----
| CALIB |
| NASHYD ( 0011) | Area (ha)= 2.52 Curve Number (CN)= 78.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----| U.H. Tp(hrs)= 0.23

```

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	3.167	2.52	6.250	5.46	9.33	0.42
0.167	0.00	3.250	2.52	6.333	2.94	9.42	0.42
0.250	0.00	3.333	7.14	6.417	2.94	9.50	0.42
0.333	0.42	3.417	7.14	6.500	2.94	9.58	0.42
0.417	0.42	3.500	7.14	6.583	2.94	9.67	0.42
0.500	0.42	3.583	7.14	6.667	2.94	9.75	0.42
0.583	0.42	3.667	7.14	6.750	2.94	9.83	0.42
0.667	0.42	3.750	7.14	6.833	2.94	9.92	0.42
0.750	0.42	3.833	7.14	6.917	2.94	10.00	0.42
0.833	0.42	3.917	7.14	7.000	2.94	10.08	0.42
0.917	0.42	4.000	7.14	7.083	2.94	10.17	0.42
1.000	0.42	4.083	7.14	7.167	2.94	10.25	0.42
1.083	0.42	4.167	7.14	7.250	2.94	10.33	0.42
1.167	0.42	4.250	7.14	7.333	1.68	10.42	0.42
1.250	0.42	4.333	19.32	7.417	1.68	10.50	0.42
1.333	0.42	4.417	19.32	7.500	1.68	10.58	0.42
1.417	0.42	4.500	19.32	7.583	1.68	10.67	0.42
1.500	0.42	4.583	19.32	7.667	1.68	10.75	0.42
1.583	0.42	4.667	19.32	7.750	1.68	10.83	0.42
1.667	0.42	4.750	19.32	7.833	1.68	10.92	0.42
1.750	0.42	4.833	19.32	7.917	1.68	11.00	0.42
1.833	0.42	4.917	19.32	8.000	1.68	11.08	0.42
1.917	0.42	5.000	19.32	8.083	1.68	11.17	0.42
2.000	0.42	5.083	19.32	8.167	1.68	11.25	0.42
2.083	0.42	5.167	19.32	8.250	1.68	11.33	0.42
2.167	0.42	5.250	19.32	8.333	0.84	11.42	0.42
2.250	0.42	5.333	5.46	8.417	0.84	11.50	0.42
2.333	2.52	5.417	5.46	8.500	0.84	11.58	0.42
2.417	2.52	5.500	5.46	8.583	0.84	11.67	0.42
2.500	2.52	5.583	5.46	8.667	0.84	11.75	0.42
2.583	2.52	5.667	5.46	8.750	0.84	11.83	0.42
2.667	2.52	5.750	5.46	8.833	0.84	11.92	0.42
2.750	2.52	5.833	5.46	8.917	0.84	12.00	0.42
2.833	2.52	5.917	5.46	9.000	0.84	12.08	0.42
2.917	2.52	6.000	5.46	9.083	0.84	12.17	0.42
3.000	2.52	6.083	5.46	9.167	0.84	12.25	0.42
3.083	2.52	6.167	5.46	9.250	0.84		

Unit Hyd Qpeak (cms)= 0.418

PEAK FLOW (cms)= 0.050 (i)

TIME TO PEAK (hrs)= 5.250

RUNOFF VOLUME (mm)= 12.587

TOTAL RAINFALL (mm)= 42.000

RUNOFF COEFFICIENT = 0.300

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

| CALIB |
| STANDHYD (0006) | Area (ha)= 16.82
| ID= 1 DT= 5.0 min | Total Imp(%)= 90.00 Dir. Conn.(%)= 75.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	15.14	1.68
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	334.86	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	2.52	6.250	5.46	9.33	0.42
0.167	0.00	3.250	2.52	6.333	2.94	9.42	0.42
0.250	0.00	3.333	7.14	6.417	2.94	9.50	0.42
0.333	0.42	3.417	7.14	6.500	2.94	9.58	0.42
0.417	0.42	3.500	7.14	6.583	2.94	9.67	0.42
0.500	0.42	3.583	7.14	6.667	2.94	9.75	0.42
0.583	0.42	3.667	7.14	6.750	2.94	9.83	0.42
0.667	0.42	3.750	7.14	6.833	2.94	9.92	0.42
0.750	0.42	3.833	7.14	6.917	2.94	10.00	0.42
0.833	0.42	3.917	7.14	7.000	2.94	10.08	0.42
0.917	0.42	4.000	7.14	7.083	2.94	10.17	0.42
1.000	0.42	4.083	7.14	7.167	2.94	10.25	0.42
1.083	0.42	4.167	7.14	7.250	2.94	10.33	0.42
1.167	0.42	4.250	7.14	7.333	1.68	10.42	0.42
1.250	0.42	4.333	19.32	7.417	1.68	10.50	0.42
1.333	0.42	4.417	19.32	7.500	1.68	10.58	0.42
1.417	0.42	4.500	19.32	7.583	1.68	10.67	0.42
1.500	0.42	4.583	19.32	7.667	1.68	10.75	0.42
1.583	0.42	4.667	19.32	7.750	1.68	10.83	0.42
1.667	0.42	4.750	19.32	7.833	1.68	10.92	0.42

1.750	0.42	4.833	19.32	7.917	1.68	11.00	0.42
1.833	0.42	4.917	19.32	8.000	1.68	11.08	0.42
1.917	0.42	5.000	19.32	8.083	1.68	11.17	0.42
2.000	0.42	5.083	19.32	8.167	1.68	11.25	0.42
2.083	0.42	5.167	19.32	8.250	1.68	11.33	0.42
2.167	0.42	5.250	19.32	8.333	0.84	11.42	0.42
2.250	0.42	5.333	5.46	8.417	0.84	11.50	0.42
2.333	2.52	5.417	5.46	8.500	0.84	11.58	0.42
2.417	2.52	5.500	5.46	8.583	0.84	11.67	0.42
2.500	2.52	5.583	5.46	8.667	0.84	11.75	0.42
2.583	2.52	5.667	5.46	8.750	0.84	11.83	0.42
2.667	2.52	5.750	5.46	8.833	0.84	11.92	0.42
2.750	2.52	5.833	5.46	8.917	0.84	12.00	0.42
2.833	2.52	5.917	5.46	9.000	0.84	12.08	0.42
2.917	2.52	6.000	5.46	9.083	0.84	12.17	0.42
3.000	2.52	6.083	5.46	9.167	0.84	12.25	0.42
3.083	2.52	6.167	5.46	9.250	0.84		

Max.Eff.Inten.(mm/hr)= 19.32 39.79
over (min) 10.00 25.00
Storage Coeff. (min)= 10.18 (ii) 20.39 (ii)
Unit Hyd. Tpeak (min)= 10.00 25.00
Unit Hyd. peak (cms)= 0.11 0.05

TOTALS

PEAK FLOW (cms)= 0.68 0.16 0.833 (iii)
TIME TO PEAK (hrs)= 5.25 5.33 5.25
RUNOFF VOLUME (mm)= 41.00 28.21 37.80
TOTAL RAINFALL (mm)= 42.00 42.00 42.00
RUNOFF COEFFICIENT = 0.98 0.67 0.90

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 84.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0012) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0011):    2.52    0.050    5.25    12.59
+ ID2= 2 ( 0006):   16.82    0.833    5.25    37.80
=====
ID = 3 ( 0012):   19.34    0.883    5.25    34.52

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0008) |
| 1 + 2 = 3 |
-----
                AREA      QPEAK      TPEAK      R.V.
                (ha)      (cms)      (hrs)      (mm)
      ID1= 1 ( 0012):  19.34  0.883    5.25    34.52
+ ID2= 2 ( 0004):  36.35  0.402    5.92    12.13
=====
      ID = 3 ( 0008):  55.69  1.146    5.25    19.90

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| NASHYD ( 0005) |
| ID= 1 DT= 5.0 min |
-----
Area      (ha)= 14.66   Curve Number (CN)= 65.0
Ia        (mm)= 5.00   # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.59

```

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	3.167	2.52	6.250	5.46	9.33	0.42
0.167	0.00	3.250	2.52	6.333	2.94	9.42	0.42
0.250	0.00	3.333	7.14	6.417	2.94	9.50	0.42
0.333	0.42	3.417	7.14	6.500	2.94	9.58	0.42
0.417	0.42	3.500	7.14	6.583	2.94	9.67	0.42
0.500	0.42	3.583	7.14	6.667	2.94	9.75	0.42
0.583	0.42	3.667	7.14	6.750	2.94	9.83	0.42
0.667	0.42	3.750	7.14	6.833	2.94	9.92	0.42
0.750	0.42	3.833	7.14	6.917	2.94	10.00	0.42
0.833	0.42	3.917	7.14	7.000	2.94	10.08	0.42
0.917	0.42	4.000	7.14	7.083	2.94	10.17	0.42
1.000	0.42	4.083	7.14	7.167	2.94	10.25	0.42
1.083	0.42	4.167	7.14	7.250	2.94	10.33	0.42
1.167	0.42	4.250	7.14	7.333	1.68	10.42	0.42
1.250	0.42	4.333	19.32	7.417	1.68	10.50	0.42
1.333	0.42	4.417	19.32	7.500	1.68	10.58	0.42
1.417	0.42	4.500	19.32	7.583	1.68	10.67	0.42
1.500	0.42	4.583	19.32	7.667	1.68	10.75	0.42
1.583	0.42	4.667	19.32	7.750	1.68	10.83	0.42
1.667	0.42	4.750	19.32	7.833	1.68	10.92	0.42
1.750	0.42	4.833	19.32	7.917	1.68	11.00	0.42
1.833	0.42	4.917	19.32	8.000	1.68	11.08	0.42
1.917	0.42	5.000	19.32	8.083	1.68	11.17	0.42
2.000	0.42	5.083	19.32	8.167	1.68	11.25	0.42
2.083	0.42	5.167	19.32	8.250	1.68	11.33	0.42
2.167	0.42	5.250	19.32	8.333	0.84	11.42	0.42

2.250	0.42	5.333	5.46	8.417	0.84	11.50	0.42
2.333	2.52	5.417	5.46	8.500	0.84	11.58	0.42
2.417	2.52	5.500	5.46	8.583	0.84	11.67	0.42
2.500	2.52	5.583	5.46	8.667	0.84	11.75	0.42
2.583	2.52	5.667	5.46	8.750	0.84	11.83	0.42
2.667	2.52	5.750	5.46	8.833	0.84	11.92	0.42
2.750	2.52	5.833	5.46	8.917	0.84	12.00	0.42
2.833	2.52	5.917	5.46	9.000	0.84	12.08	0.42
2.917	2.52	6.000	5.46	9.083	0.84	12.17	0.42
3.000	2.52	6.083	5.46	9.167	0.84	12.25	0.42
3.083	2.52	6.167	5.46	9.250	0.84		

Unit Hyd Qpeak (cms)= 0.949

PEAK FLOW (cms)= 0.123 (i)
TIME TO PEAK (hrs)= 5.583
RUNOFF VOLUME (mm)= 7.878
TOTAL RAINFALL (mm)= 42.000
RUNOFF COEFFICIENT = 0.188

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

| CALIB |
| STANDHYD (0007) | Area (ha)= 0.41
| ID= 1 DT= 5.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 10.00
|-----|

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.27	0.14
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	52.28	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	2.52	6.250	5.46	9.33	0.42
0.167	0.00	3.250	2.52	6.333	2.94	9.42	0.42
0.250	0.00	3.333	7.14	6.417	2.94	9.50	0.42
0.333	0.42	3.417	7.14	6.500	2.94	9.58	0.42
0.417	0.42	3.500	7.14	6.583	2.94	9.67	0.42
0.500	0.42	3.583	7.14	6.667	2.94	9.75	0.42
0.583	0.42	3.667	7.14	6.750	2.94	9.83	0.42
0.667	0.42	3.750	7.14	6.833	2.94	9.92	0.42
0.750	0.42	3.833	7.14	6.917	2.94	10.00	0.42

0.833	0.42	3.917	7.14	7.000	2.94	10.08	0.42
0.917	0.42	4.000	7.14	7.083	2.94	10.17	0.42
1.000	0.42	4.083	7.14	7.167	2.94	10.25	0.42
1.083	0.42	4.167	7.14	7.250	2.94	10.33	0.42
1.167	0.42	4.250	7.14	7.333	1.68	10.42	0.42
1.250	0.42	4.333	19.32	7.417	1.68	10.50	0.42
1.333	0.42	4.417	19.32	7.500	1.68	10.58	0.42
1.417	0.42	4.500	19.32	7.583	1.68	10.67	0.42
1.500	0.42	4.583	19.32	7.667	1.68	10.75	0.42
1.583	0.42	4.667	19.32	7.750	1.68	10.83	0.42
1.667	0.42	4.750	19.32	7.833	1.68	10.92	0.42
1.750	0.42	4.833	19.32	7.917	1.68	11.00	0.42
1.833	0.42	4.917	19.32	8.000	1.68	11.08	0.42
1.917	0.42	5.000	19.32	8.083	1.68	11.17	0.42
2.000	0.42	5.083	19.32	8.167	1.68	11.25	0.42
2.083	0.42	5.167	19.32	8.250	1.68	11.33	0.42
2.167	0.42	5.250	19.32	8.333	0.84	11.42	0.42
2.250	0.42	5.333	5.46	8.417	0.84	11.50	0.42
2.333	2.52	5.417	5.46	8.500	0.84	11.58	0.42
2.417	2.52	5.500	5.46	8.583	0.84	11.67	0.42
2.500	2.52	5.583	5.46	8.667	0.84	11.75	0.42
2.583	2.52	5.667	5.46	8.750	0.84	11.83	0.42
2.667	2.52	5.750	5.46	8.833	0.84	11.92	0.42
2.750	2.52	5.833	5.46	8.917	0.84	12.00	0.42
2.833	2.52	5.917	5.46	9.000	0.84	12.08	0.42
2.917	2.52	6.000	5.46	9.083	0.84	12.17	0.42
3.000	2.52	6.083	5.46	9.167	0.84	12.25	0.42
3.083	2.52	6.167	5.46	9.250	0.84		

Max.Eff.Inten.(mm/hr)=	19.32	41.21
over (min)	5.00	15.00
Storage Coeff. (min)=	3.34 (ii)	13.40 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.26	0.08

TOTALS

PEAK FLOW (cms)=	0.00	0.02	0.018 (iii)
TIME TO PEAK (hrs)=	4.83	5.25	5.25
RUNOFF VOLUME (mm)=	41.00	28.48	29.71
TOTAL RAINFALL (mm)=	42.00	42.00	42.00
RUNOFF COEFFICIENT =	0.98	0.68	0.71

***** 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* = 84.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0009) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
      ID1= 1 ( 0005):  14.66    0.123    5.58    7.88
+ ID2= 2 ( 0007):    0.41    0.018    5.25   29.71
=====
      ID = 3 ( 0009):  15.07    0.132    5.58    8.47

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0010) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
      ID1= 1 ( 0008):  55.69    1.146    5.25   19.90
+ ID2= 2 ( 0009):  15.07    0.132    5.58    8.47
=====
      ID = 3 ( 0010):  70.76    1.261    5.25   17.47

```

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

```

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000  TTTTT  TTTTT  H   H   Y   Y   M   M   000  TM
0   0   T      T   H   H   Y   Y   MM  MM  O   O
0   0   T      T   H   H   Y   M   M   O   O
000  T      T   H   H   Y   M   M   000

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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\V02\voin.dat

Output filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\ecc75195-69a7-4bb8-924e-81122c515232\s

Summary filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\ecc75195-69a7-4bb8-924e-81122c515232\s

DATE: 06-29-2026

TIME: 03:46:21

USER:

COMMENTS: _____

** SIMULATION : 25 Year 12 Hour AES (Bloor, T **

READ STORM

Filename: C:\Users\dmurchison\AppData

ata\Local\Temp\

96f6e017-39ec-4dd5-9feb-e3727c87678c\9cbef418

Ptotal= 73.10 mm

Comments: 25 Year 12 Hour AES (Bloor, TRCA)

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	12.43	6.50	5.12	9.75	0.73
0.25	0.73	3.50	12.43	6.75	5.12	10.00	0.73
0.50	0.73	3.75	12.43	7.00	5.12	10.25	0.73
0.75	0.73	4.00	12.43	7.25	2.92	10.50	0.73
1.00	0.73	4.25	33.63	7.50	2.92	10.75	0.73
1.25	0.73	4.50	33.63	7.75	2.92	11.00	0.73
1.50	0.73	4.75	33.63	8.00	2.92	11.25	0.73
1.75	0.73	5.00	33.63	8.25	1.46	11.50	0.73
2.00	0.73	5.25	9.50	8.50	1.46	11.75	0.73
2.25	4.39	5.50	9.50	8.75	1.46	12.00	0.73
2.50	4.39	5.75	9.50	9.00	1.46		
2.75	4.39	6.00	9.50	9.25	0.73		
3.00	4.39	6.25	5.12	9.50	0.73		

CALIB

NASHYD (0004)

Area (ha)= 36.35 Curve Number (CN)= 77.0

| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00

 U.H. Tp(hrs)= 0.81

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	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73
0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73
0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73
1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73
1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73
1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73
1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73
2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73
2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73
2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73
2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73
2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73
2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73
2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

Unit Hyd Qpeak (cms)= 1.714

PEAK FLOW (cms)= 1.104 (i)

TIME TO PEAK (hrs)= 5.833
 RUNOFF VOLUME (mm)= 32.212
 TOTAL RAINFALL (mm)= 73.100
 RUNOFF COEFFICIENT = 0.441

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

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-----
| CALIB |
| NASHYD ( 0011) | Area (ha)= 2.52 Curve Number (CN)= 78.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
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| U.H. Tp(hrs)= 0.23
  
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NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

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----- TRANSFORMED HYETOGRAPH -----

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TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73
0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73
0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73
1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73
1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73
1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73
1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73
2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73
2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73
2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73
2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73

2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73
2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73
2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

Unit Hyd Qpeak (cms)= 0.418

PEAK FLOW (cms)= 0.131 (i)

TIME TO PEAK (hrs)= 5.250

RUNOFF VOLUME (mm)= 33.150

TOTAL RAINFALL (mm)= 73.100

RUNOFF COEFFICIENT = 0.453

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

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| CALIB |
| STANDHYD ( 0006) | Area (ha)= 16.82
| ID= 1 DT= 5.0 min | Total Imp(%)= 90.00 Dir. Conn.(%)= 75.00
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		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	15.14	1.68
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	334.86	40.00
Mannings n	=	0.013	0.250

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

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----- TRANSFORMED HYETOGRAPH -----

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TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73
0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73
0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73
1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73

1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73
1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73
1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73
2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73
2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73
2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73
2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73
2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73
2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73
2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

Max.Eff.Inten.(mm/hr)= 33.63 77.23
over (min) 10.00 15.00
Storage Coeff. (min)= 8.16 (ii) 13.03 (ii)
Unit Hyd. Tpeak (min)= 10.00 15.00
Unit Hyd. peak (cms)= 0.13 0.08

TOTALS

PEAK FLOW (cms)= 1.18 0.35 1.524 (iii)
TIME TO PEAK (hrs)= 5.25 5.25 5.25
RUNOFF VOLUME (mm)= 72.10 57.22 68.38
TOTAL RAINFALL (mm)= 73.10 73.10 73.10
RUNOFF COEFFICIENT = 0.99 0.78 0.94

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 84.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| ADD HYD (0012) |
1 + 2 = 3

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)

```

ID1= 1 ( 0011):      2.52   0.131      5.25   33.15
+ ID2= 2 ( 0006):     16.82   1.524      5.25   68.38
=====
ID = 3 ( 0012):     19.34   1.655      5.25   63.79

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NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-----
| ADD HYD ( 0008) |
| 1 + 2 = 3 |
-----
                AREA      QPEAK      TPEAK      R.V.
                (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0012):     19.34   1.655      5.25   63.79
+ ID2= 2 ( 0004):     36.35   1.104      5.83   32.21
=====
ID = 3 ( 0008):     55.69   2.451      5.25   43.18

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NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-----
| CALIB
| NASHYD ( 0005) |
| ID= 1 DT= 5.0 min |
-----
Area      (ha)= 14.66   Curve Number (CN)= 65.0
Ia        (mm)= 5.00   # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.59

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

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----- TRANSFORMED HYETOGRAPH -----

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TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73
0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73
0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73
1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73
1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73

1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73
1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73
2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73
2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73
2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73
2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73
2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73
2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73
2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

Unit Hyd Qpeak (cms)= 0.949

PEAK FLOW (cms)= 0.363 (i)

TIME TO PEAK (hrs)= 5.583

RUNOFF VOLUME (mm)= 22.636

TOTAL RAINFALL (mm)= 73.100

RUNOFF COEFFICIENT = 0.310

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

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-----
| CALIB |
| STANDHYD ( 0007) |
| ID= 1 DT= 5.0 min |
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Area (ha)= 0.41

Total Imp(%)= 65.00 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.27	0.14
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	52.28	40.00
Mannings n	=	0.013	0.250

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

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----- TRANSFORMED HYETOGRAPH -----

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TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73

0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73
0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73
1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73
1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73
1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73
1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73
2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73
2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73
2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73
2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73
2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73
2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73
2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

Max.Eff.Inten.(mm/hr)=	33.63	79.71
over (min)	5.00	15.00
Storage Coeff. (min)=	2.68 (ii)	10.40 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.29	0.09

TOTALS

PEAK FLOW (cms)=	0.00	0.03	0.035 (iii)
TIME TO PEAK (hrs)=	4.83	5.25	5.25
RUNOFF VOLUME (mm)=	72.10	57.58	59.02
TOTAL RAINFALL (mm)=	73.10	73.10	73.10
RUNOFF COEFFICIENT =	0.99	0.79	0.81

***** 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* = 84.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-----
| ADD HYD ( 0009) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0005):  14.66    0.363    5.58    22.64
+ ID2= 2 ( 0007):   0.41    0.035    5.25    59.02
=====
ID = 3 ( 0009):  15.07    0.381    5.50    23.63

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0010) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0008):  55.69    2.451    5.25    43.18
+ ID2= 2 ( 0009):  15.07    0.381    5.50    23.63
=====
ID = 3 ( 0010):  70.76    2.789    5.25    39.01

```

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

```

```

000   TTTTT TTTTT H   H   Y   Y   M   M   000   TM
0   0   T   T   H   H   Y   Y   MM MM   0   0
0   0   T   T   H   H   Y   M   M   0   0
000   T   T   H   H   Y   M   M   000

```

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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\V02\voin.dat

Output filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\5c101de6-1749-4c41-938a-c381fb6b0808\s

Summary filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\5c101de6-1749-4c41-938a-c381fb6b0808\s

DATE: 06-29-2026

TIME: 03:46:20

USER:

COMMENTS: _____

 ** SIMULATION : 5 Year 12 Hour AES (Bloor, TR **

READ STORM	Filename: C:\Users\dmurchison\AppData\Local\Temp\96f6e017-39ec-4dd5-9feb-e3727c87678c\9daba5d0
Ptotal= 54.38 mm	Comments: 5 Year 12 Hour AES (Bloor, TRCA)

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	9.25	6.50	3.81	9.75	0.54
0.25	0.54	3.50	9.25	6.75	3.81	10.00	0.54
0.50	0.54	3.75	9.25	7.00	3.81	10.25	0.54
0.75	0.54	4.00	9.25	7.25	2.18	10.50	0.54
1.00	0.54	4.25	25.02	7.50	2.18	10.75	0.54
1.25	0.54	4.50	25.02	7.75	2.18	11.00	0.54
1.50	0.54	4.75	25.02	8.00	2.18	11.25	0.54
1.75	0.54	5.00	25.02	8.25	1.09	11.50	0.54
2.00	0.54	5.25	7.07	8.50	1.09	11.75	0.54
2.25	3.26	5.50	7.07	8.75	1.09	12.00	0.54
2.50	3.26	5.75	7.07	9.00	1.09		
2.75	3.26	6.00	7.07	9.25	0.54		

3.00 3.26 | 6.25 3.81 | 9.50 0.54 |

 | CALIB
 | NASHYD (0004)
ID= 1 DT= 5.0 min

Area (ha)= 36.35 Curve Number (CN)= 77.0
 Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 U.H. Tp(hrs)= 0.81

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	3.167	3.26	6.250	7.07	9.33	0.54
0.167	0.00	3.250	3.26	6.333	3.81	9.42	0.54
0.250	0.00	3.333	9.25	6.417	3.81	9.50	0.54
0.333	0.54	3.417	9.25	6.500	3.81	9.58	0.54
0.417	0.54	3.500	9.25	6.583	3.81	9.67	0.54
0.500	0.54	3.583	9.25	6.667	3.81	9.75	0.54
0.583	0.54	3.667	9.25	6.750	3.81	9.83	0.54
0.667	0.54	3.750	9.25	6.833	3.81	9.92	0.54
0.750	0.54	3.833	9.25	6.917	3.81	10.00	0.54
0.833	0.54	3.917	9.25	7.000	3.81	10.08	0.54
0.917	0.54	4.000	9.25	7.083	3.81	10.17	0.54
1.000	0.54	4.083	9.25	7.167	3.81	10.25	0.54
1.083	0.54	4.167	9.25	7.250	3.81	10.33	0.54
1.167	0.54	4.250	9.25	7.333	2.18	10.42	0.54
1.250	0.54	4.333	25.02	7.417	2.18	10.50	0.54
1.333	0.54	4.417	25.02	7.500	2.18	10.58	0.54
1.417	0.54	4.500	25.02	7.583	2.18	10.67	0.54
1.500	0.54	4.583	25.02	7.667	2.18	10.75	0.54
1.583	0.54	4.667	25.02	7.750	2.18	10.83	0.54
1.667	0.54	4.750	25.02	7.833	2.18	10.92	0.54
1.750	0.54	4.833	25.02	7.917	2.18	11.00	0.54
1.833	0.54	4.917	25.02	8.000	2.18	11.08	0.54
1.917	0.54	5.000	25.02	8.083	2.18	11.17	0.54
2.000	0.54	5.083	25.02	8.167	2.18	11.25	0.54
2.083	0.54	5.167	25.02	8.250	2.18	11.33	0.54
2.167	0.54	5.250	25.02	8.333	1.09	11.42	0.54
2.250	0.54	5.333	7.07	8.417	1.09	11.50	0.54
2.333	3.26	5.417	7.07	8.500	1.09	11.58	0.54
2.417	3.26	5.500	7.07	8.583	1.09	11.67	0.54
2.500	3.26	5.583	7.07	8.667	1.09	11.75	0.54
2.583	3.26	5.667	7.07	8.750	1.09	11.83	0.54
2.667	3.26	5.750	7.07	8.833	1.09	11.92	0.54
2.750	3.26	5.833	7.07	8.917	1.09	12.00	0.54
2.833	3.26	5.917	7.07	9.000	1.09	12.08	0.54

2.917	3.26	6.000	7.07	9.083	1.09	12.17	0.54
3.000	3.26	6.083	7.07	9.167	1.09	12.25	0.54
3.083	3.26	6.167	7.07	9.250	1.09		

Unit Hyd Qpeak (cms)= 1.714

PEAK FLOW (cms)= 0.656 (i)

TIME TO PEAK (hrs)= 5.833

RUNOFF VOLUME (mm)= 19.468

TOTAL RAINFALL (mm)= 54.380

RUNOFF COEFFICIENT = 0.358

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

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-----
| CALIB |
| NASHYD ( 0011) | Area (ha)= 2.52 Curve Number (CN)= 78.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----| U.H. Tp(hrs)= 0.23

```

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

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----- 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	3.167	3.26	6.250	7.07	9.33	0.54
0.167	0.00	3.250	3.26	6.333	3.81	9.42	0.54
0.250	0.00	3.333	9.25	6.417	3.81	9.50	0.54
0.333	0.54	3.417	9.25	6.500	3.81	9.58	0.54
0.417	0.54	3.500	9.25	6.583	3.81	9.67	0.54
0.500	0.54	3.583	9.25	6.667	3.81	9.75	0.54
0.583	0.54	3.667	9.25	6.750	3.81	9.83	0.54
0.667	0.54	3.750	9.25	6.833	3.81	9.92	0.54
0.750	0.54	3.833	9.25	6.917	3.81	10.00	0.54
0.833	0.54	3.917	9.25	7.000	3.81	10.08	0.54
0.917	0.54	4.000	9.25	7.083	3.81	10.17	0.54
1.000	0.54	4.083	9.25	7.167	3.81	10.25	0.54
1.083	0.54	4.167	9.25	7.250	3.81	10.33	0.54
1.167	0.54	4.250	9.25	7.333	2.18	10.42	0.54
1.250	0.54	4.333	25.02	7.417	2.18	10.50	0.54
1.333	0.54	4.417	25.02	7.500	2.18	10.58	0.54
1.417	0.54	4.500	25.02	7.583	2.18	10.67	0.54
1.500	0.54	4.583	25.02	7.667	2.18	10.75	0.54
1.583	0.54	4.667	25.02	7.750	2.18	10.83	0.54
1.667	0.54	4.750	25.02	7.833	2.18	10.92	0.54
1.750	0.54	4.833	25.02	7.917	2.18	11.00	0.54
1.833	0.54	4.917	25.02	8.000	2.18	11.08	0.54
1.917	0.54	5.000	25.02	8.083	2.18	11.17	0.54

2.000	0.54	5.083	25.02	8.167	2.18	11.25	0.54
2.083	0.54	5.167	25.02	8.250	2.18	11.33	0.54
2.167	0.54	5.250	25.02	8.333	1.09	11.42	0.54
2.250	0.54	5.333	7.07	8.417	1.09	11.50	0.54
2.333	3.26	5.417	7.07	8.500	1.09	11.58	0.54
2.417	3.26	5.500	7.07	8.583	1.09	11.67	0.54
2.500	3.26	5.583	7.07	8.667	1.09	11.75	0.54
2.583	3.26	5.667	7.07	8.750	1.09	11.83	0.54
2.667	3.26	5.750	7.07	8.833	1.09	11.92	0.54
2.750	3.26	5.833	7.07	8.917	1.09	12.00	0.54
2.833	3.26	5.917	7.07	9.000	1.09	12.08	0.54
2.917	3.26	6.000	7.07	9.083	1.09	12.17	0.54
3.000	3.26	6.083	7.07	9.167	1.09	12.25	0.54
3.083	3.26	6.167	7.07	9.250	1.09		

Unit Hyd Qpeak (cms)= 0.418

PEAK FLOW (cms)= 0.080 (i)
TIME TO PEAK (hrs)= 5.250
RUNOFF VOLUME (mm)= 20.126
TOTAL RAINFALL (mm)= 54.380
RUNOFF COEFFICIENT = 0.370

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

| CALIB |
| STANDHYD (0006) | Area (ha)= 16.82
| ID= 1 DT= 5.0 min | Total Imp(%)= 90.00 Dir. Conn.(%)= 75.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	15.14	1.68
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	334.86	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	3.26	6.250	7.07	9.33	0.54
0.167	0.00	3.250	3.26	6.333	3.81	9.42	0.54
0.250	0.00	3.333	9.25	6.417	3.81	9.50	0.54
0.333	0.54	3.417	9.25	6.500	3.81	9.58	0.54
0.417	0.54	3.500	9.25	6.583	3.81	9.67	0.54
0.500	0.54	3.583	9.25	6.667	3.81	9.75	0.54

0.583	0.54	3.667	9.25	6.750	3.81	9.83	0.54
0.667	0.54	3.750	9.25	6.833	3.81	9.92	0.54
0.750	0.54	3.833	9.25	6.917	3.81	10.00	0.54
0.833	0.54	3.917	9.25	7.000	3.81	10.08	0.54
0.917	0.54	4.000	9.25	7.083	3.81	10.17	0.54
1.000	0.54	4.083	9.25	7.167	3.81	10.25	0.54
1.083	0.54	4.167	9.25	7.250	3.81	10.33	0.54
1.167	0.54	4.250	9.25	7.333	2.18	10.42	0.54
1.250	0.54	4.333	25.02	7.417	2.18	10.50	0.54
1.333	0.54	4.417	25.02	7.500	2.18	10.58	0.54
1.417	0.54	4.500	25.02	7.583	2.18	10.67	0.54
1.500	0.54	4.583	25.02	7.667	2.18	10.75	0.54
1.583	0.54	4.667	25.02	7.750	2.18	10.83	0.54
1.667	0.54	4.750	25.02	7.833	2.18	10.92	0.54
1.750	0.54	4.833	25.02	7.917	2.18	11.00	0.54
1.833	0.54	4.917	25.02	8.000	2.18	11.08	0.54
1.917	0.54	5.000	25.02	8.083	2.18	11.17	0.54
2.000	0.54	5.083	25.02	8.167	2.18	11.25	0.54
2.083	0.54	5.167	25.02	8.250	2.18	11.33	0.54
2.167	0.54	5.250	25.02	8.333	1.09	11.42	0.54
2.250	0.54	5.333	7.07	8.417	1.09	11.50	0.54
2.333	3.26	5.417	7.07	8.500	1.09	11.58	0.54
2.417	3.26	5.500	7.07	8.583	1.09	11.67	0.54
2.500	3.26	5.583	7.07	8.667	1.09	11.75	0.54
2.583	3.26	5.667	7.07	8.750	1.09	11.83	0.54
2.667	3.26	5.750	7.07	8.833	1.09	11.92	0.54
2.750	3.26	5.833	7.07	8.917	1.09	12.00	0.54
2.833	3.26	5.917	7.07	9.000	1.09	12.08	0.54
2.917	3.26	6.000	7.07	9.083	1.09	12.17	0.54
3.000	3.26	6.083	7.07	9.167	1.09	12.25	0.54
3.083	3.26	6.167	7.07	9.250	1.09		

Max.Eff.Inten.(mm/hr)=	25.02	54.87
over (min)	10.00	20.00
Storage Coeff. (min)=	9.18 (ii)	18.15 (ii)
Unit Hyd. Tpeak (min)=	10.00	20.00
Unit Hyd. peak (cms)=	0.12	0.06

TOTALS

PEAK FLOW (cms)=	0.88	0.23	1.106 (iii)
TIME TO PEAK (hrs)=	5.25	5.25	5.25
RUNOFF VOLUME (mm)=	53.38	39.55	49.92
TOTAL RAINFALL (mm)=	54.38	54.38	54.38
RUNOFF COEFFICIENT =	0.98	0.73	0.92

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 84.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0012) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0011):    2.52    0.080    5.25    20.13
+ ID2= 2 ( 0006):   16.82    1.106    5.25    49.92
=====
ID = 3 ( 0012):    19.34    1.186    5.25    46.04

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0008) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0012):    19.34    1.186    5.25    46.04
+ ID2= 2 ( 0004):   36.35    0.656    5.83    19.47
=====
ID = 3 ( 0008):    55.69    1.637    5.25    28.70

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| NASHYD ( 0005) |
| ID= 1 DT= 5.0 min |
-----
Area      (ha)= 14.66   Curve Number (CN)= 65.0
Ia        (mm)= 5.00   # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.59

```

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	3.167	3.26	6.250	7.07	9.33	0.54
0.167	0.00	3.250	3.26	6.333	3.81	9.42	0.54
0.250	0.00	3.333	9.25	6.417	3.81	9.50	0.54
0.333	0.54	3.417	9.25	6.500	3.81	9.58	0.54
0.417	0.54	3.500	9.25	6.583	3.81	9.67	0.54
0.500	0.54	3.583	9.25	6.667	3.81	9.75	0.54
0.583	0.54	3.667	9.25	6.750	3.81	9.83	0.54
0.667	0.54	3.750	9.25	6.833	3.81	9.92	0.54
0.750	0.54	3.833	9.25	6.917	3.81	10.00	0.54
0.833	0.54	3.917	9.25	7.000	3.81	10.08	0.54
0.917	0.54	4.000	9.25	7.083	3.81	10.17	0.54
1.000	0.54	4.083	9.25	7.167	3.81	10.25	0.54

1.083	0.54	4.167	9.25	7.250	3.81	10.33	0.54
1.167	0.54	4.250	9.25	7.333	2.18	10.42	0.54
1.250	0.54	4.333	25.02	7.417	2.18	10.50	0.54
1.333	0.54	4.417	25.02	7.500	2.18	10.58	0.54
1.417	0.54	4.500	25.02	7.583	2.18	10.67	0.54
1.500	0.54	4.583	25.02	7.667	2.18	10.75	0.54
1.583	0.54	4.667	25.02	7.750	2.18	10.83	0.54
1.667	0.54	4.750	25.02	7.833	2.18	10.92	0.54
1.750	0.54	4.833	25.02	7.917	2.18	11.00	0.54
1.833	0.54	4.917	25.02	8.000	2.18	11.08	0.54
1.917	0.54	5.000	25.02	8.083	2.18	11.17	0.54
2.000	0.54	5.083	25.02	8.167	2.18	11.25	0.54
2.083	0.54	5.167	25.02	8.250	2.18	11.33	0.54
2.167	0.54	5.250	25.02	8.333	1.09	11.42	0.54
2.250	0.54	5.333	7.07	8.417	1.09	11.50	0.54
2.333	3.26	5.417	7.07	8.500	1.09	11.58	0.54
2.417	3.26	5.500	7.07	8.583	1.09	11.67	0.54
2.500	3.26	5.583	7.07	8.667	1.09	11.75	0.54
2.583	3.26	5.667	7.07	8.750	1.09	11.83	0.54
2.667	3.26	5.750	7.07	8.833	1.09	11.92	0.54
2.750	3.26	5.833	7.07	8.917	1.09	12.00	0.54
2.833	3.26	5.917	7.07	9.000	1.09	12.08	0.54
2.917	3.26	6.000	7.07	9.083	1.09	12.17	0.54
3.000	3.26	6.083	7.07	9.167	1.09	12.25	0.54
3.083	3.26	6.167	7.07	9.250	1.09		

Unit Hyd Qpeak (cms)= 0.949

PEAK FLOW (cms)= 0.207 (i)

TIME TO PEAK (hrs)= 5.583

RUNOFF VOLUME (mm)= 13.099

TOTAL RAINFALL (mm)= 54.380

RUNOFF COEFFICIENT = 0.241

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

 | CALIB |
 | STANDHYD (0007) | Area (ha)= 0.41
 | ID= 1 DT= 5.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.27	0.14
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	52.28	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	3.26	6.250	7.07	9.33	0.54
0.167	0.00	3.250	3.26	6.333	3.81	9.42	0.54
0.250	0.00	3.333	9.25	6.417	3.81	9.50	0.54
0.333	0.54	3.417	9.25	6.500	3.81	9.58	0.54
0.417	0.54	3.500	9.25	6.583	3.81	9.67	0.54
0.500	0.54	3.583	9.25	6.667	3.81	9.75	0.54
0.583	0.54	3.667	9.25	6.750	3.81	9.83	0.54
0.667	0.54	3.750	9.25	6.833	3.81	9.92	0.54
0.750	0.54	3.833	9.25	6.917	3.81	10.00	0.54
0.833	0.54	3.917	9.25	7.000	3.81	10.08	0.54
0.917	0.54	4.000	9.25	7.083	3.81	10.17	0.54
1.000	0.54	4.083	9.25	7.167	3.81	10.25	0.54
1.083	0.54	4.167	9.25	7.250	3.81	10.33	0.54
1.167	0.54	4.250	9.25	7.333	2.18	10.42	0.54
1.250	0.54	4.333	25.02	7.417	2.18	10.50	0.54
1.333	0.54	4.417	25.02	7.500	2.18	10.58	0.54
1.417	0.54	4.500	25.02	7.583	2.18	10.67	0.54
1.500	0.54	4.583	25.02	7.667	2.18	10.75	0.54
1.583	0.54	4.667	25.02	7.750	2.18	10.83	0.54
1.667	0.54	4.750	25.02	7.833	2.18	10.92	0.54
1.750	0.54	4.833	25.02	7.917	2.18	11.00	0.54
1.833	0.54	4.917	25.02	8.000	2.18	11.08	0.54
1.917	0.54	5.000	25.02	8.083	2.18	11.17	0.54
2.000	0.54	5.083	25.02	8.167	2.18	11.25	0.54
2.083	0.54	5.167	25.02	8.250	2.18	11.33	0.54
2.167	0.54	5.250	25.02	8.333	1.09	11.42	0.54
2.250	0.54	5.333	7.07	8.417	1.09	11.50	0.54
2.333	3.26	5.417	7.07	8.500	1.09	11.58	0.54
2.417	3.26	5.500	7.07	8.583	1.09	11.67	0.54
2.500	3.26	5.583	7.07	8.667	1.09	11.75	0.54
2.583	3.26	5.667	7.07	8.750	1.09	11.83	0.54
2.667	3.26	5.750	7.07	8.833	1.09	11.92	0.54
2.750	3.26	5.833	7.07	8.917	1.09	12.00	0.54
2.833	3.26	5.917	7.07	9.000	1.09	12.08	0.54
2.917	3.26	6.000	7.07	9.083	1.09	12.17	0.54
3.000	3.26	6.083	7.07	9.167	1.09	12.25	0.54
3.083	3.26	6.167	7.07	9.250	1.09		

Max.Eff.Inten.(mm/hr)= 25.02 56.73
over (min) 5.00 15.00
Storage Coeff. (min)= 3.01 (ii) 11.87 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.28 0.09

TOTALS

PEAK FLOW (cms)= 0.00 0.02 0.025 (iii)

TIME TO PEAK	(hrs)=	4.83	5.25	5.25
RUNOFF VOLUME	(mm)=	53.38	39.86	41.19
TOTAL RAINFALL	(mm)=	54.38	54.38	54.38
RUNOFF COEFFICIENT	=	0.98	0.73	0.76

***** 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* = 84.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0009)					
1 + 2 = 3					
		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0005):	14.66	0.207	5.58	13.10	
+ ID2= 2 (0007):	0.41	0.025	5.25	41.19	
=====					
ID = 3 (0009):	15.07	0.220	5.50	13.86	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0010)					
1 + 2 = 3					
		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0008):	55.69	1.637	5.25	28.70	
+ ID2= 2 (0009):	15.07	0.220	5.50	13.86	
=====					
ID = 3 (0010):	70.76	1.830	5.25	25.54	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

=====

V	V	I	SSSSS	U	U	A	L	
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	

(v 6.2.2022)

000 TTTTT TTTTT H H Y Y M M 000 TM


```

O   O   T       T   H   H   Y   Y   MM MM   O   O
O   O   T       T   H   H   Y       M   M   O   O
000    T       T   H   H   Y       M   M   000

```

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat

Output filename:
 C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\fd94b4a7-0ea1-4fcc-955b-90a1d6b5b970\s

Summary filename:
 C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\fd94b4a7-0ea1-4fcc-955b-90a1d6b5b970\s

DATE: 06-29-2026

TIME: 03:46:21

USER:

COMMENTS: _____

 ** SIMULATION : 50 Year 12 Hour AES (Bloor, T **

READ STORM Ptotal= 80.82 mm	Filename: C:\Users\dmurchison\AppData\Local\Temp\96f6e017-39ec-4dd5-9feb-e3727c87678c\6072a665 Comments: 50 Year 12 Hour AES (Bloor, TRCA)

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	13.74	6.50	5.66	9.75	0.81
0.25	0.81	3.50	13.74	6.75	5.66	10.00	0.81
0.50	0.81	3.75	13.74	7.00	5.66	10.25	0.81
0.75	0.81	4.00	13.74	7.25	3.23	10.50	0.81
1.00	0.81	4.25	37.17	7.50	3.23	10.75	0.81

1.25	0.81	4.50	37.17	7.75	3.23	11.00	0.81
1.50	0.81	4.75	37.17	8.00	3.23	11.25	0.81
1.75	0.81	5.00	37.17	8.25	1.62	11.50	0.81
2.00	0.81	5.25	10.50	8.50	1.62	11.75	0.81
2.25	4.85	5.50	10.50	8.75	1.62	12.00	0.81
2.50	4.85	5.75	10.50	9.00	1.62		
2.75	4.85	6.00	10.50	9.25	0.81		
3.00	4.85	6.25	5.66	9.50	0.81		

CALIB			
NASHYD (0004)			
ID= 1 DT= 5.0 min			

Area	(ha)=	36.35	Curve Number (CN)= 77.0
Ia	(mm)=	5.00	# of Linear Res.(N)= 3.00
U.H. Tp(hrs)=	0.81		

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	3.167	4.85	6.250	10.50	9.33	0.81
0.167	0.00	3.250	4.85	6.333	5.66	9.42	0.81
0.250	0.00	3.333	13.74	6.417	5.66	9.50	0.81
0.333	0.81	3.417	13.74	6.500	5.66	9.58	0.81
0.417	0.81	3.500	13.74	6.583	5.66	9.67	0.81
0.500	0.81	3.583	13.74	6.667	5.66	9.75	0.81
0.583	0.81	3.667	13.74	6.750	5.66	9.83	0.81
0.667	0.81	3.750	13.74	6.833	5.66	9.92	0.81
0.750	0.81	3.833	13.74	6.917	5.66	10.00	0.81
0.833	0.81	3.917	13.74	7.000	5.66	10.08	0.81
0.917	0.81	4.000	13.74	7.083	5.66	10.17	0.81
1.000	0.81	4.083	13.74	7.167	5.66	10.25	0.81
1.083	0.81	4.167	13.74	7.250	5.66	10.33	0.81
1.167	0.81	4.250	13.74	7.333	3.23	10.42	0.81
1.250	0.81	4.333	37.17	7.417	3.23	10.50	0.81
1.333	0.81	4.417	37.17	7.500	3.23	10.58	0.81
1.417	0.81	4.500	37.17	7.583	3.23	10.67	0.81
1.500	0.81	4.583	37.17	7.667	3.23	10.75	0.81
1.583	0.81	4.667	37.17	7.750	3.23	10.83	0.81
1.667	0.81	4.750	37.17	7.833	3.23	10.92	0.81
1.750	0.81	4.833	37.17	7.917	3.23	11.00	0.81
1.833	0.81	4.917	37.17	8.000	3.23	11.08	0.81
1.917	0.81	5.000	37.17	8.083	3.23	11.17	0.81
2.000	0.81	5.083	37.17	8.167	3.23	11.25	0.81
2.083	0.81	5.167	37.17	8.250	3.23	11.33	0.81
2.167	0.81	5.250	37.17	8.333	1.62	11.42	0.81
2.250	0.81	5.333	10.50	8.417	1.62	11.50	0.81

2.333	4.85	5.417	10.50	8.500	1.62	11.58	0.81
2.417	4.85	5.500	10.50	8.583	1.62	11.67	0.81
2.500	4.85	5.583	10.50	8.667	1.62	11.75	0.81
2.583	4.85	5.667	10.50	8.750	1.62	11.83	0.81
2.667	4.85	5.750	10.50	8.833	1.62	11.92	0.81
2.750	4.85	5.833	10.50	8.917	1.62	12.00	0.81
2.833	4.85	5.917	10.50	9.000	1.62	12.08	0.81
2.917	4.85	6.000	10.50	9.083	1.62	12.17	0.81
3.000	4.85	6.083	10.50	9.167	1.62	12.25	0.81
3.083	4.85	6.167	10.50	9.250	1.62		

Unit Hyd Qpeak (cms)= 1.714

PEAK FLOW (cms)= 1.304 (i)

TIME TO PEAK (hrs)= 5.833

RUNOFF VOLUME (mm)= 37.897

TOTAL RAINFALL (mm)= 80.820

RUNOFF COEFFICIENT = 0.469

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

CALIB			
NASHYD (0011)	Area (ha)= 2.52	Curve Number (CN)= 78.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
-----	U.H. Tp(hrs)= 0.23		

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	3.167	4.85	6.250	10.50	9.33	0.81
0.167	0.00	3.250	4.85	6.333	5.66	9.42	0.81
0.250	0.00	3.333	13.74	6.417	5.66	9.50	0.81
0.333	0.81	3.417	13.74	6.500	5.66	9.58	0.81
0.417	0.81	3.500	13.74	6.583	5.66	9.67	0.81
0.500	0.81	3.583	13.74	6.667	5.66	9.75	0.81
0.583	0.81	3.667	13.74	6.750	5.66	9.83	0.81
0.667	0.81	3.750	13.74	6.833	5.66	9.92	0.81
0.750	0.81	3.833	13.74	6.917	5.66	10.00	0.81
0.833	0.81	3.917	13.74	7.000	5.66	10.08	0.81
0.917	0.81	4.000	13.74	7.083	5.66	10.17	0.81
1.000	0.81	4.083	13.74	7.167	5.66	10.25	0.81
1.083	0.81	4.167	13.74	7.250	5.66	10.33	0.81
1.167	0.81	4.250	13.74	7.333	3.23	10.42	0.81
1.250	0.81	4.333	37.17	7.417	3.23	10.50	0.81
1.333	0.81	4.417	37.17	7.500	3.23	10.58	0.81

1.417	0.81	4.500	37.17	7.583	3.23	10.67	0.81
1.500	0.81	4.583	37.17	7.667	3.23	10.75	0.81
1.583	0.81	4.667	37.17	7.750	3.23	10.83	0.81
1.667	0.81	4.750	37.17	7.833	3.23	10.92	0.81
1.750	0.81	4.833	37.17	7.917	3.23	11.00	0.81
1.833	0.81	4.917	37.17	8.000	3.23	11.08	0.81
1.917	0.81	5.000	37.17	8.083	3.23	11.17	0.81
2.000	0.81	5.083	37.17	8.167	3.23	11.25	0.81
2.083	0.81	5.167	37.17	8.250	3.23	11.33	0.81
2.167	0.81	5.250	37.17	8.333	1.62	11.42	0.81
2.250	0.81	5.333	10.50	8.417	1.62	11.50	0.81
2.333	4.85	5.417	10.50	8.500	1.62	11.58	0.81
2.417	4.85	5.500	10.50	8.583	1.62	11.67	0.81
2.500	4.85	5.583	10.50	8.667	1.62	11.75	0.81
2.583	4.85	5.667	10.50	8.750	1.62	11.83	0.81
2.667	4.85	5.750	10.50	8.833	1.62	11.92	0.81
2.750	4.85	5.833	10.50	8.917	1.62	12.00	0.81
2.833	4.85	5.917	10.50	9.000	1.62	12.08	0.81
2.917	4.85	6.000	10.50	9.083	1.62	12.17	0.81
3.000	4.85	6.083	10.50	9.167	1.62	12.25	0.81
3.083	4.85	6.167	10.50	9.250	1.62		

Unit Hyd Qpeak (cms)= 0.418

PEAK FLOW (cms)= 0.153 (i)

TIME TO PEAK (hrs)= 5.250

RUNOFF VOLUME (mm)= 38.941

TOTAL RAINFALL (mm)= 80.820

RUNOFF COEFFICIENT = 0.482

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

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-----
| CALIB |
| STANDHYD ( 0006) |
| ID= 1 DT= 5.0 min |
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Area (ha)= 16.82

Total Imp(%)= 90.00 Dir. Conn.(%)= 75.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	15.14	1.68
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	334.86	40.00
Mannings n	=	0.013	0.250

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

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----- 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	3.167	4.85	6.250	10.50	9.33	0.81
0.167	0.00	3.250	4.85	6.333	5.66	9.42	0.81
0.250	0.00	3.333	13.74	6.417	5.66	9.50	0.81
0.333	0.81	3.417	13.74	6.500	5.66	9.58	0.81
0.417	0.81	3.500	13.74	6.583	5.66	9.67	0.81
0.500	0.81	3.583	13.74	6.667	5.66	9.75	0.81
0.583	0.81	3.667	13.74	6.750	5.66	9.83	0.81
0.667	0.81	3.750	13.74	6.833	5.66	9.92	0.81
0.750	0.81	3.833	13.74	6.917	5.66	10.00	0.81
0.833	0.81	3.917	13.74	7.000	5.66	10.08	0.81
0.917	0.81	4.000	13.74	7.083	5.66	10.17	0.81
1.000	0.81	4.083	13.74	7.167	5.66	10.25	0.81
1.083	0.81	4.167	13.74	7.250	5.66	10.33	0.81
1.167	0.81	4.250	13.74	7.333	3.23	10.42	0.81
1.250	0.81	4.333	37.17	7.417	3.23	10.50	0.81
1.333	0.81	4.417	37.17	7.500	3.23	10.58	0.81
1.417	0.81	4.500	37.17	7.583	3.23	10.67	0.81
1.500	0.81	4.583	37.17	7.667	3.23	10.75	0.81
1.583	0.81	4.667	37.17	7.750	3.23	10.83	0.81
1.667	0.81	4.750	37.17	7.833	3.23	10.92	0.81
1.750	0.81	4.833	37.17	7.917	3.23	11.00	0.81
1.833	0.81	4.917	37.17	8.000	3.23	11.08	0.81
1.917	0.81	5.000	37.17	8.083	3.23	11.17	0.81
2.000	0.81	5.083	37.17	8.167	3.23	11.25	0.81
2.083	0.81	5.167	37.17	8.250	3.23	11.33	0.81
2.167	0.81	5.250	37.17	8.333	1.62	11.42	0.81
2.250	0.81	5.333	10.50	8.417	1.62	11.50	0.81
2.333	4.85	5.417	10.50	8.500	1.62	11.58	0.81
2.417	4.85	5.500	10.50	8.583	1.62	11.67	0.81
2.500	4.85	5.583	10.50	8.667	1.62	11.75	0.81
2.583	4.85	5.667	10.50	8.750	1.62	11.83	0.81
2.667	4.85	5.750	10.50	8.833	1.62	11.92	0.81
2.750	4.85	5.833	10.50	8.917	1.62	12.00	0.81
2.833	4.85	5.917	10.50	9.000	1.62	12.08	0.81
2.917	4.85	6.000	10.50	9.083	1.62	12.17	0.81
3.000	4.85	6.083	10.50	9.167	1.62	12.25	0.81
3.083	4.85	6.167	10.50	9.250	1.62		

Max.Eff.Inten.(mm/hr)=	37.17	86.39
over (min)	10.00	15.00
Storage Coeff. (min)=	7.84 (ii)	12.52 (ii)
Unit Hyd. Tpeak (min)=	10.00	15.00
Unit Hyd. peak (cms)=	0.13	0.08

TOTALS

PEAK FLOW (cms)=	1.30	0.39	1.692 (iii)
TIME TO PEAK (hrs)=	5.25	5.25	5.25
RUNOFF VOLUME (mm)=	79.82	64.63	76.02
TOTAL RAINFALL (mm)=	80.82	80.82	80.82
RUNOFF COEFFICIENT =	0.99	0.80	0.94

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 84.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-----
| ADD HYD ( 0012) |
| 1 + 2 = 3      |
-----
                AREA      QPEAK      TPEAK      R.V.
                (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0011):   2.52    0.153     5.25     38.94
+ ID2= 2 ( 0006):  16.82    1.692     5.25     76.02
=====
ID = 3 ( 0012):   19.34    1.845     5.25     71.19

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-----
| ADD HYD ( 0008) |
| 1 + 2 = 3      |
-----
                AREA      QPEAK      TPEAK      R.V.
                (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0012):   19.34    1.845     5.25     71.19
+ ID2= 2 ( 0004):  36.35    1.304     5.83     37.90
=====
ID = 3 ( 0008):   55.69    2.798     5.25     49.46

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NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-----
| CALIB          |
| NASHYD ( 0005) |
| ID= 1 DT= 5.0 min |
-----
Area      (ha)=  14.66   Curve Number (CN)= 65.0
Ia        (mm)=   5.00   # of Linear Res.(N)= 3.00
U.H. Tp(hrs)=   0.59

```

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	3.167	4.85	6.250	10.50	9.33	0.81
0.167	0.00	3.250	4.85	6.333	5.66	9.42	0.81
0.250	0.00	3.333	13.74	6.417	5.66	9.50	0.81
0.333	0.81	3.417	13.74	6.500	5.66	9.58	0.81
0.417	0.81	3.500	13.74	6.583	5.66	9.67	0.81

0.500	0.81	3.583	13.74	6.667	5.66	9.75	0.81
0.583	0.81	3.667	13.74	6.750	5.66	9.83	0.81
0.667	0.81	3.750	13.74	6.833	5.66	9.92	0.81
0.750	0.81	3.833	13.74	6.917	5.66	10.00	0.81
0.833	0.81	3.917	13.74	7.000	5.66	10.08	0.81
0.917	0.81	4.000	13.74	7.083	5.66	10.17	0.81
1.000	0.81	4.083	13.74	7.167	5.66	10.25	0.81
1.083	0.81	4.167	13.74	7.250	5.66	10.33	0.81
1.167	0.81	4.250	13.74	7.333	3.23	10.42	0.81
1.250	0.81	4.333	37.17	7.417	3.23	10.50	0.81
1.333	0.81	4.417	37.17	7.500	3.23	10.58	0.81
1.417	0.81	4.500	37.17	7.583	3.23	10.67	0.81
1.500	0.81	4.583	37.17	7.667	3.23	10.75	0.81
1.583	0.81	4.667	37.17	7.750	3.23	10.83	0.81
1.667	0.81	4.750	37.17	7.833	3.23	10.92	0.81
1.750	0.81	4.833	37.17	7.917	3.23	11.00	0.81
1.833	0.81	4.917	37.17	8.000	3.23	11.08	0.81
1.917	0.81	5.000	37.17	8.083	3.23	11.17	0.81
2.000	0.81	5.083	37.17	8.167	3.23	11.25	0.81
2.083	0.81	5.167	37.17	8.250	3.23	11.33	0.81
2.167	0.81	5.250	37.17	8.333	1.62	11.42	0.81
2.250	0.81	5.333	10.50	8.417	1.62	11.50	0.81
2.333	4.85	5.417	10.50	8.500	1.62	11.58	0.81
2.417	4.85	5.500	10.50	8.583	1.62	11.67	0.81
2.500	4.85	5.583	10.50	8.667	1.62	11.75	0.81
2.583	4.85	5.667	10.50	8.750	1.62	11.83	0.81
2.667	4.85	5.750	10.50	8.833	1.62	11.92	0.81
2.750	4.85	5.833	10.50	8.917	1.62	12.00	0.81
2.833	4.85	5.917	10.50	9.000	1.62	12.08	0.81
2.917	4.85	6.000	10.50	9.083	1.62	12.17	0.81
3.000	4.85	6.083	10.50	9.167	1.62	12.25	0.81
3.083	4.85	6.167	10.50	9.250	1.62		

Unit Hyd Qpeak (cms)= 0.949

PEAK FLOW (cms)= 0.435 (i)

TIME TO PEAK (hrs)= 5.583

RUNOFF VOLUME (mm)= 27.040

TOTAL RAINFALL (mm)= 80.820

RUNOFF COEFFICIENT = 0.335

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

 | CALIB
 | STANDHYD (0007)
ID= 1 DT= 5.0 min

Area (ha)= 0.41

Total Imp(%)= 65.00 Dir. Conn.(%)= 10.00

IMPERVIOUS PERVIOUS (i)

Surface Area	(ha)=	0.27	0.14
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	52.28	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	4.85	6.250	10.50	9.33	0.81
0.167	0.00	3.250	4.85	6.333	5.66	9.42	0.81
0.250	0.00	3.333	13.74	6.417	5.66	9.50	0.81
0.333	0.81	3.417	13.74	6.500	5.66	9.58	0.81
0.417	0.81	3.500	13.74	6.583	5.66	9.67	0.81
0.500	0.81	3.583	13.74	6.667	5.66	9.75	0.81
0.583	0.81	3.667	13.74	6.750	5.66	9.83	0.81
0.667	0.81	3.750	13.74	6.833	5.66	9.92	0.81
0.750	0.81	3.833	13.74	6.917	5.66	10.00	0.81
0.833	0.81	3.917	13.74	7.000	5.66	10.08	0.81
0.917	0.81	4.000	13.74	7.083	5.66	10.17	0.81
1.000	0.81	4.083	13.74	7.167	5.66	10.25	0.81
1.083	0.81	4.167	13.74	7.250	5.66	10.33	0.81
1.167	0.81	4.250	13.74	7.333	3.23	10.42	0.81
1.250	0.81	4.333	37.17	7.417	3.23	10.50	0.81
1.333	0.81	4.417	37.17	7.500	3.23	10.58	0.81
1.417	0.81	4.500	37.17	7.583	3.23	10.67	0.81
1.500	0.81	4.583	37.17	7.667	3.23	10.75	0.81
1.583	0.81	4.667	37.17	7.750	3.23	10.83	0.81
1.667	0.81	4.750	37.17	7.833	3.23	10.92	0.81
1.750	0.81	4.833	37.17	7.917	3.23	11.00	0.81
1.833	0.81	4.917	37.17	8.000	3.23	11.08	0.81
1.917	0.81	5.000	37.17	8.083	3.23	11.17	0.81
2.000	0.81	5.083	37.17	8.167	3.23	11.25	0.81
2.083	0.81	5.167	37.17	8.250	3.23	11.33	0.81
2.167	0.81	5.250	37.17	8.333	1.62	11.42	0.81
2.250	0.81	5.333	10.50	8.417	1.62	11.50	0.81
2.333	4.85	5.417	10.50	8.500	1.62	11.58	0.81
2.417	4.85	5.500	10.50	8.583	1.62	11.67	0.81
2.500	4.85	5.583	10.50	8.667	1.62	11.75	0.81
2.583	4.85	5.667	10.50	8.750	1.62	11.83	0.81
2.667	4.85	5.750	10.50	8.833	1.62	11.92	0.81
2.750	4.85	5.833	10.50	8.917	1.62	12.00	0.81
2.833	4.85	5.917	10.50	9.000	1.62	12.08	0.81
2.917	4.85	6.000	10.50	9.083	1.62	12.17	0.81
3.000	4.85	6.083	10.50	9.167	1.62	12.25	0.81
3.083	4.85	6.167	10.50	9.250	1.62		

Max.Eff.Inten.(mm/hr)=	37.17	89.13	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.57 (ii)	9.96 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.29	0.11	
			TOTALS
PEAK FLOW (cms)=	0.00	0.03	0.039 (iii)
TIME TO PEAK (hrs)=	4.83	5.25	5.25
RUNOFF VOLUME (mm)=	79.82	65.00	66.46
TOTAL RAINFALL (mm)=	80.82	80.82	80.82
RUNOFF COEFFICIENT =	0.99	0.80	0.82

***** 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* = 84.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0009)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0005):	14.66	0.435	5.58	27.04
+ ID2= 2 (0007):	0.41	0.039	5.25	66.46
=====				
ID = 3 (0009):	15.07	0.452	5.50	28.11

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0010)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0008):	55.69	2.798	5.25	49.46
+ ID2= 2 (0009):	15.07	0.452	5.50	28.11
=====				
ID = 3 (0010):	70.76	3.204	5.25	44.91

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

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000   TTTT   TTTT   H   H   Y   Y   M   M   000   TM
0   0   T       T   H   H   Y   Y   MM  MM   0   0
0   0   T       T   H   H   Y   M   M   0   0
000   T       T   H   H   Y   M   M   000

```

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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 OTTHYM0 6.2\V02\voin.dat

Output filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\1af76ea0-e193-48be-98e1-4c3b48369402\s

Summary filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\1af76ea0-e193-48be-98e1-4c3b48369402\s

DATE: 06-29-2026

TIME: 03:46:20

USER:

COMMENTS: _____

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*****
** SIMULATION : CW 10 Yr 4 Hr Chicago Design **
*****

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-----
| CHICAGO STORM |
| Ptotal= 58.18 mm |
-----

```

IDF curve parameters: A= 628.126

B= 0.000

C= 0.687

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

Duration of storm = 4.00 hrs

Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	5.08	1.00	23.38	2.00	9.92	3.00	5.83
0.17	5.66	1.17	129.14	2.17	8.78	3.17	5.50
0.33	6.45	1.33	28.60	2.33	7.92	3.33	5.21
0.50	7.57	1.50	18.18	2.50	7.24	3.50	4.95
0.67	9.34	1.67	13.93	2.67	6.68	3.67	4.73
0.83	12.71	1.83	11.51	2.83	6.22	3.83	4.52

```

-----
| CALIB |
| NASHYD ( 0004) | Area (ha)= 36.35 Curve Number (CN)= 77.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----| U.H. Tp(hrs)= 0.81

```

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	5.08	1.083	23.38	2.083	9.92	3.08	5.83
0.167	5.08	1.167	23.38	2.167	9.92	3.17	5.83
0.250	5.66	1.250	129.14	2.250	8.78	3.25	5.50
0.333	5.66	1.333	129.14	2.333	8.78	3.33	5.50
0.417	6.45	1.417	28.60	2.417	7.92	3.42	5.21
0.500	6.45	1.500	28.60	2.500	7.92	3.50	5.21
0.583	7.57	1.583	18.18	2.583	7.24	3.58	4.95
0.667	7.57	1.667	18.18	2.667	7.24	3.67	4.95
0.750	9.34	1.750	13.93	2.750	6.68	3.75	4.73
0.833	9.34	1.833	13.93	2.833	6.68	3.83	4.73
0.917	12.71	1.917	11.51	2.917	6.22	3.92	4.52
1.000	12.71	2.000	11.51	3.000	6.22	4.00	4.52

Unit Hyd Qpeak (cms)= 1.714

PEAK FLOW (cms)= 0.890 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 21.912
TOTAL RAINFALL (mm)= 58.175
RUNOFF COEFFICIENT = 0.377

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

CALIB			
NASHYD (0011)		Area (ha)= 2.52	Curve Number (CN)= 78.0
ID= 1 DT= 5.0 min		Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
-----		U.H. Tp(hrs)= 0.23	

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

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	5.08	1.083	23.38	2.083	9.92	3.08	5.83
0.167	5.08	1.167	23.38	2.167	9.92	3.17	5.83
0.250	5.66	1.250	129.14	2.250	8.78	3.25	5.50
0.333	5.66	1.333	129.14	2.333	8.78	3.33	5.50
0.417	6.45	1.417	28.60	2.417	7.92	3.42	5.21
0.500	6.45	1.500	28.60	2.500	7.92	3.50	5.21
0.583	7.57	1.583	18.18	2.583	7.24	3.58	4.95
0.667	7.57	1.667	18.18	2.667	7.24	3.67	4.95
0.750	9.34	1.750	13.93	2.750	6.68	3.75	4.73
0.833	9.34	1.833	13.93	2.833	6.68	3.83	4.73
0.917	12.71	1.917	11.51	2.917	6.22	3.92	4.52
1.000	12.71	2.000	11.51	3.000	6.22	4.00	4.52

Unit Hyd Qpeak (cms)= 0.418

PEAK FLOW (cms)= 0.147 (i)
 TIME TO PEAK (hrs)= 1.500
 RUNOFF VOLUME (mm)= 22.629
 TOTAL RAINFALL (mm)= 58.175
 RUNOFF COEFFICIENT = 0.389

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

CALIB			
STANDHYD (0006)		Area (ha)= 16.82	
ID= 1 DT= 5.0 min		Total Imp(%)= 90.00	Dir. Conn.(%)= 75.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	15.14	1.68
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	334.86	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	5.08	1.083	23.38	2.083	9.92	3.08	5.83
0.167	5.08	1.167	23.38	2.167	9.92	3.17	5.83
0.250	5.66	1.250	129.14	2.250	8.78	3.25	5.50
0.333	5.66	1.333	129.14	2.333	8.78	3.33	5.50
0.417	6.45	1.417	28.60	2.417	7.92	3.42	5.21
0.500	6.45	1.500	28.60	2.500	7.92	3.50	5.21
0.583	7.57	1.583	18.18	2.583	7.24	3.58	4.95
0.667	7.57	1.667	18.18	2.667	7.24	3.67	4.95
0.750	9.34	1.750	13.93	2.750	6.68	3.75	4.73
0.833	9.34	1.833	13.93	2.833	6.68	3.83	4.73
0.917	12.71	1.917	11.51	2.917	6.22	3.92	4.52
1.000	12.71	2.000	11.51	3.000	6.22	4.00	4.52

Max.Eff.Inten.(mm/hr)= 129.14 246.44
over (min) 5.00 10.00
Storage Coeff. (min)= 4.76 (ii) 7.61 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.22 0.13

TOTALS

PEAK FLOW (cms)= 4.07 0.78 4.770 (iii)
TIME TO PEAK (hrs)= 1.33 1.42 1.33
RUNOFF VOLUME (mm)= 57.18 43.09 53.65
TOTAL RAINFALL (mm)= 58.18 58.18 58.18
RUNOFF COEFFICIENT = 0.98 0.74 0.92

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 84.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0012) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0011):    2.52    0.147    1.50    22.63
+ ID2= 2 ( 0006):   16.82    4.770    1.33    53.65
=====
ID = 3 ( 0012):   19.34    4.856    1.33    49.61

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0008) |
| 1 + 2 = 3 |
-----
                AREA      QPEAK      TPEAK      R.V.
                (ha)      (cms)      (hrs)      (mm)
      ID1= 1 ( 0012):  19.34  4.856      1.33  49.61
+ ID2= 2 ( 0004):  36.35  0.890      2.33  21.91
=====
      ID = 3 ( 0008):  55.69  4.931      1.33  31.53

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| NASHYD ( 0005) |
| ID= 1 DT= 5.0 min |
-----
      Area      (ha)= 14.66      Curve Number (CN)= 65.0
      Ia      (mm)= 5.00      # of Linear Res.(N)= 3.00
      U.H. Tp(hrs)= 0.59

```

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

```

----- TRANSFORMED HYETOGRAPH -----
      TIME      RAIN | TIME      RAIN | TIME      RAIN | TIME      RAIN
      hrs      mm/hr | hrs      mm/hr | hrs      mm/hr | hrs      mm/hr
0.083      5.08 | 1.083     23.38 | 2.083     9.92 | 3.08      5.83
0.167      5.08 | 1.167     23.38 | 2.167     9.92 | 3.17      5.83
0.250      5.66 | 1.250    129.14 | 2.250     8.78 | 3.25      5.50
0.333      5.66 | 1.333    129.14 | 2.333     8.78 | 3.33      5.50
0.417      6.45 | 1.417     28.60 | 2.417     7.92 | 3.42      5.21
0.500      6.45 | 1.500     28.60 | 2.500     7.92 | 3.50      5.21
0.583      7.57 | 1.583     18.18 | 2.583     7.24 | 3.58      4.95
0.667      7.57 | 1.667     18.18 | 2.667     7.24 | 3.67      4.95
0.750      9.34 | 1.750     13.93 | 2.750     6.68 | 3.75      4.73
0.833      9.34 | 1.833     13.93 | 2.833     6.68 | 3.83      4.73
0.917     12.71 | 1.917     11.51 | 2.917     6.22 | 3.92      4.52
1.000     12.71 | 2.000     11.51 | 3.000     6.22 | 4.00      4.52

```

Unit Hyd Qpeak (cms)= 0.949

PEAK FLOW (cms)= 0.289 (i)

TIME TO PEAK (hrs)= 2.083

RUNOFF VOLUME (mm)= 14.886

TOTAL RAINFALL (mm)= 58.175

RUNOFF COEFFICIENT = 0.256

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

```

-----
| CALIB |

```

| STANDHYD (0007) | Area (ha)= 0.41
 | ID= 1 DT= 5.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.27	0.14
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	52.28	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	5.08	1.083	23.38	2.083	9.92	3.08	5.83
0.167	5.08	1.167	23.38	2.167	9.92	3.17	5.83
0.250	5.66	1.250	129.14	2.250	8.78	3.25	5.50
0.333	5.66	1.333	129.14	2.333	8.78	3.33	5.50
0.417	6.45	1.417	28.60	2.417	7.92	3.42	5.21
0.500	6.45	1.500	28.60	2.500	7.92	3.50	5.21
0.583	7.57	1.583	18.18	2.583	7.24	3.58	4.95
0.667	7.57	1.667	18.18	2.667	7.24	3.67	4.95
0.750	9.34	1.750	13.93	2.750	6.68	3.75	4.73
0.833	9.34	1.833	13.93	2.833	6.68	3.83	4.73
0.917	12.71	1.917	11.51	2.917	6.22	3.92	4.52
1.000	12.71	2.000	11.51	3.000	6.22	4.00	4.52

Max.Eff.Inten.(mm/hr)=	129.14	255.73
over (min)	5.00	10.00
Storage Coeff. (min)=	1.56 (ii)	6.41 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.33	0.14

TOTALS

PEAK FLOW (cms)=	0.01	0.07	0.082 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	57.18	43.41	44.78
TOTAL RAINFALL (mm)=	58.18	58.18	58.18
RUNOFF COEFFICIENT =	0.98	0.75	0.77

***** 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* = 84.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0009) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
      ID1= 1 ( 0005):  14.66    0.289    2.08    14.89
+ ID2= 2 ( 0007):    0.41    0.082    1.33    44.78
=====
      ID = 3 ( 0009):  15.07    0.302    2.00    15.70

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0010) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
      ID1= 1 ( 0008):  55.69    4.931    1.33    31.53
+ ID2= 2 ( 0009):    15.07    0.302    2.00    15.70
=====
      ID = 3 ( 0010):  70.76    5.054    1.33    28.16

```

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

```

```

000  TTTTT  TTTTT  H   H   Y   Y   M   M   000  TM
0   0   T    T    H   H   Y   Y   MM  MM  O   O
0   0   T    T    H   H   Y    M   M   O   O
000   T    T    H   H   Y    M   M   000

```

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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\V02\voin.dat

Output filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\b7ac439e-d0a3-48e6-88cb-c7f510a62216\s

Summary filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\b7ac439e-d0a3-48e6-88cb-c7f510a62216\s

DATE: 06-29-2026

TIME: 03:46:20

USER:

COMMENTS: _____

** SIMULATION : CW 100 Yr 4 Hr Chicago Design **

CHICAGO STORM
Ptotal= 81.27 mm

IDF curve parameters: A= 896.876

B= 0.000

C= 0.691

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

Duration of storm = 4.00 hrs

Storm time step = 10.00 min

Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	7.01	1.00	32.55	2.00	13.74	3.00	8.06
0.17	7.82	1.17	182.70	2.17	12.16	3.17	7.59
0.33	8.91	1.33	39.87	2.33	10.95	3.33	7.19
0.50	10.47	1.50	25.27	2.50	10.01	3.50	6.83
0.67	12.94	1.67	19.33	2.67	9.24	3.67	6.52
0.83	17.63	1.83	15.96	2.83	8.60	3.83	6.24

CALIB
NASHYD (0004)
ID= 1 DT= 5.0 min

Area (ha)= 36.35

Curve Number (CN)= 77.0

Ia (mm)= 5.00

of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.81

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	7.01	1.083	32.55	2.083	13.74	3.08	8.06
0.167	7.01	1.167	32.55	2.167	13.74	3.17	8.06
0.250	7.82	1.250	182.70	2.250	12.16	3.25	7.59
0.333	7.82	1.333	182.70	2.333	12.16	3.33	7.59
0.417	8.91	1.417	39.87	2.417	10.95	3.42	7.19
0.500	8.91	1.500	39.87	2.500	10.95	3.50	7.19
0.583	10.47	1.583	25.27	2.583	10.01	3.58	6.83
0.667	10.47	1.667	25.27	2.667	10.01	3.67	6.83
0.750	12.94	1.750	19.33	2.750	9.24	3.75	6.52
0.833	12.94	1.833	19.33	2.833	9.24	3.83	6.52
0.917	17.63	1.917	15.96	2.917	8.60	3.92	6.24
1.000	17.63	2.000	15.96	3.000	8.60	4.00	6.24

Unit Hyd Qpeak (cms)= 1.714

PEAK FLOW (cms)= 1.605 (i)
 TIME TO PEAK (hrs)= 2.333
 RUNOFF VOLUME (mm)= 38.231
 TOTAL RAINFALL (mm)= 81.265
 RUNOFF COEFFICIENT = 0.470

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

```

-----
| CALIB |
| NASHYD ( 0011) | Area (ha)= 2.52 Curve Number (CN)= 78.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
-----
| U.H. Tp(hrs)= 0.23

```

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	7.01	1.083	32.55	2.083	13.74	3.08	8.06
0.167	7.01	1.167	32.55	2.167	13.74	3.17	8.06
0.250	7.82	1.250	182.70	2.250	12.16	3.25	7.59
0.333	7.82	1.333	182.70	2.333	12.16	3.33	7.59
0.417	8.91	1.417	39.87	2.417	10.95	3.42	7.19
0.500	8.91	1.500	39.87	2.500	10.95	3.50	7.19
0.583	10.47	1.583	25.27	2.583	10.01	3.58	6.83
0.667	10.47	1.667	25.27	2.667	10.01	3.67	6.83
0.750	12.94	1.750	19.33	2.750	9.24	3.75	6.52

0.833	12.94		1.833	19.33		2.833	9.24		3.83	6.52
0.917	17.63		1.917	15.96		2.917	8.60		3.92	6.24
1.000	17.63		2.000	15.96		3.000	8.60		4.00	6.24

Unit Hyd Qpeak (cms)= 0.418

PEAK FLOW (cms)= 0.271 (i)
 TIME TO PEAK (hrs)= 1.500
 RUNOFF VOLUME (mm)= 39.281
 TOTAL RAINFALL (mm)= 81.265
 RUNOFF COEFFICIENT = 0.483

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

 | CALIB |
 | STANDHYD (0006) | Area (ha)= 16.82
 | ID= 1 DT= 5.0 min | Total Imp(%)= 90.00 Dir. Conn.(%)= 75.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	15.14	1.68
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	334.86	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME	RAIN
hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs	mm/hr
0.083	7.01		1.083	32.55		2.083	13.74		3.08	8.06
0.167	7.01		1.167	32.55		2.167	13.74		3.17	8.06
0.250	7.82		1.250	182.70		2.250	12.16		3.25	7.59
0.333	7.82		1.333	182.70		2.333	12.16		3.33	7.59
0.417	8.91		1.417	39.87		2.417	10.95		3.42	7.19
0.500	8.91		1.500	39.87		2.500	10.95		3.50	7.19
0.583	10.47		1.583	25.27		2.583	10.01		3.58	6.83
0.667	10.47		1.667	25.27		2.667	10.01		3.67	6.83
0.750	12.94		1.750	19.33		2.750	9.24		3.75	6.52
0.833	12.94		1.833	19.33		2.833	9.24		3.83	6.52
0.917	17.63		1.917	15.96		2.917	8.60		3.92	6.24
1.000	17.63		2.000	15.96		3.000	8.60		4.00	6.24

Max.Eff.Inten.(mm/hr)=	182.70	381.98
over (min)	5.00	10.00
Storage Coeff. (min)=	4.15 (ii)	6.62 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00

Unit Hyd. peak (cms)=	0.24	0.14	
			TOTALS
PEAK FLOW (cms)=	5.93	1.25	7.105 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	80.27	65.06	76.46
TOTAL RAINFALL (mm)=	81.27	81.27	81.27
RUNOFF COEFFICIENT =	0.99	0.80	0.94

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 84.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0012) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0011):    2.52    0.271    1.50    39.28
+ ID2= 2 ( 0006):   16.82    7.105    1.33    76.46
=====
ID = 3 ( 0012):   19.34    7.273    1.33    71.62

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0008) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0012):   19.34    7.273    1.33    71.62
+ ID2= 2 ( 0004):   36.35    1.605    2.33    38.23
=====
ID = 3 ( 0008):   55.69    7.436    1.33    49.83

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| NASHYD ( 0005) |
| ID= 1 DT= 5.0 min |
-----
          Area      (ha)= 14.66      Curve Number (CN)= 65.0
          Ia      (mm)= 5.00      # of Linear Res.(N)= 3.00
          U.H. Tp(hrs)= 0.59

```

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	7.01	1.083	32.55	2.083	13.74	3.08	8.06
0.167	7.01	1.167	32.55	2.167	13.74	3.17	8.06
0.250	7.82	1.250	182.70	2.250	12.16	3.25	7.59
0.333	7.82	1.333	182.70	2.333	12.16	3.33	7.59
0.417	8.91	1.417	39.87	2.417	10.95	3.42	7.19
0.500	8.91	1.500	39.87	2.500	10.95	3.50	7.19
0.583	10.47	1.583	25.27	2.583	10.01	3.58	6.83
0.667	10.47	1.667	25.27	2.667	10.01	3.67	6.83
0.750	12.94	1.750	19.33	2.750	9.24	3.75	6.52
0.833	12.94	1.833	19.33	2.833	9.24	3.83	6.52
0.917	17.63	1.917	15.96	2.917	8.60	3.92	6.24
1.000	17.63	2.000	15.96	3.000	8.60	4.00	6.24

Unit Hyd Qpeak (cms)= 0.949

PEAK FLOW (cms)= 0.551 (i)

TIME TO PEAK (hrs)= 2.000

RUNOFF VOLUME (mm)= 27.302

TOTAL RAINFALL (mm)= 81.265

RUNOFF COEFFICIENT = 0.336

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

 | CALIB |
 | STANDHYD (0007) | Area (ha)= 0.41
 | ID= 1 DT= 5.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.27	0.14
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	52.28	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	7.01	1.083	32.55	2.083	13.74	3.08	8.06
0.167	7.01	1.167	32.55	2.167	13.74	3.17	8.06
0.250	7.82	1.250	182.70	2.250	12.16	3.25	7.59
0.333	7.82	1.333	182.70	2.333	12.16	3.33	7.59
0.417	8.91	1.417	39.87	2.417	10.95	3.42	7.19

0.500	8.91	1.500	39.87	2.500	10.95	3.50	7.19
0.583	10.47	1.583	25.27	2.583	10.01	3.58	6.83
0.667	10.47	1.667	25.27	2.667	10.01	3.67	6.83
0.750	12.94	1.750	19.33	2.750	9.24	3.75	6.52
0.833	12.94	1.833	19.33	2.833	9.24	3.83	6.52
0.917	17.63	1.917	15.96	2.917	8.60	3.92	6.24
1.000	17.63	2.000	15.96	3.000	8.60	4.00	6.24

Max.Eff.Inten.(mm/hr)= 182.70 395.42
over (min) 5.00 10.00
Storage Coeff. (min)= 1.36 (ii) 5.43 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.33 0.16

TOTALS

PEAK FLOW (cms)= 0.02 0.12 0.134 (iii)
TIME TO PEAK (hrs)= 1.33 1.42 1.33
RUNOFF VOLUME (mm)= 80.27 65.42 66.90
TOTAL RAINFALL (mm)= 81.27 81.27 81.27
RUNOFF COEFFICIENT = 0.99 0.81 0.82

***** 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* = 84.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0009) |
| 1 + 2 = 3 |
-----
          AREA    QPEAK    TPEAK    R.V.
          (ha)    (cms)    (hrs)    (mm)
ID1= 1 ( 0005):  14.66  0.551  2.00  27.30
+ ID2= 2 ( 0007):   0.41  0.134  1.33  66.90
=====
ID = 3 ( 0009):  15.07  0.570  2.00  28.38

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0010) |
| 1 + 2 = 3 |
-----
          AREA    QPEAK    TPEAK    R.V.
          (ha)    (cms)    (hrs)    (mm)
ID1= 1 ( 0008):  55.69  7.436  1.33  49.83
+ ID2= 2 ( 0009):  15.07  0.570  2.00  28.38

```

=====

ID = 3 (0010):	70.76	7.659	1.33	45.26

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		

000	TTTTT	TTTTT	H	H	Y	Y	M	M	000	TM
0	0	T	T	H	H	Y Y	MM	MM	0	0
0	0	T	T	H	H	Y	M	M	0	0
000	T	T	H	H	Y		M	M	000	

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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\V02\voin.dat

Output filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\0eb7cc66-cecc-445b-8591-b4d56a641fd5\s

Summary filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\0eb7cc66-cecc-445b-8591-b4d56a641fd5\s

DATE: 06-29-2026

TIME: 03:46:20

USER:

COMMENTS: _____

** SIMULATION : CW 2 Yr 4 Hr Chicago Design S **

```

-----
| CHICAGO STORM |
| Ptotal= 39.44 mm |
-----

```

IDF curve parameters: A= 414.345
 B= 0.000
 C= 0.682
 used in: INTENSITY = A / (t + B)^C

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

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	3.49	1.00	15.91	2.00	6.80	3.00	4.01
0.17	3.89	1.17	86.17	2.17	6.02	3.17	3.78
0.33	4.43	1.33	19.44	2.33	5.43	3.33	3.58
0.50	5.19	1.50	12.40	2.50	4.97	3.50	3.41
0.67	6.40	1.67	9.52	2.67	4.59	3.67	3.26
0.83	8.69	1.83	7.88	2.83	4.28	3.83	3.12

```

-----
| CALIB |
| NASHYD ( 0004) |
| ID= 1 DT= 5.0 min |
-----

```

Area (ha)= 36.35 Curve Number (CN)= 77.0
 Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 U.H. Tp(hrs)= 0.81

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	3.49	1.083	15.91	2.083	6.80	3.08	4.01
0.167	3.49	1.167	15.91	2.167	6.80	3.17	4.01
0.250	3.89	1.250	86.17	2.250	6.02	3.25	3.78
0.333	3.89	1.333	19.44	2.333	5.43	3.33	3.58
0.417	4.43	1.417	12.40	2.417	4.97	3.42	3.41
0.500	4.43	1.500	9.52	2.500	4.59	3.50	3.26
0.583	5.19	1.583	7.88	2.583	4.28	3.58	3.12
0.667	5.19	1.667		2.667		3.67	
0.750	6.40	1.750		2.750		3.75	
0.833	6.40	1.833		2.833		3.83	
0.917	8.69	1.917		2.917		3.92	
1.000	8.69	2.000		3.000		4.00	

Unit Hyd Qpeak (cms)= 1.714

PEAK FLOW (cms)= 0.419 (i)

TIME TO PEAK (hrs)= 2.417
RUNOFF VOLUME (mm)= 10.753
TOTAL RAINFALL (mm)= 39.442
RUNOFF COEFFICIENT = 0.273

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

```
-----
| CALIB |
| NASHYD ( 0011) | Area (ha)= 2.52 Curve Number (CN)= 78.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----| U.H. Tp(hrs)= 0.23
```

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

```
----- TRANSFORMED HYETOGRAPH -----
TIME RAIN | TIME RAIN | ' TIME RAIN | TIME RAIN
hrs mm/hr | hrs mm/hr | ' hrs mm/hr | hrs mm/hr
0.083 3.49 | 1.083 15.91 | 2.083 6.80 | 3.08 4.01
0.167 3.49 | 1.167 15.91 | 2.167 6.80 | 3.17 4.01
0.250 3.89 | 1.250 86.17 | 2.250 6.02 | 3.25 3.78
0.333 3.89 | 1.333 86.17 | 2.333 6.02 | 3.33 3.78
0.417 4.43 | 1.417 19.44 | 2.417 5.43 | 3.42 3.58
0.500 4.43 | 1.500 19.44 | 2.500 5.43 | 3.50 3.58
0.583 5.19 | 1.583 12.40 | 2.583 4.97 | 3.58 3.41
0.667 5.19 | 1.667 12.40 | 2.667 4.97 | 3.67 3.41
0.750 6.40 | 1.750 9.52 | 2.750 4.59 | 3.75 3.26
0.833 6.40 | 1.833 9.52 | 2.833 4.59 | 3.83 3.26
0.917 8.69 | 1.917 7.88 | 2.917 4.28 | 3.92 3.12
1.000 8.69 | 2.000 7.88 | 3.000 4.28 | 4.00 3.12
```

Unit Hyd Qpeak (cms)= 0.418

PEAK FLOW (cms)= 0.066 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 11.170
TOTAL RAINFALL (mm)= 39.442
RUNOFF COEFFICIENT = 0.283

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

```
-----
| CALIB |
| STANDHYD ( 0006) | Area (ha)= 16.82
| ID= 1 DT= 5.0 min | Total Imp(%)= 90.00 Dir. Conn.(%)= 75.00
|-----|
```

IMPERVIOUS PERVIOUS (i)

Surface Area	(ha)=	15.14	1.68
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	334.86	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	3.49	1.083	15.91	2.083	6.80	3.08	4.01
0.167	3.49	1.167	15.91	2.167	6.80	3.17	4.01
0.250	3.89	1.250	86.17	2.250	6.02	3.25	3.78
0.333	3.89	1.333	86.17	2.333	6.02	3.33	3.78
0.417	4.43	1.417	19.44	2.417	5.43	3.42	3.58
0.500	4.43	1.500	19.44	2.500	5.43	3.50	3.58
0.583	5.19	1.583	12.40	2.583	4.97	3.58	3.41
0.667	5.19	1.667	12.40	2.667	4.97	3.67	3.41
0.750	6.40	1.750	9.52	2.750	4.59	3.75	3.26
0.833	6.40	1.833	9.52	2.833	4.59	3.83	3.26
0.917	8.69	1.917	7.88	2.917	4.28	3.92	3.12
1.000	8.69	2.000	7.88	3.000	4.28	4.00	3.12

Max.Eff.Inten.(mm/hr)=	86.17	142.08
over (min)	5.00	10.00
Storage Coeff. (min)=	5.60 (ii)	8.94 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.20	0.12

TOTALS

PEAK FLOW (cms)=	2.60	0.43	2.967 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	38.44	25.92	35.31
TOTAL RAINFALL (mm)=	39.44	39.44	39.44
RUNOFF COEFFICIENT =	0.97	0.66	0.90

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 84.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

 | ADD HYD (0012) |
1 + 2 = 3

AREA	QPEAK	TPEAK	R.V.
(ha)	(cms)	(hrs)	(mm)

ID1= 1 (0011):	2.52	0.066	1.50	11.17
+ ID2= 2 (0006):	16.82	2.967	1.33	35.31
=====				
ID = 3 (0012):	19.34	3.003	1.33	32.17

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0008)				
1 + 2 = 3				

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0012):	19.34	3.003	1.33	32.17
+ ID2= 2 (0004):	36.35	0.419	2.42	10.75
=====				
ID = 3 (0008):	55.69	3.030	1.33	18.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0005)			
ID= 1 DT= 5.0 min			

Area	(ha)=	14.66	Curve Number (CN)= 65.0
Ia	(mm)=	5.00	# of Linear Res.(N)= 3.00
U.H. Tp	(hrs)=	0.59	

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

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	3.49	1.083	15.91	2.083	6.80	3.08	4.01
0.167	3.49	1.167	15.91	2.167	6.80	3.17	4.01
0.250	3.89	1.250	86.17	2.250	6.02	3.25	3.78
0.333	3.89	1.333	86.17	2.333	6.02	3.33	3.78
0.417	4.43	1.417	19.44	2.417	5.43	3.42	3.58
0.500	4.43	1.500	19.44	2.500	5.43	3.50	3.58
0.583	5.19	1.583	12.40	2.583	4.97	3.58	3.41
0.667	5.19	1.667	12.40	2.667	4.97	3.67	3.41
0.750	6.40	1.750	9.52	2.750	4.59	3.75	3.26
0.833	6.40	1.833	9.52	2.833	4.59	3.83	3.26
0.917	8.69	1.917	7.88	2.917	4.28	3.92	3.12
1.000	8.69	2.000	7.88	3.000	4.28	4.00	3.12

Unit Hyd Qpeak (cms)= 0.949

PEAK FLOW (cms)= 0.128 (i)
 TIME TO PEAK (hrs)= 2.083
 RUNOFF VOLUME (mm)= 6.928
 TOTAL RAINFALL (mm)= 39.442

RUNOFF COEFFICIENT = 0.176

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

```
-----
| CALIB |
| STANDHYD ( 0007) | Area (ha)= 0.41
| ID= 1 DT= 5.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 10.00
|-----|
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.27	0.14
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	52.28	40.00
Mannings n	=	0.013	0.250

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

```
----- TRANSFORMED HYETOGRAPH -----
TIME    RAIN | TIME    RAIN | TIME    RAIN | TIME    RAIN
hrs      mm/hr | hrs      mm/hr | hrs      mm/hr | hrs      mm/hr
0.083    3.49 | 1.083   15.91 | 2.083    6.80 | 3.08    4.01
0.167    3.49 | 1.167   15.91 | 2.167    6.80 | 3.17    4.01
0.250    3.89 | 1.250   86.17 | 2.250    6.02 | 3.25    3.78
0.333    3.89 | 1.333   86.17 | 2.333    6.02 | 3.33    3.78
0.417    4.43 | 1.417   19.44 | 2.417    5.43 | 3.42    3.58
0.500    4.43 | 1.500   19.44 | 2.500    5.43 | 3.50    3.58
0.583    5.19 | 1.583   12.40 | 2.583    4.97 | 3.58    3.41
0.667    5.19 | 1.667   12.40 | 2.667    4.97 | 3.67    3.41
0.750    6.40 | 1.750    9.52 | 2.750    4.59 | 3.75    3.26
0.833    6.40 | 1.833    9.52 | 2.833    4.59 | 3.83    3.26
0.917    8.69 | 1.917    7.88 | 2.917    4.28 | 3.92    3.12
1.000    8.69 | 2.000    7.88 | 3.000    4.28 | 4.00    3.12
```

Max.Eff.Inten.(mm/hr)=	86.17	147.93
over (min)	5.00	10.00
Storage Coeff. (min)=	1.84 (ii)	7.87 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.32	0.13

TOTALS

PEAK FLOW (cms)=	0.01	0.04	0.045 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	38.44	26.18	27.39
TOTAL RAINFALL (mm)=	39.44	39.44	39.44
RUNOFF COEFFICIENT =	0.97	0.66	0.69

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

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%

YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 84.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0009) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0005):  14.66  0.128  2.08  6.93
+ ID2= 2 ( 0007):   0.41  0.045  1.33 27.39
=====
ID = 3 ( 0009):  15.07  0.136  2.08  7.48

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0010) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0008):  55.69  3.030  1.33 18.19
+ ID2= 2 ( 0009):  15.07  0.136  2.08  7.48
=====
ID = 3 ( 0010):  70.76  3.089  1.33 15.91

```

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

```

```

000  TTTTT TTTTT H   H   Y   Y   M   M   000  TM
0  0   T    T    H   H   Y   Y   MM MM 0  0
0  0   T    T    H   H   Y    M   M 0  0
000   T    T    H   H   Y    M   M 000

```

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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\V02\voin.dat

Output filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\0c0b9e7d-9f39-4b25-97b8-0bd24830e799\s

Summary filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\0c0b9e7d-9f39-4b25-97b8-0bd24830e799\s

DATE: 06-29-2026

TIME: 03:46:20

USER:

COMMENTS: _____

** SIMULATION : CW 25 Yr 4 Hr Chicago Design **

| CHICAGO STORM |
Ptotal= 67.37 mm

IDF curve parameters: A= 739.425
B= 0.000
C= 0.690

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

Duration of storm = 4.00 hrs

Storm time step = 10.00 min

Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	5.83	1.00	27.01	2.00	11.42	3.00	6.70
0.17	6.50	1.17	150.97	2.17	10.10	3.17	6.31
0.33	7.41	1.33	33.07	2.33	9.10	3.33	5.98
0.50	8.70	1.50	20.98	2.50	8.32	3.50	5.68
0.67	10.75	1.67	16.05	2.67	7.68	3.67	5.42
0.83	14.64	1.83	13.26	2.83	7.15	3.83	5.19

CALIB			
NASHYD (0004)		Area (ha)= 36.35	Curve Number (CN)= 77.0
ID= 1 DT= 5.0 min		Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
-----		U.H. Tp(hrs)= 0.81	

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

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	5.83	1.083	27.01	2.083	11.42	3.08	6.70
0.167	5.83	1.167	27.01	2.167	11.42	3.17	6.70
0.250	6.50	1.250	150.97	2.250	10.10	3.25	6.31
0.333	6.50	1.333	150.97	2.333	10.10	3.33	6.31
0.417	7.41	1.417	33.07	2.417	9.10	3.42	5.98
0.500	7.41	1.500	33.07	2.500	9.10	3.50	5.98
0.583	8.70	1.583	20.98	2.583	8.32	3.58	5.68
0.667	8.70	1.667	20.98	2.667	8.32	3.67	5.68
0.750	10.75	1.750	16.05	2.750	7.68	3.75	5.42
0.833	10.75	1.833	16.05	2.833	7.68	3.83	5.42
0.917	14.64	1.917	13.26	2.917	7.15	3.92	5.19
1.000	14.64	2.000	13.26	3.000	7.15	4.00	5.19

Unit Hyd Qpeak (cms)= 1.714

PEAK FLOW (cms)= 1.162 (i)
 TIME TO PEAK (hrs)= 2.333
 RUNOFF VOLUME (mm)= 28.137
 TOTAL RAINFALL (mm)= 67.367
 RUNOFF COEFFICIENT = 0.418

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

CALIB			
NASHYD (0011)		Area (ha)= 2.52	Curve Number (CN)= 78.0
ID= 1 DT= 5.0 min		Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
-----		U.H. Tp(hrs)= 0.23	

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

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	5.83	1.083	27.01	2.083	11.42	3.08	6.70
0.167	5.83	1.167	27.01	2.167	11.42	3.17	6.70

0.250	6.50	1.250	150.97	2.250	10.10	3.25	6.31
0.333	6.50	1.333	150.97	2.333	10.10	3.33	6.31
0.417	7.41	1.417	33.07	2.417	9.10	3.42	5.98
0.500	7.41	1.500	33.07	2.500	9.10	3.50	5.98
0.583	8.70	1.583	20.98	2.583	8.32	3.58	5.68
0.667	8.70	1.667	20.98	2.667	8.32	3.67	5.68
0.750	10.75	1.750	16.05	2.750	7.68	3.75	5.42
0.833	10.75	1.833	16.05	2.833	7.68	3.83	5.42
0.917	14.64	1.917	13.26	2.917	7.15	3.92	5.19
1.000	14.64	2.000	13.26	3.000	7.15	4.00	5.19

Unit Hyd Qpeak (cms)= 0.418

PEAK FLOW (cms)= 0.194 (i)

TIME TO PEAK (hrs)= 1.500

RUNOFF VOLUME (mm)= 28.993

TOTAL RAINFALL (mm)= 67.367

RUNOFF COEFFICIENT = 0.430

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

CALIB		Area (ha)= 16.82	
STANDHYD (0006)		Total Imp(%)= 90.00 Dir. Conn.(%)= 75.00	
ID= 1 DT= 5.0 min			

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	15.14	1.68
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	334.86	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	5.83	1.083	27.01	2.083	11.42	3.08	6.70
0.167	5.83	1.167	27.01	2.167	11.42	3.17	6.70
0.250	6.50	1.250	150.97	2.250	10.10	3.25	6.31
0.333	6.50	1.333	150.97	2.333	10.10	3.33	6.31
0.417	7.41	1.417	33.07	2.417	9.10	3.42	5.98
0.500	7.41	1.500	33.07	2.500	9.10	3.50	5.98
0.583	8.70	1.583	20.98	2.583	8.32	3.58	5.68
0.667	8.70	1.667	20.98	2.667	8.32	3.67	5.68
0.750	10.75	1.750	16.05	2.750	7.68	3.75	5.42
0.833	10.75	1.833	16.05	2.833	7.68	3.83	5.42

0.917	14.64		1.917	13.26		2.917	7.15		3.92	5.19
1.000	14.64		2.000	13.26		3.000	7.15		4.00	5.19

Max.Eff.Inten.(mm/hr)=	150.97	300.99
over (min)	5.00	10.00
Storage Coeff. (min)=	4.47 (ii)	7.15 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.23	0.14

TOTALS

PEAK FLOW (cms)=	4.82	0.97	5.711 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	66.37	51.76	62.72
TOTAL RAINFALL (mm)=	67.37	67.37	67.37
RUNOFF COEFFICIENT =	0.99	0.77	0.93

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 84.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0012) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0011):    2.52    0.194    1.50    28.99
+ ID2= 2 ( 0006):   16.82    5.711    1.33    62.72
=====
ID = 3 ( 0012):   19.34    5.828    1.33    58.32

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0008) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0012):   19.34    5.828    1.33    58.32
+ ID2= 2 ( 0004):   36.35    1.162    2.33    28.14
=====
ID = 3 ( 0008):   55.69    5.935    1.33    38.62

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |

```

NASHYD (0005)	Area (ha)= 14.66	Curve Number (CN)= 65.0
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
-----	U.H. Tp(hrs)= 0.59	

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

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	5.83	1.083	27.01	2.083	11.42	3.08	6.70
0.167	5.83	1.167	27.01	2.167	11.42	3.17	6.70
0.250	6.50	1.250	150.97	2.250	10.10	3.25	6.31
0.333	6.50	1.333	150.97	2.333	10.10	3.33	6.31
0.417	7.41	1.417	33.07	2.417	9.10	3.42	5.98
0.500	7.41	1.500	33.07	2.500	9.10	3.50	5.98
0.583	8.70	1.583	20.98	2.583	8.32	3.58	5.68
0.667	8.70	1.667	20.98	2.667	8.32	3.67	5.68
0.750	10.75	1.750	16.05	2.750	7.68	3.75	5.42
0.833	10.75	1.833	16.05	2.833	7.68	3.83	5.42
0.917	14.64	1.917	13.26	2.917	7.15	3.92	5.19
1.000	14.64	2.000	13.26	3.000	7.15	4.00	5.19

Unit Hyd Qpeak (cms)= 0.949

PEAK FLOW (cms)= 0.387 (i)
TIME TO PEAK (hrs)= 2.083
RUNOFF VOLUME (mm)= 19.532
TOTAL RAINFALL (mm)= 67.367
RUNOFF COEFFICIENT = 0.290

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

CALIB	
STANDHYD (0007)	Area (ha)= 0.41
ID= 1 DT= 5.0 min	Total Imp(%)= 65.00 Dir. Conn.(%)= 10.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.27	0.14
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	52.28	40.00
Mannings n =	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	5.83	1.083	27.01	2.083	11.42	3.08	6.70
0.167	5.83	1.167	27.01	2.167	11.42	3.17	6.70
0.250	6.50	1.250	150.97	2.250	10.10	3.25	6.31
0.333	6.50	1.333	150.97	2.333	10.10	3.33	6.31
0.417	7.41	1.417	33.07	2.417	9.10	3.42	5.98
0.500	7.41	1.500	33.07	2.500	9.10	3.50	5.98
0.583	8.70	1.583	20.98	2.583	8.32	3.58	5.68
0.667	8.70	1.667	20.98	2.667	8.32	3.67	5.68
0.750	10.75	1.750	16.05	2.750	7.68	3.75	5.42
0.833	10.75	1.833	16.05	2.833	7.68	3.83	5.42
0.917	14.64	1.917	13.26	2.917	7.15	3.92	5.19
1.000	14.64	2.000	13.26	3.000	7.15	4.00	5.19

Max.Eff.Inten.(mm/hr)= 150.97 311.98
over (min) 5.00 10.00
Storage Coeff. (min)= 1.47 (ii) 5.95 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.33 0.15

TOTALS

PEAK FLOW (cms)= 0.02 0.09 0.103 (iii)
TIME TO PEAK (hrs)= 1.33 1.42 1.33
RUNOFF VOLUME (mm)= 66.37 52.10 53.52
TOTAL RAINFALL (mm)= 67.37 67.37 67.37
RUNOFF COEFFICIENT = 0.99 0.77 0.79

***** 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* = 84.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0009) |
| 1 + 2 = 3 |
-----
          AREA    QPEAK    TPEAK    R.V.
          (ha)    (cms)    (hrs)    (mm)
ID1= 1 ( 0005):  14.66  0.387    2.08  19.53
+ ID2= 2 ( 0007):   0.41  0.103    1.33  53.52
=====
ID = 3 ( 0009):  15.07  0.402    2.00  20.46

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0010) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
      ID1= 1 ( 0008):  55.69    5.935    1.33    38.62
+ ID2= 2 ( 0009):  15.07    0.402    2.00    20.46
=====
      ID = 3 ( 0010):  70.76    6.096    1.33    34.75

```

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
      000   TTTTT  TTTTT  H   H   Y   Y   M   M   000   TM
      0   0   T     T     H   H   Y   Y   MM  MM   0   0
      0   0   T     T     H   H   Y     M   M   0   0
      000   T     T     H   H   Y     M   M   000

```

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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\V02\voin.dat

Output filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\14e367f2-b22a-4e46-9248-23e5dd15d4a3\s

Summary filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\14e367f2-b22a-4e46-9248-23e5dd15d4a3\s

DATE: 06-29-2026

TIME: 03:46:20

USER:

COMMENTS: _____

 ** SIMULATION : CW 5 Yr 4 Hr Chicago Design S **

CHICAGO STORM
 Ptotal= 50.66 mm

IDF curve parameters: A= 543.943
 B= 0.000
 C= 0.686

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

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	4.43	1.00	20.37	2.00	8.66	3.00	5.09
0.17	4.94	1.17	112.09	2.17	7.66	3.17	4.80
0.33	5.63	1.33	24.91	2.33	6.91	3.33	4.55
0.50	6.61	1.50	15.85	2.50	6.32	3.50	4.33
0.67	8.15	1.67	12.15	2.67	5.83	3.67	4.13
0.83	11.09	1.83	10.04	2.83	5.43	3.83	3.95

CALIB
 NASHYD (0004)
 ID= 1 DT= 5.0 min

Area (ha)= 36.35 Curve Number (CN)= 77.0
 Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 U.H. Tp(hrs)= 0.81

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.43	1.083	20.37	2.083	8.66	3.08	5.09
0.167	4.43	1.167	20.37	2.167	8.66	3.17	5.09
0.250	4.94	1.250	112.09	2.250	7.66	3.25	4.80
0.333	4.94	1.333	112.09	2.333	7.66	3.33	4.80
0.417	5.63	1.417	24.91	2.417	6.91	3.42	4.55
0.500	5.63	1.500	24.91	2.500	6.91	3.50	4.55
0.583	6.61	1.583	15.85	2.583	6.32	3.58	4.33
0.667	6.61	1.667	15.85	2.667	6.32	3.67	4.33
0.750	8.15	1.750	12.15	2.750	5.83	3.75	4.13

0.833	8.15	1.833	12.15	2.833	5.83	3.83	4.13
0.917	11.09	1.917	10.04	2.917	5.43	3.92	3.95
1.000	11.09	2.000	10.04	3.000	5.43	4.00	3.95

Unit Hyd Qpeak (cms)= 1.714

PEAK FLOW (cms)= 0.687 (i)
 TIME TO PEAK (hrs)= 2.417
 RUNOFF VOLUME (mm)= 17.152
 TOTAL RAINFALL (mm)= 50.655
 RUNOFF COEFFICIENT = 0.339

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

```

-----
| CALIB |
| NASHYD ( 0011) | Area (ha)= 2.52 Curve Number (CN)= 78.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----| U.H. Tp(hrs)= 0.23

```

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

```

----- TRANSFORMED HYETOGRAPH -----

```

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	4.43	1.083	20.37	2.083	8.66	3.08	5.09
0.167	4.43	1.167	20.37	2.167	8.66	3.17	5.09
0.250	4.94	1.250	112.09	2.250	7.66	3.25	4.80
0.333	4.94	1.333	112.09	2.333	7.66	3.33	4.80
0.417	5.63	1.417	24.91	2.417	6.91	3.42	4.55
0.500	5.63	1.500	24.91	2.500	6.91	3.50	4.55
0.583	6.61	1.583	15.85	2.583	6.32	3.58	4.33
0.667	6.61	1.667	15.85	2.667	6.32	3.67	4.33
0.750	8.15	1.750	12.15	2.750	5.83	3.75	4.13
0.833	8.15	1.833	12.15	2.833	5.83	3.83	4.13
0.917	11.09	1.917	10.04	2.917	5.43	3.92	3.95
1.000	11.09	2.000	10.04	3.000	5.43	4.00	3.95

Unit Hyd Qpeak (cms)= 0.418

PEAK FLOW (cms)= 0.112 (i)
 TIME TO PEAK (hrs)= 1.500
 RUNOFF VOLUME (mm)= 17.751
 TOTAL RAINFALL (mm)= 50.655
 RUNOFF COEFFICIENT = 0.350

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

```

-----
| CALIB |
| STANDHYD ( 0006) | Area (ha)= 16.82
| ID= 1 DT= 5.0 min | Total Imp(%)= 90.00 Dir. Conn.(%)= 75.00
-----

```

```

                IMPERVIOUS    PERVIOUS (i)
Surface Area    (ha)=        15.14        1.68
Dep. Storage    (mm)=         1.00         1.50
Average Slope    (%)=         1.00         2.00
Length          (m)=        334.86        40.00
Mannings n      =         0.013         0.250

```

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

```

                ----- TRANSFORMED HYETOGRAPH -----
                TIME    RAIN | TIME    RAIN | ' TIME    RAIN | TIME    RAIN
                hrs    mm/hr | hrs    mm/hr | ' hrs    mm/hr | hrs    mm/hr
0.083    4.43 | 1.083    20.37 | 2.083    8.66 | 3.08    5.09
0.167    4.43 | 1.167    20.37 | 2.167    8.66 | 3.17    5.09
0.250    4.94 | 1.250   112.09 | 2.250    7.66 | 3.25    4.80
0.333    4.94 | 1.333   112.09 | 2.333    7.66 | 3.33    4.80
0.417    5.63 | 1.417    24.91 | 2.417    6.91 | 3.42    4.55
0.500    5.63 | 1.500    24.91 | 2.500    6.91 | 3.50    4.55
0.583    6.61 | 1.583    15.85 | 2.583    6.32 | 3.58    4.33
0.667    6.61 | 1.667    15.85 | 2.667    6.32 | 3.67    4.33
0.750    8.15 | 1.750    12.15 | 2.750    5.83 | 3.75    4.13
0.833    8.15 | 1.833    12.15 | 2.833    5.83 | 3.83    4.13
0.917   11.09 | 1.917    10.04 | 2.917    5.43 | 3.92    3.95
1.000   11.09 | 2.000    10.04 | 3.000    5.43 | 4.00    3.95

```

```

Max.Eff.Inten.(mm/hr)=    112.09    204.14
over (min)            5.00    10.00
Storage Coeff. (min)=    5.04 (ii)    8.05 (ii)
Unit Hyd. Tpeak (min)=    5.00    10.00
Unit Hyd. peak (cms)=    0.21    0.13

```

TOTALS

```

PEAK FLOW (cms)=    3.48    0.63    4.043 (iii)
TIME TO PEAK (hrs)=    1.33    1.42    1.33
RUNOFF VOLUME (mm)=    49.66    36.10    46.27
TOTAL RAINFALL (mm)=    50.66    50.66    50.66
RUNOFF COEFFICIENT =    0.98    0.71    0.91

```

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 84.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0012) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0011):    2.52    0.112    1.50    17.75
+ ID2= 2 ( 0006):   16.82    4.043    1.33    46.27
=====
ID = 3 ( 0012):    19.34    4.107    1.33    42.55

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0008) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0012):    19.34    4.107    1.33    42.55
+ ID2= 2 ( 0004):   36.35    0.687    2.42    17.15
=====
ID = 3 ( 0008):    55.69    4.161    1.33    25.97

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| NASHYD ( 0005) |
| ID= 1 DT= 5.0 min |
-----
Area      (ha)= 14.66   Curve Number (CN)= 65.0
Ia        (mm)= 5.00   # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.59

```

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

```

----- TRANSFORMED HYETOGRAPH -----

```

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	4.43	1.083	20.37	2.083	8.66	3.08	5.09
0.167	4.43	1.167	20.37	2.167	8.66	3.17	5.09
0.250	4.94	1.250	112.09	2.250	7.66	3.25	4.80
0.333	4.94	1.333	112.09	2.333	7.66	3.33	4.80
0.417	5.63	1.417	24.91	2.417	6.91	3.42	4.55
0.500	5.63	1.500	24.91	2.500	6.91	3.50	4.55
0.583	6.61	1.583	15.85	2.583	6.32	3.58	4.33
0.667	6.61	1.667	15.85	2.667	6.32	3.67	4.33
0.750	8.15	1.750	12.15	2.750	5.83	3.75	4.13
0.833	8.15	1.833	12.15	2.833	5.83	3.83	4.13
0.917	11.09	1.917	10.04	2.917	5.43	3.92	3.95
1.000	11.09	2.000	10.04	3.000	5.43	4.00	3.95

Unit Hyd Qpeak (cms)= 0.949

PEAK FLOW (cms)= 0.219 (i)

TIME TO PEAK (hrs)= 2.083

RUNOFF VOLUME (mm)= 11.426

TOTAL RAINFALL (mm)= 50.655

RUNOFF COEFFICIENT = 0.226

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

```
-----
| CALIB |
| STANDHYD ( 0007) | Area (ha)= 0.41
| ID= 1 DT= 5.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 10.00
-----
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.27	0.14
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	52.28	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	4.43	1.083	20.37	2.083	8.66	3.08	5.09
0.167	4.43	1.167	20.37	2.167	8.66	3.17	5.09
0.250	4.94	1.250	112.09	2.250	7.66	3.25	4.80
0.333	4.94	1.333	112.09	2.333	7.66	3.33	4.80
0.417	5.63	1.417	24.91	2.417	6.91	3.42	4.55
0.500	5.63	1.500	24.91	2.500	6.91	3.50	4.55
0.583	6.61	1.583	15.85	2.583	6.32	3.58	4.33
0.667	6.61	1.667	15.85	2.667	6.32	3.67	4.33
0.750	8.15	1.750	12.15	2.750	5.83	3.75	4.13
0.833	8.15	1.833	12.15	2.833	5.83	3.83	4.13
0.917	11.09	1.917	10.04	2.917	5.43	3.92	3.95
1.000	11.09	2.000	10.04	3.000	5.43	4.00	3.95

Max.Eff.Inten.(mm/hr)=	112.09	212.07
over (min)	5.00	10.00
Storage Coeff. (min)=	1.65 (ii)	6.88 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.32	0.14

TOTALS

PEAK FLOW (cms)=	0.01	0.06	0.067 (iii)

TIME TO PEAK	(hrs)=	1.33	1.42	1.33
RUNOFF VOLUME	(mm)=	49.66	36.40	37.71
TOTAL RAINFALL	(mm)=	50.66	50.66	50.66
RUNOFF COEFFICIENT	=	0.98	0.72	0.74

***** 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* = 84.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0009)				
1 + 2 = 3				
		AREA	QPEAK	TPEAK
		(ha)	(cms)	(hrs)
				R.V.
				(mm)
ID1= 1 (0005):	14.66	0.219	2.08	11.43
+ ID2= 2 (0007):	0.41	0.067	1.33	37.71
=====				
ID = 3 (0009):	15.07	0.229	2.08	12.14

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0010)				
1 + 2 = 3				
		AREA	QPEAK	TPEAK
		(ha)	(cms)	(hrs)
				R.V.
				(mm)
ID1= 1 (0008):	55.69	4.161	1.33	25.97
+ ID2= 2 (0009):	15.07	0.229	2.08	12.14
=====				
ID = 3 (0010):	70.76	4.256	1.33	23.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

=====

V	V	I	SSSSS	U	U	A	L	
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	

(v 6.2.2022)

000 TTTTT TTTTT H H Y Y M M 000 TM

0 0 T T H H Y Y MM MM O O
0 0 T T H H Y M M O O
000 T T H H Y M M 000

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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\V02\voin.dat

Output filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\31b1fff8-5153-4dc6-976b-cd616d2fcaa5\s

Summary filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\31b1fff8-5153-4dc6-976b-cd616d2fcaa5\s

DATE: 06-29-2026

TIME: 03:46:20

USER:

COMMENTS: _____

** SIMULATION : CW 50 Yr 4 Hr Chicago Design **

| CHICAGO STORM |
Ptotal= 74.35 mm

IDF curve parameters: A= 820.514
B= 0.000
C= 0.691

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

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

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	6.41	1.00	29.78	2.00	12.57	3.00	7.37
0.17	7.15	1.17	167.14	2.17	11.12	3.17	6.95

0.33	8.15	1.33	36.47	2.33	10.02	3.33	6.58
0.50	9.58	1.50	23.12	2.50	9.15	3.50	6.25
0.67	11.84	1.67	17.69	2.67	8.45	3.67	5.96
0.83	16.13	1.83	14.60	2.83	7.87	3.83	5.71

```

-----
| CALIB                                     |
| NASHYD ( 0004) | Area (ha)= 36.35 Curve Number (CN)= 77.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----| U.H. Tp(hrs)= 0.81

```

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

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.41	1.083	29.78	2.083	12.57	3.08	7.37
0.167	6.41	1.167	29.78	2.167	12.57	3.17	7.37
0.250	7.15	1.250	167.14	2.250	11.12	3.25	6.95
0.333	7.15	1.333	167.14	2.333	11.12	3.33	6.95
0.417	8.15	1.417	36.47	2.417	10.02	3.42	6.58
0.500	8.15	1.500	36.47	2.500	10.02	3.50	6.58
0.583	9.58	1.583	23.12	2.583	9.15	3.58	6.25
0.667	9.58	1.667	23.12	2.667	9.15	3.67	6.25
0.750	11.84	1.750	17.69	2.750	8.45	3.75	5.96
0.833	11.84	1.833	17.69	2.833	8.45	3.83	5.96
0.917	16.13	1.917	14.60	2.917	7.87	3.92	5.71
1.000	16.13	2.000	14.60	3.000	7.87	4.00	5.71

Unit Hyd Qpeak (cms)= 1.714

PEAK FLOW (cms)= 1.381 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 33.115
TOTAL RAINFALL (mm)= 74.346
RUNOFF COEFFICIENT = 0.445

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

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-----
| CALIB                                     |
| NASHYD ( 0011) | Area (ha)= 2.52 Curve Number (CN)= 78.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----| U.H. Tp(hrs)= 0.23

```

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

----- TRANSFORMED HYETOGRAPH -----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.41	1.083	29.78	2.083	12.57	3.08	7.37
0.167	6.41	1.167	29.78	2.167	12.57	3.17	7.37
0.250	7.15	1.250	167.14	2.250	11.12	3.25	6.95
0.333	7.15	1.333	167.14	2.333	11.12	3.33	6.95
0.417	8.15	1.417	36.47	2.417	10.02	3.42	6.58
0.500	8.15	1.500	36.47	2.500	10.02	3.50	6.58
0.583	9.58	1.583	23.12	2.583	9.15	3.58	6.25
0.667	9.58	1.667	23.12	2.667	9.15	3.67	6.25
0.750	11.84	1.750	17.69	2.750	8.45	3.75	5.96
0.833	11.84	1.833	17.69	2.833	8.45	3.83	5.96
0.917	16.13	1.917	14.60	2.917	7.87	3.92	5.71
1.000	16.13	2.000	14.60	3.000	7.87	4.00	5.71

Unit Hyd Qpeak (cms)= 0.418

PEAK FLOW (cms)= 0.233 (i)

TIME TO PEAK (hrs)= 1.500

RUNOFF VOLUME (mm)= 34.071

TOTAL RAINFALL (mm)= 74.346

RUNOFF COEFFICIENT = 0.458

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

 | CALIB
 | STANDHYD (0006)
ID= 1 DT= 5.0 min

Area (ha)= 16.82
 Total Imp(%)= 90.00 Dir. Conn.(%)= 75.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	15.14	1.68
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	334.86	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.41	1.083	29.78	2.083	12.57	3.08	7.37
0.167	6.41	1.167	29.78	2.167	12.57	3.17	7.37
0.250	7.15	1.250	167.14	2.250	11.12	3.25	6.95

0.333	7.15	1.333	167.14	2.333	11.12	3.33	6.95
0.417	8.15	1.417	36.47	2.417	10.02	3.42	6.58
0.500	8.15	1.500	36.47	2.500	10.02	3.50	6.58
0.583	9.58	1.583	23.12	2.583	9.15	3.58	6.25
0.667	9.58	1.667	23.12	2.667	9.15	3.67	6.25
0.750	11.84	1.750	17.69	2.750	8.45	3.75	5.96
0.833	11.84	1.833	17.69	2.833	8.45	3.83	5.96
0.917	16.13	1.917	14.60	2.917	7.87	3.92	5.71
1.000	16.13	2.000	14.60	3.000	7.87	4.00	5.71

Max.Eff.Inten.(mm/hr)= 167.14 342.04
over (min) 5.00 10.00
Storage Coeff. (min)= 4.30 (ii) 6.86 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.23 0.14

TOTALS

PEAK FLOW (cms)= 5.38 1.11 6.418 (iii)
TIME TO PEAK (hrs)= 1.33 1.42 1.33
RUNOFF VOLUME (mm)= 73.35 58.42 69.61
TOTAL RAINFALL (mm)= 74.35 74.35 74.35
RUNOFF COEFFICIENT = 0.99 0.79 0.94

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 84.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0012) |
| 1 + 2 = 3 |
-----
          AREA    QPEAK    TPEAK    R.V.
          (ha)    (cms)    (hrs)    (mm)
ID1= 1 ( 0011):    2.52    0.233    1.50    34.07
+ ID2= 2 ( 0006):   16.82    6.418    1.33    69.61
=====
ID = 3 ( 0012):   19.34    6.560    1.33    64.98

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0008) |
| 1 + 2 = 3 |
-----
          AREA    QPEAK    TPEAK    R.V.
          (ha)    (cms)    (hrs)    (mm)
ID1= 1 ( 0012):   19.34    6.560    1.33    64.98
+ ID2= 2 ( 0004):   36.35    1.381    2.33    33.12

```

=====

ID = 3 (0008): 55.69 6.694 1.33 44.18

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0005)	Area (ha)=	14.66	Curve Number (CN)= 65.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.59	

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.41	1.083	29.78	2.083	12.57	3.08	7.37
0.167	6.41	1.167	29.78	2.167	12.57	3.17	7.37
0.250	7.15	1.250	167.14	2.250	11.12	3.25	6.95
0.333	7.15	1.333	167.14	2.333	11.12	3.33	6.95
0.417	8.15	1.417	36.47	2.417	10.02	3.42	6.58
0.500	8.15	1.500	36.47	2.500	10.02	3.50	6.58
0.583	9.58	1.583	23.12	2.583	9.15	3.58	6.25
0.667	9.58	1.667	23.12	2.667	9.15	3.67	6.25
0.750	11.84	1.750	17.69	2.750	8.45	3.75	5.96
0.833	11.84	1.833	17.69	2.833	8.45	3.83	5.96
0.917	16.13	1.917	14.60	2.917	7.87	3.92	5.71
1.000	16.13	2.000	14.60	3.000	7.87	4.00	5.71

Unit Hyd Qpeak (cms)= 0.949

PEAK FLOW (cms)= 0.467 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 23.330
TOTAL RAINFALL (mm)= 74.346
RUNOFF COEFFICIENT = 0.314

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

CALIB			
STANDHYD (0007)	Area (ha)=	0.41	
ID= 1 DT= 5.0 min	Total Imp(%)=	65.00	Dir. Conn.(%)= 10.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.27	0.14
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00

Length (m)= 52.28 40.00
Mannings n = 0.013 0.250

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

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.41	1.083	29.78	2.083	12.57	3.08	7.37
0.167	6.41	1.167	29.78	2.167	12.57	3.17	7.37
0.250	7.15	1.250	167.14	2.250	11.12	3.25	6.95
0.333	7.15	1.333	167.14	2.333	11.12	3.33	6.95
0.417	8.15	1.417	36.47	2.417	10.02	3.42	6.58
0.500	8.15	1.500	36.47	2.500	10.02	3.50	6.58
0.583	9.58	1.583	23.12	2.583	9.15	3.58	6.25
0.667	9.58	1.667	23.12	2.667	9.15	3.67	6.25
0.750	11.84	1.750	17.69	2.750	8.45	3.75	5.96
0.833	11.84	1.833	17.69	2.833	8.45	3.83	5.96
0.917	16.13	1.917	14.60	2.917	7.87	3.92	5.71
1.000	16.13	2.000	14.60	3.000	7.87	4.00	5.71

Max.Eff.Inten.(mm/hr)= 167.14 354.29
over (min) 5.00 10.00
Storage Coeff. (min)= 1.41 (ii) 5.66 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.33 0.15

TOTALS

PEAK FLOW (cms)= 0.02 0.10 0.119 (iii)
TIME TO PEAK (hrs)= 1.33 1.42 1.33
RUNOFF VOLUME (mm)= 73.35 58.77 60.22
TOTAL RAINFALL (mm)= 74.35 74.35 74.35
RUNOFF COEFFICIENT = 0.99 0.79 0.81

***** 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* = 84.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| ADD HYD (0009) |
1 + 2 = 3

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)

ID1= 1 (0005):	14.66	0.467	2.00	23.33
+ ID2= 2 (0007):	0.41	0.119	1.33	60.22
=====				
ID = 3 (0009):	15.07	0.484	2.00	24.33

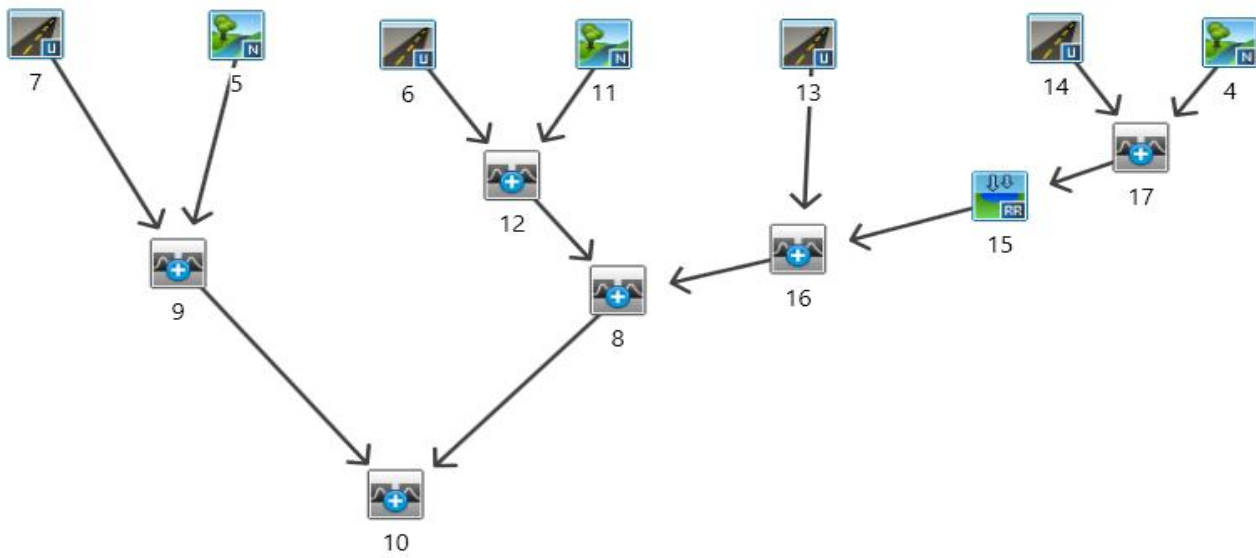
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0010)				
1 + 2 = 3				

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0008):	55.69	6.694	1.33	44.18
+ ID2= 2 (0009):	15.07	0.484	2.00	24.33
=====				
ID = 3 (0010):	70.76	6.886	1.33	39.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

PROPOSED CONDITIONS VO MODEL



=====

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

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat

Output filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\3a75c877-4434-4015-a05f-e72486147f1b\s

Summary filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\3a75c877-4434-4015-a05f-e72486147f1b\s

DATE: 06-29-2026

TIME: 03:37:01

USER:

COMMENTS: _____

** SIMULATION : 4hr25mm **

| READ STORM |
|

Filename: C:\Users\dmurchison\AppData\Local\Temp\

c9fe7a4c-305a-42f5-8285-51341097c314\906b0ba0
 Ptotal= 25.07 mm | Comments: 4hr25mm

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	5.10	2.33	3.60	3.50	1.70
0.17	1.40	1.33	12.50	2.50	3.00	3.67	1.50
0.33	1.50	1.50	61.50	2.67	2.70	3.83	1.50
0.50	1.80	1.67	16.20	2.83	2.40	4.00	1.50
0.67	2.10	1.83	8.40	3.00	2.30		
0.83	2.60	2.00	5.70	3.17	2.00		
1.00	3.30	2.17	4.30	3.33	1.80		

CALIB	Area (ha)=	Curve Number (CN)=
NASHYD (0004)	6.09	77.0
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.32	

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

---- TRANSFORMED HYETOGRAPH ----

TIME 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	3.30	2.250	4.30	3.33	2.00
0.167	0.00	1.250	5.10	2.333	4.30	3.42	1.80
0.250	1.40	1.333	5.10	2.417	3.60	3.50	1.80
0.333	1.40	1.417	12.50	2.500	3.60	3.58	1.70
0.417	1.50	1.500	12.50	2.583	3.00	3.67	1.70
0.500	1.50	1.583	61.50	2.667	3.00	3.75	1.50
0.583	1.80	1.667	61.50	2.750	2.70	3.83	1.50
0.667	1.80	1.750	16.20	2.833	2.70	3.92	1.50
0.750	2.10	1.833	16.20	2.917	2.40	4.00	1.50
0.833	2.10	1.917	8.40	3.000	2.40	4.08	1.50
0.917	2.60	2.000	8.40	3.083	2.30	4.17	1.50
1.000	2.60	2.083	5.70	3.167	2.30		
1.083	3.30	2.167	5.70	3.250	2.00		

Unit Hyd Qpeak (cms)= 0.727

PEAK FLOW (cms)= 0.056 (i)

TIME TO PEAK (hrs)= 2.000

RUNOFF VOLUME (mm)= 4.196

TOTAL RAINFALL (mm)= 25.067

RUNOFF COEFFICIENT = 0.167

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

 | CALIB |
 | STANDHYD (0014) |
ID= 1 DT= 5.0 min

Area (ha)= 29.18
 Total Imp(%)= 61.00 Dir. Conn.(%)= 52.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	17.80	11.38
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	441.06	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.167	3.30	2.250	4.30	3.33	2.00
0.167	0.00	1.250	5.10	2.333	4.30	3.42	1.80
0.250	1.40	1.333	5.10	2.417	3.60	3.50	1.80
0.333	1.40	1.417	12.50	2.500	3.60	3.58	1.70
0.417	1.50	1.500	12.50	2.583	3.00	3.67	1.70
0.500	1.50	1.583	61.50	2.667	3.00	3.75	1.50
0.583	1.80	1.667	61.50	2.750	2.70	3.83	1.50
0.667	1.80	1.750	16.20	2.833	2.70	3.92	1.50
0.750	2.10	1.833	16.20	2.917	2.40	4.00	1.50
0.833	2.10	1.917	8.40	3.000	2.40	4.08	1.50
0.917	2.60	2.000	8.40	3.083	2.30	4.17	1.50
1.000	2.60	2.083	5.70	3.167	2.30		
1.083	3.30	2.167	5.70	3.250	2.00		

Max.Eff.Inten.(mm/hr)=	61.50	20.81
over (min)	10.00	25.00
Storage Coeff. (min)=	7.56 (ii)	20.78 (ii)
Unit Hyd. Tpeak (min)=	10.00	25.00
Unit Hyd. peak (cms)=	0.13	0.05

TOTALS

PEAK FLOW (cms)=	1.76	0.32	1.908 (iii)
TIME TO PEAK (hrs)=	1.75	2.00	1.75
RUNOFF VOLUME (mm)=	24.07	9.44	17.04
TOTAL RAINFALL (mm)=	25.07	25.07	25.07
RUNOFF COEFFICIENT =	0.96	0.38	0.68

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

CN* = 85.0 Ia = Dep. Storage (Above)

(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL

THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0017) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0014):  29.18    1.908    1.75    17.04
+ ID2= 2 ( 0004):   6.09    0.056    2.00     4.20
=====
ID = 3 ( 0017):  35.27    1.938    1.75    14.83
  
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 0015) |
| IN= 2---> OUT= 1 |
| DT= 5.0 min |
-----
          OVERFLOW IS OFF
          OUTFLOW      STORAGE      OUTFLOW      STORAGE
          (cms)      (ha.m.)      (cms)      (ha.m.)
          0.0000      0.0000      0.8560      0.8830
          0.1100      0.4970      1.1200      1.0200
          0.4000      0.6220      1.3290      1.1270
          0.6590      0.7730      1.5420      1.2350

          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
INFLOW : ID= 2 ( 0017)  35.270    1.938    1.75    14.83
OUTFLOW: ID= 1 ( 0015)  35.270    0.096    4.25    14.79
  
```

PEAK FLOW REDUCTION [Qout/Qin](%)= 4.97
 TIME SHIFT OF PEAK FLOW (min)=150.00
 MAXIMUM STORAGE USED (ha.m.)= 0.4351

```

-----
| CALIB |
| STANDHYD ( 0013) |
| ID= 1 DT= 5.0 min |
-----
          Area (ha)= 1.08
          Total Imp(%)= 62.00 Dir. Conn.(%)= 10.00

          IMPERVIOUS      PERVIOUS (i)
          Surface Area (ha)= 0.67 0.41
          Dep. Storage (mm)= 1.00 1.50
          Average Slope (%)= 1.00 2.00
          Length (m)= 84.85 40.00
          Mannings n = 0.013 0.250
  
```

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

----- TRANSFORMED HYETOGRAPH -----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.167	3.30	2.250	4.30	3.33	2.00
0.167	0.00	1.250	5.10	2.333	4.30	3.42	1.80
0.250	1.40	1.333	5.10	2.417	3.60	3.50	1.80
0.333	1.40	1.417	12.50	2.500	3.60	3.58	1.70
0.417	1.50	1.500	12.50	2.583	3.00	3.67	1.70
0.500	1.50	1.583	61.50	2.667	3.00	3.75	1.50
0.583	1.80	1.667	61.50	2.750	2.70	3.83	1.50
0.667	1.80	1.750	16.20	2.833	2.70	3.92	1.50
0.750	2.10	1.833	16.20	2.917	2.40	4.00	1.50
0.833	2.10	1.917	8.40	3.000	2.40	4.08	1.50
0.917	2.60	2.000	8.40	3.083	2.30	4.17	1.50
1.000	2.60	2.083	5.70	3.167	2.30		
1.083	3.30	2.167	5.70	3.250	2.00		

Max.Eff.Inten.(mm/hr)= 61.50 79.12
over (min) 5.00 15.00
Storage Coeff. (min)= 2.81 (ii) 10.56 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.28 0.09

TOTALS

PEAK FLOW (cms)= 0.02 0.05 0.057 (iii)
TIME TO PEAK (hrs)= 1.67 1.83 1.83
RUNOFF VOLUME (mm)= 24.07 13.77 14.79
TOTAL RAINFALL (mm)= 25.07 25.07 25.07
RUNOFF COEFFICIENT = 0.96 0.55 0.59

***** 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* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0016) |
| 1 + 2 = 3 |
-----
      AREA      QPEAK      TPEAK      R.V.
      (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0013):  1.08  0.057  1.83  14.79
+ ID2= 2 ( 0015): 35.27  0.096  4.25  14.79
=====
ID = 3 ( 0016):  36.35  0.101  1.83  14.79

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| NASHYD ( 0011) | Area (ha)= 2.52 Curve Number (CN)= 77.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
-----
| U.H. Tp(hrs)= 0.81

```

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   3.30 | 2.250   4.30 | 3.33   2.00
0.167   0.00 | 1.250   5.10 | 2.333   4.30 | 3.42   1.80
0.250   1.40 | 1.333   5.10 | 2.417   3.60 | 3.50   1.80
0.333   1.40 | 1.417  12.50 | 2.500   3.60 | 3.58   1.70
0.417   1.50 | 1.500  12.50 | 2.583   3.00 | 3.67   1.70
0.500   1.50 | 1.583  61.50 | 2.667   3.00 | 3.75   1.50
0.583   1.80 | 1.667  61.50 | 2.750   2.70 | 3.83   1.50
0.667   1.80 | 1.750  16.20 | 2.833   2.70 | 3.92   1.50
0.750   2.10 | 1.833  16.20 | 2.917   2.40 | 4.00   1.50
0.833   2.10 | 1.917   8.40 | 3.000   2.40 | 4.08   1.50
0.917   2.60 | 2.000   8.40 | 3.083   2.30 | 4.17   1.50
1.000   2.60 | 2.083   5.70 | 3.167   2.30 |
1.083   3.30 | 2.167   5.70 | 3.250   2.00 |

```

Unit Hyd Qpeak (cms)= 0.119

PEAK FLOW (cms)= 0.013 (i)
 TIME TO PEAK (hrs)= 2.750
 RUNOFF VOLUME (mm)= 4.197
 TOTAL RAINFALL (mm)= 25.067
 RUNOFF COEFFICIENT = 0.167

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

```

-----
| CALIB |
| STANDHYD ( 0006) | Area (ha)= 16.82
| ID= 1 DT= 5.0 min | Total Imp(%)= 90.00 Dir. Conn.(%)= 75.00
-----

```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	15.14	1.68
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	334.86	40.00

Mannings n = 0.013 0.250

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.167	3.30	2.250	4.30	3.33	2.00
0.167	0.00	1.250	5.10	2.333	4.30	3.42	1.80
0.250	1.40	1.333	5.10	2.417	3.60	3.50	1.80
0.333	1.40	1.417	12.50	2.500	3.60	3.58	1.70
0.417	1.50	1.500	12.50	2.583	3.00	3.67	1.70
0.500	1.50	1.583	61.50	2.667	3.00	3.75	1.50
0.583	1.80	1.667	61.50	2.750	2.70	3.83	1.50
0.667	1.80	1.750	16.20	2.833	2.70	3.92	1.50
0.750	2.10	1.833	16.20	2.917	2.40	4.00	1.50
0.833	2.10	1.917	8.40	3.000	2.40	4.08	1.50
0.917	2.60	2.000	8.40	3.083	2.30	4.17	1.50
1.000	2.60	2.083	5.70	3.167	2.30		
1.083	3.30	2.167	5.70	3.250	2.00		

Max.Eff.Inten.(mm/hr)= 61.50 82.71
over (min) 5.00 15.00
Storage Coeff. (min)= 6.41 (ii) 10.24 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.18 0.09

TOTALS

PEAK FLOW (cms)= 1.78 0.22 1.905 (iii)
TIME TO PEAK (hrs)= 1.67 1.83 1.67
RUNOFF VOLUME (mm)= 24.07 13.66 21.46
TOTAL RAINFALL (mm)= 25.07 25.07 25.07
RUNOFF COEFFICIENT = 0.96 0.54 0.86

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 84.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0012) |
| 1 + 2 = 3 |
-----
      AREA      QPEAK      TPEAK      R.V.
      (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0011):  2.52  0.013  2.75  4.20
+ ID2= 2 ( 0006): 16.82  1.905  1.67 21.46
=====

```

ID = 3 (0012): 19.34 1.906 1.67 19.21

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 0008) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0012): 19.34 1.906 1.67 19.21
+ ID2= 2 ( 0016): 36.35 0.101 1.83 14.79
=====
ID = 3 ( 0008): 55.69 1.973 1.67 16.33
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB |
| NASHYD ( 0005) |
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 14.66 Curve Number (CN)= 65.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.59
```

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 3.30 | 2.250 4.30 | 3.33 2.00
0.167 0.00 | 1.250 5.10 | 2.333 4.30 | 3.42 1.80
0.250 1.40 | 1.333 5.10 | 2.417 3.60 | 3.50 1.80
0.333 1.40 | 1.417 12.50 | 2.500 3.60 | 3.58 1.70
0.417 1.50 | 1.500 12.50 | 2.583 3.00 | 3.67 1.70
0.500 1.50 | 1.583 61.50 | 2.667 3.00 | 3.75 1.50
0.583 1.80 | 1.667 61.50 | 2.750 2.70 | 3.83 1.50
0.667 1.80 | 1.750 16.20 | 2.833 2.70 | 3.92 1.50
0.750 2.10 | 1.833 16.20 | 2.917 2.40 | 4.00 1.50
0.833 2.10 | 1.917 8.40 | 3.000 2.40 | 4.08 1.50
0.917 2.60 | 2.000 8.40 | 3.083 2.30 | 4.17 1.50
1.000 2.60 | 2.083 5.70 | 3.167 2.30 |
1.083 3.30 | 2.167 5.70 | 3.250 2.00 |
```

Unit Hyd Qpeak (cms)= 0.949

PEAK FLOW (cms)= 0.055 (i)
TIME TO PEAK (hrs)= 2.417
RUNOFF VOLUME (mm)= 2.567
TOTAL RAINFALL (mm)= 25.067
RUNOFF COEFFICIENT = 0.102

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

```

-----
| CALIB |
| STANDHYD ( 0007) |
| ID= 1 DT= 5.0 min |
-----

```

```

Area      (ha)=    0.41
Total Imp(%)= 65.00   Dir. Conn.(%)= 10.00

```

```

                        IMPERVIOUS      PERVIOUS (i)
Surface Area      (ha)=          0.27          0.14
Dep. Storage      (mm)=          1.00          1.50
Average Slope      (%)=          1.00          2.00
Length            (m)=         52.28         40.00
Mannings n        =          0.013         0.250

```

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.167	3.30	2.250	4.30	3.33	2.00
0.167	0.00	1.250	5.10	2.333	4.30	3.42	1.80
0.250	1.40	1.333	5.10	2.417	3.60	3.50	1.80
0.333	1.40	1.417	12.50	2.500	3.60	3.58	1.70
0.417	1.50	1.500	12.50	2.583	3.00	3.67	1.70
0.500	1.50	1.583	61.50	2.667	3.00	3.75	1.50
0.583	1.80	1.667	61.50	2.750	2.70	3.83	1.50
0.667	1.80	1.750	16.20	2.833	2.70	3.92	1.50
0.750	2.10	1.833	16.20	2.917	2.40	4.00	1.50
0.833	2.10	1.917	8.40	3.000	2.40	4.08	1.50
0.917	2.60	2.000	8.40	3.083	2.30	4.17	1.50
1.000	2.60	2.083	5.70	3.167	2.30		
1.083	3.30	2.167	5.70	3.250	2.00		

```

Max.Eff.Inten.(mm/hr)=    61.50    86.43
over (min)            5.00    10.00
Storage Coeff. (min)=    2.10 (ii)    9.58 (ii)
Unit Hyd. Tpeak (min)=    5.00    10.00
Unit Hyd. peak (cms)=    0.31    0.11

```

TOTALS

```

PEAK FLOW      (cms)=    0.01    0.02    0.025 (iii)
TIME TO PEAK   (hrs)=    1.67    1.75    1.67
RUNOFF VOLUME  (mm)=    24.07    13.84    14.85
TOTAL RAINFALL (mm)=    25.07    25.07    25.07
RUNOFF COEFFICIENT =    0.96    0.55    0.59

```

***** 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* = 84.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0009) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0005):  14.66  0.055  2.42  2.57
+ ID2= 2 ( 0007):   0.41  0.025  1.67  14.85
=====
ID = 3 ( 0009):  15.07  0.059  2.33  2.90

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0010) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0008):  55.69  1.973  1.67  16.33
+ ID2= 2 ( 0009):  15.07  0.059  2.33  2.90
=====
ID = 3 ( 0010):  70.76  2.002  1.67  13.47

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

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

```

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat

Output filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\1af76ea0-e193-48be-98e1-4c3b48369402\s

Summary filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\1af76ea0-e193-48be-98e1-4c3b48369402\s

DATE: 06-29-2026

TIME: 03:37:01

USER:

COMMENTS: _____

** SIMULATION : CW 10 Yr 4 Hr Chicago Design **

| CHICAGO STORM |
Ptotal= 58.18 mm

IDF curve parameters: A= 628.126
 B= 0.000
 C= 0.687

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

Duration of storm = 4.00 hrs

Storm time step = 10.00 min

Time to peak ratio = 0.33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	5.08	1.00	23.38	2.00	9.92	3.00	5.83
0.17	5.66	1.17	129.14	2.17	8.78	3.17	5.50
0.33	6.45	1.33	28.60	2.33	7.92	3.33	5.21
0.50	7.57	1.50	18.18	2.50	7.24	3.50	4.95
0.67	9.34	1.67	13.93	2.67	6.68	3.67	4.73

0.83 12.71 | 1.83 11.51 | 2.83 6.22 | 3.83 4.52

| CALIB |
| NASHYD (0004) | Area (ha)= 6.09 Curve Number (CN)= 77.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.32

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

----- TRANSFORMED HYETOGRAPH -----
TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN
hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr
0.083 5.08 | 1.083 23.38 | 2.083 9.92 | 3.08 5.83
0.167 5.08 | 1.167 23.38 | 2.167 9.92 | 3.17 5.83
0.250 5.66 | 1.250 129.14 | 2.250 8.78 | 3.25 5.50
0.333 5.66 | 1.333 129.14 | 2.333 8.78 | 3.33 5.50
0.417 6.45 | 1.417 28.60 | 2.417 7.92 | 3.42 5.21
0.500 6.45 | 1.500 28.60 | 2.500 7.92 | 3.50 5.21
0.583 7.57 | 1.583 18.18 | 2.583 7.24 | 3.58 4.95
0.667 7.57 | 1.667 18.18 | 2.667 7.24 | 3.67 4.95
0.750 9.34 | 1.750 13.93 | 2.750 6.68 | 3.75 4.73
0.833 9.34 | 1.833 13.93 | 2.833 6.68 | 3.83 4.73
0.917 12.71 | 1.917 11.51 | 2.917 6.22 | 3.92 4.52
1.000 12.71 | 2.000 11.51 | 3.000 6.22 | 4.00 4.52

Unit Hyd Qpeak (cms)= 0.727

PEAK FLOW (cms)= 0.274 (i)

TIME TO PEAK (hrs)= 1.667

RUNOFF VOLUME (mm)= 21.905

TOTAL RAINFALL (mm)= 58.175

RUNOFF COEFFICIENT = 0.377

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

| CALIB |
| STANDHYD (0014) | Area (ha)= 29.18
| ID= 1 DT= 5.0 min | Total Imp(%)= 61.00 Dir. Conn.(%)= 52.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 17.80 11.38
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 441.06 40.00

Mannings n = 0.013 0.250

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	5.08	1.083	23.38	2.083	9.92	3.08	5.83
0.167	5.08	1.167	23.38	2.167	9.92	3.17	5.83
0.250	5.66	1.250	129.14	2.250	8.78	3.25	5.50
0.333	5.66	1.333	129.14	2.333	8.78	3.33	5.50
0.417	6.45	1.417	28.60	2.417	7.92	3.42	5.21
0.500	6.45	1.500	28.60	2.500	7.92	3.50	5.21
0.583	7.57	1.583	18.18	2.583	7.24	3.58	4.95
0.667	7.57	1.667	18.18	2.667	7.24	3.67	4.95
0.750	9.34	1.750	13.93	2.750	6.68	3.75	4.73
0.833	9.34	1.833	13.93	2.833	6.68	3.83	4.73
0.917	12.71	1.917	11.51	2.917	6.22	3.92	4.52
1.000	12.71	2.000	11.51	3.000	6.22	4.00	4.52

Max.Eff.Inten.(mm/hr)= 129.14 93.24
over (min) 5.00 15.00
Storage Coeff. (min)= 5.62 (ii) 12.88 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.20 0.08

TOTALS

PEAK FLOW (cms)= 4.68 1.51 5.523 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.33
RUNOFF VOLUME (mm)= 57.18 34.74 46.41
TOTAL RAINFALL (mm)= 58.18 58.18 58.18
RUNOFF COEFFICIENT = 0.98 0.60 0.80

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

ADD HYD (0017)				
1 + 2 = 3				

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0014):	29.18	5.523	1.33	46.41
+ ID2= 2 (0004):	6.09	0.274	1.67	21.91
=====				
ID = 3 (0017):	35.27	5.631	1.33	42.18

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0015)		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	0.8560	0.8830
	0.1100	0.4970	1.1200	1.0200
	0.4000	0.6220	1.3290	1.1270
	0.6590	0.7730	1.5420	1.2350
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (0017)	35.270	5.631	1.33	42.18
OUTFLOW: ID= 1 (0015)	35.270	0.856	2.33	42.14
PEAK FLOW REDUCTION [Qout/Qin](%)= 15.20				
TIME SHIFT OF PEAK FLOW (min)= 60.00				
MAXIMUM STORAGE USED (ha.m.)= 0.8831				

CALIB				
STANDHYD (0013)	Area (ha)=	1.08		
ID= 1 DT= 5.0 min	Total Imp(%)=	62.00	Dir. Conn.(%)=	10.00

	IMPERVIOUS	PERVIOUS (i)		
Surface Area	(ha)=	0.67	0.41	
Dep. Storage	(mm)=	1.00	1.50	
Average Slope	(%)=	1.00	2.00	
Length	(m)=	84.85	40.00	
Mannings n	=	0.013	0.250	

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

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	5.08	1.083	23.38	2.083	9.92	3.08	5.83
0.167	5.08	1.167	23.38	2.167	9.92	3.17	5.83
0.250	5.66	1.250	129.14	2.250	8.78	3.25	5.50
0.333	5.66	1.333	129.14	2.333	8.78	3.33	5.50
0.417	6.45	1.417	28.60	2.417	7.92	3.42	5.21
0.500	6.45	1.500	28.60	2.500	7.92	3.50	5.21
0.583	7.57	1.583	18.18	2.583	7.24	3.58	4.95
0.667	7.57	1.667	18.18	2.667	7.24	3.67	4.95
0.750	9.34	1.750	13.93	2.750	6.68	3.75	4.73

0.833	9.34		1.833	13.93		2.833	6.68		3.83	4.73
0.917	12.71		1.917	11.51		2.917	6.22		3.92	4.52
1.000	12.71		2.000	11.51		3.000	6.22		4.00	4.52

Max.Eff.Inten.(mm/hr)=	129.14	234.94
over (min)	5.00	10.00
Storage Coeff. (min)=	2.09 (ii)	7.11 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.31	0.14

TOTALS

PEAK FLOW (cms)=	0.04	0.19	0.208 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	57.18	43.30	44.68
TOTAL RAINFALL (mm)=	58.18	58.18	58.18
RUNOFF COEFFICIENT =	0.98	0.74	0.77

***** 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* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0016)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0013):	1.08	0.208	1.33	44.68
+ ID2= 2 (0015):	35.27	0.856	2.33	42.14
=====				
ID = 3 (0016):	36.35	0.882	2.33	42.22

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	Area (ha)=	2.52	Curve Number (CN)=	77.0
NASHYD (0011)	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)=	0.81		

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME	RAIN

hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	5.08	1.083	23.38	2.083	9.92	3.08	5.83
0.167	5.08	1.167	23.38	2.167	9.92	3.17	5.83
0.250	5.66	1.250	129.14	2.250	8.78	3.25	5.50
0.333	5.66	1.333	129.14	2.333	8.78	3.33	5.50
0.417	6.45	1.417	28.60	2.417	7.92	3.42	5.21
0.500	6.45	1.500	28.60	2.500	7.92	3.50	5.21
0.583	7.57	1.583	18.18	2.583	7.24	3.58	4.95
0.667	7.57	1.667	18.18	2.667	7.24	3.67	4.95
0.750	9.34	1.750	13.93	2.750	6.68	3.75	4.73
0.833	9.34	1.833	13.93	2.833	6.68	3.83	4.73
0.917	12.71	1.917	11.51	2.917	6.22	3.92	4.52
1.000	12.71	2.000	11.51	3.000	6.22	4.00	4.52

Unit Hyd Qpeak (cms)= 0.119

PEAK FLOW (cms)= 0.062 (i)
 TIME TO PEAK (hrs)= 2.333
 RUNOFF VOLUME (mm)= 21.911
 TOTAL RAINFALL (mm)= 58.175
 RUNOFF COEFFICIENT = 0.377

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

 | CALIB |
 | STANDHYD (0006) | Area (ha)= 16.82
 | ID= 1 DT= 5.0 min | Total Imp(%)= 90.00 Dir. Conn.(%)= 75.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	15.14	1.68
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	334.86	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	5.08	1.083	23.38	2.083	9.92	3.08	5.83
0.167	5.08	1.167	23.38	2.167	9.92	3.17	5.83
0.250	5.66	1.250	129.14	2.250	8.78	3.25	5.50
0.333	5.66	1.333	129.14	2.333	8.78	3.33	5.50
0.417	6.45	1.417	28.60	2.417	7.92	3.42	5.21
0.500	6.45	1.500	28.60	2.500	7.92	3.50	5.21
0.583	7.57	1.583	18.18	2.583	7.24	3.58	4.95

0.667	7.57	1.667	18.18	2.667	7.24	3.67	4.95
0.750	9.34	1.750	13.93	2.750	6.68	3.75	4.73
0.833	9.34	1.833	13.93	2.833	6.68	3.83	4.73
0.917	12.71	1.917	11.51	2.917	6.22	3.92	4.52
1.000	12.71	2.000	11.51	3.000	6.22	4.00	4.52

Max.Eff.Inten.(mm/hr)= 129.14 246.44
over (min) 5.00 10.00
Storage Coeff. (min)= 4.76 (ii) 7.61 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.22 0.13

TOTALS

PEAK FLOW (cms)= 4.07 0.78 4.770 (iii)
TIME TO PEAK (hrs)= 1.33 1.42 1.33
RUNOFF VOLUME (mm)= 57.18 43.09 53.65
TOTAL RAINFALL (mm)= 58.18 58.18 58.18
RUNOFF COEFFICIENT = 0.98 0.74 0.92

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 84.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0012) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0011):    2.52    0.062    2.33    21.91
+ ID2= 2 ( 0006):   16.82    4.770    1.33    53.65
=====
ID = 3 ( 0012):   19.34    4.775    1.33    49.52

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0008) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0012):   19.34    4.775    1.33    49.52
+ ID2= 2 ( 0016):   36.35    0.882    2.33    42.22
=====
ID = 3 ( 0008):   55.69    5.061    1.33    44.75

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| NASHYD ( 0005) | Area (ha)= 14.66 Curve Number (CN)= 65.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----| U.H. Tp(hrs)= 0.59

```

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

```

----- TRANSFORMED HYETOGRAPH -----
TIME    RAIN | TIME    RAIN | TIME    RAIN | TIME    RAIN
hrs     mm/hr | hrs     mm/hr | hrs     mm/hr | hrs     mm/hr
0.083   5.08 | 1.083   23.38 | 2.083   9.92 | 3.08    5.83
0.167   5.08 | 1.167   23.38 | 2.167   9.92 | 3.17    5.83
0.250   5.66 | 1.250  129.14 | 2.250   8.78 | 3.25    5.50
0.333   5.66 | 1.333  129.14 | 2.333   8.78 | 3.33    5.50
0.417   6.45 | 1.417   28.60 | 2.417   7.92 | 3.42    5.21
0.500   6.45 | 1.500   28.60 | 2.500   7.92 | 3.50    5.21
0.583   7.57 | 1.583   18.18 | 2.583   7.24 | 3.58    4.95
0.667   7.57 | 1.667   18.18 | 2.667   7.24 | 3.67    4.95
0.750   9.34 | 1.750   13.93 | 2.750   6.68 | 3.75    4.73
0.833   9.34 | 1.833   13.93 | 2.833   6.68 | 3.83    4.73
0.917  12.71 | 1.917   11.51 | 2.917   6.22 | 3.92    4.52
1.000  12.71 | 2.000   11.51 | 3.000   6.22 | 4.00    4.52

```

Unit Hyd Qpeak (cms)= 0.949

PEAK FLOW (cms)= 0.289 (i)
 TIME TO PEAK (hrs)= 2.083
 RUNOFF VOLUME (mm)= 14.886
 TOTAL RAINFALL (mm)= 58.175
 RUNOFF COEFFICIENT = 0.256

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

```

-----
| CALIB |
| STANDHYD ( 0007) | Area (ha)= 0.41
| ID= 1 DT= 5.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 10.00
|-----|

```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.27	0.14
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	52.28	40.00
Mannings n =	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.08	1.083	23.38	2.083	9.92	3.08	5.83
0.167	5.08	1.167	23.38	2.167	9.92	3.17	5.83
0.250	5.66	1.250	129.14	2.250	8.78	3.25	5.50
0.333	5.66	1.333	129.14	2.333	8.78	3.33	5.50
0.417	6.45	1.417	28.60	2.417	7.92	3.42	5.21
0.500	6.45	1.500	28.60	2.500	7.92	3.50	5.21
0.583	7.57	1.583	18.18	2.583	7.24	3.58	4.95
0.667	7.57	1.667	18.18	2.667	7.24	3.67	4.95
0.750	9.34	1.750	13.93	2.750	6.68	3.75	4.73
0.833	9.34	1.833	13.93	2.833	6.68	3.83	4.73
0.917	12.71	1.917	11.51	2.917	6.22	3.92	4.52
1.000	12.71	2.000	11.51	3.000	6.22	4.00	4.52

Max.Eff.Inten.(mm/hr)= 129.14 255.73
over (min) 5.00 10.00
Storage Coeff. (min)= 1.56 (ii) 6.41 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.33 0.14

TOTALS

PEAK FLOW (cms)= 0.01 0.07 0.082 (iii)
TIME TO PEAK (hrs)= 1.33 1.42 1.33
RUNOFF VOLUME (mm)= 57.18 43.41 44.78
TOTAL RAINFALL (mm)= 58.18 58.18 58.18
RUNOFF COEFFICIENT = 0.98 0.75 0.77

***** 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* = 84.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0009) |
| 1 + 2 = 3 |
-----
      AREA      QPEAK      TPEAK      R.V.
      (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0005):  14.66  0.289  2.08  14.89
+ ID2= 2 ( 0007):   0.41  0.082  1.33  44.78
=====
ID = 3 ( 0009):  15.07  0.302  2.00  15.70

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 0010) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0008):  55.69  5.061  1.33  44.75
+ ID2= 2 ( 0009):  15.07  0.302  2.00  15.70
=====
ID = 3 ( 0010):  70.76  5.184  1.33  38.57
```

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

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat

Output filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\
b7ac439e-d0a3-48e6-88cb-c7f510a62216\s

Summary filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\
b7ac439e-d0a3-48e6-88cb-c7f510a62216\s

DATE: 06-29-2026

TIME: 03:37:00

USER:

COMMENTS: _____

** SIMULATION : CW 100 Yr 4 Hr Chicago Design **

| CHICAGO STORM |
Ptotal= 81.27 mm

IDF curve parameters: A= 896.876
B= 0.000
C= 0.691

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

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

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	7.01	1.00	32.55	2.00	13.74	3.00	8.06
0.17	7.82	1.17	182.70	2.17	12.16	3.17	7.59
0.33	8.91	1.33	39.87	2.33	10.95	3.33	7.19
0.50	10.47	1.50	25.27	2.50	10.01	3.50	6.83
0.67	12.94	1.67	19.33	2.67	9.24	3.67	6.52
0.83	17.63	1.83	15.96	2.83	8.60	3.83	6.24

| CALIB |
| NASHYD (0004) |
ID= 1 DT= 5.0 min

Area (ha)= 6.09 Curve Number (CN)= 77.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.32

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	7.01	1.083	32.55	2.083	13.74	3.08	8.06
0.167	7.01	1.167	32.55	2.167	13.74	3.17	8.06
0.250	7.82	1.250	182.70	2.250	12.16	3.25	7.59
0.333	7.82	1.333	182.70	2.333	12.16	3.33	7.59
0.417	8.91	1.417	39.87	2.417	10.95	3.42	7.19
0.500	8.91	1.500	39.87	2.500	10.95	3.50	7.19

0.583	10.47	1.583	25.27	2.583	10.01	3.58	6.83
0.667	10.47	1.667	25.27	2.667	10.01	3.67	6.83
0.750	12.94	1.750	19.33	2.750	9.24	3.75	6.52
0.833	12.94	1.833	19.33	2.833	9.24	3.83	6.52
0.917	17.63	1.917	15.96	2.917	8.60	3.92	6.24
1.000	17.63	2.000	15.96	3.000	8.60	4.00	6.24

Unit Hyd Qpeak (cms)= 0.727

PEAK FLOW (cms)= 0.504 (i)

TIME TO PEAK (hrs)= 1.667

RUNOFF VOLUME (mm)= 38.220

TOTAL RAINFALL (mm)= 81.265

RUNOFF COEFFICIENT = 0.470

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

```

-----
| CALIB |
| STANDHYD ( 0014) |
| ID= 1 DT= 5.0 min |
-----

```

Area (ha)= 29.18
Total Imp(%)= 61.00 Dir. Conn.(%)= 52.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	17.80	11.38
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	441.06	40.00
Mannings n	=	0.013	0.250

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

```

----- TRANSFORMED HYETOGRAPH -----

```

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	7.01	1.083	32.55	2.083	13.74	3.08	8.06
0.167	7.01	1.167	32.55	2.167	13.74	3.17	8.06
0.250	7.82	1.250	182.70	2.250	12.16	3.25	7.59
0.333	7.82	1.333	182.70	2.333	12.16	3.33	7.59
0.417	8.91	1.417	39.87	2.417	10.95	3.42	7.19
0.500	8.91	1.500	39.87	2.500	10.95	3.50	7.19
0.583	10.47	1.583	25.27	2.583	10.01	3.58	6.83
0.667	10.47	1.667	25.27	2.667	10.01	3.67	6.83
0.750	12.94	1.750	19.33	2.750	9.24	3.75	6.52
0.833	12.94	1.833	19.33	2.833	9.24	3.83	6.52
0.917	17.63	1.917	15.96	2.917	8.60	3.92	6.24
1.000	17.63	2.000	15.96	3.000	8.60	4.00	6.24

Max. Eff. Inten. (mm/hr)= 182.70 154.02

over (min)	5.00	10.00	
Storage Coeff. (min)=	4.89 (ii)	9.83 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.22	0.11	
			TOTALS
PEAK FLOW (cms)=	6.87	3.00	9.427 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	80.27	55.02	68.15
TOTAL RAINFALL (mm)=	81.27	81.27	81.27
RUNOFF COEFFICIENT =	0.99	0.68	0.84

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

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

```

-----
| ADD HYD ( 0017) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0014):  29.18  9.427      1.33  68.15
+ ID2= 2 ( 0004):   6.09  0.504      1.67  38.22
=====
ID = 3 ( 0017):  35.27  9.642      1.33  62.98

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 0015) |
| IN= 2---> OUT= 1 |
| DT= 5.0 min |
-----
          OVERFLOW IS OFF
          OUTFLOW      STORAGE      OUTFLOW      STORAGE
          (cms)      (ha.m.)      (cms)      (ha.m.)
          0.0000      0.0000      0.8560      0.8830
          0.1100      0.4970      1.1200      1.0200
          0.4000      0.6220      1.3290      1.1270
          0.6590      0.7730      1.5420      1.2350
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
INFLOW : ID= 2 ( 0017)  35.270      9.642      1.33      62.98
OUTFLOW: ID= 1 ( 0015)  35.270      1.542      2.08      62.95

```

PEAK FLOW REDUCTION [Qout/Qin](%)= 15.99
 TIME SHIFT OF PEAK FLOW (min)= 45.00
 MAXIMUM STORAGE USED (ha.m.)= 1.2350

```

-----
| CALIB |
| STANDHYD ( 0013) |
| ID= 1 DT= 5.0 min |
|-----|

```

```

Area      (ha)=    1.08
Total Imp(%)= 62.00   Dir. Conn.(%)= 10.00

```

```

                        IMPERVIOUS      PERVIOUS (i)
Surface Area      (ha)=          0.67          0.41
Dep. Storage      (mm)=          1.00          1.50
Average Slope      (%)=          1.00          2.00
Length            (m)=         84.85         40.00
Mannings n        =          0.013         0.250

```

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	7.01	1.083	32.55	2.083	13.74	3.08	8.06
0.167	7.01	1.167	32.55	2.167	13.74	3.17	8.06
0.250	7.82	1.250	182.70	2.250	12.16	3.25	7.59
0.333	7.82	1.333	182.70	2.333	12.16	3.33	7.59
0.417	8.91	1.417	39.87	2.417	10.95	3.42	7.19
0.500	8.91	1.500	39.87	2.500	10.95	3.50	7.19
0.583	10.47	1.583	25.27	2.583	10.01	3.58	6.83
0.667	10.47	1.667	25.27	2.667	10.01	3.67	6.83
0.750	12.94	1.750	19.33	2.750	9.24	3.75	6.52
0.833	12.94	1.833	19.33	2.833	9.24	3.83	6.52
0.917	17.63	1.917	15.96	2.917	8.60	3.92	6.24
1.000	17.63	2.000	15.96	3.000	8.60	4.00	6.24

```

Max.Eff.Inten.(mm/hr)=    182.70    363.58
over (min)            5.00    10.00
Storage Coeff. (min)=    1.82 (ii)    6.03 (ii)
Unit Hyd. Tpeak (min)=    5.00    10.00
Unit Hyd. peak (cms)=    0.32    0.15

```

TOTALS

```

PEAK FLOW      (cms)=    0.05    0.30    0.340 (iii)
TIME TO PEAK   (hrs)=    1.33    1.42    1.33
RUNOFF VOLUME  (mm)=    80.27    65.30    66.80
TOTAL RAINFALL (mm)=    81.27    81.27    81.27
RUNOFF COEFFICIENT =    0.99    0.80    0.82

```

***** 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* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0016)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0013):		1.08	0.340	1.33	66.80
+ ID2= 2 (0015):		35.27	1.542	2.08	62.95
=====					
ID = 3 (0016):		36.35	1.587	2.08	63.06

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB		Area	(ha)=	2.52	Curve Number (CN)=	77.0
NASHYD (0011)		Ia	(mm)=	5.00	# of Linear Res.(N)=	3.00
ID= 1 DT= 5.0 min		U.H. Tp(hrs)=	0.81			

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	7.01	1.083	32.55	2.083	13.74	3.08	8.06
0.167	7.01	1.167	32.55	2.167	13.74	3.17	8.06
0.250	7.82	1.250	182.70	2.250	12.16	3.25	7.59
0.333	7.82	1.333	182.70	2.333	12.16	3.33	7.59
0.417	8.91	1.417	39.87	2.417	10.95	3.42	7.19
0.500	8.91	1.500	39.87	2.500	10.95	3.50	7.19
0.583	10.47	1.583	25.27	2.583	10.01	3.58	6.83
0.667	10.47	1.667	25.27	2.667	10.01	3.67	6.83
0.750	12.94	1.750	19.33	2.750	9.24	3.75	6.52
0.833	12.94	1.833	19.33	2.833	9.24	3.83	6.52
0.917	17.63	1.917	15.96	2.917	8.60	3.92	6.24
1.000	17.63	2.000	15.96	3.000	8.60	4.00	6.24

Unit Hyd Qpeak (cms)= 0.119

PEAK FLOW (cms)= 0.111 (i)

TIME TO PEAK (hrs)= 2.333

RUNOFF VOLUME (mm)= 38.231

TOTAL RAINFALL (mm)= 81.265

RUNOFF COEFFICIENT = 0.470

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

```

-----
| CALIB |
| STANDHYD ( 0006) |
| ID= 1 DT= 5.0 min |
-----

```

Area (ha)= 16.82
Total Imp(%)= 90.00 Dir. Conn.(%)= 75.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	15.14	1.68
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	334.86	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	7.01	1.083	32.55	2.083	13.74	3.08	8.06
0.167	7.01	1.167	32.55	2.167	13.74	3.17	8.06
0.250	7.82	1.250	182.70	2.250	12.16	3.25	7.59
0.333	7.82	1.333	182.70	2.333	12.16	3.33	7.59
0.417	8.91	1.417	39.87	2.417	10.95	3.42	7.19
0.500	8.91	1.500	39.87	2.500	10.95	3.50	7.19
0.583	10.47	1.583	25.27	2.583	10.01	3.58	6.83
0.667	10.47	1.667	25.27	2.667	10.01	3.67	6.83
0.750	12.94	1.750	19.33	2.750	9.24	3.75	6.52
0.833	12.94	1.833	19.33	2.833	9.24	3.83	6.52
0.917	17.63	1.917	15.96	2.917	8.60	3.92	6.24
1.000	17.63	2.000	15.96	3.000	8.60	4.00	6.24

Max.Eff.Inten.(mm/hr)=	182.70	381.98
over (min)	5.00	10.00
Storage Coeff. (min)=	4.15 (ii)	6.62 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.24	0.14

TOTALS

PEAK FLOW (cms)=	5.93	1.25	7.105 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	80.27	65.06	76.46
TOTAL RAINFALL (mm)=	81.27	81.27	81.27
RUNOFF COEFFICIENT =	0.99	0.80	0.94

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

- CN* = 84.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0012)					
1	+	2	=	3	

		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1	(0011):	2.52	0.111	2.33	38.23
+ ID2= 2	(0006):	16.82	7.105	1.33	76.46
=====					
ID = 3	(0012):	19.34	7.117	1.33	71.48

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0008)					
1	+	2	=	3	

		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1	(0012):	19.34	7.117	1.33	71.48
+ ID2= 2	(0016):	36.35	1.587	2.08	63.06
=====					
ID = 3	(0008):	55.69	7.744	1.33	65.98

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0005)					
ID= 1	DT= 5.0 min	Area	(ha)= 14.66	Curve Number	(CN)= 65.0
		Ia	(mm)= 5.00	# of Linear Res.(N)=	3.00
		U.H. Tp(hrs)=	0.59		

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	7.01	1.083	32.55	2.083	13.74	3.08	8.06
0.167	7.01	1.167	32.55	2.167	13.74	3.17	8.06
0.250	7.82	1.250	182.70	2.250	12.16	3.25	7.59
0.333	7.82	1.333	182.70	2.333	12.16	3.33	7.59
0.417	8.91	1.417	39.87	2.417	10.95	3.42	7.19
0.500	8.91	1.500	39.87	2.500	10.95	3.50	7.19
0.583	10.47	1.583	25.27	2.583	10.01	3.58	6.83
0.667	10.47	1.667	25.27	2.667	10.01	3.67	6.83

0.750	12.94	1.750	19.33	2.750	9.24	3.75	6.52
0.833	12.94	1.833	19.33	2.833	9.24	3.83	6.52
0.917	17.63	1.917	15.96	2.917	8.60	3.92	6.24
1.000	17.63	2.000	15.96	3.000	8.60	4.00	6.24

Unit Hyd Qpeak (cms)= 0.949

PEAK FLOW (cms)= 0.551 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 27.302
TOTAL RAINFALL (mm)= 81.265
RUNOFF COEFFICIENT = 0.336

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

CALIB	
STANDHYD (0007)	Area (ha)= 0.41
ID= 1 DT= 5.0 min	Total Imp(%)= 65.00 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.27	0.14
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	52.28	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	7.01	1.083	32.55	2.083	13.74	3.08	8.06
0.167	7.01	1.167	32.55	2.167	13.74	3.17	8.06
0.250	7.82	1.250	182.70	2.250	12.16	3.25	7.59
0.333	7.82	1.333	182.70	2.333	12.16	3.33	7.59
0.417	8.91	1.417	39.87	2.417	10.95	3.42	7.19
0.500	8.91	1.500	39.87	2.500	10.95	3.50	7.19
0.583	10.47	1.583	25.27	2.583	10.01	3.58	6.83
0.667	10.47	1.667	25.27	2.667	10.01	3.67	6.83
0.750	12.94	1.750	19.33	2.750	9.24	3.75	6.52
0.833	12.94	1.833	19.33	2.833	9.24	3.83	6.52
0.917	17.63	1.917	15.96	2.917	8.60	3.92	6.24
1.000	17.63	2.000	15.96	3.000	8.60	4.00	6.24

Max.Eff.Inten.(mm/hr)= 182.70 395.42
over (min) 5.00 10.00
Storage Coeff. (min)= 1.36 (ii) 5.43 (ii)

Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.33	0.16	
			TOTALS
PEAK FLOW (cms)=	0.02	0.12	0.134 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	80.27	65.42	66.90
TOTAL RAINFALL (mm)=	81.27	81.27	81.27
RUNOFF COEFFICIENT =	0.99	0.81	0.82

***** 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* = 84.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0009) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0005):  14.66  0.551  2.00  27.30
+ ID2= 2 ( 0007):   0.41  0.134  1.33  66.90
=====
ID = 3 ( 0009):  15.07  0.570  2.00  28.38
  
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0010) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0008):  55.69  7.744  1.33  65.98
+ ID2= 2 ( 0009):  15.07  0.570  2.00  28.38
=====
ID = 3 ( 0010):  70.76  7.967  1.33  57.98
  
```

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 SSSS UUUUU A A LLLLL

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat

Output filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\0eb7cc66-cecc-445b-8591-b4d56a641fd5\s

Summary filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\0eb7cc66-cecc-445b-8591-b4d56a641fd5\s

DATE: 06-29-2026

TIME: 03:37:00

USER:

COMMENTS: _____

** SIMULATION : CW 2 Yr 4 Hr Chicago Design S **

| CHICAGO STORM |
Ptotal= 39.44 mm

IDF curve parameters: A= 414.345

B= 0.000

C= 0.682

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

Duration of storm = 4.00 hrs

Storm time step = 10.00 min

Time to peak ratio = 0.33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	3.49	1.00	15.91	2.00	6.80	3.00	4.01
0.17	3.89	1.17	86.17	2.17	6.02	3.17	3.78
0.33	4.43	1.33	19.44	2.33	5.43	3.33	3.58
0.50	5.19	1.50	12.40	2.50	4.97	3.50	3.41
0.67	6.40	1.67	9.52	2.67	4.59	3.67	3.26
0.83	8.69	1.83	7.88	2.83	4.28	3.83	3.12

```

-----
| CALIB                                     |
| NASHYD ( 0004) | Area (ha)= 6.09 Curve Number (CN)= 77.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----| U.H. Tp(hrs)= 0.32

```

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	3.49	1.083	15.91	2.083	6.80	3.08	4.01
0.167	3.49	1.167	15.91	2.167	6.80	3.17	4.01
0.250	3.89	1.250	86.17	2.250	6.02	3.25	3.78
0.333	3.89	1.333	86.17	2.333	6.02	3.33	3.78
0.417	4.43	1.417	19.44	2.417	5.43	3.42	3.58
0.500	4.43	1.500	19.44	2.500	5.43	3.50	3.58
0.583	5.19	1.583	12.40	2.583	4.97	3.58	3.41
0.667	5.19	1.667	12.40	2.667	4.97	3.67	3.41
0.750	6.40	1.750	9.52	2.750	4.59	3.75	3.26
0.833	6.40	1.833	9.52	2.833	4.59	3.83	3.26
0.917	8.69	1.917	7.88	2.917	4.28	3.92	3.12
1.000	8.69	2.000	7.88	3.000	4.28	4.00	3.12

Unit Hyd Qpeak (cms)= 0.727

PEAK FLOW (cms)= 0.125 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 10.750
TOTAL RAINFALL (mm)= 39.442
RUNOFF COEFFICIENT = 0.273

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

```

-----
| CALIB                                     |
| STANDHYD ( 0014) | Area (ha)= 29.18

```

| ID= 1 DT= 5.0 min | Total Imp(%)= 61.00 Dir. Conn.(%)= 52.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	17.80	11.38
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	441.06	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	3.49	1.083	15.91	2.083	6.80	3.08	4.01
0.167	3.49	1.167	15.91	2.167	6.80	3.17	4.01
0.250	3.89	1.250	86.17	2.250	6.02	3.25	3.78
0.333	3.89	1.333	86.17	2.333	6.02	3.33	3.78
0.417	4.43	1.417	19.44	2.417	5.43	3.42	3.58
0.500	4.43	1.500	19.44	2.500	5.43	3.50	3.58
0.583	5.19	1.583	12.40	2.583	4.97	3.58	3.41
0.667	5.19	1.667	12.40	2.667	4.97	3.67	3.41
0.750	6.40	1.750	9.52	2.750	4.59	3.75	3.26
0.833	6.40	1.833	9.52	2.833	4.59	3.83	3.26
0.917	8.69	1.917	7.88	2.917	4.28	3.92	3.12
1.000	8.69	2.000	7.88	3.000	4.28	4.00	3.12

Max.Eff.Inten.(mm/hr)=	86.17	49.49
over (min)	5.00	20.00
Storage Coeff. (min)=	6.61 (ii)	15.96 (ii)
Unit Hyd. Tpeak (min)=	5.00	20.00
Unit Hyd. peak (cms)=	0.18	0.07

TOTALS

PEAK FLOW (cms)=	2.96	0.69	3.245 (iii)
TIME TO PEAK (hrs)=	1.33	1.58	1.33
RUNOFF VOLUME (mm)=	38.44	19.57	29.38
TOTAL RAINFALL (mm)=	39.44	39.44	39.44
RUNOFF COEFFICIENT =	0.97	0.50	0.75

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

ADD HYD (0017)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0014):	29.18	3.245	1.33	29.38
+ ID2= 2 (0004):	6.09	0.125	1.67	10.75
=====				
ID = 3 (0017):	35.27	3.288	1.33	26.17

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0015)	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	0.8560	0.8830
	0.1100	0.4970	1.1200	1.0200
	0.4000	0.6220	1.3290	1.1270
	0.6590	0.7730	1.5420	1.2350
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (0017)	35.270	3.288	1.33	26.17
OUTFLOW: ID= 1 (0015)	35.270	0.400	2.83	26.13

PEAK FLOW REDUCTION [Qout/Qin](%)= 12.17
TIME SHIFT OF PEAK FLOW (min)= 90.00
MAXIMUM STORAGE USED (ha.m.)= 0.6221

CALIB	
STANDHYD (0013)	Area (ha)= 1.08
ID= 1 DT= 5.0 min	Total Imp(%)= 62.00 Dir. Conn.(%)= 10.00
	IMPERVIOUS PERVIOUS (i)
Surface Area (ha)=	0.67 0.41
Dep. Storage (mm)=	1.00 1.50
Average Slope (%)=	1.00 2.00
Length (m)=	84.85 40.00
Mannings n =	0.013 0.250

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	3.49	1.083	15.91	2.083	6.80	3.08	4.01
0.167	3.49	1.167	15.91	2.167	6.80	3.17	4.01

0.250	3.89	1.250	86.17	2.250	6.02	3.25	3.78
0.333	3.89	1.333	86.17	2.333	6.02	3.33	3.78
0.417	4.43	1.417	19.44	2.417	5.43	3.42	3.58
0.500	4.43	1.500	19.44	2.500	5.43	3.50	3.58
0.583	5.19	1.583	12.40	2.583	4.97	3.58	3.41
0.667	5.19	1.667	12.40	2.667	4.97	3.67	3.41
0.750	6.40	1.750	9.52	2.750	4.59	3.75	3.26
0.833	6.40	1.833	9.52	2.833	4.59	3.83	3.26
0.917	8.69	1.917	7.88	2.917	4.28	3.92	3.12
1.000	8.69	2.000	7.88	3.000	4.28	4.00	3.12

Max.Eff.Inten.(mm/hr)= 86.17 135.71
over (min) 5.00 10.00
Storage Coeff. (min)= 2.46 (ii) 8.70 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.30 0.12

TOTALS

PEAK FLOW (cms)= 0.03 0.10 0.113 (iii)
TIME TO PEAK (hrs)= 1.33 1.42 1.33
RUNOFF VOLUME (mm)= 38.44 26.09 27.32
TOTAL RAINFALL (mm)= 39.44 39.44 39.44
RUNOFF COEFFICIENT = 0.97 0.66 0.69

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

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

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

```

-----
| ADD HYD ( 0016)|
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0013):    1.08    0.113    1.33    27.32
+ ID2= 2 ( 0015):   35.27    0.400    2.83    26.13
=====
ID = 3 ( 0016):   36.35    0.413    2.83    26.17

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB
| NASHYD ( 0011)|
| ID= 1 DT= 5.0 min |
-----
Area      (ha)= 2.52  Curve Number (CN)= 77.0
Ia        (mm)= 5.00  # of Linear Res.(N)= 3.00

```

----- U.H. Tp(hrs)= 0.81

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	3.49	1.083	15.91	2.083	6.80	3.08	4.01
0.167	3.49	1.167	15.91	2.167	6.80	3.17	4.01
0.250	3.89	1.250	86.17	2.250	6.02	3.25	3.78
0.333	3.89	1.333	86.17	2.333	6.02	3.33	3.78
0.417	4.43	1.417	19.44	2.417	5.43	3.42	3.58
0.500	4.43	1.500	19.44	2.500	5.43	3.50	3.58
0.583	5.19	1.583	12.40	2.583	4.97	3.58	3.41
0.667	5.19	1.667	12.40	2.667	4.97	3.67	3.41
0.750	6.40	1.750	9.52	2.750	4.59	3.75	3.26
0.833	6.40	1.833	9.52	2.833	4.59	3.83	3.26
0.917	8.69	1.917	7.88	2.917	4.28	3.92	3.12
1.000	8.69	2.000	7.88	3.000	4.28	4.00	3.12

Unit Hyd Qpeak (cms)= 0.119

PEAK FLOW (cms)= 0.029 (i)

TIME TO PEAK (hrs)= 2.417

RUNOFF VOLUME (mm)= 10.753

TOTAL RAINFALL (mm)= 39.442

RUNOFF COEFFICIENT = 0.273

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

CALIB	
STANDHYD (0006)	Area (ha)= 16.82
ID= 1 DT= 5.0 min	Total Imp(%)= 90.00 Dir. Conn.(%)= 75.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	15.14	1.68
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	334.86	40.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr

0.083	3.49	1.083	15.91	2.083	6.80	3.08	4.01
0.167	3.49	1.167	15.91	2.167	6.80	3.17	4.01
0.250	3.89	1.250	86.17	2.250	6.02	3.25	3.78
0.333	3.89	1.333	86.17	2.333	6.02	3.33	3.78
0.417	4.43	1.417	19.44	2.417	5.43	3.42	3.58
0.500	4.43	1.500	19.44	2.500	5.43	3.50	3.58
0.583	5.19	1.583	12.40	2.583	4.97	3.58	3.41
0.667	5.19	1.667	12.40	2.667	4.97	3.67	3.41
0.750	6.40	1.750	9.52	2.750	4.59	3.75	3.26
0.833	6.40	1.833	9.52	2.833	4.59	3.83	3.26
0.917	8.69	1.917	7.88	2.917	4.28	3.92	3.12
1.000	8.69	2.000	7.88	3.000	4.28	4.00	3.12

Max.Eff.Inten.(mm/hr)= 86.17 142.08
over (min) 5.00 10.00
Storage Coeff. (min)= 5.60 (ii) 8.94 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.20 0.12

TOTALS

PEAK FLOW (cms)= 2.60 0.43 2.967 (iii)
TIME TO PEAK (hrs)= 1.33 1.42 1.33
RUNOFF VOLUME (mm)= 38.44 25.92 35.31
TOTAL RAINFALL (mm)= 39.44 39.44 39.44
RUNOFF COEFFICIENT = 0.97 0.66 0.90

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 84.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0012) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0011):    2.52    0.029    2.42    10.75
+ ID2= 2 ( 0006):   16.82    2.967    1.33    35.31
=====
ID = 3 ( 0012):   19.34    2.969    1.33    32.11

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0008) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)

```

```

ID1= 1 ( 0012):    19.34    2.969    1.33    32.11
+ ID2= 2 ( 0016):    36.35    0.413    2.83    26.17
=====
ID = 3 ( 0008):    55.69    3.128    1.33    28.23

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| NASHYD ( 0005) | Area (ha)= 14.66 Curve Number (CN)= 65.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
-----
| U.H. Tp(hrs)= 0.59

```

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

```

----- TRANSFORMED HYETOGRAPH -----
TIME    RAIN | TIME    RAIN | ' TIME    RAIN | TIME    RAIN
hrs     mm/hr | hrs     mm/hr | ' hrs     mm/hr | hrs     mm/hr
0.083   3.49 | 1.083   15.91 | 2.083   6.80 | 3.08    4.01
0.167   3.49 | 1.167   15.91 | 2.167   6.80 | 3.17    4.01
0.250   3.89 | 1.250   86.17 | 2.250   6.02 | 3.25    3.78
0.333   3.89 | 1.333   86.17 | 2.333   6.02 | 3.33    3.78
0.417   4.43 | 1.417   19.44 | 2.417   5.43 | 3.42    3.58
0.500   4.43 | 1.500   19.44 | 2.500   5.43 | 3.50    3.58
0.583   5.19 | 1.583   12.40 | 2.583   4.97 | 3.58    3.41
0.667   5.19 | 1.667   12.40 | 2.667   4.97 | 3.67    3.41
0.750   6.40 | 1.750    9.52 | 2.750   4.59 | 3.75    3.26
0.833   6.40 | 1.833    9.52 | 2.833   4.59 | 3.83    3.26
0.917   8.69 | 1.917    7.88 | 2.917   4.28 | 3.92    3.12
1.000   8.69 | 2.000    7.88 | 3.000   4.28 | 4.00    3.12

```

Unit Hyd Qpeak (cms)= 0.949

```

PEAK FLOW      (cms)= 0.128 (i)
TIME TO PEAK   (hrs)= 2.083
RUNOFF VOLUME  (mm)= 6.928
TOTAL RAINFALL (mm)= 39.442
RUNOFF COEFFICIENT = 0.176

```

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

```

-----
| CALIB |
| STANDHYD ( 0007) | Area (ha)= 0.41
| ID= 1 DT= 5.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 10.00
-----
| IMPERVIOUS | PERVIOUS (i)
| Surface Area (ha)= 0.27 0.14

```

Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	52.28	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	3.49	1.083	15.91	2.083	6.80	3.08	4.01
0.167	3.49	1.167	15.91	2.167	6.80	3.17	4.01
0.250	3.89	1.250	86.17	2.250	6.02	3.25	3.78
0.333	3.89	1.333	86.17	2.333	6.02	3.33	3.78
0.417	4.43	1.417	19.44	2.417	5.43	3.42	3.58
0.500	4.43	1.500	19.44	2.500	5.43	3.50	3.58
0.583	5.19	1.583	12.40	2.583	4.97	3.58	3.41
0.667	5.19	1.667	12.40	2.667	4.97	3.67	3.41
0.750	6.40	1.750	9.52	2.750	4.59	3.75	3.26
0.833	6.40	1.833	9.52	2.833	4.59	3.83	3.26
0.917	8.69	1.917	7.88	2.917	4.28	3.92	3.12
1.000	8.69	2.000	7.88	3.000	4.28	4.00	3.12

Max.Eff.Inten.(mm/hr)=	86.17	147.93
over (min)	5.00	10.00
Storage Coeff. (min)=	1.84 (ii)	7.87 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.32	0.13

TOTALS

PEAK FLOW (cms)=	0.01	0.04	0.045 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	38.44	26.18	27.39
TOTAL RAINFALL (mm)=	39.44	39.44	39.44
RUNOFF COEFFICIENT =	0.97	0.66	0.69

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

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 84.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| ADD HYD (0009)|

1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0005):	14.66	0.128	2.08	6.93
+ ID2= 2 (0007):	0.41	0.045	1.33	27.39
=====				
ID = 3 (0009):	15.07	0.136	2.08	7.48

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0008):	55.69	3.128	1.33	28.23
+ ID2= 2 (0009):	15.07	0.136	2.08	7.48
=====				
ID = 3 (0010):	70.76	3.187	1.33	23.81

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		

000	TTTTT	TTTTT	H	H	Y	Y	M	M	000	TM	
0	0	T	T	H	H	Y	Y	MM	MM	0	0
0	0	T	T	H	H	Y	M	M	0	0	
000	T	T	H	H	Y	M	M	000			

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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\V02\voin.dat

Output filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\0c0b9e7d-9f39-4b25-97b8-0bd24830e799\s

Summary filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\0c0b9e7d-9f39-4b25-97b8-0bd24830e799\s

DATE: 06-29-2026

TIME: 03:37:01

USER:

COMMENTS: _____

** SIMULATION : CW 25 Yr 4 Hr Chicago Design **

| CHICAGO STORM |
Ptotal= 67.37 mm

IDF curve parameters: A= 739.425
B= 0.000
C= 0.690
used in: INTENSITY = $A / (t + B)^C$

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

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	5.83	1.00	27.01	2.00	11.42	3.00	6.70
0.17	6.50	1.17	150.97	2.17	10.10	3.17	6.31
0.33	7.41	1.33	33.07	2.33	9.10	3.33	5.98
0.50	8.70	1.50	20.98	2.50	8.32	3.50	5.68
0.67	10.75	1.67	16.05	2.67	7.68	3.67	5.42
0.83	14.64	1.83	13.26	2.83	7.15	3.83	5.19

| CALIB |
| NASHYD (0004) |
ID= 1 DT= 5.0 min

Area (ha)= 6.09 Curve Number (CN)= 77.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.32

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr

0.083	5.83	1.083	27.01	2.083	11.42	3.08	6.70
0.167	5.83	1.167	27.01	2.167	11.42	3.17	6.70
0.250	6.50	1.250	150.97	2.250	10.10	3.25	6.31
0.333	6.50	1.333	150.97	2.333	10.10	3.33	6.31
0.417	7.41	1.417	33.07	2.417	9.10	3.42	5.98
0.500	7.41	1.500	33.07	2.500	9.10	3.50	5.98
0.583	8.70	1.583	20.98	2.583	8.32	3.58	5.68
0.667	8.70	1.667	20.98	2.667	8.32	3.67	5.68
0.750	10.75	1.750	16.05	2.750	7.68	3.75	5.42
0.833	10.75	1.833	16.05	2.833	7.68	3.83	5.42
0.917	14.64	1.917	13.26	2.917	7.15	3.92	5.19
1.000	14.64	2.000	13.26	3.000	7.15	4.00	5.19

Unit Hyd Qpeak (cms)= 0.727

PEAK FLOW (cms)= 0.362 (i)

TIME TO PEAK (hrs)= 1.667

RUNOFF VOLUME (mm)= 28.129

TOTAL RAINFALL (mm)= 67.367

RUNOFF COEFFICIENT = 0.418

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

CALIB
STANDHYD (0014)
ID= 1 DT= 5.0 min

Area (ha)= 29.18

Total Imp(%)= 61.00 Dir. Conn.(%)= 52.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	17.80	11.38
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	441.06	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	5.83	1.083	27.01	2.083	11.42	3.08	6.70
0.167	5.83	1.167	27.01	2.167	11.42	3.17	6.70
0.250	6.50	1.250	150.97	2.250	10.10	3.25	6.31
0.333	6.50	1.333	150.97	2.333	10.10	3.33	6.31
0.417	7.41	1.417	33.07	2.417	9.10	3.42	5.98
0.500	7.41	1.500	33.07	2.500	9.10	3.50	5.98
0.583	8.70	1.583	20.98	2.583	8.32	3.58	5.68
0.667	8.70	1.667	20.98	2.667	8.32	3.67	5.68

0.750	10.75	1.750	16.05	2.750	7.68	3.75	5.42
0.833	10.75	1.833	16.05	2.833	7.68	3.83	5.42
0.917	14.64	1.917	13.26	2.917	7.15	3.92	5.19
1.000	14.64	2.000	13.26	3.000	7.15	4.00	5.19

Max.Eff.Inten.(mm/hr)= 150.97 117.23
 over (min) 5.00 15.00
 Storage Coeff. (min)= 5.28 (ii) 11.90 (ii)
 Unit Hyd. Tpeak (min)= 5.00 15.00
 Unit Hyd. peak (cms)= 0.21 0.09

TOTALS

PEAK FLOW (cms)= 5.57 1.95 6.685 (iii)
 TIME TO PEAK (hrs)= 1.33 1.50 1.33
 RUNOFF VOLUME (mm)= 66.37 42.66 54.99
 TOTAL RAINFALL (mm)= 67.37 67.37 67.37
 RUNOFF COEFFICIENT = 0.99 0.63 0.82

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

CN* = 85.0 Ia = Dep. Storage (Above)

(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.

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

```

-----
| ADD HYD ( 0017) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0014):  29.18  6.685      1.33  54.99
+ ID2= 2 ( 0004):   6.09  0.362      1.67  28.13
=====
ID = 3 ( 0017):  35.27  6.833      1.33  50.35
  
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 0015) |
| IN= 2---> OUT= 1 |
| DT= 5.0 min |
-----
          OUTFLOW      STORAGE      OUTFLOW      STORAGE
          (cms)      (ha.m.)      (cms)      (ha.m.)
          0.0000      0.0000      0.8560      0.8830
          0.1100      0.4970      1.1200      1.0200
          0.4000      0.6220      1.3290      1.1270
          0.6590      0.7730      1.5420      1.2350

          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
INFLOW : ID= 2 ( 0017)  35.270      6.833      1.33  50.35
  
```

OUTFLOW: ID= 1 (0015) 35.270 1.120 2.25 50.32

PEAK FLOW REDUCTION [Qout/Qin](%)= 16.40
 TIME SHIFT OF PEAK FLOW (min)= 55.00
 MAXIMUM STORAGE USED (ha.m.)= 1.0205

 CALIB
 STANDHYD (0013) Area (ha)= 1.08
 ID= 1 DT= 5.0 min Total Imp(%)= 62.00 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.67	0.41
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	84.85	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	5.83	1.083	27.01	2.083	11.42	3.08	6.70
0.167	5.83	1.167	27.01	2.167	11.42	3.17	6.70
0.250	6.50	1.250	150.97	2.250	10.10	3.25	6.31
0.333	6.50	1.333	150.97	2.333	10.10	3.33	6.31
0.417	7.41	1.417	33.07	2.417	9.10	3.42	5.98
0.500	7.41	1.500	33.07	2.500	9.10	3.50	5.98
0.583	8.70	1.583	20.98	2.583	8.32	3.58	5.68
0.667	8.70	1.667	20.98	2.667	8.32	3.67	5.68
0.750	10.75	1.750	16.05	2.750	7.68	3.75	5.42
0.833	10.75	1.833	16.05	2.833	7.68	3.83	5.42
0.917	14.64	1.917	13.26	2.917	7.15	3.92	5.19
1.000	14.64	2.000	13.26	3.000	7.15	4.00	5.19

Max.Eff.Inten.(mm/hr)=	150.97	286.74
over (min)	5.00	10.00
Storage Coeff. (min)=	1.96 (ii)	6.59 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.31	0.14

TOTALS

PEAK FLOW (cms)=	0.05	0.23	0.260 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	66.37	51.99	53.42
TOTAL RAINFALL (mm)=	67.37	67.37	67.37
RUNOFF COEFFICIENT =	0.99	0.77	0.79

***** 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* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0016)				
1 + 2 = 3				

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0013):	1.08	0.260	1.33	53.42
+ ID2= 2 (0015):	35.27	1.120	2.25	50.32
=====				
ID = 3 (0016):	36.35	1.153	2.17	50.41

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
NASHYD (0011)				
ID= 1 DT= 5.0 min				

	Area	(ha)=	2.52	Curve Number (CN)= 77.0
	Ia	(mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp	(hrs)=	0.81	

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

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	5.83	1.083	27.01	2.083	11.42	3.08	6.70
0.167	5.83	1.167	27.01	2.167	11.42	3.17	6.70
0.250	6.50	1.250	150.97	2.250	10.10	3.25	6.31
0.333	6.50	1.333	150.97	2.333	10.10	3.33	6.31
0.417	7.41	1.417	33.07	2.417	9.10	3.42	5.98
0.500	7.41	1.500	33.07	2.500	9.10	3.50	5.98
0.583	8.70	1.583	20.98	2.583	8.32	3.58	5.68
0.667	8.70	1.667	20.98	2.667	8.32	3.67	5.68
0.750	10.75	1.750	16.05	2.750	7.68	3.75	5.42
0.833	10.75	1.833	16.05	2.833	7.68	3.83	5.42
0.917	14.64	1.917	13.26	2.917	7.15	3.92	5.19
1.000	14.64	2.000	13.26	3.000	7.15	4.00	5.19

Unit Hyd Qpeak (cms)= 0.119

PEAK FLOW (cms)= 0.081 (i)
 TIME TO PEAK (hrs)= 2.333
 RUNOFF VOLUME (mm)= 28.137
 TOTAL RAINFALL (mm)= 67.367
 RUNOFF COEFFICIENT = 0.418

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

 | CALIB |
 | STANDHYD (0006) | Area (ha)= 16.82
 | ID= 1 DT= 5.0 min | Total Imp(%)= 90.00 Dir. Conn.(%)= 75.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	15.14	1.68
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	334.86	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	5.83	1.083	27.01	2.083	11.42	3.08	6.70
0.167	5.83	1.167	27.01	2.167	11.42	3.17	6.70
0.250	6.50	1.250	150.97	2.250	10.10	3.25	6.31
0.333	6.50	1.333	150.97	2.333	10.10	3.33	6.31
0.417	7.41	1.417	33.07	2.417	9.10	3.42	5.98
0.500	7.41	1.500	33.07	2.500	9.10	3.50	5.98
0.583	8.70	1.583	20.98	2.583	8.32	3.58	5.68
0.667	8.70	1.667	20.98	2.667	8.32	3.67	5.68
0.750	10.75	1.750	16.05	2.750	7.68	3.75	5.42
0.833	10.75	1.833	16.05	2.833	7.68	3.83	5.42
0.917	14.64	1.917	13.26	2.917	7.15	3.92	5.19
1.000	14.64	2.000	13.26	3.000	7.15	4.00	5.19

Max.Eff.Inten.(mm/hr)=	150.97	300.99
over (min)	5.00	10.00
Storage Coeff. (min)=	4.47 (ii)	7.15 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.23	0.14

TOTALS

PEAK FLOW (cms)=	4.82	0.97	5.711 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	66.37	51.76	62.72
TOTAL RAINFALL (mm)=	67.37	67.37	67.37

RUNOFF COEFFICIENT = 0.99 0.77 0.93

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 84.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| ADD HYD ( 0012) |
| 1 + 2 = 3 |
|-----|
| AREA QPEAK TPEAK R.V. |
| (ha) (cms) (hrs) (mm) |
| ID1= 1 ( 0011): 2.52 0.081 2.33 28.14 |
| + ID2= 2 ( 0006): 16.82 5.711 1.33 62.72 |
|=====|
| ID = 3 ( 0012): 19.34 5.719 1.33 58.21 |
|=====|
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 0008) |
| 1 + 2 = 3 |
|-----|
| AREA QPEAK TPEAK R.V. |
| (ha) (cms) (hrs) (mm) |
| ID1= 1 ( 0012): 19.34 5.719 1.33 58.21 |
| + ID2= 2 ( 0016): 36.35 1.153 2.17 50.41 |
|=====|
| ID = 3 ( 0008): 55.69 6.073 1.33 53.12 |
|=====|
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB |
| NASHYD ( 0005) | Area (ha)= 14.66 Curve Number (CN)= 65.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----| U.H. Tp(hrs)= 0.59
```

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

```
----- TRANSFORMED HYETOGRAPH -----
TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN
hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr
0.083 5.83 | 1.083 27.01 | 2.083 11.42 | 3.08 6.70
0.167 5.83 | 1.167 27.01 | 2.167 11.42 | 3.17 6.70
0.250 6.50 | 1.250 150.97 | 2.250 10.10 | 3.25 6.31
```


0.333	6.50	1.333	150.97	2.333	10.10	3.33	6.31
0.417	7.41	1.417	33.07	2.417	9.10	3.42	5.98
0.500	7.41	1.500	33.07	2.500	9.10	3.50	5.98
0.583	8.70	1.583	20.98	2.583	8.32	3.58	5.68
0.667	8.70	1.667	20.98	2.667	8.32	3.67	5.68
0.750	10.75	1.750	16.05	2.750	7.68	3.75	5.42
0.833	10.75	1.833	16.05	2.833	7.68	3.83	5.42
0.917	14.64	1.917	13.26	2.917	7.15	3.92	5.19
1.000	14.64	2.000	13.26	3.000	7.15	4.00	5.19

Unit Hyd Qpeak (cms)= 0.949

PEAK FLOW (cms)= 0.387 (i)
TIME TO PEAK (hrs)= 2.083
RUNOFF VOLUME (mm)= 19.532
TOTAL RAINFALL (mm)= 67.367
RUNOFF COEFFICIENT = 0.290

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

| CALIB |
| STANDHYD (0007) | Area (ha)= 0.41
| ID= 1 DT= 5.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.27	0.14
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	52.28	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	5.83	1.083	27.01	2.083	11.42	3.08	6.70
0.167	5.83	1.167	27.01	2.167	11.42	3.17	6.70
0.250	6.50	1.250	150.97	2.250	10.10	3.25	6.31
0.333	6.50	1.333	150.97	2.333	10.10	3.33	6.31
0.417	7.41	1.417	33.07	2.417	9.10	3.42	5.98
0.500	7.41	1.500	33.07	2.500	9.10	3.50	5.98
0.583	8.70	1.583	20.98	2.583	8.32	3.58	5.68
0.667	8.70	1.667	20.98	2.667	8.32	3.67	5.68
0.750	10.75	1.750	16.05	2.750	7.68	3.75	5.42
0.833	10.75	1.833	16.05	2.833	7.68	3.83	5.42
0.917	14.64	1.917	13.26	2.917	7.15	3.92	5.19

1.000 14.64 | 2.000 13.26 | 3.000 7.15 | 4.00 5.19

Max.Eff.Inten.(mm/hr)= 150.97 311.98
over (min) 5.00 10.00
Storage Coeff. (min)= 1.47 (ii) 5.95 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.33 0.15

TOTALS

PEAK FLOW (cms)= 0.02 0.09 0.103 (iii)
TIME TO PEAK (hrs)= 1.33 1.42 1.33
RUNOFF VOLUME (mm)= 66.37 52.10 53.52
TOTAL RAINFALL (mm)= 67.37 67.37 67.37
RUNOFF COEFFICIENT = 0.99 0.77 0.79

***** 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* = 84.0 Ia = Dep. Storage (Above)

(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.

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

```

-----
| ADD HYD ( 0009) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0005):  14.66  0.387  2.08  19.53
+ ID2= 2 ( 0007):   0.41  0.103  1.33  53.52
=====
ID = 3 ( 0009):  15.07  0.402  2.00  20.46

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0010) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0008):  55.69  6.073  1.33  53.12
+ ID2= 2 ( 0009):  15.07  0.402  2.00  20.46
=====
ID = 3 ( 0010):  70.76  6.234  1.33  46.16

```

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
```

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat

Output filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\14e367f2-b22a-4e46-9248-23e5dd15d4a3\s

Summary filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\14e367f2-b22a-4e46-9248-23e5dd15d4a3\s

DATE: 06-29-2026

TIME: 03:37:01

USER:

COMMENTS: _____

** SIMULATION : CW 5 Yr 4 Hr Chicago Design S **

| CHICAGO STORM |
Ptotal= 50.66 mm

IDF curve parameters: A= 543.943

B= 0.000

C= 0.686

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

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

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	4.43	1.00	20.37	2.00	8.66	3.00	5.09
0.17	4.94	1.17	112.09	2.17	7.66	3.17	4.80
0.33	5.63	1.33	24.91	2.33	6.91	3.33	4.55
0.50	6.61	1.50	15.85	2.50	6.32	3.50	4.33
0.67	8.15	1.67	12.15	2.67	5.83	3.67	4.13
0.83	11.09	1.83	10.04	2.83	5.43	3.83	3.95

```

-----
| CALIB |
| NASHYD ( 0004) | Area (ha)= 6.09 Curve Number (CN)= 77.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----| U.H. Tp(hrs)= 0.32

```

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	4.43	1.083	20.37	2.083	8.66	3.08	5.09
0.167	4.43	1.167	20.37	2.167	8.66	3.17	5.09
0.250	4.94	1.250	112.09	2.250	7.66	3.25	4.80
0.333	4.94	1.333	112.09	2.333	7.66	3.33	4.80
0.417	5.63	1.417	24.91	2.417	6.91	3.42	4.55
0.500	5.63	1.500	24.91	2.500	6.91	3.50	4.55
0.583	6.61	1.583	15.85	2.583	6.32	3.58	4.33
0.667	6.61	1.667	15.85	2.667	6.32	3.67	4.33
0.750	8.15	1.750	12.15	2.750	5.83	3.75	4.13
0.833	8.15	1.833	12.15	2.833	5.83	3.83	4.13
0.917	11.09	1.917	10.04	2.917	5.43	3.92	3.95
1.000	11.09	2.000	10.04	3.000	5.43	4.00	3.95

Unit Hyd Qpeak (cms)= 0.727

PEAK FLOW (cms)= 0.210 (i)

TIME TO PEAK (hrs)= 1.667

RUNOFF VOLUME (mm)= 17.147

TOTAL RAINFALL (mm)= 50.655

RUNOFF COEFFICIENT = 0.338

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

 | CALIB |
 | STANDHYD (0014) |
ID= 1 DT= 5.0 min

Area (ha)= 29.18
 Total Imp(%)= 61.00 Dir. Conn.(%)= 52.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	17.80	11.38
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	441.06	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	4.43	1.083	20.37	2.083	8.66	3.08	5.09
0.167	4.43	1.167	20.37	2.167	8.66	3.17	5.09
0.250	4.94	1.250	112.09	2.250	7.66	3.25	4.80
0.333	4.94	1.333	112.09	2.333	7.66	3.33	4.80
0.417	5.63	1.417	24.91	2.417	6.91	3.42	4.55
0.500	5.63	1.500	24.91	2.500	6.91	3.50	4.55
0.583	6.61	1.583	15.85	2.583	6.32	3.58	4.33
0.667	6.61	1.667	15.85	2.667	6.32	3.67	4.33
0.750	8.15	1.750	12.15	2.750	5.83	3.75	4.13
0.833	8.15	1.833	12.15	2.833	5.83	3.83	4.13
0.917	11.09	1.917	10.04	2.917	5.43	3.92	3.95
1.000	11.09	2.000	10.04	3.000	5.43	4.00	3.95

Max.Eff.Inten.(mm/hr)=	112.09	75.07
over (min)	5.00	15.00
Storage Coeff. (min)=	5.95 (ii)	13.86 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.19	0.08

TOTALS

PEAK FLOW (cms)=	3.99	1.17	4.637 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.33
RUNOFF VOLUME (mm)=	49.66	28.47	39.48
TOTAL RAINFALL (mm)=	50.66	50.66	50.66
RUNOFF COEFFICIENT =	0.98	0.56	0.78

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.

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

```
-----
| ADD HYD ( 0017) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0014):  29.18  4.637    1.33    39.48
+ ID2= 2 ( 0004):   6.09  0.210    1.67    17.15
=====
ID = 3 ( 0017):  35.27  4.715    1.33    35.63
=====
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| RESERVOIR( 0015) |
| IN= 2---> OUT= 1 |
| DT= 5.0 min |
-----
          OUTFLOW      STORAGE      OUTFLOW      STORAGE
          (cms)      (ha.m.)      (cms)      (ha.m.)
          0.0000      0.0000      0.8560      0.8830
          0.1100      0.4970      1.1200      1.0200
          0.4000      0.6220      1.3290      1.1270
          0.6590      0.7730      1.5420      1.2350
```

```

          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
INFLOW : ID= 2 ( 0017)  35.270    4.715    1.33    35.63
OUTFLOW: ID= 1 ( 0015)  35.270    0.659    2.50    35.59
```

PEAK FLOW REDUCTION [Qout/Qin](%)= 13.98
TIME SHIFT OF PEAK FLOW (min)= 70.00
MAXIMUM STORAGE USED (ha.m.)= 0.7733

```
-----
| CALIB |
| STANDHYD ( 0013) |
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 1.08
Total Imp(%)= 62.00 Dir. Conn.(%)= 10.00
```

```

          IMPERVIOUS      PERVIOUS (i)
Surface Area (ha)= 0.67 0.41
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 84.85 40.00
Mannings n = 0.013 0.250
```

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

----- TRANSFORMED HYETOGRAPH -----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.43	1.083	20.37	2.083	8.66	3.08	5.09
0.167	4.43	1.167	20.37	2.167	8.66	3.17	5.09
0.250	4.94	1.250	112.09	2.250	7.66	3.25	4.80
0.333	4.94	1.333	112.09	2.333	7.66	3.33	4.80
0.417	5.63	1.417	24.91	2.417	6.91	3.42	4.55
0.500	5.63	1.500	24.91	2.500	6.91	3.50	4.55
0.583	6.61	1.583	15.85	2.583	6.32	3.58	4.33
0.667	6.61	1.667	15.85	2.667	6.32	3.67	4.33
0.750	8.15	1.750	12.15	2.750	5.83	3.75	4.13
0.833	8.15	1.833	12.15	2.833	5.83	3.83	4.13
0.917	11.09	1.917	10.04	2.917	5.43	3.92	3.95
1.000	11.09	2.000	10.04	3.000	5.43	4.00	3.95

Max.Eff.Inten.(mm/hr)= 112.09 194.74
over (min) 5.00 10.00
Storage Coeff. (min)= 2.21 (ii) 7.62 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.30 0.13

TOTALS

PEAK FLOW (cms)= 0.03 0.15 0.168 (iii)
TIME TO PEAK (hrs)= 1.33 1.42 1.33
RUNOFF VOLUME (mm)= 49.66 36.29 37.62
TOTAL RAINFALL (mm)= 50.66 50.66 50.66
RUNOFF COEFFICIENT = 0.98 0.72 0.74

***** 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* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0016)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0013):		1.08	0.168	1.33	37.62
+ ID2= 2 (0015):		35.27	0.659	2.50	35.59
=====					
ID = 3 (0016):		36.35	0.680	2.42	35.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| NASHYD ( 0011) | Area (ha)= 2.52 Curve Number (CN)= 77.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----| U.H. Tp(hrs)= 0.81

```

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

```

----- TRANSFORMED HYETOGRAPH -----
      TIME    RAIN | TIME    RAIN | TIME    RAIN | TIME    RAIN
      hrs   mm/hr | hrs   mm/hr | hrs   mm/hr | hrs   mm/hr
0.083    4.43 | 1.083   20.37 | 2.083    8.66 | 3.08    5.09
0.167    4.43 | 1.167   20.37 | 2.167    8.66 | 3.17    5.09
0.250    4.94 | 1.250  112.09 | 2.250    7.66 | 3.25    4.80
0.333    4.94 | 1.333  112.09 | 2.333    7.66 | 3.33    4.80
0.417    5.63 | 1.417   24.91 | 2.417    6.91 | 3.42    4.55
0.500    5.63 | 1.500   24.91 | 2.500    6.91 | 3.50    4.55
0.583    6.61 | 1.583   15.85 | 2.583    6.32 | 3.58    4.33
0.667    6.61 | 1.667   15.85 | 2.667    6.32 | 3.67    4.33
0.750    8.15 | 1.750   12.15 | 2.750    5.83 | 3.75    4.13
0.833    8.15 | 1.833   12.15 | 2.833    5.83 | 3.83    4.13
0.917   11.09 | 1.917   10.04 | 2.917    5.43 | 3.92    3.95
1.000   11.09 | 2.000   10.04 | 3.000    5.43 | 4.00    3.95

```

Unit Hyd Qpeak (cms)= 0.119

PEAK FLOW (cms)= 0.048 (i)
 TIME TO PEAK (hrs)= 2.417
 RUNOFF VOLUME (mm)= 17.151
 TOTAL RAINFALL (mm)= 50.655
 RUNOFF COEFFICIENT = 0.339

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

```

-----
| CALIB |
| STANDHYD ( 0006) | Area (ha)= 16.82
| ID= 1 DT= 5.0 min | Total Imp(%)= 90.00 Dir. Conn.(%)= 75.00
|-----|

```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	15.14	1.68
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	334.86	40.00
Mannings n =	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.43	1.083	20.37	2.083	8.66	3.08	5.09
0.167	4.43	1.167	20.37	2.167	8.66	3.17	5.09
0.250	4.94	1.250	112.09	2.250	7.66	3.25	4.80
0.333	4.94	1.333	112.09	2.333	7.66	3.33	4.80
0.417	5.63	1.417	24.91	2.417	6.91	3.42	4.55
0.500	5.63	1.500	24.91	2.500	6.91	3.50	4.55
0.583	6.61	1.583	15.85	2.583	6.32	3.58	4.33
0.667	6.61	1.667	15.85	2.667	6.32	3.67	4.33
0.750	8.15	1.750	12.15	2.750	5.83	3.75	4.13
0.833	8.15	1.833	12.15	2.833	5.83	3.83	4.13
0.917	11.09	1.917	10.04	2.917	5.43	3.92	3.95
1.000	11.09	2.000	10.04	3.000	5.43	4.00	3.95

Max.Eff.Inten.(mm/hr)= 112.09 204.14
over (min) 5.00 10.00
Storage Coeff. (min)= 5.04 (ii) 8.05 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.21 0.13

TOTALS

PEAK FLOW (cms)= 3.48 0.63 4.043 (iii)
TIME TO PEAK (hrs)= 1.33 1.42 1.33
RUNOFF VOLUME (mm)= 49.66 36.10 46.27
TOTAL RAINFALL (mm)= 50.66 50.66 50.66
RUNOFF COEFFICIENT = 0.98 0.71 0.91

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 84.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| ADD HYD (0012) |
| 1 + 2 = 3 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0011):	2.52	0.048	2.42	17.15
+ ID2= 2 (0006):	16.82	4.043	1.33	46.27
=====				
ID = 3 (0012):	19.34	4.047	1.33	42.47

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0008) |
| 1 + 2 = 3 |
-----
                AREA      QPEAK      TPEAK      R.V.
                (ha)      (cms)      (hrs)      (mm)
      ID1= 1 ( 0012):  19.34  4.047      1.33  42.47
+ ID2= 2 ( 0016):  36.35  0.680      2.42  35.66
=====
      ID = 3 ( 0008):  55.69  4.281      1.33  38.02

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| NASHYD ( 0005) |
| ID= 1 DT= 5.0 min |
-----
      Area      (ha)= 14.66      Curve Number      (CN)= 65.0
      Ia      (mm)= 5.00      # of Linear Res.(N)= 3.00
      U.H. Tp(hrs)= 0.59

```

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

```

----- TRANSFORMED HYETOGRAPH -----
      TIME      RAIN | TIME      RAIN | ' TIME      RAIN | TIME      RAIN
      hrs      mm/hr | hrs      mm/hr | ' hrs      mm/hr | hrs      mm/hr
0.083      4.43 | 1.083     20.37 | 2.083     8.66 | 3.08      5.09
0.167      4.43 | 1.167     20.37 | 2.167     8.66 | 3.17      5.09
0.250      4.94 | 1.250    112.09 | 2.250     7.66 | 3.25      4.80
0.333      4.94 | 1.333    112.09 | 2.333     7.66 | 3.33      4.80
0.417      5.63 | 1.417     24.91 | 2.417     6.91 | 3.42      4.55
0.500      5.63 | 1.500     24.91 | 2.500     6.91 | 3.50      4.55
0.583      6.61 | 1.583     15.85 | 2.583     6.32 | 3.58      4.33
0.667      6.61 | 1.667     15.85 | 2.667     6.32 | 3.67      4.33
0.750      8.15 | 1.750     12.15 | 2.750     5.83 | 3.75      4.13
0.833      8.15 | 1.833     12.15 | 2.833     5.83 | 3.83      4.13
0.917     11.09 | 1.917     10.04 | 2.917     5.43 | 3.92      3.95
1.000     11.09 | 2.000     10.04 | 3.000     5.43 | 4.00      3.95

```

Unit Hyd Qpeak (cms)= 0.949

PEAK FLOW (cms)= 0.219 (i)

TIME TO PEAK (hrs)= 2.083

RUNOFF VOLUME (mm)= 11.426

TOTAL RAINFALL (mm)= 50.655

RUNOFF COEFFICIENT = 0.226

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

```

-----
| CALIB |

```

| STANDHYD (0007) | Area (ha)= 0.41
 | ID= 1 DT= 5.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.27	0.14
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	52.28	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	4.43	1.083	20.37	2.083	8.66	3.08	5.09
0.167	4.43	1.167	20.37	2.167	8.66	3.17	5.09
0.250	4.94	1.250	112.09	2.250	7.66	3.25	4.80
0.333	4.94	1.333	112.09	2.333	7.66	3.33	4.80
0.417	5.63	1.417	24.91	2.417	6.91	3.42	4.55
0.500	5.63	1.500	24.91	2.500	6.91	3.50	4.55
0.583	6.61	1.583	15.85	2.583	6.32	3.58	4.33
0.667	6.61	1.667	15.85	2.667	6.32	3.67	4.33
0.750	8.15	1.750	12.15	2.750	5.83	3.75	4.13
0.833	8.15	1.833	12.15	2.833	5.83	3.83	4.13
0.917	11.09	1.917	10.04	2.917	5.43	3.92	3.95
1.000	11.09	2.000	10.04	3.000	5.43	4.00	3.95

Max.Eff.Inten.(mm/hr)=	112.09	212.07
over (min)	5.00	10.00
Storage Coeff. (min)=	1.65 (ii)	6.88 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.32	0.14

TOTALS

PEAK FLOW (cms)=	0.01	0.06	0.067 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	49.66	36.40	37.71
TOTAL RAINFALL (mm)=	50.66	50.66	50.66
RUNOFF COEFFICIENT =	0.98	0.72	0.74

***** 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* = 84.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0009) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0005):  14.66    0.219    2.08    11.43
+ ID2= 2 ( 0007):   0.41    0.067    1.33    37.71
=====
ID = 3 ( 0009):  15.07    0.229    2.08    12.14

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0010) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0008):  55.69    4.281    1.33    38.02
+ ID2= 2 ( 0009):  15.07    0.229    2.08    12.14
=====
ID = 3 ( 0010):  70.76    4.377    1.33    32.51

```

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

```

```

000   TTTTT   TTTTT   H   H   Y   Y   M   M   000   TM
0   0   T       T   H   H   Y   Y   MM MM   0   0
0   0   T       T   H   H   Y   M   M   0   0
000   T       T   H   H   Y   M   M   000

```

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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\V02\voin.dat

Output filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\31b1fff8-5153-4dc6-976b-cd616d2fcaa5\s

Summary filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\31b1fff8-5153-4dc6-976b-cd616d2fcaa5\s

DATE: 06-29-2026

TIME: 03:37:01

USER:

COMMENTS: _____

** SIMULATION : CW 50 Yr 4 Hr Chicago Design **

| CHICAGO STORM |
Ptotal= 74.35 mm

IDF curve parameters: A= 820.514

B= 0.000

C= 0.691

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

Duration of storm = 4.00 hrs

Storm time step = 10.00 min

Time to peak ratio = 0.33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	6.41	1.00	29.78	2.00	12.57	3.00	7.37
0.17	7.15	1.17	167.14	2.17	11.12	3.17	6.95
0.33	8.15	1.33	36.47	2.33	10.02	3.33	6.58
0.50	9.58	1.50	23.12	2.50	9.15	3.50	6.25
0.67	11.84	1.67	17.69	2.67	8.45	3.67	5.96
0.83	16.13	1.83	14.60	2.83	7.87	3.83	5.71

| CALIB |
| NASHYD (0004) |
ID= 1 DT= 5.0 min

Area (ha)= 6.09 Curve Number (CN)= 77.0

Ia (mm)= 5.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.32

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

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.41	1.083	29.78	2.083	12.57	3.08	7.37
0.167	6.41	1.167	29.78	2.167	12.57	3.17	7.37
0.250	7.15	1.250	167.14	2.250	11.12	3.25	6.95
0.333	7.15	1.333	167.14	2.333	11.12	3.33	6.95
0.417	8.15	1.417	36.47	2.417	10.02	3.42	6.58
0.500	8.15	1.500	36.47	2.500	10.02	3.50	6.58
0.583	9.58	1.583	23.12	2.583	9.15	3.58	6.25
0.667	9.58	1.667	23.12	2.667	9.15	3.67	6.25
0.750	11.84	1.750	17.69	2.750	8.45	3.75	5.96
0.833	11.84	1.833	17.69	2.833	8.45	3.83	5.96
0.917	16.13	1.917	14.60	2.917	7.87	3.92	5.71
1.000	16.13	2.000	14.60	3.000	7.87	4.00	5.71

Unit Hyd Qpeak (cms)= 0.727

PEAK FLOW (cms)= 0.432 (i)
 TIME TO PEAK (hrs)= 1.667
 RUNOFF VOLUME (mm)= 33.105
 TOTAL RAINFALL (mm)= 74.346
 RUNOFF COEFFICIENT = 0.445

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

 | CALIB |
 | STANDHYD (0014) | Area (ha)= 29.18
 | ID= 1 DT= 5.0 min | Total Imp(%)= 61.00 Dir. Conn.(%)= 52.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	17.80	11.38
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	441.06	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.41	1.083	29.78	2.083	12.57	3.08	7.37
0.167	6.41	1.167	29.78	2.167	12.57	3.17	7.37
0.250	7.15	1.250	167.14	2.250	11.12	3.25	6.95

0.333	7.15	1.333	167.14	2.333	11.12	3.33	6.95
0.417	8.15	1.417	36.47	2.417	10.02	3.42	6.58
0.500	8.15	1.500	36.47	2.500	10.02	3.50	6.58
0.583	9.58	1.583	23.12	2.583	9.15	3.58	6.25
0.667	9.58	1.667	23.12	2.667	9.15	3.67	6.25
0.750	11.84	1.750	17.69	2.750	8.45	3.75	5.96
0.833	11.84	1.833	17.69	2.833	8.45	3.83	5.96
0.917	16.13	1.917	14.60	2.917	7.87	3.92	5.71
1.000	16.13	2.000	14.60	3.000	7.87	4.00	5.71

Max.Eff.Inten.(mm/hr)= 167.14 135.72
over (min) 5.00 15.00
Storage Coeff. (min)= 5.07 (ii) 11.31 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.21 0.09

TOTALS

PEAK FLOW (cms)= 6.23 2.30 7.570 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.33
RUNOFF VOLUME (mm)= 73.35 48.82 61.57
TOTAL RAINFALL (mm)= 74.35 74.35 74.35
RUNOFF COEFFICIENT = 0.99 0.66 0.83

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

```

-----
| ADD HYD ( 0017) |
| 1 + 2 = 3 |
-----
          AREA    QPEAK    TPEAK    R.V.
          (ha)    (cms)    (hrs)    (mm)
ID1= 1 ( 0014):  29.18  7.570    1.33  61.57
+ ID2= 2 ( 0004):   6.09  0.432    1.67  33.11
=====
ID = 3 ( 0017):  35.27  7.750    1.33  56.66

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 0015) |
| IN= 2---> OUT= 1 |
| DT= 5.0 min |
-----
          OVERFLOW IS OFF
          OUTFLOW    STORAGE    OUTFLOW    STORAGE
          (cms)    (ha.m.)    (cms)    (ha.m.)
          0.0000    0.0000    0.8560    0.8830
          0.1100    0.4970    1.1200    1.0200
          0.4000    0.6220    1.3290    1.1270

```

0.6590 0.7730 | 1.5420 1.2350

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0017)	35.270	7.750	1.33	56.66
OUTFLOW: ID= 1 (0015)	35.270	1.329	2.17	56.62

PEAK FLOW REDUCTION [Qout/Qin](%)= 17.15
 TIME SHIFT OF PEAK FLOW (min)= 50.00
 MAXIMUM STORAGE USED (ha.m.)= 1.1276

CALIB	
STANDHYD (0013)	Area (ha)= 1.08
ID= 1 DT= 5.0 min	Total Imp(%)= 62.00 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.67	0.41
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	84.85	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.41	1.083	29.78	2.083	12.57	3.08	7.37
0.167	6.41	1.167	29.78	2.167	12.57	3.17	7.37
0.250	7.15	1.250	167.14	2.250	11.12	3.25	6.95
0.333	7.15	1.333	167.14	2.333	11.12	3.33	6.95
0.417	8.15	1.417	36.47	2.417	10.02	3.42	6.58
0.500	8.15	1.500	36.47	2.500	10.02	3.50	6.58
0.583	9.58	1.583	23.12	2.583	9.15	3.58	6.25
0.667	9.58	1.667	23.12	2.667	9.15	3.67	6.25
0.750	11.84	1.750	17.69	2.750	8.45	3.75	5.96
0.833	11.84	1.833	17.69	2.833	8.45	3.83	5.96
0.917	16.13	1.917	14.60	2.917	7.87	3.92	5.71
1.000	16.13	2.000	14.60	3.000	7.87	4.00	5.71

Max.Eff.Inten.(mm/hr)=	167.14	325.70
over (min)	5.00	10.00
Storage Coeff. (min)=	1.88 (ii)	6.29 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.32	0.15

TOTALS

PEAK FLOW	(cms)=	0.05	0.26	0.300 (iii)

TIME TO PEAK	(hrs)=	1.33	1.42	1.33
RUNOFF VOLUME	(mm)=	73.35	58.65	60.12
TOTAL RAINFALL	(mm)=	74.35	74.35	74.35
RUNOFF COEFFICIENT	=	0.99	0.79	0.81

***** 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* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0016) |
| 1 + 2 = 3 |
-----

```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0013):	1.08	0.300	1.33	60.12
+ ID2= 2 (0015):	35.27	1.329	2.17	56.62
=====				
ID = 3 (0016):	36.35	1.368	2.17	56.73

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| NASHYD ( 0011) |
| ID= 1 DT= 5.0 min |
-----

```

Area (ha)=	2.52	Curve Number (CN)=	77.0
Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
U.H. Tp(hrs)=	0.81		

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

```

----- TRANSFORMED HYETOGRAPH -----

```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.41	1.083	29.78	2.083	12.57	3.08	7.37
0.167	6.41	1.167	29.78	2.167	12.57	3.17	7.37
0.250	7.15	1.250	167.14	2.250	11.12	3.25	6.95
0.333	7.15	1.333	167.14	2.333	11.12	3.33	6.95
0.417	8.15	1.417	36.47	2.417	10.02	3.42	6.58
0.500	8.15	1.500	36.47	2.500	10.02	3.50	6.58
0.583	9.58	1.583	23.12	2.583	9.15	3.58	6.25
0.667	9.58	1.667	23.12	2.667	9.15	3.67	6.25
0.750	11.84	1.750	17.69	2.750	8.45	3.75	5.96
0.833	11.84	1.833	17.69	2.833	8.45	3.83	5.96

0.917	16.13		1.917	14.60		2.917	7.87		3.92	5.71
1.000	16.13		2.000	14.60		3.000	7.87		4.00	5.71

Unit Hyd Qpeak (cms)= 0.119

PEAK FLOW (cms)= 0.096 (i)
 TIME TO PEAK (hrs)= 2.333
 RUNOFF VOLUME (mm)= 33.114
 TOTAL RAINFALL (mm)= 74.346
 RUNOFF COEFFICIENT = 0.445

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

 | CALIB |
 | STANDHYD (0006) | Area (ha)= 16.82
 | ID= 1 DT= 5.0 min | Total Imp(%)= 90.00 Dir. Conn.(%)= 75.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	15.14	1.68
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	334.86	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.41	1.083	29.78	2.083	12.57	3.08	7.37
0.167	6.41	1.167	29.78	2.167	12.57	3.17	7.37
0.250	7.15	1.250	167.14	2.250	11.12	3.25	6.95
0.333	7.15	1.333	167.14	2.333	11.12	3.33	6.95
0.417	8.15	1.417	36.47	2.417	10.02	3.42	6.58
0.500	8.15	1.500	36.47	2.500	10.02	3.50	6.58
0.583	9.58	1.583	23.12	2.583	9.15	3.58	6.25
0.667	9.58	1.667	23.12	2.667	9.15	3.67	6.25
0.750	11.84	1.750	17.69	2.750	8.45	3.75	5.96
0.833	11.84	1.833	17.69	2.833	8.45	3.83	5.96
0.917	16.13	1.917	14.60	2.917	7.87	3.92	5.71
1.000	16.13	2.000	14.60	3.000	7.87	4.00	5.71

Max.Eff.Inten.(mm/hr)=	167.14	342.04
over (min)	5.00	10.00
Storage Coeff. (min)=	4.30 (ii)	6.86 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.23	0.14

				TOTALS
PEAK FLOW	(cms)=	5.38	1.11	6.418 (iii)
TIME TO PEAK	(hrs)=	1.33	1.42	1.33
RUNOFF VOLUME	(mm)=	73.35	58.42	69.61
TOTAL RAINFALL	(mm)=	74.35	74.35	74.35
RUNOFF COEFFICIENT	=	0.99	0.79	0.94

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 84.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0012) |
| 1 + 2 = 3 |
-----

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	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0011):	2.52	0.096	2.33	33.11
+ ID2= 2 (0006):	16.82	6.418	1.33	69.61
=====				
ID = 3 (0012):	19.34	6.428	1.33	64.86

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-----
| ADD HYD ( 0008) |
| 1 + 2 = 3 |
-----

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	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0012):	19.34	6.428	1.33	64.86
+ ID2= 2 (0016):	36.35	1.368	2.17	56.73
=====				
ID = 3 (0008):	55.69	6.835	1.33	59.55

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| CALIB |
| NASHYD ( 0005) |
| ID= 1 DT= 5.0 min |
-----

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Area (ha)=	14.66	Curve Number (CN)=	65.0
Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
U.H. Tp(hrs)=	0.59		

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.41	1.083	29.78	2.083	12.57	3.08	7.37
0.167	6.41	1.167	29.78	2.167	12.57	3.17	7.37
0.250	7.15	1.250	167.14	2.250	11.12	3.25	6.95
0.333	7.15	1.333	167.14	2.333	11.12	3.33	6.95
0.417	8.15	1.417	36.47	2.417	10.02	3.42	6.58
0.500	8.15	1.500	36.47	2.500	10.02	3.50	6.58
0.583	9.58	1.583	23.12	2.583	9.15	3.58	6.25
0.667	9.58	1.667	23.12	2.667	9.15	3.67	6.25
0.750	11.84	1.750	17.69	2.750	8.45	3.75	5.96
0.833	11.84	1.833	17.69	2.833	8.45	3.83	5.96
0.917	16.13	1.917	14.60	2.917	7.87	3.92	5.71
1.000	16.13	2.000	14.60	3.000	7.87	4.00	5.71

Unit Hyd Qpeak (cms)= 0.949

PEAK FLOW (cms)= 0.467 (i)

TIME TO PEAK (hrs)= 2.000

RUNOFF VOLUME (mm)= 23.330

TOTAL RAINFALL (mm)= 74.346

RUNOFF COEFFICIENT = 0.314

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

 | CALIB
 | STANDHYD (0007)
ID= 1 DT= 5.0 min

Area (ha)= 0.41
 Total Imp(%)= 65.00 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.27	0.14
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	52.28	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.41	1.083	29.78	2.083	12.57	3.08	7.37
0.167	6.41	1.167	29.78	2.167	12.57	3.17	7.37
0.250	7.15	1.250	167.14	2.250	11.12	3.25	6.95
0.333	7.15	1.333	167.14	2.333	11.12	3.33	6.95
0.417	8.15	1.417	36.47	2.417	10.02	3.42	6.58
0.500	8.15	1.500	36.47	2.500	10.02	3.50	6.58

0.583	9.58	1.583	23.12	2.583	9.15	3.58	6.25
0.667	9.58	1.667	23.12	2.667	9.15	3.67	6.25
0.750	11.84	1.750	17.69	2.750	8.45	3.75	5.96
0.833	11.84	1.833	17.69	2.833	8.45	3.83	5.96
0.917	16.13	1.917	14.60	2.917	7.87	3.92	5.71
1.000	16.13	2.000	14.60	3.000	7.87	4.00	5.71

Max.Eff.Inten.(mm/hr)= 167.14 354.29
over (min) 5.00 10.00
Storage Coeff. (min)= 1.41 (ii) 5.66 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.33 0.15

TOTALS

PEAK FLOW (cms)= 0.02 0.10 0.119 (iii)
TIME TO PEAK (hrs)= 1.33 1.42 1.33
RUNOFF VOLUME (mm)= 73.35 58.77 60.22
TOTAL RAINFALL (mm)= 74.35 74.35 74.35
RUNOFF COEFFICIENT = 0.99 0.79 0.81

***** 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* = 84.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0009)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0005):	14.66	0.467	2.00	23.33
+ ID2= 2 (0007):	0.41	0.119	1.33	60.22
=====				
ID = 3 (0009):	15.07	0.484	2.00	24.33

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0010)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0008):	55.69	6.835	1.33	59.55
+ ID2= 2 (0009):	15.07	0.484	2.00	24.33
=====				

ID = 3 (0010): 70.76 7.027 1.33 52.05

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

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat

Output filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\0d9ce0d0-39b7-4fa2-a4f2-957460f4c2bd\s

Summary filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\0d9ce0d0-39b7-4fa2-a4f2-957460f4c2bd\s

DATE: 06-29-2026

TIME: 03:39:32

USER:

COMMENTS: _____

** SIMULATION : Run 01 **

| READ STORM |

Filename: C:\Users\dmurchison\AppData\Local\Temp\

Ptotal= 42.00 mm	6e09c52b-96dc-4275-b229-fc5cffc2deb1\40723ce6 Comments: 2 Year 12 Hour AES (Bloor, TRCA)

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	7.14	6.50	2.94	9.75	0.42
0.25	0.42	3.50	7.14	6.75	2.94	10.00	0.42
0.50	0.42	3.75	7.14	7.00	2.94	10.25	0.42
0.75	0.42	4.00	7.14	7.25	1.68	10.50	0.42
1.00	0.42	4.25	19.32	7.50	1.68	10.75	0.42
1.25	0.42	4.50	19.32	7.75	1.68	11.00	0.42
1.50	0.42	4.75	19.32	8.00	1.68	11.25	0.42
1.75	0.42	5.00	19.32	8.25	0.84	11.50	0.42
2.00	0.42	5.25	5.46	8.50	0.84	11.75	0.42
2.25	2.52	5.50	5.46	8.75	0.84	12.00	0.42
2.50	2.52	5.75	5.46	9.00	0.84		
2.75	2.52	6.00	5.46	9.25	0.42		
3.00	2.52	6.25	2.94	9.50	0.42		

CALIB	
NASHYD (0004)	Area (ha)= 6.09 Curve Number (CN)= 77.0
ID= 1 DT= 5.0 min	Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.32

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	2.52	6.250	5.46	9.33	0.42
0.167	0.00	3.250	2.52	6.333	2.94	9.42	0.42
0.250	0.00	3.333	7.14	6.417	2.94	9.50	0.42
0.333	0.42	3.417	7.14	6.500	2.94	9.58	0.42
0.417	0.42	3.500	7.14	6.583	2.94	9.67	0.42
0.500	0.42	3.583	7.14	6.667	2.94	9.75	0.42
0.583	0.42	3.667	7.14	6.750	2.94	9.83	0.42
0.667	0.42	3.750	7.14	6.833	2.94	9.92	0.42
0.750	0.42	3.833	7.14	6.917	2.94	10.00	0.42
0.833	0.42	3.917	7.14	7.000	2.94	10.08	0.42
0.917	0.42	4.000	7.14	7.083	2.94	10.17	0.42
1.000	0.42	4.083	7.14	7.167	2.94	10.25	0.42
1.083	0.42	4.167	7.14	7.250	2.94	10.33	0.42
1.167	0.42	4.250	7.14	7.333	1.68	10.42	0.42
1.250	0.42	4.333	19.32	7.417	1.68	10.50	0.42
1.333	0.42	4.417	19.32	7.500	1.68	10.58	0.42
1.417	0.42	4.500	19.32	7.583	1.68	10.67	0.42

1.500	0.42	4.583	19.32	7.667	1.68	10.75	0.42
1.583	0.42	4.667	19.32	7.750	1.68	10.83	0.42
1.667	0.42	4.750	19.32	7.833	1.68	10.92	0.42
1.750	0.42	4.833	19.32	7.917	1.68	11.00	0.42
1.833	0.42	4.917	19.32	8.000	1.68	11.08	0.42
1.917	0.42	5.000	19.32	8.083	1.68	11.17	0.42
2.000	0.42	5.083	19.32	8.167	1.68	11.25	0.42
2.083	0.42	5.167	19.32	8.250	1.68	11.33	0.42
2.167	0.42	5.250	19.32	8.333	0.84	11.42	0.42
2.250	0.42	5.333	5.46	8.417	0.84	11.50	0.42
2.333	2.52	5.417	5.46	8.500	0.84	11.58	0.42
2.417	2.52	5.500	5.46	8.583	0.84	11.67	0.42
2.500	2.52	5.583	5.46	8.667	0.84	11.75	0.42
2.583	2.52	5.667	5.46	8.750	0.84	11.83	0.42
2.667	2.52	5.750	5.46	8.833	0.84	11.92	0.42
2.750	2.52	5.833	5.46	8.917	0.84	12.00	0.42
2.833	2.52	5.917	5.46	9.000	0.84	12.08	0.42
2.917	2.52	6.000	5.46	9.083	0.84	12.17	0.42
3.000	2.52	6.083	5.46	9.167	0.84	12.25	0.42
3.083	2.52	6.167	5.46	9.250	0.84		

Unit Hyd Qpeak (cms)= 0.727

PEAK FLOW (cms)= 0.106 (i)

TIME TO PEAK (hrs)= 5.333

RUNOFF VOLUME (mm)= 12.125

TOTAL RAINFALL (mm)= 42.000

RUNOFF COEFFICIENT = 0.289

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

CALIB	
STANDHYD (0014)	Area (ha)= 29.18
ID= 1 DT= 5.0 min	Total Imp(%)= 61.00 Dir. Conn.(%)= 52.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	17.80	11.38
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	441.06	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr

0.083	0.00	3.167	2.52	6.250	5.46	9.33	0.42
0.167	0.00	3.250	2.52	6.333	2.94	9.42	0.42
0.250	0.00	3.333	7.14	6.417	2.94	9.50	0.42
0.333	0.42	3.417	7.14	6.500	2.94	9.58	0.42
0.417	0.42	3.500	7.14	6.583	2.94	9.67	0.42
0.500	0.42	3.583	7.14	6.667	2.94	9.75	0.42
0.583	0.42	3.667	7.14	6.750	2.94	9.83	0.42
0.667	0.42	3.750	7.14	6.833	2.94	9.92	0.42
0.750	0.42	3.833	7.14	6.917	2.94	10.00	0.42
0.833	0.42	3.917	7.14	7.000	2.94	10.08	0.42
0.917	0.42	4.000	7.14	7.083	2.94	10.17	0.42
1.000	0.42	4.083	7.14	7.167	2.94	10.25	0.42
1.083	0.42	4.167	7.14	7.250	2.94	10.33	0.42
1.167	0.42	4.250	7.14	7.333	1.68	10.42	0.42
1.250	0.42	4.333	19.32	7.417	1.68	10.50	0.42
1.333	0.42	4.417	19.32	7.500	1.68	10.58	0.42
1.417	0.42	4.500	19.32	7.583	1.68	10.67	0.42
1.500	0.42	4.583	19.32	7.667	1.68	10.75	0.42
1.583	0.42	4.667	19.32	7.750	1.68	10.83	0.42
1.667	0.42	4.750	19.32	7.833	1.68	10.92	0.42
1.750	0.42	4.833	19.32	7.917	1.68	11.00	0.42
1.833	0.42	4.917	19.32	8.000	1.68	11.08	0.42
1.917	0.42	5.000	19.32	8.083	1.68	11.17	0.42
2.000	0.42	5.083	19.32	8.167	1.68	11.25	0.42
2.083	0.42	5.167	19.32	8.250	1.68	11.33	0.42
2.167	0.42	5.250	19.32	8.333	0.84	11.42	0.42
2.250	0.42	5.333	5.46	8.417	0.84	11.50	0.42
2.333	2.52	5.417	5.46	8.500	0.84	11.58	0.42
2.417	2.52	5.500	5.46	8.583	0.84	11.67	0.42
2.500	2.52	5.583	5.46	8.667	0.84	11.75	0.42
2.583	2.52	5.667	5.46	8.750	0.84	11.83	0.42
2.667	2.52	5.750	5.46	8.833	0.84	11.92	0.42
2.750	2.52	5.833	5.46	8.917	0.84	12.00	0.42
2.833	2.52	5.917	5.46	9.000	0.84	12.08	0.42
2.917	2.52	6.000	5.46	9.083	0.84	12.17	0.42
3.000	2.52	6.083	5.46	9.167	0.84	12.25	0.42
3.083	2.52	6.167	5.46	9.250	0.84		

Max.Eff.Inten.(mm/hr)=	19.32	15.72
over (min)	10.00	30.00
Storage Coeff. (min)=	12.01 (ii)	26.81 (ii)
Unit Hyd. Tpeak (min)=	10.00	30.00
Unit Hyd. peak (cms)=	0.10	0.04

TOTALS

PEAK FLOW (cms)=	0.81	0.37	1.162 (iii)
TIME TO PEAK (hrs)=	5.25	5.42	5.25
RUNOFF VOLUME (mm)=	41.00	21.54	31.66
TOTAL RAINFALL (mm)=	42.00	42.00	42.00
RUNOFF COEFFICIENT =	0.98	0.51	0.75

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

ADD HYD (0017)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0014):	29.18	1.162	5.25	31.66
+ ID2= 2 (0004):	6.09	0.106	5.33	12.13
=====				
ID = 3 (0017):	35.27	1.265	5.25	28.29

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0015)	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	0.8140	0.8740
	0.1100	0.4970	1.0580	1.0110
	0.3830	0.6160	1.2550	1.1150
	0.6280	0.7680	1.4530	1.2180
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (0017)	35.270	1.265	5.25	28.29
OUTFLOW: ID= 1 (0015)	35.270	0.383	6.50	28.25

PEAK FLOW REDUCTION [Qout/Qin](%)= 30.24
 TIME SHIFT OF PEAK FLOW (min)= 75.00
 MAXIMUM STORAGE USED (ha.m.)= 0.6159

CALIB			
STANDHYD (0013)	Area (ha)=	1.08	
ID= 1 DT= 5.0 min	Total Imp(%)=	62.00	Dir. Conn.(%)= 10.00
	IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	0.67	0.41
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	84.85	40.00

Mannings n = 0.013 0.250

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	2.52	6.250	5.46	9.33	0.42
0.167	0.00	3.250	2.52	6.333	2.94	9.42	0.42
0.250	0.00	3.333	7.14	6.417	2.94	9.50	0.42
0.333	0.42	3.417	7.14	6.500	2.94	9.58	0.42
0.417	0.42	3.500	7.14	6.583	2.94	9.67	0.42
0.500	0.42	3.583	7.14	6.667	2.94	9.75	0.42
0.583	0.42	3.667	7.14	6.750	2.94	9.83	0.42
0.667	0.42	3.750	7.14	6.833	2.94	9.92	0.42
0.750	0.42	3.833	7.14	6.917	2.94	10.00	0.42
0.833	0.42	3.917	7.14	7.000	2.94	10.08	0.42
0.917	0.42	4.000	7.14	7.083	2.94	10.17	0.42
1.000	0.42	4.083	7.14	7.167	2.94	10.25	0.42
1.083	0.42	4.167	7.14	7.250	2.94	10.33	0.42
1.167	0.42	4.250	7.14	7.333	1.68	10.42	0.42
1.250	0.42	4.333	19.32	7.417	1.68	10.50	0.42
1.333	0.42	4.417	19.32	7.500	1.68	10.58	0.42
1.417	0.42	4.500	19.32	7.583	1.68	10.67	0.42
1.500	0.42	4.583	19.32	7.667	1.68	10.75	0.42
1.583	0.42	4.667	19.32	7.750	1.68	10.83	0.42
1.667	0.42	4.750	19.32	7.833	1.68	10.92	0.42
1.750	0.42	4.833	19.32	7.917	1.68	11.00	0.42
1.833	0.42	4.917	19.32	8.000	1.68	11.08	0.42
1.917	0.42	5.000	19.32	8.083	1.68	11.17	0.42
2.000	0.42	5.083	19.32	8.167	1.68	11.25	0.42
2.083	0.42	5.167	19.32	8.250	1.68	11.33	0.42
2.167	0.42	5.250	19.32	8.333	0.84	11.42	0.42
2.250	0.42	5.333	5.46	8.417	0.84	11.50	0.42
2.333	2.52	5.417	5.46	8.500	0.84	11.58	0.42
2.417	2.52	5.500	5.46	8.583	0.84	11.67	0.42
2.500	2.52	5.583	5.46	8.667	0.84	11.75	0.42
2.583	2.52	5.667	5.46	8.750	0.84	11.83	0.42
2.667	2.52	5.750	5.46	8.833	0.84	11.92	0.42
2.750	2.52	5.833	5.46	8.917	0.84	12.00	0.42
2.833	2.52	5.917	5.46	9.000	0.84	12.08	0.42
2.917	2.52	6.000	5.46	9.083	0.84	12.17	0.42
3.000	2.52	6.083	5.46	9.167	0.84	12.25	0.42
3.083	2.52	6.167	5.46	9.250	0.84		

Max.Eff.Inten.(mm/hr)= 19.32 37.89
over (min) 5.00 15.00
Storage Coeff. (min)= 4.47 (ii) 14.87 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00

Unit Hyd. peak (cms)=	0.23	0.08	
			TOTALS
PEAK FLOW (cms)=	0.01	0.04	0.046 (iii)
TIME TO PEAK (hrs)=	5.08	5.25	5.25
RUNOFF VOLUME (mm)=	41.00	28.38	29.64
TOTAL RAINFALL (mm)=	42.00	42.00	42.00
RUNOFF COEFFICIENT =	0.98	0.68	0.71

***** 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* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0016) |
| 1 + 2 = 3 |
-----
      AREA      QPEAK      TPEAK      R.V.
      (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0013):    1.08    0.046    5.25    29.64
+ ID2= 2 ( 0015):   35.27    0.383    6.50    28.25
=====
ID = 3 ( 0016):   36.35    0.395    6.42    28.30
  
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| NASHYD ( 0011) |
| ID= 1 DT= 5.0 min |
-----
      Area      (ha)= 2.52      Curve Number (CN)= 77.0
      Ia      (mm)= 5.00      # of Linear Res.(N)= 3.00
      U.H. Tp(hrs)= 0.81
  
```

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 | 3.167      2.52 | 6.250      5.46 | 9.33      0.42
0.167      0.00 | 3.250      2.52 | 6.333      2.94 | 9.42      0.42
0.250      0.00 | 3.333      7.14 | 6.417      2.94 | 9.50      0.42
0.333      0.42 | 3.417      7.14 | 6.500      2.94 | 9.58      0.42
0.417      0.42 | 3.500      7.14 | 6.583      2.94 | 9.67      0.42
0.500      0.42 | 3.583      7.14 | 6.667      2.94 | 9.75      0.42
0.583      0.42 | 3.667      7.14 | 6.750      2.94 | 9.83      0.42
  
```

0.667	0.42	3.750	7.14	6.833	2.94	9.92	0.42
0.750	0.42	3.833	7.14	6.917	2.94	10.00	0.42
0.833	0.42	3.917	7.14	7.000	2.94	10.08	0.42
0.917	0.42	4.000	7.14	7.083	2.94	10.17	0.42
1.000	0.42	4.083	7.14	7.167	2.94	10.25	0.42
1.083	0.42	4.167	7.14	7.250	2.94	10.33	0.42
1.167	0.42	4.250	7.14	7.333	1.68	10.42	0.42
1.250	0.42	4.333	19.32	7.417	1.68	10.50	0.42
1.333	0.42	4.417	19.32	7.500	1.68	10.58	0.42
1.417	0.42	4.500	19.32	7.583	1.68	10.67	0.42
1.500	0.42	4.583	19.32	7.667	1.68	10.75	0.42
1.583	0.42	4.667	19.32	7.750	1.68	10.83	0.42
1.667	0.42	4.750	19.32	7.833	1.68	10.92	0.42
1.750	0.42	4.833	19.32	7.917	1.68	11.00	0.42
1.833	0.42	4.917	19.32	8.000	1.68	11.08	0.42
1.917	0.42	5.000	19.32	8.083	1.68	11.17	0.42
2.000	0.42	5.083	19.32	8.167	1.68	11.25	0.42
2.083	0.42	5.167	19.32	8.250	1.68	11.33	0.42
2.167	0.42	5.250	19.32	8.333	0.84	11.42	0.42
2.250	0.42	5.333	5.46	8.417	0.84	11.50	0.42
2.333	2.52	5.417	5.46	8.500	0.84	11.58	0.42
2.417	2.52	5.500	5.46	8.583	0.84	11.67	0.42
2.500	2.52	5.583	5.46	8.667	0.84	11.75	0.42
2.583	2.52	5.667	5.46	8.750	0.84	11.83	0.42
2.667	2.52	5.750	5.46	8.833	0.84	11.92	0.42
2.750	2.52	5.833	5.46	8.917	0.84	12.00	0.42
2.833	2.52	5.917	5.46	9.000	0.84	12.08	0.42
2.917	2.52	6.000	5.46	9.083	0.84	12.17	0.42
3.000	2.52	6.083	5.46	9.167	0.84	12.25	0.42
3.083	2.52	6.167	5.46	9.250	0.84		

Unit Hyd Qpeak (cms)= 0.119

PEAK FLOW (cms)= 0.028 (i)

TIME TO PEAK (hrs)= 5.917

RUNOFF VOLUME (mm)= 12.128

TOTAL RAINFALL (mm)= 42.000

RUNOFF COEFFICIENT = 0.289

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

 | CALIB
 | STANDHYD (0006)
ID= 1 DT= 5.0 min

Area (ha)= 16.82

Total Imp(%)= 90.00 Dir. Conn.(%)= 75.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	15.14	1.68
Dep. Storage	(mm)=	1.00	1.50

Average Slope	(%)=	1.00	2.00
Length	(m)=	334.86	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	2.52	6.250	5.46	9.33	0.42
0.167	0.00	3.250	2.52	6.333	2.94	9.42	0.42
0.250	0.00	3.333	7.14	6.417	2.94	9.50	0.42
0.333	0.42	3.417	7.14	6.500	2.94	9.58	0.42
0.417	0.42	3.500	7.14	6.583	2.94	9.67	0.42
0.500	0.42	3.583	7.14	6.667	2.94	9.75	0.42
0.583	0.42	3.667	7.14	6.750	2.94	9.83	0.42
0.667	0.42	3.750	7.14	6.833	2.94	9.92	0.42
0.750	0.42	3.833	7.14	6.917	2.94	10.00	0.42
0.833	0.42	3.917	7.14	7.000	2.94	10.08	0.42
0.917	0.42	4.000	7.14	7.083	2.94	10.17	0.42
1.000	0.42	4.083	7.14	7.167	2.94	10.25	0.42
1.083	0.42	4.167	7.14	7.250	2.94	10.33	0.42
1.167	0.42	4.250	7.14	7.333	1.68	10.42	0.42
1.250	0.42	4.333	19.32	7.417	1.68	10.50	0.42
1.333	0.42	4.417	19.32	7.500	1.68	10.58	0.42
1.417	0.42	4.500	19.32	7.583	1.68	10.67	0.42
1.500	0.42	4.583	19.32	7.667	1.68	10.75	0.42
1.583	0.42	4.667	19.32	7.750	1.68	10.83	0.42
1.667	0.42	4.750	19.32	7.833	1.68	10.92	0.42
1.750	0.42	4.833	19.32	7.917	1.68	11.00	0.42
1.833	0.42	4.917	19.32	8.000	1.68	11.08	0.42
1.917	0.42	5.000	19.32	8.083	1.68	11.17	0.42
2.000	0.42	5.083	19.32	8.167	1.68	11.25	0.42
2.083	0.42	5.167	19.32	8.250	1.68	11.33	0.42
2.167	0.42	5.250	19.32	8.333	0.84	11.42	0.42
2.250	0.42	5.333	5.46	8.417	0.84	11.50	0.42
2.333	2.52	5.417	5.46	8.500	0.84	11.58	0.42
2.417	2.52	5.500	5.46	8.583	0.84	11.67	0.42
2.500	2.52	5.583	5.46	8.667	0.84	11.75	0.42
2.583	2.52	5.667	5.46	8.750	0.84	11.83	0.42
2.667	2.52	5.750	5.46	8.833	0.84	11.92	0.42
2.750	2.52	5.833	5.46	8.917	0.84	12.00	0.42
2.833	2.52	5.917	5.46	9.000	0.84	12.08	0.42
2.917	2.52	6.000	5.46	9.083	0.84	12.17	0.42
3.000	2.52	6.083	5.46	9.167	0.84	12.25	0.42
3.083	2.52	6.167	5.46	9.250	0.84		

Max.Eff.Inten.(mm/hr)=	19.32	39.79
over (min)	10.00	25.00

Storage Coeff. (min)=	10.18 (ii)	20.39 (ii)
Unit Hyd. Tpeak (min)=	10.00	25.00
Unit Hyd. peak (cms)=	0.11	0.05

TOTALS

PEAK FLOW (cms)=	0.68	0.16	0.833 (iii)
TIME TO PEAK (hrs)=	5.25	5.33	5.25
RUNOFF VOLUME (mm)=	41.00	28.21	37.80
TOTAL RAINFALL (mm)=	42.00	42.00	42.00
RUNOFF COEFFICIENT =	0.98	0.67	0.90

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

CN* = 84.0 Ia = Dep. Storage (Above)

(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.

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

```

-----
| ADD HYD ( 0012) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0011):    2.52    0.028    5.92    12.13
+ ID2= 2 ( 0006):   16.82    0.833    5.25    37.80
=====
ID = 3 ( 0012):   19.34    0.851    5.25    34.46

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0008) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0012):   19.34    0.851    5.25    34.46
+ ID2= 2 ( 0016):   36.35    0.395    6.42    28.30
=====
ID = 3 ( 0008):   55.69    0.994    5.25    30.44

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-----
| CALIB |
| NASHYD ( 0005) |
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 14.66 Curve Number (CN)= 65.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.59

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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	3.167	2.52	6.250	5.46	9.33	0.42
0.167	0.00	3.250	2.52	6.333	2.94	9.42	0.42
0.250	0.00	3.333	7.14	6.417	2.94	9.50	0.42
0.333	0.42	3.417	7.14	6.500	2.94	9.58	0.42
0.417	0.42	3.500	7.14	6.583	2.94	9.67	0.42
0.500	0.42	3.583	7.14	6.667	2.94	9.75	0.42
0.583	0.42	3.667	7.14	6.750	2.94	9.83	0.42
0.667	0.42	3.750	7.14	6.833	2.94	9.92	0.42
0.750	0.42	3.833	7.14	6.917	2.94	10.00	0.42
0.833	0.42	3.917	7.14	7.000	2.94	10.08	0.42
0.917	0.42	4.000	7.14	7.083	2.94	10.17	0.42
1.000	0.42	4.083	7.14	7.167	2.94	10.25	0.42
1.083	0.42	4.167	7.14	7.250	2.94	10.33	0.42
1.167	0.42	4.250	7.14	7.333	1.68	10.42	0.42
1.250	0.42	4.333	19.32	7.417	1.68	10.50	0.42
1.333	0.42	4.417	19.32	7.500	1.68	10.58	0.42
1.417	0.42	4.500	19.32	7.583	1.68	10.67	0.42
1.500	0.42	4.583	19.32	7.667	1.68	10.75	0.42
1.583	0.42	4.667	19.32	7.750	1.68	10.83	0.42
1.667	0.42	4.750	19.32	7.833	1.68	10.92	0.42
1.750	0.42	4.833	19.32	7.917	1.68	11.00	0.42
1.833	0.42	4.917	19.32	8.000	1.68	11.08	0.42
1.917	0.42	5.000	19.32	8.083	1.68	11.17	0.42
2.000	0.42	5.083	19.32	8.167	1.68	11.25	0.42
2.083	0.42	5.167	19.32	8.250	1.68	11.33	0.42
2.167	0.42	5.250	19.32	8.333	0.84	11.42	0.42
2.250	0.42	5.333	5.46	8.417	0.84	11.50	0.42
2.333	2.52	5.417	5.46	8.500	0.84	11.58	0.42
2.417	2.52	5.500	5.46	8.583	0.84	11.67	0.42
2.500	2.52	5.583	5.46	8.667	0.84	11.75	0.42
2.583	2.52	5.667	5.46	8.750	0.84	11.83	0.42
2.667	2.52	5.750	5.46	8.833	0.84	11.92	0.42
2.750	2.52	5.833	5.46	8.917	0.84	12.00	0.42
2.833	2.52	5.917	5.46	9.000	0.84	12.08	0.42
2.917	2.52	6.000	5.46	9.083	0.84	12.17	0.42
3.000	2.52	6.083	5.46	9.167	0.84	12.25	0.42
3.083	2.52	6.167	5.46	9.250	0.84		

Unit Hyd Qpeak (cms)= 0.949

PEAK FLOW (cms)= 0.123 (i)
 TIME TO PEAK (hrs)= 5.583
 RUNOFF VOLUME (mm)= 7.878
 TOTAL RAINFALL (mm)= 42.000
 RUNOFF COEFFICIENT = 0.188

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

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-----
| CALIB |
| STANDHYD ( 0007) |
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 0.41
Total Imp(%)= 65.00 Dir. Conn.(%)= 10.00

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		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.27	0.14
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	52.28	40.00
Mannings n	=	0.013	0.250

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

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----- 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	3.167	2.52	6.250	5.46	9.33	0.42
0.167	0.00	3.250	2.52	6.333	2.94	9.42	0.42
0.250	0.00	3.333	7.14	6.417	2.94	9.50	0.42
0.333	0.42	3.417	7.14	6.500	2.94	9.58	0.42
0.417	0.42	3.500	7.14	6.583	2.94	9.67	0.42
0.500	0.42	3.583	7.14	6.667	2.94	9.75	0.42
0.583	0.42	3.667	7.14	6.750	2.94	9.83	0.42
0.667	0.42	3.750	7.14	6.833	2.94	9.92	0.42
0.750	0.42	3.833	7.14	6.917	2.94	10.00	0.42
0.833	0.42	3.917	7.14	7.000	2.94	10.08	0.42
0.917	0.42	4.000	7.14	7.083	2.94	10.17	0.42
1.000	0.42	4.083	7.14	7.167	2.94	10.25	0.42
1.083	0.42	4.167	7.14	7.250	2.94	10.33	0.42
1.167	0.42	4.250	7.14	7.333	1.68	10.42	0.42
1.250	0.42	4.333	19.32	7.417	1.68	10.50	0.42
1.333	0.42	4.417	19.32	7.500	1.68	10.58	0.42
1.417	0.42	4.500	19.32	7.583	1.68	10.67	0.42
1.500	0.42	4.583	19.32	7.667	1.68	10.75	0.42
1.583	0.42	4.667	19.32	7.750	1.68	10.83	0.42
1.667	0.42	4.750	19.32	7.833	1.68	10.92	0.42
1.750	0.42	4.833	19.32	7.917	1.68	11.00	0.42
1.833	0.42	4.917	19.32	8.000	1.68	11.08	0.42
1.917	0.42	5.000	19.32	8.083	1.68	11.17	0.42
2.000	0.42	5.083	19.32	8.167	1.68	11.25	0.42
2.083	0.42	5.167	19.32	8.250	1.68	11.33	0.42
2.167	0.42	5.250	19.32	8.333	0.84	11.42	0.42
2.250	0.42	5.333	5.46	8.417	0.84	11.50	0.42
2.333	2.52	5.417	5.46	8.500	0.84	11.58	0.42
2.417	2.52	5.500	5.46	8.583	0.84	11.67	0.42

2.500	2.52	5.583	5.46	8.667	0.84	11.75	0.42
2.583	2.52	5.667	5.46	8.750	0.84	11.83	0.42
2.667	2.52	5.750	5.46	8.833	0.84	11.92	0.42
2.750	2.52	5.833	5.46	8.917	0.84	12.00	0.42
2.833	2.52	5.917	5.46	9.000	0.84	12.08	0.42
2.917	2.52	6.000	5.46	9.083	0.84	12.17	0.42
3.000	2.52	6.083	5.46	9.167	0.84	12.25	0.42
3.083	2.52	6.167	5.46	9.250	0.84		

Max.Eff.Inten.(mm/hr)=	19.32	41.21
over (min)	5.00	15.00
Storage Coeff. (min)=	3.34 (ii)	13.40 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.26	0.08

TOTALS

PEAK FLOW (cms)=	0.00	0.02	0.018 (iii)
TIME TO PEAK (hrs)=	4.83	5.25	5.25
RUNOFF VOLUME (mm)=	41.00	28.48	29.71
TOTAL RAINFALL (mm)=	42.00	42.00	42.00
RUNOFF COEFFICIENT =	0.98	0.68	0.71

***** 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* = 84.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0009)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (0005):	14.66	0.123	5.58	7.88
+ ID2= 2 (0007):	0.41	0.018	5.25	29.71
=====				
ID = 3 (0009):	15.07	0.132	5.58	8.47

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0010)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (0008):	55.69	0.994	5.25	30.44

```

+ ID2= 2 ( 0009):    15.07    0.132    5.58    8.47
=====
ID = 3 ( 0010):    70.76    1.108    5.25    25.76

```

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

```

```

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

```

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat

Output filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\85ebb179-b895-4be7-9804-2bf959caf0bc\s

Summary filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\85ebb179-b895-4be7-9804-2bf959caf0bc\s

DATE: 06-29-2026

TIME: 03:39:32

USER:

COMMENTS: _____

```

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

```

READ STORM Ptotal= 54.38 mm	Filename: C:\Users\dmurchison\AppData Local\Temp\ 6e09c52b-96dc-4275-b229-fc5cffc2deb1\00de4d38 Comments: 5 Year 12 Hour AES (Bloor, TRCA)

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	9.25	6.50	3.81	9.75	0.54
0.25	0.54	3.50	9.25	6.75	3.81	10.00	0.54
0.50	0.54	3.75	9.25	7.00	3.81	10.25	0.54
0.75	0.54	4.00	9.25	7.25	2.18	10.50	0.54
1.00	0.54	4.25	25.02	7.50	2.18	10.75	0.54
1.25	0.54	4.50	25.02	7.75	2.18	11.00	0.54
1.50	0.54	4.75	25.02	8.00	2.18	11.25	0.54
1.75	0.54	5.00	25.02	8.25	1.09	11.50	0.54
2.00	0.54	5.25	7.07	8.50	1.09	11.75	0.54
2.25	3.26	5.50	7.07	8.75	1.09	12.00	0.54
2.50	3.26	5.75	7.07	9.00	1.09		
2.75	3.26	6.00	7.07	9.25	0.54		
3.00	3.26	6.25	3.81	9.50	0.54		

CALIB NASHYD (0004) ID= 1 DT= 5.0 min	Area (ha)= 6.09 Ia (mm)= 5.00 U.H. Tp(hrs)= 0.32 Curve Number (CN)= 77.0 # of Linear Res.(N)= 3.00

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	3.167	3.26	6.250	7.07	9.33	0.54
0.167	0.00	3.250	3.26	6.333	3.81	9.42	0.54
0.250	0.00	3.333	9.25	6.417	3.81	9.50	0.54
0.333	0.54	3.417	9.25	6.500	3.81	9.58	0.54
0.417	0.54	3.500	9.25	6.583	3.81	9.67	0.54
0.500	0.54	3.583	9.25	6.667	3.81	9.75	0.54
0.583	0.54	3.667	9.25	6.750	3.81	9.83	0.54
0.667	0.54	3.750	9.25	6.833	3.81	9.92	0.54
0.750	0.54	3.833	9.25	6.917	3.81	10.00	0.54
0.833	0.54	3.917	9.25	7.000	3.81	10.08	0.54
0.917	0.54	4.000	9.25	7.083	3.81	10.17	0.54

1.000	0.54	4.083	9.25	7.167	3.81	10.25	0.54
1.083	0.54	4.167	9.25	7.250	3.81	10.33	0.54
1.167	0.54	4.250	9.25	7.333	2.18	10.42	0.54
1.250	0.54	4.333	25.02	7.417	2.18	10.50	0.54
1.333	0.54	4.417	25.02	7.500	2.18	10.58	0.54
1.417	0.54	4.500	25.02	7.583	2.18	10.67	0.54
1.500	0.54	4.583	25.02	7.667	2.18	10.75	0.54
1.583	0.54	4.667	25.02	7.750	2.18	10.83	0.54
1.667	0.54	4.750	25.02	7.833	2.18	10.92	0.54
1.750	0.54	4.833	25.02	7.917	2.18	11.00	0.54
1.833	0.54	4.917	25.02	8.000	2.18	11.08	0.54
1.917	0.54	5.000	25.02	8.083	2.18	11.17	0.54
2.000	0.54	5.083	25.02	8.167	2.18	11.25	0.54
2.083	0.54	5.167	25.02	8.250	2.18	11.33	0.54
2.167	0.54	5.250	25.02	8.333	1.09	11.42	0.54
2.250	0.54	5.333	7.07	8.417	1.09	11.50	0.54
2.333	3.26	5.417	7.07	8.500	1.09	11.58	0.54
2.417	3.26	5.500	7.07	8.583	1.09	11.67	0.54
2.500	3.26	5.583	7.07	8.667	1.09	11.75	0.54
2.583	3.26	5.667	7.07	8.750	1.09	11.83	0.54
2.667	3.26	5.750	7.07	8.833	1.09	11.92	0.54
2.750	3.26	5.833	7.07	8.917	1.09	12.00	0.54
2.833	3.26	5.917	7.07	9.000	1.09	12.08	0.54
2.917	3.26	6.000	7.07	9.083	1.09	12.17	0.54
3.000	3.26	6.083	7.07	9.167	1.09	12.25	0.54
3.083	3.26	6.167	7.07	9.250	1.09		

Unit Hyd Qpeak (cms)= 0.727

PEAK FLOW (cms)= 0.171 (i)

TIME TO PEAK (hrs)= 5.333

RUNOFF VOLUME (mm)= 19.462

TOTAL RAINFALL (mm)= 54.380

RUNOFF COEFFICIENT = 0.358

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

 | CALIB |
 | STANDHYD (0014) | Area (ha)= 29.18
 | ID= 1 DT= 5.0 min | Total Imp(%)= 61.00 Dir. Conn.(%)= 52.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	17.80	11.38
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	441.06	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.26	6.250	7.07	9.33	0.54
0.167	0.00	3.250	3.26	6.333	3.81	9.42	0.54
0.250	0.00	3.333	9.25	6.417	3.81	9.50	0.54
0.333	0.54	3.417	9.25	6.500	3.81	9.58	0.54
0.417	0.54	3.500	9.25	6.583	3.81	9.67	0.54
0.500	0.54	3.583	9.25	6.667	3.81	9.75	0.54
0.583	0.54	3.667	9.25	6.750	3.81	9.83	0.54
0.667	0.54	3.750	9.25	6.833	3.81	9.92	0.54
0.750	0.54	3.833	9.25	6.917	3.81	10.00	0.54
0.833	0.54	3.917	9.25	7.000	3.81	10.08	0.54
0.917	0.54	4.000	9.25	7.083	3.81	10.17	0.54
1.000	0.54	4.083	9.25	7.167	3.81	10.25	0.54
1.083	0.54	4.167	9.25	7.250	3.81	10.33	0.54
1.167	0.54	4.250	9.25	7.333	2.18	10.42	0.54
1.250	0.54	4.333	25.02	7.417	2.18	10.50	0.54
1.333	0.54	4.417	25.02	7.500	2.18	10.58	0.54
1.417	0.54	4.500	25.02	7.583	2.18	10.67	0.54
1.500	0.54	4.583	25.02	7.667	2.18	10.75	0.54
1.583	0.54	4.667	25.02	7.750	2.18	10.83	0.54
1.667	0.54	4.750	25.02	7.833	2.18	10.92	0.54
1.750	0.54	4.833	25.02	7.917	2.18	11.00	0.54
1.833	0.54	4.917	25.02	8.000	2.18	11.08	0.54
1.917	0.54	5.000	25.02	8.083	2.18	11.17	0.54
2.000	0.54	5.083	25.02	8.167	2.18	11.25	0.54
2.083	0.54	5.167	25.02	8.250	2.18	11.33	0.54
2.167	0.54	5.250	25.02	8.333	1.09	11.42	0.54
2.250	0.54	5.333	7.07	8.417	1.09	11.50	0.54
2.333	3.26	5.417	7.07	8.500	1.09	11.58	0.54
2.417	3.26	5.500	7.07	8.583	1.09	11.67	0.54
2.500	3.26	5.583	7.07	8.667	1.09	11.75	0.54
2.583	3.26	5.667	7.07	8.750	1.09	11.83	0.54
2.667	3.26	5.750	7.07	8.833	1.09	11.92	0.54
2.750	3.26	5.833	7.07	8.917	1.09	12.00	0.54
2.833	3.26	5.917	7.07	9.000	1.09	12.08	0.54
2.917	3.26	6.000	7.07	9.083	1.09	12.17	0.54
3.000	3.26	6.083	7.07	9.167	1.09	12.25	0.54
3.083	3.26	6.167	7.07	9.250	1.09		

Max.Eff.Inten.(mm/hr)=	25.02	22.60
over (min)	10.00	25.00
Storage Coeff. (min)=	10.83 (ii)	23.63 (ii)
Unit Hyd. Tpeak (min)=	10.00	25.00
Unit Hyd. peak (cms)=	0.11	0.05

TOTALS

PEAK FLOW	(cms)=	1.05	0.58	1.615 (iii)
TIME TO PEAK	(hrs)=	5.25	5.33	5.25
RUNOFF VOLUME	(mm)=	53.38	31.55	42.90
TOTAL RAINFALL	(mm)=	54.38	54.38	54.38
RUNOFF COEFFICIENT	=	0.98	0.58	0.79

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

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-----
| ADD HYD ( 0017) |
| 1 + 2 = 3 |
-----

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	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0014):	29.18	1.615	5.25	42.90
+ ID2= 2 (0004):	6.09	0.171	5.33	19.46
=====				
ID = 3 (0017):	35.27	1.782	5.25	38.85

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-----
| RESERVOIR( 0015) |
| IN= 2---> OUT= 1 |
| DT= 5.0 min |
-----

```

OVERFLOW IS OFF

	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.8140	0.8740
	0.1100	0.4970	1.0580	1.0110
	0.3830	0.6160	1.2550	1.1150
	0.6280	0.7680	1.4530	1.2180

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0017)	35.270	1.782	5.25	38.85
OUTFLOW: ID= 1 (0015)	35.270	0.628	6.25	38.82

PEAK FLOW REDUCTION [Qout/Qin](%)= 35.24
 TIME SHIFT OF PEAK FLOW (min)= 60.00
 MAXIMUM STORAGE USED (ha.m.)= 0.7683

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-----
| CALIB |
| STANDHYD ( 0013) |
| ID= 1 DT= 5.0 min |
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Area (ha)=	1.08		
Total Imp(%)=	62.00	Dir. Conn.(%)=	10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.67	0.41
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	84.85	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	3.26	6.250	7.07	9.33	0.54
0.167	0.00	3.250	3.26	6.333	3.81	9.42	0.54
0.250	0.00	3.333	9.25	6.417	3.81	9.50	0.54
0.333	0.54	3.417	9.25	6.500	3.81	9.58	0.54
0.417	0.54	3.500	9.25	6.583	3.81	9.67	0.54
0.500	0.54	3.583	9.25	6.667	3.81	9.75	0.54
0.583	0.54	3.667	9.25	6.750	3.81	9.83	0.54
0.667	0.54	3.750	9.25	6.833	3.81	9.92	0.54
0.750	0.54	3.833	9.25	6.917	3.81	10.00	0.54
0.833	0.54	3.917	9.25	7.000	3.81	10.08	0.54
0.917	0.54	4.000	9.25	7.083	3.81	10.17	0.54
1.000	0.54	4.083	9.25	7.167	3.81	10.25	0.54
1.083	0.54	4.167	9.25	7.250	3.81	10.33	0.54
1.167	0.54	4.250	9.25	7.333	2.18	10.42	0.54
1.250	0.54	4.333	25.02	7.417	2.18	10.50	0.54
1.333	0.54	4.417	25.02	7.500	2.18	10.58	0.54
1.417	0.54	4.500	25.02	7.583	2.18	10.67	0.54
1.500	0.54	4.583	25.02	7.667	2.18	10.75	0.54
1.583	0.54	4.667	25.02	7.750	2.18	10.83	0.54
1.667	0.54	4.750	25.02	7.833	2.18	10.92	0.54
1.750	0.54	4.833	25.02	7.917	2.18	11.00	0.54
1.833	0.54	4.917	25.02	8.000	2.18	11.08	0.54
1.917	0.54	5.000	25.02	8.083	2.18	11.17	0.54
2.000	0.54	5.083	25.02	8.167	2.18	11.25	0.54
2.083	0.54	5.167	25.02	8.250	2.18	11.33	0.54
2.167	0.54	5.250	25.02	8.333	1.09	11.42	0.54
2.250	0.54	5.333	7.07	8.417	1.09	11.50	0.54
2.333	3.26	5.417	7.07	8.500	1.09	11.58	0.54
2.417	3.26	5.500	7.07	8.583	1.09	11.67	0.54
2.500	3.26	5.583	7.07	8.667	1.09	11.75	0.54
2.583	3.26	5.667	7.07	8.750	1.09	11.83	0.54
2.667	3.26	5.750	7.07	8.833	1.09	11.92	0.54
2.750	3.26	5.833	7.07	8.917	1.09	12.00	0.54
2.833	3.26	5.917	7.07	9.000	1.09	12.08	0.54
2.917	3.26	6.000	7.07	9.083	1.09	12.17	0.54
3.000	3.26	6.083	7.07	9.167	1.09	12.25	0.54

3.083 3.26 | 6.167 7.07 | 9.250 1.09 |

Max.Eff.Inten.(mm/hr)= 25.02 52.18
 over (min) 5.00 15.00
Storage Coeff. (min)= 4.03 (ii) 13.18 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.24 0.08

TOTALS

PEAK FLOW (cms)= 0.01 0.06 0.064 (iii)
TIME TO PEAK (hrs)= 5.08 5.25 5.25
RUNOFF VOLUME (mm)= 53.38 39.75 41.11
TOTAL RAINFALL (mm)= 54.38 54.38 54.38
RUNOFF COEFFICIENT = 0.98 0.73 0.76

***** 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* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| ADD HYD (0016) |
1 + 2 = 3
 AREA QPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
ID1= 1 (0013): 1.08 0.064 5.25 41.11
+ ID2= 2 (0015): 35.27 0.628 6.25 38.82
=====

ID = 3 (0016): 36.35 0.648 6.25 38.89

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB
| NASHYD (0011) | Area (ha)= 2.52 Curve Number (CN)= 77.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00

 U.H. Tp(hrs)= 0.81

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	3.167	3.26	6.250	7.07	9.33	0.54

0.167	0.00	3.250	3.26	6.333	3.81	9.42	0.54
0.250	0.00	3.333	9.25	6.417	3.81	9.50	0.54
0.333	0.54	3.417	9.25	6.500	3.81	9.58	0.54
0.417	0.54	3.500	9.25	6.583	3.81	9.67	0.54
0.500	0.54	3.583	9.25	6.667	3.81	9.75	0.54
0.583	0.54	3.667	9.25	6.750	3.81	9.83	0.54
0.667	0.54	3.750	9.25	6.833	3.81	9.92	0.54
0.750	0.54	3.833	9.25	6.917	3.81	10.00	0.54
0.833	0.54	3.917	9.25	7.000	3.81	10.08	0.54
0.917	0.54	4.000	9.25	7.083	3.81	10.17	0.54
1.000	0.54	4.083	9.25	7.167	3.81	10.25	0.54
1.083	0.54	4.167	9.25	7.250	3.81	10.33	0.54
1.167	0.54	4.250	9.25	7.333	2.18	10.42	0.54
1.250	0.54	4.333	25.02	7.417	2.18	10.50	0.54
1.333	0.54	4.417	25.02	7.500	2.18	10.58	0.54
1.417	0.54	4.500	25.02	7.583	2.18	10.67	0.54
1.500	0.54	4.583	25.02	7.667	2.18	10.75	0.54
1.583	0.54	4.667	25.02	7.750	2.18	10.83	0.54
1.667	0.54	4.750	25.02	7.833	2.18	10.92	0.54
1.750	0.54	4.833	25.02	7.917	2.18	11.00	0.54
1.833	0.54	4.917	25.02	8.000	2.18	11.08	0.54
1.917	0.54	5.000	25.02	8.083	2.18	11.17	0.54
2.000	0.54	5.083	25.02	8.167	2.18	11.25	0.54
2.083	0.54	5.167	25.02	8.250	2.18	11.33	0.54
2.167	0.54	5.250	25.02	8.333	1.09	11.42	0.54
2.250	0.54	5.333	7.07	8.417	1.09	11.50	0.54
2.333	3.26	5.417	7.07	8.500	1.09	11.58	0.54
2.417	3.26	5.500	7.07	8.583	1.09	11.67	0.54
2.500	3.26	5.583	7.07	8.667	1.09	11.75	0.54
2.583	3.26	5.667	7.07	8.750	1.09	11.83	0.54
2.667	3.26	5.750	7.07	8.833	1.09	11.92	0.54
2.750	3.26	5.833	7.07	8.917	1.09	12.00	0.54
2.833	3.26	5.917	7.07	9.000	1.09	12.08	0.54
2.917	3.26	6.000	7.07	9.083	1.09	12.17	0.54
3.000	3.26	6.083	7.07	9.167	1.09	12.25	0.54
3.083	3.26	6.167	7.07	9.250	1.09		

Unit Hyd Qpeak (cms)= 0.119

PEAK FLOW (cms)= 0.046 (i)

TIME TO PEAK (hrs)= 5.833

RUNOFF VOLUME (mm)= 19.467

TOTAL RAINFALL (mm)= 54.380

RUNOFF COEFFICIENT = 0.358

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

STANDHYD (0006)	Area (ha)= 16.82	
ID= 1 DT= 5.0 min	Total Imp(%)= 90.00	Dir. Conn.(%)= 75.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	15.14	1.68
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	334.86	40.00
Mannings n =	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	3.26	6.250	7.07	9.33	0.54
0.167	0.00	3.250	3.26	6.333	3.81	9.42	0.54
0.250	0.00	3.333	9.25	6.417	3.81	9.50	0.54
0.333	0.54	3.417	9.25	6.500	3.81	9.58	0.54
0.417	0.54	3.500	9.25	6.583	3.81	9.67	0.54
0.500	0.54	3.583	9.25	6.667	3.81	9.75	0.54
0.583	0.54	3.667	9.25	6.750	3.81	9.83	0.54
0.667	0.54	3.750	9.25	6.833	3.81	9.92	0.54
0.750	0.54	3.833	9.25	6.917	3.81	10.00	0.54
0.833	0.54	3.917	9.25	7.000	3.81	10.08	0.54
0.917	0.54	4.000	9.25	7.083	3.81	10.17	0.54
1.000	0.54	4.083	9.25	7.167	3.81	10.25	0.54
1.083	0.54	4.167	9.25	7.250	3.81	10.33	0.54
1.167	0.54	4.250	9.25	7.333	2.18	10.42	0.54
1.250	0.54	4.333	25.02	7.417	2.18	10.50	0.54
1.333	0.54	4.417	25.02	7.500	2.18	10.58	0.54
1.417	0.54	4.500	25.02	7.583	2.18	10.67	0.54
1.500	0.54	4.583	25.02	7.667	2.18	10.75	0.54
1.583	0.54	4.667	25.02	7.750	2.18	10.83	0.54
1.667	0.54	4.750	25.02	7.833	2.18	10.92	0.54
1.750	0.54	4.833	25.02	7.917	2.18	11.00	0.54
1.833	0.54	4.917	25.02	8.000	2.18	11.08	0.54
1.917	0.54	5.000	25.02	8.083	2.18	11.17	0.54
2.000	0.54	5.083	25.02	8.167	2.18	11.25	0.54
2.083	0.54	5.167	25.02	8.250	2.18	11.33	0.54
2.167	0.54	5.250	25.02	8.333	1.09	11.42	0.54
2.250	0.54	5.333	7.07	8.417	1.09	11.50	0.54
2.333	3.26	5.417	7.07	8.500	1.09	11.58	0.54
2.417	3.26	5.500	7.07	8.583	1.09	11.67	0.54
2.500	3.26	5.583	7.07	8.667	1.09	11.75	0.54
2.583	3.26	5.667	7.07	8.750	1.09	11.83	0.54
2.667	3.26	5.750	7.07	8.833	1.09	11.92	0.54
2.750	3.26	5.833	7.07	8.917	1.09	12.00	0.54
2.833	3.26	5.917	7.07	9.000	1.09	12.08	0.54

2.917	3.26	6.000	7.07	9.083	1.09	12.17	0.54
3.000	3.26	6.083	7.07	9.167	1.09	12.25	0.54
3.083	3.26	6.167	7.07	9.250	1.09		

Max.Eff.Inten.(mm/hr)=	25.02	54.87
over (min)	10.00	20.00
Storage Coeff. (min)=	9.18 (ii)	18.15 (ii)
Unit Hyd. Tpeak (min)=	10.00	20.00
Unit Hyd. peak (cms)=	0.12	0.06

TOTALS

PEAK FLOW (cms)=	0.88	0.23	1.106 (iii)
TIME TO PEAK (hrs)=	5.25	5.25	5.25
RUNOFF VOLUME (mm)=	53.38	39.55	49.92
TOTAL RAINFALL (mm)=	54.38	54.38	54.38
RUNOFF COEFFICIENT =	0.98	0.73	0.92

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 84.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0012)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0011):	2.52	0.046	5.83	19.47
+ ID2= 2 (0006):	16.82	1.106	5.25	49.92
=====				
ID = 3 (0012):	19.34	1.137	5.25	45.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0008)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0012):	19.34	1.137	5.25	45.95
+ ID2= 2 (0016):	36.35	0.648	6.25	38.89
=====				
ID = 3 (0008):	55.69	1.563	5.25	41.34

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB

NASHYD (0005)	Area (ha)= 14.66	Curve Number (CN)= 65.0
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
-----	U.H. Tp(hrs)= 0.59	

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	3.167	3.26	6.250	7.07	9.33	0.54
0.167	0.00	3.250	3.26	6.333	3.81	9.42	0.54
0.250	0.00	3.333	9.25	6.417	3.81	9.50	0.54
0.333	0.54	3.417	9.25	6.500	3.81	9.58	0.54
0.417	0.54	3.500	9.25	6.583	3.81	9.67	0.54
0.500	0.54	3.583	9.25	6.667	3.81	9.75	0.54
0.583	0.54	3.667	9.25	6.750	3.81	9.83	0.54
0.667	0.54	3.750	9.25	6.833	3.81	9.92	0.54
0.750	0.54	3.833	9.25	6.917	3.81	10.00	0.54
0.833	0.54	3.917	9.25	7.000	3.81	10.08	0.54
0.917	0.54	4.000	9.25	7.083	3.81	10.17	0.54
1.000	0.54	4.083	9.25	7.167	3.81	10.25	0.54
1.083	0.54	4.167	9.25	7.250	3.81	10.33	0.54
1.167	0.54	4.250	9.25	7.333	2.18	10.42	0.54
1.250	0.54	4.333	25.02	7.417	2.18	10.50	0.54
1.333	0.54	4.417	25.02	7.500	2.18	10.58	0.54
1.417	0.54	4.500	25.02	7.583	2.18	10.67	0.54
1.500	0.54	4.583	25.02	7.667	2.18	10.75	0.54
1.583	0.54	4.667	25.02	7.750	2.18	10.83	0.54
1.667	0.54	4.750	25.02	7.833	2.18	10.92	0.54
1.750	0.54	4.833	25.02	7.917	2.18	11.00	0.54
1.833	0.54	4.917	25.02	8.000	2.18	11.08	0.54
1.917	0.54	5.000	25.02	8.083	2.18	11.17	0.54
2.000	0.54	5.083	25.02	8.167	2.18	11.25	0.54
2.083	0.54	5.167	25.02	8.250	2.18	11.33	0.54
2.167	0.54	5.250	25.02	8.333	1.09	11.42	0.54
2.250	0.54	5.333	7.07	8.417	1.09	11.50	0.54
2.333	3.26	5.417	7.07	8.500	1.09	11.58	0.54
2.417	3.26	5.500	7.07	8.583	1.09	11.67	0.54
2.500	3.26	5.583	7.07	8.667	1.09	11.75	0.54
2.583	3.26	5.667	7.07	8.750	1.09	11.83	0.54
2.667	3.26	5.750	7.07	8.833	1.09	11.92	0.54
2.750	3.26	5.833	7.07	8.917	1.09	12.00	0.54
2.833	3.26	5.917	7.07	9.000	1.09	12.08	0.54
2.917	3.26	6.000	7.07	9.083	1.09	12.17	0.54
3.000	3.26	6.083	7.07	9.167	1.09	12.25	0.54
3.083	3.26	6.167	7.07	9.250	1.09		

Unit Hyd Qpeak (cms)= 0.949

PEAK FLOW (cms)= 0.207 (i)
 TIME TO PEAK (hrs)= 5.583
 RUNOFF VOLUME (mm)= 13.099
 TOTAL RAINFALL (mm)= 54.380
 RUNOFF COEFFICIENT = 0.241

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

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-----
| CALIB |
| STANDHYD ( 0007) |
| ID= 1 DT= 5.0 min |
-----
  
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Area (ha)= 0.41
 Total Imp(%)= 65.00 Dir. Conn.(%)= 10.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.27	0.14
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	52.28	40.00
Mannings n =	0.013	0.250

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

```

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.26	6.250	7.07	9.33	0.54
0.167	0.00	3.250	3.26	6.333	3.81	9.42	0.54
0.250	0.00	3.333	9.25	6.417	3.81	9.50	0.54
0.333	0.54	3.417	9.25	6.500	3.81	9.58	0.54
0.417	0.54	3.500	9.25	6.583	3.81	9.67	0.54
0.500	0.54	3.583	9.25	6.667	3.81	9.75	0.54
0.583	0.54	3.667	9.25	6.750	3.81	9.83	0.54
0.667	0.54	3.750	9.25	6.833	3.81	9.92	0.54
0.750	0.54	3.833	9.25	6.917	3.81	10.00	0.54
0.833	0.54	3.917	9.25	7.000	3.81	10.08	0.54
0.917	0.54	4.000	9.25	7.083	3.81	10.17	0.54
1.000	0.54	4.083	9.25	7.167	3.81	10.25	0.54
1.083	0.54	4.167	9.25	7.250	3.81	10.33	0.54
1.167	0.54	4.250	9.25	7.333	2.18	10.42	0.54
1.250	0.54	4.333	25.02	7.417	2.18	10.50	0.54
1.333	0.54	4.417	25.02	7.500	2.18	10.58	0.54
1.417	0.54	4.500	25.02	7.583	2.18	10.67	0.54
1.500	0.54	4.583	25.02	7.667	2.18	10.75	0.54
1.583	0.54	4.667	25.02	7.750	2.18	10.83	0.54
1.667	0.54	4.750	25.02	7.833	2.18	10.92	0.54
1.750	0.54	4.833	25.02	7.917	2.18	11.00	0.54
1.833	0.54	4.917	25.02	8.000	2.18	11.08	0.54
1.917	0.54	5.000	25.02	8.083	2.18	11.17	0.54

2.000	0.54	5.083	25.02	8.167	2.18	11.25	0.54
2.083	0.54	5.167	25.02	8.250	2.18	11.33	0.54
2.167	0.54	5.250	25.02	8.333	1.09	11.42	0.54
2.250	0.54	5.333	7.07	8.417	1.09	11.50	0.54
2.333	3.26	5.417	7.07	8.500	1.09	11.58	0.54
2.417	3.26	5.500	7.07	8.583	1.09	11.67	0.54
2.500	3.26	5.583	7.07	8.667	1.09	11.75	0.54
2.583	3.26	5.667	7.07	8.750	1.09	11.83	0.54
2.667	3.26	5.750	7.07	8.833	1.09	11.92	0.54
2.750	3.26	5.833	7.07	8.917	1.09	12.00	0.54
2.833	3.26	5.917	7.07	9.000	1.09	12.08	0.54
2.917	3.26	6.000	7.07	9.083	1.09	12.17	0.54
3.000	3.26	6.083	7.07	9.167	1.09	12.25	0.54
3.083	3.26	6.167	7.07	9.250	1.09		

Max.Eff.Inten.(mm/hr)= 25.02 56.73
over (min) 5.00 15.00
Storage Coeff. (min)= 3.01 (ii) 11.87 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.28 0.09

TOTALS

PEAK FLOW (cms)= 0.00 0.02 0.025 (iii)
TIME TO PEAK (hrs)= 4.83 5.25 5.25
RUNOFF VOLUME (mm)= 53.38 39.86 41.19
TOTAL RAINFALL (mm)= 54.38 54.38 54.38
RUNOFF COEFFICIENT = 0.98 0.73 0.76

***** 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* = 84.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0009) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0005):  14.66  0.207  5.58  13.10
+ ID2= 2 ( 0007):   0.41  0.025  5.25  41.19
=====
ID = 3 ( 0009):  15.07  0.220  5.50  13.86

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.


```

-----
| ADD HYD ( 0010) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
      ID1= 1 ( 0008):  55.69    1.563    5.25    41.34
+ ID2= 2 ( 0009):  15.07    0.220    5.50    13.86
=====
      ID = 3 ( 0010):  70.76    1.756    5.25    35.49

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-----
=====
=====
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
000    TTTTT  TTTTT  H    H    Y    Y  M    M    000    TM
O    O    T    T    H    H    Y Y    MM MM  O    O
O    O    T    T    H    H    Y    M    M  O    O
000    T    T    H    H    Y    M    M    000

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat

Output filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\c882cb4f-bc5b-422a-b4c1-865e54d192d2\s

Summary filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\c882cb4f-bc5b-422a-b4c1-865e54d192d2\s

DATE: 06-29-2026

TIME: 03:39:33

USER:

COMMENTS: _____

 ** SIMULATION : Run 03 **

READ STORM Ptotal= 62.71 mm	Filename: C:\Users\dmurchison\AppData Local\Temp\ 6e09c52b-96dc-4275-b229-fc5cffc2deb1\14bc5876 Comments: 10 Year 12 Hour AES (Bloor, TRCA)

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	10.66	6.50	4.39	9.75	0.63
0.25	0.63	3.50	10.66	6.75	4.39	10.00	0.63
0.50	0.63	3.75	10.66	7.00	4.39	10.25	0.63
0.75	0.63	4.00	10.66	7.25	2.51	10.50	0.63
1.00	0.63	4.25	28.84	7.50	2.51	10.75	0.63
1.25	0.63	4.50	28.84	7.75	2.51	11.00	0.63
1.50	0.63	4.75	28.84	8.00	2.51	11.25	0.63
1.75	0.63	5.00	28.84	8.25	1.25	11.50	0.63
2.00	0.63	5.25	8.15	8.50	1.25	11.75	0.63
2.25	3.76	5.50	8.15	8.75	1.25	12.00	0.63
2.50	3.76	5.75	8.15	9.00	1.25		
2.75	3.76	6.00	8.15	9.25	0.63		
3.00	3.76	6.25	4.39	9.50	0.63		

CALIB NASHYD (0004) ID= 1 DT= 5.0 min	Area (ha)= 6.09 Curve Number (CN)= 77.0 Ia (mm)= 5.00 # of Linear Res.(N)= 3.00 U.H. Tp(hrs)= 0.32

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	3.76	6.250	8.15	9.33	0.63
0.167	0.00	3.250	3.76	6.333	4.39	9.42	0.63
0.250	0.00	3.333	10.66	6.417	4.39	9.50	0.63
0.333	0.63	3.417	10.66	6.500	4.39	9.58	0.63
0.417	0.63	3.500	10.66	6.583	4.39	9.67	0.63

0.500	0.63	3.583	10.66	6.667	4.39	9.75	0.63
0.583	0.63	3.667	10.66	6.750	4.39	9.83	0.63
0.667	0.63	3.750	10.66	6.833	4.39	9.92	0.63
0.750	0.63	3.833	10.66	6.917	4.39	10.00	0.63
0.833	0.63	3.917	10.66	7.000	4.39	10.08	0.63
0.917	0.63	4.000	10.66	7.083	4.39	10.17	0.63
1.000	0.63	4.083	10.66	7.167	4.39	10.25	0.63
1.083	0.63	4.167	10.66	7.250	4.39	10.33	0.63
1.167	0.63	4.250	10.66	7.333	2.51	10.42	0.63
1.250	0.63	4.333	28.84	7.417	2.51	10.50	0.63
1.333	0.63	4.417	28.84	7.500	2.51	10.58	0.63
1.417	0.63	4.500	28.84	7.583	2.51	10.67	0.63
1.500	0.63	4.583	28.84	7.667	2.51	10.75	0.63
1.583	0.63	4.667	28.84	7.750	2.51	10.83	0.63
1.667	0.63	4.750	28.84	7.833	2.51	10.92	0.63
1.750	0.63	4.833	28.84	7.917	2.51	11.00	0.63
1.833	0.63	4.917	28.84	8.000	2.51	11.08	0.63
1.917	0.63	5.000	28.84	8.083	2.51	11.17	0.63
2.000	0.63	5.083	28.84	8.167	2.51	11.25	0.63
2.083	0.63	5.167	28.84	8.250	2.51	11.33	0.63
2.167	0.63	5.250	28.84	8.333	1.25	11.42	0.63
2.250	0.63	5.333	8.15	8.417	1.25	11.50	0.63
2.333	3.76	5.417	8.15	8.500	1.25	11.58	0.63
2.417	3.76	5.500	8.15	8.583	1.25	11.67	0.63
2.500	3.76	5.583	8.15	8.667	1.25	11.75	0.63
2.583	3.76	5.667	8.15	8.750	1.25	11.83	0.63
2.667	3.76	5.750	8.15	8.833	1.25	11.92	0.63
2.750	3.76	5.833	8.15	8.917	1.25	12.00	0.63
2.833	3.76	5.917	8.15	9.000	1.25	12.08	0.63
2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
3.083	3.76	6.167	8.15	9.250	1.25		

Unit Hyd Qpeak (cms)= 0.727

PEAK FLOW (cms)= 0.220 (i)

TIME TO PEAK (hrs)= 5.333

RUNOFF VOLUME (mm)= 24.925

TOTAL RAINFALL (mm)= 62.710

RUNOFF COEFFICIENT = 0.397

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

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| CALIB |
| STANDHYD ( 0014) | Area (ha)= 29.18
| ID= 1 DT= 5.0 min | Total Imp(%)= 61.00 Dir. Conn.(%)= 52.00
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IMPERVIOUS PERVIOUS (i)

Surface Area	(ha)=	17.80	11.38
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	441.06	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	3.76	6.250	8.15	9.33	0.63
0.167	0.00	3.250	3.76	6.333	4.39	9.42	0.63
0.250	0.00	3.333	10.66	6.417	4.39	9.50	0.63
0.333	0.63	3.417	10.66	6.500	4.39	9.58	0.63
0.417	0.63	3.500	10.66	6.583	4.39	9.67	0.63
0.500	0.63	3.583	10.66	6.667	4.39	9.75	0.63
0.583	0.63	3.667	10.66	6.750	4.39	9.83	0.63
0.667	0.63	3.750	10.66	6.833	4.39	9.92	0.63
0.750	0.63	3.833	10.66	6.917	4.39	10.00	0.63
0.833	0.63	3.917	10.66	7.000	4.39	10.08	0.63
0.917	0.63	4.000	10.66	7.083	4.39	10.17	0.63
1.000	0.63	4.083	10.66	7.167	4.39	10.25	0.63
1.083	0.63	4.167	10.66	7.250	4.39	10.33	0.63
1.167	0.63	4.250	10.66	7.333	2.51	10.42	0.63
1.250	0.63	4.333	28.84	7.417	2.51	10.50	0.63
1.333	0.63	4.417	28.84	7.500	2.51	10.58	0.63
1.417	0.63	4.500	28.84	7.583	2.51	10.67	0.63
1.500	0.63	4.583	28.84	7.667	2.51	10.75	0.63
1.583	0.63	4.667	28.84	7.750	2.51	10.83	0.63
1.667	0.63	4.750	28.84	7.833	2.51	10.92	0.63
1.750	0.63	4.833	28.84	7.917	2.51	11.00	0.63
1.833	0.63	4.917	28.84	8.000	2.51	11.08	0.63
1.917	0.63	5.000	28.84	8.083	2.51	11.17	0.63
2.000	0.63	5.083	28.84	8.167	2.51	11.25	0.63
2.083	0.63	5.167	28.84	8.250	2.51	11.33	0.63
2.167	0.63	5.250	28.84	8.333	1.25	11.42	0.63
2.250	0.63	5.333	8.15	8.417	1.25	11.50	0.63
2.333	3.76	5.417	8.15	8.500	1.25	11.58	0.63
2.417	3.76	5.500	8.15	8.583	1.25	11.67	0.63
2.500	3.76	5.583	8.15	8.667	1.25	11.75	0.63
2.583	3.76	5.667	8.15	8.750	1.25	11.83	0.63
2.667	3.76	5.750	8.15	8.833	1.25	11.92	0.63
2.750	3.76	5.833	8.15	8.917	1.25	12.00	0.63
2.833	3.76	5.917	8.15	9.000	1.25	12.08	0.63
2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
3.083	3.76	6.167	8.15	9.250	1.25		

Max.Eff.Inten.(mm/hr)=	28.84	27.35	
over (min)	10.00	25.00	
Storage Coeff. (min)=	10.23 (ii)	22.09 (ii)	
Unit Hyd. Tpeak (min)=	10.00	25.00	
Unit Hyd. peak (cms)=	0.11	0.05	
			TOTALS
PEAK FLOW (cms)=	1.21	0.72	1.917 (iii)
TIME TO PEAK (hrs)=	5.25	5.33	5.25
RUNOFF VOLUME (mm)=	61.71	38.62	50.63
TOTAL RAINFALL (mm)=	62.71	62.71	62.71
RUNOFF COEFFICIENT =	0.98	0.62	0.81

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

ADD HYD (0017)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (0014):	29.18	1.917	5.25	50.63
+ ID2= 2 (0004):	6.09	0.220	5.33	24.92
=====				
ID = 3 (0017):	35.27	2.132	5.25	46.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0015)	OVERFLOW IS OFF			
IN= 2---> OUT= 1	OUTFLOW		STORAGE	
DT= 5.0 min	(cms)	(ha.m.)	(cms)	(ha.m.)
	0.0000	0.0000	0.8140	0.8740
	0.1100	0.4970	1.0580	1.0110
	0.3830	0.6160	1.2550	1.1150
	0.6280	0.7680	1.4530	1.2180
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0017)	35.270	2.132	5.25	46.19
OUTFLOW: ID= 1 (0015)	35.270	0.814	6.08	46.16

PEAK FLOW REDUCTION [Qout/Qin](%)= 38.16
 TIME SHIFT OF PEAK FLOW (min)= 50.00
 MAXIMUM STORAGE USED (ha.m.)= 0.8740

 | CALIB |
 | STANDHYD (0013) |
ID= 1 DT= 5.0 min

Area (ha)= 1.08
 Total Imp(%)= 62.00 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.67	0.41
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	84.85	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	'	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	'	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	3.76	'	6.250	8.15	9.33	0.63
0.167	0.00	3.250	3.76	'	6.333	4.39	9.42	0.63
0.250	0.00	3.333	10.66	'	6.417	4.39	9.50	0.63
0.333	0.63	3.417	10.66	'	6.500	4.39	9.58	0.63
0.417	0.63	3.500	10.66	'	6.583	4.39	9.67	0.63
0.500	0.63	3.583	10.66	'	6.667	4.39	9.75	0.63
0.583	0.63	3.667	10.66	'	6.750	4.39	9.83	0.63
0.667	0.63	3.750	10.66	'	6.833	4.39	9.92	0.63
0.750	0.63	3.833	10.66	'	6.917	4.39	10.00	0.63
0.833	0.63	3.917	10.66	'	7.000	4.39	10.08	0.63
0.917	0.63	4.000	10.66	'	7.083	4.39	10.17	0.63
1.000	0.63	4.083	10.66	'	7.167	4.39	10.25	0.63
1.083	0.63	4.167	10.66	'	7.250	4.39	10.33	0.63
1.167	0.63	4.250	10.66	'	7.333	2.51	10.42	0.63
1.250	0.63	4.333	28.84	'	7.417	2.51	10.50	0.63
1.333	0.63	4.417	28.84	'	7.500	2.51	10.58	0.63
1.417	0.63	4.500	28.84	'	7.583	2.51	10.67	0.63
1.500	0.63	4.583	28.84	'	7.667	2.51	10.75	0.63
1.583	0.63	4.667	28.84	'	7.750	2.51	10.83	0.63
1.667	0.63	4.750	28.84	'	7.833	2.51	10.92	0.63
1.750	0.63	4.833	28.84	'	7.917	2.51	11.00	0.63
1.833	0.63	4.917	28.84	'	8.000	2.51	11.08	0.63
1.917	0.63	5.000	28.84	'	8.083	2.51	11.17	0.63
2.000	0.63	5.083	28.84	'	8.167	2.51	11.25	0.63
2.083	0.63	5.167	28.84	'	8.250	2.51	11.33	0.63
2.167	0.63	5.250	28.84	'	8.333	1.25	11.42	0.63
2.250	0.63	5.333	8.15	'	8.417	1.25	11.50	0.63
2.333	3.76	5.417	8.15	'	8.500	1.25	11.58	0.63
2.417	3.76	5.500	8.15	'	8.583	1.25	11.67	0.63
2.500	3.76	5.583	8.15	'	8.667	1.25	11.75	0.63

2.583	3.76	5.667	8.15	8.750	1.25	11.83	0.63
2.667	3.76	5.750	8.15	8.833	1.25	11.92	0.63
2.750	3.76	5.833	8.15	8.917	1.25	12.00	0.63
2.833	3.76	5.917	8.15	9.000	1.25	12.08	0.63
2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
3.083	3.76	6.167	8.15	9.250	1.25		

Max.Eff.Inten.(mm/hr)=	28.84	61.59
over (min)	5.00	15.00
Storage Coeff. (min)=	3.81 (ii)	12.37 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.25	0.08

TOTALS

PEAK FLOW (cms)=	0.01	0.07	0.076 (iii)
TIME TO PEAK (hrs)=	5.08	5.25	5.25
RUNOFF VOLUME (mm)=	61.71	47.57	48.98
TOTAL RAINFALL (mm)=	62.71	62.71	62.71
RUNOFF COEFFICIENT =	0.98	0.76	0.78

***** 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* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0016)				
1 + 2 = 3				

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0013):	1.08	0.076	5.25	48.98
+ ID2= 2 (0015):	35.27	0.814	6.08	46.16
=====				
ID = 3 (0016):	36.35	0.838	6.00	46.24

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0011)			
ID= 1 DT= 5.0 min			

Area	(ha)=	2.52	Curve Number (CN)= 77.0
Ia	(mm)=	5.00	# of Linear Res.(N)= 3.00
U.H. Tp	(hrs)=	0.81	

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	3.167	3.76	6.250	8.15	9.33	0.63
0.167	0.00	3.250	3.76	6.333	4.39	9.42	0.63
0.250	0.00	3.333	10.66	6.417	4.39	9.50	0.63
0.333	0.63	3.417	10.66	6.500	4.39	9.58	0.63
0.417	0.63	3.500	10.66	6.583	4.39	9.67	0.63
0.500	0.63	3.583	10.66	6.667	4.39	9.75	0.63
0.583	0.63	3.667	10.66	6.750	4.39	9.83	0.63
0.667	0.63	3.750	10.66	6.833	4.39	9.92	0.63
0.750	0.63	3.833	10.66	6.917	4.39	10.00	0.63
0.833	0.63	3.917	10.66	7.000	4.39	10.08	0.63
0.917	0.63	4.000	10.66	7.083	4.39	10.17	0.63
1.000	0.63	4.083	10.66	7.167	4.39	10.25	0.63
1.083	0.63	4.167	10.66	7.250	4.39	10.33	0.63
1.167	0.63	4.250	10.66	7.333	2.51	10.42	0.63
1.250	0.63	4.333	28.84	7.417	2.51	10.50	0.63
1.333	0.63	4.417	28.84	7.500	2.51	10.58	0.63
1.417	0.63	4.500	28.84	7.583	2.51	10.67	0.63
1.500	0.63	4.583	28.84	7.667	2.51	10.75	0.63
1.583	0.63	4.667	28.84	7.750	2.51	10.83	0.63
1.667	0.63	4.750	28.84	7.833	2.51	10.92	0.63
1.750	0.63	4.833	28.84	7.917	2.51	11.00	0.63
1.833	0.63	4.917	28.84	8.000	2.51	11.08	0.63
1.917	0.63	5.000	28.84	8.083	2.51	11.17	0.63
2.000	0.63	5.083	28.84	8.167	2.51	11.25	0.63
2.083	0.63	5.167	28.84	8.250	2.51	11.33	0.63
2.167	0.63	5.250	28.84	8.333	1.25	11.42	0.63
2.250	0.63	5.333	8.15	8.417	1.25	11.50	0.63
2.333	3.76	5.417	8.15	8.500	1.25	11.58	0.63
2.417	3.76	5.500	8.15	8.583	1.25	11.67	0.63
2.500	3.76	5.583	8.15	8.667	1.25	11.75	0.63
2.583	3.76	5.667	8.15	8.750	1.25	11.83	0.63
2.667	3.76	5.750	8.15	8.833	1.25	11.92	0.63
2.750	3.76	5.833	8.15	8.917	1.25	12.00	0.63
2.833	3.76	5.917	8.15	9.000	1.25	12.08	0.63
2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
3.083	3.76	6.167	8.15	9.250	1.25		

Unit Hyd Qpeak (cms)= 0.119

PEAK FLOW (cms)= 0.059 (i)

TIME TO PEAK (hrs)= 5.833

RUNOFF VOLUME (mm)= 24.931

TOTAL RAINFALL (mm)= 62.710

RUNOFF COEFFICIENT = 0.398

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

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| CALIB |
| STANDHYD ( 0006) |
| ID= 1 DT= 5.0 min |
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Area (ha)= 16.82
Total Imp(%)= 90.00 Dir. Conn.(%)= 75.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	15.14	1.68
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	334.86	40.00
Mannings n	=	0.013	0.250

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

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----- TRANSFORMED HYETOGRAPH -----

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TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	3.76	6.250	8.15	9.33	0.63
0.167	0.00	3.250	3.76	6.333	4.39	9.42	0.63
0.250	0.00	3.333	10.66	6.417	4.39	9.50	0.63
0.333	0.63	3.417	10.66	6.500	4.39	9.58	0.63
0.417	0.63	3.500	10.66	6.583	4.39	9.67	0.63
0.500	0.63	3.583	10.66	6.667	4.39	9.75	0.63
0.583	0.63	3.667	10.66	6.750	4.39	9.83	0.63
0.667	0.63	3.750	10.66	6.833	4.39	9.92	0.63
0.750	0.63	3.833	10.66	6.917	4.39	10.00	0.63
0.833	0.63	3.917	10.66	7.000	4.39	10.08	0.63
0.917	0.63	4.000	10.66	7.083	4.39	10.17	0.63
1.000	0.63	4.083	10.66	7.167	4.39	10.25	0.63
1.083	0.63	4.167	10.66	7.250	4.39	10.33	0.63
1.167	0.63	4.250	10.66	7.333	2.51	10.42	0.63
1.250	0.63	4.333	28.84	7.417	2.51	10.50	0.63
1.333	0.63	4.417	28.84	7.500	2.51	10.58	0.63
1.417	0.63	4.500	28.84	7.583	2.51	10.67	0.63
1.500	0.63	4.583	28.84	7.667	2.51	10.75	0.63
1.583	0.63	4.667	28.84	7.750	2.51	10.83	0.63
1.667	0.63	4.750	28.84	7.833	2.51	10.92	0.63
1.750	0.63	4.833	28.84	7.917	2.51	11.00	0.63
1.833	0.63	4.917	28.84	8.000	2.51	11.08	0.63
1.917	0.63	5.000	28.84	8.083	2.51	11.17	0.63
2.000	0.63	5.083	28.84	8.167	2.51	11.25	0.63
2.083	0.63	5.167	28.84	8.250	2.51	11.33	0.63
2.167	0.63	5.250	28.84	8.333	1.25	11.42	0.63
2.250	0.63	5.333	8.15	8.417	1.25	11.50	0.63
2.333	3.76	5.417	8.15	8.500	1.25	11.58	0.63

2.417	3.76	5.500	8.15	8.583	1.25	11.67	0.63
2.500	3.76	5.583	8.15	8.667	1.25	11.75	0.63
2.583	3.76	5.667	8.15	8.750	1.25	11.83	0.63
2.667	3.76	5.750	8.15	8.833	1.25	11.92	0.63
2.750	3.76	5.833	8.15	8.917	1.25	12.00	0.63
2.833	3.76	5.917	8.15	9.000	1.25	12.08	0.63
2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
3.083	3.76	6.167	8.15	9.250	1.25		

Max.Eff.Inten.(mm/hr)= 28.84 64.80
over (min) 10.00 20.00
Storage Coeff. (min)= 8.67 (ii) 17.07 (ii)
Unit Hyd. Tpeak (min)= 10.00 20.00
Unit Hyd. peak (cms)= 0.12 0.06

TOTALS

PEAK FLOW (cms)= 1.01 0.28 1.287 (iii)
TIME TO PEAK (hrs)= 5.25 5.25 5.25
RUNOFF VOLUME (mm)= 61.71 47.35 58.12
TOTAL RAINFALL (mm)= 62.71 62.71 62.71
RUNOFF COEFFICIENT = 0.98 0.76 0.93

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 84.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0012) |
| 1 + 2 = 3 |
-----
          AREA    QPEAK    TPEAK    R.V.
          (ha)    (cms)    (hrs)    (mm)
ID1= 1 ( 0011):    2.52    0.059    5.83    24.93
+ ID2= 2 ( 0006):   16.82    1.287    5.25    58.12
=====
ID = 3 ( 0012):   19.34    1.328    5.25    53.80

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0008) |
| 1 + 2 = 3 |
-----
          AREA    QPEAK    TPEAK    R.V.
          (ha)    (cms)    (hrs)    (mm)
ID1= 1 ( 0012):   19.34    1.328    5.25    53.80
+ ID2= 2 ( 0016):   36.35    0.838    6.00    46.24
=====

```

ID = 3 (0008): 55.69 1.942 5.25 48.86

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB |
| NASHYD ( 0005) | Area (ha)= 14.66 Curve Number (CN)= 65.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----|
| U.H. Tp(hrs)= 0.59
```

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 | 3.167 3.76 | 6.250 8.15 | 9.33 0.63
0.167 0.00 | 3.250 3.76 | 6.333 4.39 | 9.42 0.63
0.250 0.00 | 3.333 10.66 | 6.417 4.39 | 9.50 0.63
0.333 0.63 | 3.417 10.66 | 6.500 4.39 | 9.58 0.63
0.417 0.63 | 3.500 10.66 | 6.583 4.39 | 9.67 0.63
0.500 0.63 | 3.583 10.66 | 6.667 4.39 | 9.75 0.63
0.583 0.63 | 3.667 10.66 | 6.750 4.39 | 9.83 0.63
0.667 0.63 | 3.750 10.66 | 6.833 4.39 | 9.92 0.63
0.750 0.63 | 3.833 10.66 | 6.917 4.39 | 10.00 0.63
0.833 0.63 | 3.917 10.66 | 7.000 4.39 | 10.08 0.63
0.917 0.63 | 4.000 10.66 | 7.083 4.39 | 10.17 0.63
1.000 0.63 | 4.083 10.66 | 7.167 4.39 | 10.25 0.63
1.083 0.63 | 4.167 10.66 | 7.250 4.39 | 10.33 0.63
1.167 0.63 | 4.250 10.66 | 7.333 2.51 | 10.42 0.63
1.250 0.63 | 4.333 28.84 | 7.417 2.51 | 10.50 0.63
1.333 0.63 | 4.417 28.84 | 7.500 2.51 | 10.58 0.63
1.417 0.63 | 4.500 28.84 | 7.583 2.51 | 10.67 0.63
1.500 0.63 | 4.583 28.84 | 7.667 2.51 | 10.75 0.63
1.583 0.63 | 4.667 28.84 | 7.750 2.51 | 10.83 0.63
1.667 0.63 | 4.750 28.84 | 7.833 2.51 | 10.92 0.63
1.750 0.63 | 4.833 28.84 | 7.917 2.51 | 11.00 0.63
1.833 0.63 | 4.917 28.84 | 8.000 2.51 | 11.08 0.63
1.917 0.63 | 5.000 28.84 | 8.083 2.51 | 11.17 0.63
2.000 0.63 | 5.083 28.84 | 8.167 2.51 | 11.25 0.63
2.083 0.63 | 5.167 28.84 | 8.250 2.51 | 11.33 0.63
2.167 0.63 | 5.250 28.84 | 8.333 1.25 | 11.42 0.63
2.250 0.63 | 5.333 8.15 | 8.417 1.25 | 11.50 0.63
2.333 3.76 | 5.417 8.15 | 8.500 1.25 | 11.58 0.63
2.417 3.76 | 5.500 8.15 | 8.583 1.25 | 11.67 0.63
2.500 3.76 | 5.583 8.15 | 8.667 1.25 | 11.75 0.63
2.583 3.76 | 5.667 8.15 | 8.750 1.25 | 11.83 0.63
2.667 3.76 | 5.750 8.15 | 8.833 1.25 | 11.92 0.63
2.750 3.76 | 5.833 8.15 | 8.917 1.25 | 12.00 0.63
2.833 3.76 | 5.917 8.15 | 9.000 1.25 | 12.08 0.63
```

2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
3.083	3.76	6.167	8.15	9.250	1.25		

Unit Hyd Qpeak (cms)= 0.949

PEAK FLOW (cms)= 0.273 (i)
 TIME TO PEAK (hrs)= 5.583
 RUNOFF VOLUME (mm)= 17.124
 TOTAL RAINFALL (mm)= 62.710
 RUNOFF COEFFICIENT = 0.273

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

 | CALIB |
 | STANDHYD (0007) | Area (ha)= 0.41
 | ID= 1 DT= 5.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.27	0.14
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	52.28	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	3.76	6.250	8.15	9.33	0.63
0.167	0.00	3.250	3.76	6.333	4.39	9.42	0.63
0.250	0.00	3.333	10.66	6.417	4.39	9.50	0.63
0.333	0.63	3.417	10.66	6.500	4.39	9.58	0.63
0.417	0.63	3.500	10.66	6.583	4.39	9.67	0.63
0.500	0.63	3.583	10.66	6.667	4.39	9.75	0.63
0.583	0.63	3.667	10.66	6.750	4.39	9.83	0.63
0.667	0.63	3.750	10.66	6.833	4.39	9.92	0.63
0.750	0.63	3.833	10.66	6.917	4.39	10.00	0.63
0.833	0.63	3.917	10.66	7.000	4.39	10.08	0.63
0.917	0.63	4.000	10.66	7.083	4.39	10.17	0.63
1.000	0.63	4.083	10.66	7.167	4.39	10.25	0.63
1.083	0.63	4.167	10.66	7.250	4.39	10.33	0.63
1.167	0.63	4.250	10.66	7.333	2.51	10.42	0.63
1.250	0.63	4.333	28.84	7.417	2.51	10.50	0.63
1.333	0.63	4.417	28.84	7.500	2.51	10.58	0.63
1.417	0.63	4.500	28.84	7.583	2.51	10.67	0.63

1.500	0.63	4.583	28.84	7.667	2.51	10.75	0.63
1.583	0.63	4.667	28.84	7.750	2.51	10.83	0.63
1.667	0.63	4.750	28.84	7.833	2.51	10.92	0.63
1.750	0.63	4.833	28.84	7.917	2.51	11.00	0.63
1.833	0.63	4.917	28.84	8.000	2.51	11.08	0.63
1.917	0.63	5.000	28.84	8.083	2.51	11.17	0.63
2.000	0.63	5.083	28.84	8.167	2.51	11.25	0.63
2.083	0.63	5.167	28.84	8.250	2.51	11.33	0.63
2.167	0.63	5.250	28.84	8.333	1.25	11.42	0.63
2.250	0.63	5.333	8.15	8.417	1.25	11.50	0.63
2.333	3.76	5.417	8.15	8.500	1.25	11.58	0.63
2.417	3.76	5.500	8.15	8.583	1.25	11.67	0.63
2.500	3.76	5.583	8.15	8.667	1.25	11.75	0.63
2.583	3.76	5.667	8.15	8.750	1.25	11.83	0.63
2.667	3.76	5.750	8.15	8.833	1.25	11.92	0.63
2.750	3.76	5.833	8.15	8.917	1.25	12.00	0.63
2.833	3.76	5.917	8.15	9.000	1.25	12.08	0.63
2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
3.083	3.76	6.167	8.15	9.250	1.25		

Max.Eff.Inten.(mm/hr)= 28.84 66.94
over (min) 5.00 15.00
Storage Coeff. (min)= 2.85 (ii) 11.13 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.28 0.09

TOTALS

PEAK FLOW (cms)= 0.00 0.03 0.029 (iii)
TIME TO PEAK (hrs)= 4.83 5.25 5.25
RUNOFF VOLUME (mm)= 61.71 47.69 49.07
TOTAL RAINFALL (mm)= 62.71 62.71 62.71
RUNOFF COEFFICIENT = 0.98 0.76 0.78

***** 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* = 84.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| ADD HYD (0009) |
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0005):	14.66	0.273	5.58	17.12

```

+ ID2= 2 ( 0007):      0.41   0.029      5.25   49.07
=====
ID = 3 ( 0009):      15.07   0.288      5.50   17.99

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0010)|
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0008):    55.69    1.942      5.25    48.86
+ ID2= 2 ( 0009):    15.07    0.288      5.50    17.99
=====
ID = 3 ( 0010):    70.76    2.196      5.25    42.29

```

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

000   TTTTT   TTTTT   H   H   Y   Y   M   M   000   TM
0   0   T     T   H   H   Y   Y   MM MM   0   0
0   0   T     T   H   H   Y   M   M   0   0
000   T     T   H   H   Y   M   M   000

```

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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\V02\voin.dat

Output filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\
 e19e7834-c9e9-431e-bfd0-494c9613322a\s

Summary filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\
 e19e7834-c9e9-431e-bfd0-494c9613322a\s

DATE: 06-29-2026

TIME: 03:39:33

USER:

COMMENTS: _____

** SIMULATION : Run 04 **

READ STORM	Filename: C:\Users\dmurchison\AppData Local\Temp\ 6e09c52b-96dc-4275-b229-fc5cffc2deb1\4959937e
Ptotal= 73.10 mm	Comments: 25 Year 12 Hour AES (Bloor, TRCA)

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	12.43	6.50	5.12	9.75	0.73
0.25	0.73	3.50	12.43	6.75	5.12	10.00	0.73
0.50	0.73	3.75	12.43	7.00	5.12	10.25	0.73
0.75	0.73	4.00	12.43	7.25	2.92	10.50	0.73
1.00	0.73	4.25	33.63	7.50	2.92	10.75	0.73
1.25	0.73	4.50	33.63	7.75	2.92	11.00	0.73
1.50	0.73	4.75	33.63	8.00	2.92	11.25	0.73
1.75	0.73	5.00	33.63	8.25	1.46	11.50	0.73
2.00	0.73	5.25	9.50	8.50	1.46	11.75	0.73
2.25	4.39	5.50	9.50	8.75	1.46	12.00	0.73
2.50	4.39	5.75	9.50	9.00	1.46		
2.75	4.39	6.00	9.50	9.25	0.73		
3.00	4.39	6.25	5.12	9.50	0.73		

CALIB	Area (ha)= 6.09	Curve Number (CN)= 77.0
NASHYD (0004)	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)= 0.32	

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	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73
0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73
0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73
1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73
1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73
1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73
1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73
2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73
2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73
2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73
2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73
2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73
2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73
2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

Unit Hyd Qpeak (cms)= 0.727

PEAK FLOW (cms)= 0.284 (i)

TIME TO PEAK (hrs)= 5.333

RUNOFF VOLUME (mm)= 32.202

TOTAL RAINFALL (mm)= 73.100

RUNOFF COEFFICIENT = 0.441

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

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-----
| CALIB |
| STANDHYD ( 0014) |
| ID= 1 DT= 5.0 min |
-----

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```

Area      (ha)= 29.18
Total Imp(%)= 61.00   Dir. Conn.(%)= 52.00

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```

                        IMPERVIOUS      PERVIOUS (i)
Surface Area      (ha)=      17.80      11.38
Dep. Storage      (mm)=      1.00      1.50
Average Slope      (%)=      1.00      2.00
Length            (m)=     441.06     40.00
Mannings n        =      0.013     0.250

```

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

```

----- TRANSFORMED HYETOGRAPH -----

```

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73
0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73
0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73
1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73
1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73
1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73
1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73
2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73
2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73
2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73
2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73
2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73
2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73

2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

Max.Eff.Inten.(mm/hr)= 33.63 33.38
over (min) 10.00 25.00
Storage Coeff. (min)= 9.62 (ii) 20.57 (ii)
Unit Hyd. Tpeak (min)= 10.00 25.00
Unit Hyd. peak (cms)= 0.11 0.05

TOTALS

PEAK FLOW (cms)= 1.42 0.90 2.302 (iii)
TIME TO PEAK (hrs)= 5.25 5.33 5.25
RUNOFF VOLUME (mm)= 72.10 47.71 60.39
TOTAL RAINFALL (mm)= 73.10 73.10 73.10
RUNOFF COEFFICIENT = 0.99 0.65 0.83

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

```

-----
| ADD HYD ( 0017) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0014):  29.18  2.302    5.25    60.39
+ ID2= 2 ( 0004):   6.09  0.284    5.33    32.20
=====
ID = 3 ( 0017):  35.27  2.582    5.25    55.52

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 0015) |
| IN= 2---> OUT= 1 |
| DT= 5.0 min |
-----
          OVERFLOW IS OFF
          OUTFLOW      STORAGE      OUTFLOW      STORAGE
          (cms)      (ha.m.)      (cms)      (ha.m.)
          0.0000      0.0000      0.8140      0.8740
          0.1100      0.4970      1.0580      1.0110
          0.3830      0.6160      1.2550      1.1150
          0.6280      0.7680      1.4530      1.2180

          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)

```

INFLOW : ID= 2 (0017) 35.270 2.582 5.25 55.52
 OUTFLOW: ID= 1 (0015) 35.270 1.057 5.92 55.49

PEAK FLOW REDUCTION [Qout/Qin](%)= 40.96
 TIME SHIFT OF PEAK FLOW (min)= 40.00
 MAXIMUM STORAGE USED (ha.m.)= 1.0108

 | CALIB |
 | STANDHYD (0013) | Area (ha)= 1.08
 | ID= 1 DT= 5.0 min | Total Imp(%)= 62.00 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.67	0.41
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	84.85	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73
0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73
0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73
1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73
1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73
1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73
1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73
2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73

2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73
2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73
2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73
2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73
2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73
2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

Max.Eff.Inten.(mm/hr)= 33.63 73.36
over (min) 5.00 15.00
Storage Coeff. (min)= 3.58 (ii) 11.57 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.26 0.09

TOTALS

PEAK FLOW (cms)= 0.01 0.08 0.091 (iii)
TIME TO PEAK (hrs)= 5.08 5.25 5.25
RUNOFF VOLUME (mm)= 72.10 57.46 58.92
TOTAL RAINFALL (mm)= 73.10 73.10 73.10
RUNOFF COEFFICIENT = 0.99 0.79 0.81

***** 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* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0016) |
| 1 + 2 = 3 |
-----
          AREA    QPEAK    TPEAK    R.V.
          (ha)    (cms)    (hrs)    (mm)
ID1= 1 ( 0013):    1.08    0.091    5.25    58.92
+ ID2= 2 ( 0015):   35.27    1.057    5.92    55.49
=====
ID = 3 ( 0016):   36.35    1.088    5.83    55.59

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0011)	Area (ha)=	2.52	Curve Number (CN)= 77.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
-----	U.H. Tp(hrs)=	0.81	

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	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73
0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73
0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73
1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73
1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73
1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73
1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73
2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73
2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73
2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73
2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73
2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73
2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73
2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

Unit Hyd Qpeak (cms)= 0.119

PEAK FLOW (cms)= 0.077 (i)
 TIME TO PEAK (hrs)= 5.833
 RUNOFF VOLUME (mm)= 32.211
 TOTAL RAINFALL (mm)= 73.100
 RUNOFF COEFFICIENT = 0.441

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

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-----
| CALIB |
| STANDHYD ( 0006) |
| ID= 1 DT= 5.0 min |
-----
  
```

Area (ha)= 16.82
 Total Imp(%)= 90.00 Dir. Conn.(%)= 75.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	15.14	1.68
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	334.86	40.00
Mannings n =	0.013	0.250

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

```

----- TRANSFORMED HYETOGRAPH -----
  
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TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73
0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73
0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73
1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73
1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73
1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73

1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73
2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73
2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73
2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73
2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73
2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73
2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73
2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

Max.Eff.Inten.(mm/hr)= 33.63 77.23
over (min) 10.00 15.00
Storage Coeff. (min)= 8.16 (ii) 13.03 (ii)
Unit Hyd. Tpeak (min)= 10.00 15.00
Unit Hyd. peak (cms)= 0.13 0.08

TOTALS

PEAK FLOW (cms)= 1.18 0.35 1.524 (iii)
TIME TO PEAK (hrs)= 5.25 5.25 5.25
RUNOFF VOLUME (mm)= 72.10 57.22 68.38
TOTAL RAINFALL (mm)= 73.10 73.10 73.10
RUNOFF COEFFICIENT = 0.99 0.78 0.94

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 84.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0012) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0011):    2.52    0.077    5.83    32.21
+ ID2= 2 ( 0006):   16.82    1.524    5.25    68.38
=====
ID = 3 ( 0012):    19.34    1.580    5.25    63.67

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0008)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0012):	19.34	1.580	5.25	63.67
+ ID2= 2 (0016):	36.35	1.088	5.83	55.59
=====				
ID = 3 (0008):	55.69	2.432	5.25	58.40

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
NASHYD (0005)	Area (ha)= 14.66 Curve Number (CN)= 65.0
ID= 1 DT= 5.0 min	Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.59

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	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73
0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73
0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73
1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73
1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73
1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73
1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73
2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73
2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73
2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73

2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73
2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73
2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73
2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

Unit Hyd Qpeak (cms)= 0.949

PEAK FLOW (cms)= 0.363 (i)
TIME TO PEAK (hrs)= 5.583
RUNOFF VOLUME (mm)= 22.636
TOTAL RAINFALL (mm)= 73.100
RUNOFF COEFFICIENT = 0.310

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

| CALIB |
| STANDHYD (0007) | Area (ha)= 0.41
| ID= 1 DT= 5.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.27	0.14
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	52.28	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73
0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73
0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73

1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73
1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73
1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73
1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73
2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73
2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73
2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73
2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73
2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73
2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73
2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

Max.Eff.Inten.(mm/hr)=	33.63	79.71
over (min)	5.00	15.00
Storage Coeff. (min)=	2.68 (ii)	10.40 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.29	0.09

TOTALS

PEAK FLOW (cms)=	0.00	0.03	0.035 (iii)
TIME TO PEAK (hrs)=	4.83	5.25	5.25
RUNOFF VOLUME (mm)=	72.10	57.58	59.02
TOTAL RAINFALL (mm)=	73.10	73.10	73.10
RUNOFF COEFFICIENT =	0.99	0.79	0.81

***** 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* = 84.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0009) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
      ID1= 1 ( 0005):  14.66  0.363  5.58  22.64
+ ID2= 2 ( 0007):    0.41  0.035  5.25  59.02
=====
      ID = 3 ( 0009):  15.07  0.381  5.50  23.63

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0010) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
      ID1= 1 ( 0008):  55.69  2.432  5.25  58.40
+ ID2= 2 ( 0009):    15.07  0.381  5.50  23.63
=====
      ID = 3 ( 0010):  70.76  2.770  5.25  50.99

```

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

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

```

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat

Output filename:
 C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\5112839d-1f85-472e-9506-78a82f60fa89\s

Summary filename:
C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\
5112839d-1f85-472e-9506-78a82f60fa89\s

DATE: 06-29-2026

TIME: 03:39:33

USER:

COMMENTS: _____

** SIMULATION : Run 05 **

READ STORM	Filename: C:\Users\dmurchison\AppData
	ata\Local\Temp\ 6e09c52b-96dc-4275-b229-fc5cffc2deb1\3b18de29
Ptotal= 80.82 mm	Comments: 50 Year 12 Hour AES (Bloor, TRCA)

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	13.74	6.50	5.66	9.75	0.81
0.25	0.81	3.50	13.74	6.75	5.66	10.00	0.81
0.50	0.81	3.75	13.74	7.00	5.66	10.25	0.81
0.75	0.81	4.00	13.74	7.25	3.23	10.50	0.81
1.00	0.81	4.25	37.17	7.50	3.23	10.75	0.81
1.25	0.81	4.50	37.17	7.75	3.23	11.00	0.81
1.50	0.81	4.75	37.17	8.00	3.23	11.25	0.81
1.75	0.81	5.00	37.17	8.25	1.62	11.50	0.81
2.00	0.81	5.25	10.50	8.50	1.62	11.75	0.81
2.25	4.85	5.50	10.50	8.75	1.62	12.00	0.81
2.50	4.85	5.75	10.50	9.00	1.62		
2.75	4.85	6.00	10.50	9.25	0.81		
3.00	4.85	6.25	5.66	9.50	0.81		

CALIB	Area (ha)= 6.09	Curve Number (CN)= 77.0
NASHYD (0004)	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)= 0.32	

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	3.167	4.85	6.250	10.50	9.33	0.81
0.167	0.00	3.250	4.85	6.333	5.66	9.42	0.81
0.250	0.00	3.333	13.74	6.417	5.66	9.50	0.81
0.333	0.81	3.417	13.74	6.500	5.66	9.58	0.81
0.417	0.81	3.500	13.74	6.583	5.66	9.67	0.81
0.500	0.81	3.583	13.74	6.667	5.66	9.75	0.81
0.583	0.81	3.667	13.74	6.750	5.66	9.83	0.81
0.667	0.81	3.750	13.74	6.833	5.66	9.92	0.81
0.750	0.81	3.833	13.74	6.917	5.66	10.00	0.81
0.833	0.81	3.917	13.74	7.000	5.66	10.08	0.81
0.917	0.81	4.000	13.74	7.083	5.66	10.17	0.81
1.000	0.81	4.083	13.74	7.167	5.66	10.25	0.81
1.083	0.81	4.167	13.74	7.250	5.66	10.33	0.81
1.167	0.81	4.250	13.74	7.333	3.23	10.42	0.81
1.250	0.81	4.333	37.17	7.417	3.23	10.50	0.81
1.333	0.81	4.417	37.17	7.500	3.23	10.58	0.81
1.417	0.81	4.500	37.17	7.583	3.23	10.67	0.81
1.500	0.81	4.583	37.17	7.667	3.23	10.75	0.81
1.583	0.81	4.667	37.17	7.750	3.23	10.83	0.81
1.667	0.81	4.750	37.17	7.833	3.23	10.92	0.81
1.750	0.81	4.833	37.17	7.917	3.23	11.00	0.81
1.833	0.81	4.917	37.17	8.000	3.23	11.08	0.81
1.917	0.81	5.000	37.17	8.083	3.23	11.17	0.81
2.000	0.81	5.083	37.17	8.167	3.23	11.25	0.81
2.083	0.81	5.167	37.17	8.250	3.23	11.33	0.81
2.167	0.81	5.250	37.17	8.333	1.62	11.42	0.81
2.250	0.81	5.333	10.50	8.417	1.62	11.50	0.81
2.333	4.85	5.417	10.50	8.500	1.62	11.58	0.81
2.417	4.85	5.500	10.50	8.583	1.62	11.67	0.81
2.500	4.85	5.583	10.50	8.667	1.62	11.75	0.81
2.583	4.85	5.667	10.50	8.750	1.62	11.83	0.81
2.667	4.85	5.750	10.50	8.833	1.62	11.92	0.81
2.750	4.85	5.833	10.50	8.917	1.62	12.00	0.81
2.833	4.85	5.917	10.50	9.000	1.62	12.08	0.81
2.917	4.85	6.000	10.50	9.083	1.62	12.17	0.81
3.000	4.85	6.083	10.50	9.167	1.62	12.25	0.81
3.083	4.85	6.167	10.50	9.250	1.62		

Unit Hyd Qpeak (cms)= 0.727

PEAK FLOW (cms)= 0.334 (i)

TIME TO PEAK (hrs)= 5.333

RUNOFF VOLUME (mm)= 37.886

TOTAL RAINFALL (mm)= 80.820
RUNOFF COEFFICIENT = 0.469

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

| CALIB |
| STANDHYD (0014) | Area (ha)= 29.18
| ID= 1 DT= 5.0 min | Total Imp(%)= 61.00 Dir. Conn.(%)= 52.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	17.80	11.38
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	441.06	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	4.85	6.250	10.50	9.33	0.81
0.167	0.00	3.250	4.85	6.333	5.66	9.42	0.81
0.250	0.00	3.333	13.74	6.417	5.66	9.50	0.81
0.333	0.81	3.417	13.74	6.500	5.66	9.58	0.81
0.417	0.81	3.500	13.74	6.583	5.66	9.67	0.81
0.500	0.81	3.583	13.74	6.667	5.66	9.75	0.81
0.583	0.81	3.667	13.74	6.750	5.66	9.83	0.81
0.667	0.81	3.750	13.74	6.833	5.66	9.92	0.81
0.750	0.81	3.833	13.74	6.917	5.66	10.00	0.81
0.833	0.81	3.917	13.74	7.000	5.66	10.08	0.81
0.917	0.81	4.000	13.74	7.083	5.66	10.17	0.81
1.000	0.81	4.083	13.74	7.167	5.66	10.25	0.81
1.083	0.81	4.167	13.74	7.250	5.66	10.33	0.81
1.167	0.81	4.250	13.74	7.333	3.23	10.42	0.81
1.250	0.81	4.333	37.17	7.417	3.23	10.50	0.81
1.333	0.81	4.417	37.17	7.500	3.23	10.58	0.81
1.417	0.81	4.500	37.17	7.583	3.23	10.67	0.81
1.500	0.81	4.583	37.17	7.667	3.23	10.75	0.81
1.583	0.81	4.667	37.17	7.750	3.23	10.83	0.81
1.667	0.81	4.750	37.17	7.833	3.23	10.92	0.81
1.750	0.81	4.833	37.17	7.917	3.23	11.00	0.81
1.833	0.81	4.917	37.17	8.000	3.23	11.08	0.81
1.917	0.81	5.000	37.17	8.083	3.23	11.17	0.81
2.000	0.81	5.083	37.17	8.167	3.23	11.25	0.81
2.083	0.81	5.167	37.17	8.250	3.23	11.33	0.81
2.167	0.81	5.250	37.17	8.333	1.62	11.42	0.81

2.250	0.81	5.333	10.50	8.417	1.62	11.50	0.81
2.333	4.85	5.417	10.50	8.500	1.62	11.58	0.81
2.417	4.85	5.500	10.50	8.583	1.62	11.67	0.81
2.500	4.85	5.583	10.50	8.667	1.62	11.75	0.81
2.583	4.85	5.667	10.50	8.750	1.62	11.83	0.81
2.667	4.85	5.750	10.50	8.833	1.62	11.92	0.81
2.750	4.85	5.833	10.50	8.917	1.62	12.00	0.81
2.833	4.85	5.917	10.50	9.000	1.62	12.08	0.81
2.917	4.85	6.000	10.50	9.083	1.62	12.17	0.81
3.000	4.85	6.083	10.50	9.167	1.62	12.25	0.81
3.083	4.85	6.167	10.50	9.250	1.62		

Max.Eff.Inten.(mm/hr)= 37.17 37.88
over (min) 10.00 20.00
Storage Coeff. (min)= 9.25 (ii) 19.65 (ii)
Unit Hyd. Tpeak (min)= 10.00 20.00
Unit Hyd. peak (cms)= 0.12 0.06

TOTALS

PEAK FLOW (cms)= 1.56 1.05 2.614 (iii)
TIME TO PEAK (hrs)= 5.25 5.25 5.25
RUNOFF VOLUME (mm)= 79.82 54.61 67.72
TOTAL RAINFALL (mm)= 80.82 80.82 80.82
RUNOFF COEFFICIENT = 0.99 0.68 0.84

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

```

-----
| ADD HYD ( 0017) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0014):  29.18  2.614  5.25  67.72
+ ID2= 2 ( 0004):   6.09  0.334  5.33  37.89
=====
ID = 3 ( 0017):  35.27  2.944  5.25  62.57

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 0015) |
| IN= 2---> OUT= 1 |
| DT= 5.0 min |
-----
          OUTFLOW      STORAGE      OUTFLOW      STORAGE
          (cms)      (ha.m.)      (cms)      (ha.m.)
          0.0000      0.0000      |      0.8140      0.8740

```

0.1100	0.4970		1.0580	1.0110
0.3830	0.6160		1.2550	1.1150
0.6280	0.7680		1.4530	1.2180

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0017)	35.270	2.944	5.25	62.57
OUTFLOW: ID= 1 (0015)	35.270	1.255	5.83	62.54

PEAK FLOW REDUCTION [Qout/Qin](%)= 42.62
 TIME SHIFT OF PEAK FLOW (min)= 35.00
 MAXIMUM STORAGE USED (ha.m.)= 1.1154

 | CALIB |
 | STANDHYD (0013) | Area (ha)= 1.08
 | ID= 1 DT= 5.0 min | Total Imp(%)= 62.00 Dir. Conn.(%)= 10.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.67	0.41
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	84.85	40.00
Mannings n =	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	4.85	6.250	10.50	9.33	0.81
0.167	0.00	3.250	4.85	6.333	5.66	9.42	0.81
0.250	0.00	3.333	13.74	6.417	5.66	9.50	0.81
0.333	0.81	3.417	13.74	6.500	5.66	9.58	0.81
0.417	0.81	3.500	13.74	6.583	5.66	9.67	0.81
0.500	0.81	3.583	13.74	6.667	5.66	9.75	0.81
0.583	0.81	3.667	13.74	6.750	5.66	9.83	0.81
0.667	0.81	3.750	13.74	6.833	5.66	9.92	0.81
0.750	0.81	3.833	13.74	6.917	5.66	10.00	0.81
0.833	0.81	3.917	13.74	7.000	5.66	10.08	0.81
0.917	0.81	4.000	13.74	7.083	5.66	10.17	0.81
1.000	0.81	4.083	13.74	7.167	5.66	10.25	0.81
1.083	0.81	4.167	13.74	7.250	5.66	10.33	0.81
1.167	0.81	4.250	13.74	7.333	3.23	10.42	0.81
1.250	0.81	4.333	37.17	7.417	3.23	10.50	0.81
1.333	0.81	4.417	37.17	7.500	3.23	10.58	0.81
1.417	0.81	4.500	37.17	7.583	3.23	10.67	0.81
1.500	0.81	4.583	37.17	7.667	3.23	10.75	0.81

1.583	0.81	4.667	37.17	7.750	3.23	10.83	0.81
1.667	0.81	4.750	37.17	7.833	3.23	10.92	0.81
1.750	0.81	4.833	37.17	7.917	3.23	11.00	0.81
1.833	0.81	4.917	37.17	8.000	3.23	11.08	0.81
1.917	0.81	5.000	37.17	8.083	3.23	11.17	0.81
2.000	0.81	5.083	37.17	8.167	3.23	11.25	0.81
2.083	0.81	5.167	37.17	8.250	3.23	11.33	0.81
2.167	0.81	5.250	37.17	8.333	1.62	11.42	0.81
2.250	0.81	5.333	10.50	8.417	1.62	11.50	0.81
2.333	4.85	5.417	10.50	8.500	1.62	11.58	0.81
2.417	4.85	5.500	10.50	8.583	1.62	11.67	0.81
2.500	4.85	5.583	10.50	8.667	1.62	11.75	0.81
2.583	4.85	5.667	10.50	8.750	1.62	11.83	0.81
2.667	4.85	5.750	10.50	8.833	1.62	11.92	0.81
2.750	4.85	5.833	10.50	8.917	1.62	12.00	0.81
2.833	4.85	5.917	10.50	9.000	1.62	12.08	0.81
2.917	4.85	6.000	10.50	9.083	1.62	12.17	0.81
3.000	4.85	6.083	10.50	9.167	1.62	12.25	0.81
3.083	4.85	6.167	10.50	9.250	1.62		

Max.Eff.Inten.(mm/hr)= 37.17 82.04
over (min) 5.00 15.00
Storage Coeff. (min)= 3.44 (ii) 11.08 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.26 0.09

TOTALS

PEAK FLOW (cms)= 0.01 0.09 0.102 (iii)
TIME TO PEAK (hrs)= 5.08 5.25 5.25
RUNOFF VOLUME (mm)= 79.82 64.87 66.36
TOTAL RAINFALL (mm)= 80.82 80.82 80.82
RUNOFF COEFFICIENT = 0.99 0.80 0.82

***** 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* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| ADD HYD (0016) |
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0013):	1.08	0.102	5.25	66.36
+ ID2= 2 (0015):	35.27	1.255	5.83	62.54

=====

ID = 3 (0016): 36.35 1.292 5.75 62.65

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0011)	Area (ha)=	2.52	Curve Number (CN)= 77.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.81	

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	3.167	4.85	6.250	10.50	9.33	0.81
0.167	0.00	3.250	4.85	6.333	5.66	9.42	0.81
0.250	0.00	3.333	13.74	6.417	5.66	9.50	0.81
0.333	0.81	3.417	13.74	6.500	5.66	9.58	0.81
0.417	0.81	3.500	13.74	6.583	5.66	9.67	0.81
0.500	0.81	3.583	13.74	6.667	5.66	9.75	0.81
0.583	0.81	3.667	13.74	6.750	5.66	9.83	0.81
0.667	0.81	3.750	13.74	6.833	5.66	9.92	0.81
0.750	0.81	3.833	13.74	6.917	5.66	10.00	0.81
0.833	0.81	3.917	13.74	7.000	5.66	10.08	0.81
0.917	0.81	4.000	13.74	7.083	5.66	10.17	0.81
1.000	0.81	4.083	13.74	7.167	5.66	10.25	0.81
1.083	0.81	4.167	13.74	7.250	5.66	10.33	0.81
1.167	0.81	4.250	13.74	7.333	3.23	10.42	0.81
1.250	0.81	4.333	37.17	7.417	3.23	10.50	0.81
1.333	0.81	4.417	37.17	7.500	3.23	10.58	0.81
1.417	0.81	4.500	37.17	7.583	3.23	10.67	0.81
1.500	0.81	4.583	37.17	7.667	3.23	10.75	0.81
1.583	0.81	4.667	37.17	7.750	3.23	10.83	0.81
1.667	0.81	4.750	37.17	7.833	3.23	10.92	0.81
1.750	0.81	4.833	37.17	7.917	3.23	11.00	0.81
1.833	0.81	4.917	37.17	8.000	3.23	11.08	0.81
1.917	0.81	5.000	37.17	8.083	3.23	11.17	0.81
2.000	0.81	5.083	37.17	8.167	3.23	11.25	0.81
2.083	0.81	5.167	37.17	8.250	3.23	11.33	0.81
2.167	0.81	5.250	37.17	8.333	1.62	11.42	0.81
2.250	0.81	5.333	10.50	8.417	1.62	11.50	0.81
2.333	4.85	5.417	10.50	8.500	1.62	11.58	0.81
2.417	4.85	5.500	10.50	8.583	1.62	11.67	0.81
2.500	4.85	5.583	10.50	8.667	1.62	11.75	0.81
2.583	4.85	5.667	10.50	8.750	1.62	11.83	0.81
2.667	4.85	5.750	10.50	8.833	1.62	11.92	0.81
2.750	4.85	5.833	10.50	8.917	1.62	12.00	0.81

2.833	4.85	5.917	10.50	9.000	1.62	12.08	0.81
2.917	4.85	6.000	10.50	9.083	1.62	12.17	0.81
3.000	4.85	6.083	10.50	9.167	1.62	12.25	0.81
3.083	4.85	6.167	10.50	9.250	1.62		

Unit Hyd Qpeak (cms)= 0.119

PEAK FLOW (cms)= 0.090 (i)
 TIME TO PEAK (hrs)= 5.833
 RUNOFF VOLUME (mm)= 37.896
 TOTAL RAINFALL (mm)= 80.820
 RUNOFF COEFFICIENT = 0.469

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

 | CALIB |
 | STANDHYD (0006) | Area (ha)= 16.82
 | ID= 1 DT= 5.0 min | Total Imp(%)= 90.00 Dir. Conn.(%)= 75.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	15.14	1.68
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	334.86	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	4.85	6.250	10.50	9.33	0.81
0.167	0.00	3.250	4.85	6.333	5.66	9.42	0.81
0.250	0.00	3.333	13.74	6.417	5.66	9.50	0.81
0.333	0.81	3.417	13.74	6.500	5.66	9.58	0.81
0.417	0.81	3.500	13.74	6.583	5.66	9.67	0.81
0.500	0.81	3.583	13.74	6.667	5.66	9.75	0.81
0.583	0.81	3.667	13.74	6.750	5.66	9.83	0.81
0.667	0.81	3.750	13.74	6.833	5.66	9.92	0.81
0.750	0.81	3.833	13.74	6.917	5.66	10.00	0.81
0.833	0.81	3.917	13.74	7.000	5.66	10.08	0.81
0.917	0.81	4.000	13.74	7.083	5.66	10.17	0.81
1.000	0.81	4.083	13.74	7.167	5.66	10.25	0.81
1.083	0.81	4.167	13.74	7.250	5.66	10.33	0.81
1.167	0.81	4.250	13.74	7.333	3.23	10.42	0.81
1.250	0.81	4.333	37.17	7.417	3.23	10.50	0.81
1.333	0.81	4.417	37.17	7.500	3.23	10.58	0.81

1.417	0.81	4.500	37.17	7.583	3.23	10.67	0.81
1.500	0.81	4.583	37.17	7.667	3.23	10.75	0.81
1.583	0.81	4.667	37.17	7.750	3.23	10.83	0.81
1.667	0.81	4.750	37.17	7.833	3.23	10.92	0.81
1.750	0.81	4.833	37.17	7.917	3.23	11.00	0.81
1.833	0.81	4.917	37.17	8.000	3.23	11.08	0.81
1.917	0.81	5.000	37.17	8.083	3.23	11.17	0.81
2.000	0.81	5.083	37.17	8.167	3.23	11.25	0.81
2.083	0.81	5.167	37.17	8.250	3.23	11.33	0.81
2.167	0.81	5.250	37.17	8.333	1.62	11.42	0.81
2.250	0.81	5.333	10.50	8.417	1.62	11.50	0.81
2.333	4.85	5.417	10.50	8.500	1.62	11.58	0.81
2.417	4.85	5.500	10.50	8.583	1.62	11.67	0.81
2.500	4.85	5.583	10.50	8.667	1.62	11.75	0.81
2.583	4.85	5.667	10.50	8.750	1.62	11.83	0.81
2.667	4.85	5.750	10.50	8.833	1.62	11.92	0.81
2.750	4.85	5.833	10.50	8.917	1.62	12.00	0.81
2.833	4.85	5.917	10.50	9.000	1.62	12.08	0.81
2.917	4.85	6.000	10.50	9.083	1.62	12.17	0.81
3.000	4.85	6.083	10.50	9.167	1.62	12.25	0.81
3.083	4.85	6.167	10.50	9.250	1.62		

Max.Eff.Inten.(mm/hr)= 37.17 86.39
over (min) 10.00 15.00
Storage Coeff. (min)= 7.84 (ii) 12.52 (ii)
Unit Hyd. Tpeak (min)= 10.00 15.00
Unit Hyd. peak (cms)= 0.13 0.08

TOTALS

PEAK FLOW (cms)= 1.30 0.39 1.692 (iii)
TIME TO PEAK (hrs)= 5.25 5.25 5.25
RUNOFF VOLUME (mm)= 79.82 64.63 76.02
TOTAL RAINFALL (mm)= 80.82 80.82 80.82
RUNOFF COEFFICIENT = 0.99 0.80 0.94

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 84.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| ADD HYD (0012) |
1 + 2 = 3
ID1= 1 (0011): 2.52 0.090 5.83 37.90
+ ID2= 2 (0006): 16.82 1.692 5.25 76.02
=====

ID = 3 (0012): 19.34 1.758 5.25 71.05

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 0008) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0012): 19.34 1.758 5.25 71.05
+ ID2= 2 ( 0016): 36.35 1.292 5.75 62.65
=====
ID = 3 ( 0008): 55.69 2.817 5.25 65.57
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| NASHYD ( 0005) |
| ID= 1 DT= 5.0 min |
-----
          Area      (ha)= 14.66      Curve Number (CN)= 65.0
          Ia      (mm)= 5.00      # of Linear Res.(N)= 3.00
          U.H. Tp(hrs)= 0.59
```

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 | 3.167    4.85 | 6.250   10.50 | 9.33     0.81
0.167    0.00 | 3.250    4.85 | 6.333    5.66 | 9.42     0.81
0.250    0.00 | 3.333   13.74 | 6.417    5.66 | 9.50     0.81
0.333    0.81 | 3.417   13.74 | 6.500    5.66 | 9.58     0.81
0.417    0.81 | 3.500   13.74 | 6.583    5.66 | 9.67     0.81
0.500    0.81 | 3.583   13.74 | 6.667    5.66 | 9.75     0.81
0.583    0.81 | 3.667   13.74 | 6.750    5.66 | 9.83     0.81
0.667    0.81 | 3.750   13.74 | 6.833    5.66 | 9.92     0.81
0.750    0.81 | 3.833   13.74 | 6.917    5.66 | 10.00    0.81
0.833    0.81 | 3.917   13.74 | 7.000    5.66 | 10.08    0.81
0.917    0.81 | 4.000   13.74 | 7.083    5.66 | 10.17    0.81
1.000    0.81 | 4.083   13.74 | 7.167    5.66 | 10.25    0.81
1.083    0.81 | 4.167   13.74 | 7.250    5.66 | 10.33    0.81
1.167    0.81 | 4.250   13.74 | 7.333    3.23 | 10.42    0.81
1.250    0.81 | 4.333   37.17 | 7.417    3.23 | 10.50    0.81
1.333    0.81 | 4.417   37.17 | 7.500    3.23 | 10.58    0.81
1.417    0.81 | 4.500   37.17 | 7.583    3.23 | 10.67    0.81
1.500    0.81 | 4.583   37.17 | 7.667    3.23 | 10.75    0.81
1.583    0.81 | 4.667   37.17 | 7.750    3.23 | 10.83    0.81
1.667    0.81 | 4.750   37.17 | 7.833    3.23 | 10.92    0.81
1.750    0.81 | 4.833   37.17 | 7.917    3.23 | 11.00    0.81
1.833    0.81 | 4.917   37.17 | 8.000    3.23 | 11.08    0.81
```

1.917	0.81	5.000	37.17	8.083	3.23	11.17	0.81
2.000	0.81	5.083	37.17	8.167	3.23	11.25	0.81
2.083	0.81	5.167	37.17	8.250	3.23	11.33	0.81
2.167	0.81	5.250	37.17	8.333	1.62	11.42	0.81
2.250	0.81	5.333	10.50	8.417	1.62	11.50	0.81
2.333	4.85	5.417	10.50	8.500	1.62	11.58	0.81
2.417	4.85	5.500	10.50	8.583	1.62	11.67	0.81
2.500	4.85	5.583	10.50	8.667	1.62	11.75	0.81
2.583	4.85	5.667	10.50	8.750	1.62	11.83	0.81
2.667	4.85	5.750	10.50	8.833	1.62	11.92	0.81
2.750	4.85	5.833	10.50	8.917	1.62	12.00	0.81
2.833	4.85	5.917	10.50	9.000	1.62	12.08	0.81
2.917	4.85	6.000	10.50	9.083	1.62	12.17	0.81
3.000	4.85	6.083	10.50	9.167	1.62	12.25	0.81
3.083	4.85	6.167	10.50	9.250	1.62		

Unit Hyd Qpeak (cms)= 0.949

PEAK FLOW (cms)= 0.435 (i)
TIME TO PEAK (hrs)= 5.583
RUNOFF VOLUME (mm)= 27.040
TOTAL RAINFALL (mm)= 80.820
RUNOFF COEFFICIENT = 0.335

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

| CALIB |
| STANDHYD (0007) | Area (ha)= 0.41
| ID= 1 DT= 5.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.27	0.14
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	52.28	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	4.85	6.250	10.50	9.33	0.81
0.167	0.00	3.250	4.85	6.333	5.66	9.42	0.81
0.250	0.00	3.333	13.74	6.417	5.66	9.50	0.81
0.333	0.81	3.417	13.74	6.500	5.66	9.58	0.81
0.417	0.81	3.500	13.74	6.583	5.66	9.67	0.81

0.500	0.81	3.583	13.74	6.667	5.66	9.75	0.81
0.583	0.81	3.667	13.74	6.750	5.66	9.83	0.81
0.667	0.81	3.750	13.74	6.833	5.66	9.92	0.81
0.750	0.81	3.833	13.74	6.917	5.66	10.00	0.81
0.833	0.81	3.917	13.74	7.000	5.66	10.08	0.81
0.917	0.81	4.000	13.74	7.083	5.66	10.17	0.81
1.000	0.81	4.083	13.74	7.167	5.66	10.25	0.81
1.083	0.81	4.167	13.74	7.250	5.66	10.33	0.81
1.167	0.81	4.250	13.74	7.333	3.23	10.42	0.81
1.250	0.81	4.333	37.17	7.417	3.23	10.50	0.81
1.333	0.81	4.417	37.17	7.500	3.23	10.58	0.81
1.417	0.81	4.500	37.17	7.583	3.23	10.67	0.81
1.500	0.81	4.583	37.17	7.667	3.23	10.75	0.81
1.583	0.81	4.667	37.17	7.750	3.23	10.83	0.81
1.667	0.81	4.750	37.17	7.833	3.23	10.92	0.81
1.750	0.81	4.833	37.17	7.917	3.23	11.00	0.81
1.833	0.81	4.917	37.17	8.000	3.23	11.08	0.81
1.917	0.81	5.000	37.17	8.083	3.23	11.17	0.81
2.000	0.81	5.083	37.17	8.167	3.23	11.25	0.81
2.083	0.81	5.167	37.17	8.250	3.23	11.33	0.81
2.167	0.81	5.250	37.17	8.333	1.62	11.42	0.81
2.250	0.81	5.333	10.50	8.417	1.62	11.50	0.81
2.333	4.85	5.417	10.50	8.500	1.62	11.58	0.81
2.417	4.85	5.500	10.50	8.583	1.62	11.67	0.81
2.500	4.85	5.583	10.50	8.667	1.62	11.75	0.81
2.583	4.85	5.667	10.50	8.750	1.62	11.83	0.81
2.667	4.85	5.750	10.50	8.833	1.62	11.92	0.81
2.750	4.85	5.833	10.50	8.917	1.62	12.00	0.81
2.833	4.85	5.917	10.50	9.000	1.62	12.08	0.81
2.917	4.85	6.000	10.50	9.083	1.62	12.17	0.81
3.000	4.85	6.083	10.50	9.167	1.62	12.25	0.81
3.083	4.85	6.167	10.50	9.250	1.62		

Max.Eff.Inten.(mm/hr)=	37.17	89.13
over (min)	5.00	10.00
Storage Coeff. (min)=	2.57 (ii)	9.96 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.29	0.11

TOTALS

PEAK FLOW (cms)=	0.00	0.03	0.039 (iii)
TIME TO PEAK (hrs)=	4.83	5.25	5.25
RUNOFF VOLUME (mm)=	79.82	65.00	66.46
TOTAL RAINFALL (mm)=	80.82	80.82	80.82
RUNOFF COEFFICIENT =	0.99	0.80	0.82

***** 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* = 84.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-----
| ADD HYD ( 0009) |
| 1 + 2 = 3       |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0005):   14.66   0.435   5.58   27.04
+ ID2= 2 ( 0007):    0.41   0.039   5.25   66.46
=====
ID = 3 ( 0009):   15.07   0.452   5.50   28.11

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NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-----
| ADD HYD ( 0010) |
| 1 + 2 = 3       |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0008):   55.69   2.817   5.25   65.57
+ ID2= 2 ( 0009):   15.07   0.452   5.50   28.11
=====
ID = 3 ( 0010):   70.76   3.223   5.25   57.59

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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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

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat

Output filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\7d5a1275-5215-416c-bf0b-fa55b3cf566f\s

Summary filename:

C:\Users\dmurchison\AppData\Local\Civica\XH5\0cc5ca0d-5312-4c5c-bd32-a2bb6396c368\7d5a1275-5215-416c-bf0b-fa55b3cf566f\s

DATE: 06-29-2026

TIME: 03:39:33

USER:

COMMENTS: _____

** SIMULATION : Run 06 **

READ STORM	Filename: C:\Users\dmurchison\AppData\Local\Temp\6e09c52b-96dc-4275-b229-fc5cffc2deb1\3b75bb9f
Ptotal= 88.54 mm	Comments: 100 Year 12 Hour AES (Bloor, TRCA)

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	15.05	6.50	6.20	9.75	0.89
0.25	0.89	3.50	15.05	6.75	6.20	10.00	0.89
0.50	0.89	3.75	15.05	7.00	6.20	10.25	0.89
0.75	0.89	4.00	15.05	7.25	3.54	10.50	0.89
1.00	0.89	4.25	40.71	7.50	3.54	10.75	0.89
1.25	0.89	4.50	40.71	7.75	3.54	11.00	0.89
1.50	0.89	4.75	40.71	8.00	3.54	11.25	0.89
1.75	0.89	5.00	40.71	8.25	1.77	11.50	0.89
2.00	0.89	5.25	11.51	8.50	1.77	11.75	0.89
2.25	5.31	5.50	11.51	8.75	1.77	12.00	0.89
2.50	5.31	5.75	11.51	9.00	1.77		
2.75	5.31	6.00	11.51	9.25	0.89		
3.00	5.31	6.25	6.20	9.50	0.89		

CALIB			
NASHYD (0004)	Area (ha)= 6.09	Curve Number (CN)= 77.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
-----	U.H. Tp(hrs)= 0.32		

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

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	5.31	6.250	11.51	9.33	0.89
0.167	0.00	3.250	5.31	6.333	6.20	9.42	0.89
0.250	0.00	3.333	15.05	6.417	6.20	9.50	0.89
0.333	0.89	3.417	15.05	6.500	6.20	9.58	0.89
0.417	0.89	3.500	15.05	6.583	6.20	9.67	0.89
0.500	0.89	3.583	15.05	6.667	6.20	9.75	0.89
0.583	0.89	3.667	15.05	6.750	6.20	9.83	0.89
0.667	0.89	3.750	15.05	6.833	6.20	9.92	0.89
0.750	0.89	3.833	15.05	6.917	6.20	10.00	0.89
0.833	0.89	3.917	15.05	7.000	6.20	10.08	0.89
0.917	0.89	4.000	15.05	7.083	6.20	10.17	0.89
1.000	0.89	4.083	15.05	7.167	6.20	10.25	0.89
1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89
1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89
1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89
1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89
1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89
1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89
1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89
1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89
1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89
1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89
1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89
2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89
2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89
2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89
2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89
3.083	5.31	6.167	11.51	9.250	1.77		

Unit Hyd Qpeak (cms)= 0.727

PEAK FLOW (cms)= 0.385 (i)

TIME TO PEAK (hrs)= 5.333

RUNOFF VOLUME (mm)= 43.766

TOTAL RAINFALL (mm)= 88.540

RUNOFF COEFFICIENT = 0.494

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

| CALIB |
| STANDHYD (0014) | Area (ha)= 29.18
| ID= 1 DT= 5.0 min | Total Imp(%)= 61.00 Dir. Conn.(%)= 52.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	17.80	11.38
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	441.06	40.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	5.31	6.250	11.51	9.33	0.89
0.167	0.00	3.250	5.31	6.333	6.20	9.42	0.89
0.250	0.00	3.333	15.05	6.417	6.20	9.50	0.89
0.333	0.89	3.417	15.05	6.500	6.20	9.58	0.89
0.417	0.89	3.500	15.05	6.583	6.20	9.67	0.89
0.500	0.89	3.583	15.05	6.667	6.20	9.75	0.89
0.583	0.89	3.667	15.05	6.750	6.20	9.83	0.89
0.667	0.89	3.750	15.05	6.833	6.20	9.92	0.89
0.750	0.89	3.833	15.05	6.917	6.20	10.00	0.89
0.833	0.89	3.917	15.05	7.000	6.20	10.08	0.89
0.917	0.89	4.000	15.05	7.083	6.20	10.17	0.89
1.000	0.89	4.083	15.05	7.167	6.20	10.25	0.89
1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89
1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89
1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89
1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89
1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89
1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89
1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89
1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89

1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89
1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89
1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89
2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89
2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89
2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89
2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89
3.083	5.31	6.167	11.51	9.250	1.77		

Max.Eff.Inten.(mm/hr)= 40.71 42.68
over (min) 10.00 20.00
Storage Coeff. (min)= 8.92 (ii) 18.84 (ii)
Unit Hyd. Tpeak (min)= 10.00 20.00
Unit Hyd. peak (cms)= 0.12 0.06

TOTALS

PEAK FLOW (cms)= 1.71 1.19 2.906 (iii)
TIME TO PEAK (hrs)= 5.25 5.25 5.25
RUNOFF VOLUME (mm)= 87.54 61.62 75.10
TOTAL RAINFALL (mm)= 88.54 88.54 88.54
RUNOFF COEFFICIENT = 0.99 0.70 0.85

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

```

-----
| ADD HYD ( 0017) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0014):  29.18  2.906    5.25    75.10
+ ID2= 2 ( 0004):   6.09  0.385    5.33    43.77
=====
ID = 3 ( 0017):  35.27  3.287    5.25    69.69

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-----
| RESERVOIR( 0015) |
| IN= 2---> OUT= 1 |
| DT= 5.0 min      |
-----

```

OVERFLOW IS OFF

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.8140	0.8740
0.1100	0.4970	1.0580	1.0110
0.3830	0.6160	1.2550	1.1150
0.6280	0.7680	1.4530	1.2180

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0017)	35.270	3.287	5.25	69.69
OUTFLOW: ID= 1 (0015)	35.270	1.453	5.75	69.66

PEAK FLOW REDUCTION [Qout/Qin](%)= 44.20
 TIME SHIFT OF PEAK FLOW (min)= 30.00
 MAXIMUM STORAGE USED (ha.m.)= 1.2180

```

-----
| CALIB          |
| STANDHYD ( 0013) |
| ID= 1 DT= 5.0 min |
-----

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Area (ha)= 1.08
 Total Imp(%)= 62.00 Dir. Conn.(%)= 10.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.67	0.41
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	84.85	40.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	5.31	6.250	11.51	9.33	0.89
0.167	0.00	3.250	5.31	6.333	6.20	9.42	0.89
0.250	0.00	3.333	15.05	6.417	6.20	9.50	0.89
0.333	0.89	3.417	15.05	6.500	6.20	9.58	0.89
0.417	0.89	3.500	15.05	6.583	6.20	9.67	0.89
0.500	0.89	3.583	15.05	6.667	6.20	9.75	0.89
0.583	0.89	3.667	15.05	6.750	6.20	9.83	0.89
0.667	0.89	3.750	15.05	6.833	6.20	9.92	0.89
0.750	0.89	3.833	15.05	6.917	6.20	10.00	0.89
0.833	0.89	3.917	15.05	7.000	6.20	10.08	0.89
0.917	0.89	4.000	15.05	7.083	6.20	10.17	0.89
1.000	0.89	4.083	15.05	7.167	6.20	10.25	0.89

1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89
1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89
1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89
1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89
1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89
1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89
1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89
1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89
1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89
1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89
1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89
2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89
2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89
2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89
2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89
3.083	5.31	6.167	11.51	9.250	1.77		

Max.Eff.Inten.(mm/hr)=	40.71	90.69
over (min)	5.00	15.00
Storage Coeff. (min)=	3.32 (ii)	10.66 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.26	0.09

TOTALS

PEAK FLOW (cms)=	0.01	0.10	0.113 (iii)
TIME TO PEAK (hrs)=	5.08	5.25	5.25
RUNOFF VOLUME (mm)=	87.54	72.33	73.85
TOTAL RAINFALL (mm)=	88.54	88.54	88.54
RUNOFF COEFFICIENT =	0.99	0.82	0.83

***** 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* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-----
| ADD HYD ( 0016) |
| 1 + 2 = 3 |
-----
                AREA      QPEAK      TPEAK      R.V.
                (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0013):    1.08    0.113    5.25    73.85
+ ID2= 2 ( 0015):   35.27    1.453    5.75    69.66
=====
ID = 3 ( 0016):    36.35    1.494    5.75    69.78

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-----
| CALIB |
| NASHYD ( 0011) |
| ID= 1 DT= 5.0 min |
-----
Area      (ha)= 2.52   Curve Number (CN)= 77.0
Ia        (mm)= 5.00   # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.81

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

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----- 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	3.167	5.31	6.250	11.51	9.33	0.89
0.167	0.00	3.250	5.31	6.333	6.20	9.42	0.89
0.250	0.00	3.333	15.05	6.417	6.20	9.50	0.89
0.333	0.89	3.417	15.05	6.500	6.20	9.58	0.89
0.417	0.89	3.500	15.05	6.583	6.20	9.67	0.89
0.500	0.89	3.583	15.05	6.667	6.20	9.75	0.89
0.583	0.89	3.667	15.05	6.750	6.20	9.83	0.89
0.667	0.89	3.750	15.05	6.833	6.20	9.92	0.89
0.750	0.89	3.833	15.05	6.917	6.20	10.00	0.89
0.833	0.89	3.917	15.05	7.000	6.20	10.08	0.89
0.917	0.89	4.000	15.05	7.083	6.20	10.17	0.89
1.000	0.89	4.083	15.05	7.167	6.20	10.25	0.89
1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89
1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89
1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89
1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89
1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89
1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89
1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89
1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89
1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89
1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89
1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89
2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89
2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89
2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89
2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89

2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89
3.083	5.31	6.167	11.51	9.250	1.77		

Unit Hyd Qpeak (cms)= 0.119

PEAK FLOW (cms)= 0.105 (i)

TIME TO PEAK (hrs)= 5.750

RUNOFF VOLUME (mm)= 43.779

TOTAL RAINFALL (mm)= 88.540

RUNOFF COEFFICIENT = 0.494

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

CALIB			
STANDHYD (0006)		Area (ha)=	16.82
ID= 1 DT= 5.0 min		Total Imp(%)=	90.00 Dir. Conn.(%)= 75.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	15.14	1.68
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	334.86	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	5.31	6.250	11.51	9.33	0.89
0.167	0.00	3.250	5.31	6.333	6.20	9.42	0.89
0.250	0.00	3.333	15.05	6.417	6.20	9.50	0.89
0.333	0.89	3.417	15.05	6.500	6.20	9.58	0.89
0.417	0.89	3.500	15.05	6.583	6.20	9.67	0.89
0.500	0.89	3.583	15.05	6.667	6.20	9.75	0.89
0.583	0.89	3.667	15.05	6.750	6.20	9.83	0.89
0.667	0.89	3.750	15.05	6.833	6.20	9.92	0.89
0.750	0.89	3.833	15.05	6.917	6.20	10.00	0.89
0.833	0.89	3.917	15.05	7.000	6.20	10.08	0.89

0.917	0.89	4.000	15.05	7.083	6.20	10.17	0.89
1.000	0.89	4.083	15.05	7.167	6.20	10.25	0.89
1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89
1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89
1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89
1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89
1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89
1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89
1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89
1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89
1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89
1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89
1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89
2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89
2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89
2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89
2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89
3.083	5.31	6.167	11.51	9.250	1.77		

Max.Eff.Inten.(mm/hr)= 40.71 95.53
over (min) 10.00 15.00
Storage Coeff. (min)= 7.56 (ii) 12.07 (ii)
Unit Hyd. Tpeak (min)= 10.00 15.00
Unit Hyd. peak (cms)= 0.13 0.09

TOTALS

PEAK FLOW (cms)= 1.43 0.43 1.860 (iii)
TIME TO PEAK (hrs)= 5.25 5.25 5.25
RUNOFF VOLUME (mm)= 87.54 72.08 83.67
TOTAL RAINFALL (mm)= 88.54 88.54 88.54
RUNOFF COEFFICIENT = 0.99 0.81 0.95

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 84.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0012)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0011):		2.52	0.105	5.75	43.78
+ ID2= 2 (0006):		16.82	1.860	5.25	83.67
=====					
ID = 3 (0012):		19.34	1.937	5.25	78.48

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0008)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0012):		19.34	1.937	5.25	78.48
+ ID2= 2 (0016):		36.35	1.494	5.75	69.78
=====					
ID = 3 (0008):		55.69	3.188	5.25	72.80

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0005)		Area (ha)= 14.66	Curve Number (CN)= 65.0
ID= 1 DT= 5.0 min		Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
		U.H. Tp(hrs)= 0.59	

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	3.167	5.31	6.250	11.51	9.33	0.89
0.167	0.00	3.250	5.31	6.333	6.20	9.42	0.89
0.250	0.00	3.333	15.05	6.417	6.20	9.50	0.89
0.333	0.89	3.417	15.05	6.500	6.20	9.58	0.89
0.417	0.89	3.500	15.05	6.583	6.20	9.67	0.89
0.500	0.89	3.583	15.05	6.667	6.20	9.75	0.89
0.583	0.89	3.667	15.05	6.750	6.20	9.83	0.89
0.667	0.89	3.750	15.05	6.833	6.20	9.92	0.89
0.750	0.89	3.833	15.05	6.917	6.20	10.00	0.89
0.833	0.89	3.917	15.05	7.000	6.20	10.08	0.89
0.917	0.89	4.000	15.05	7.083	6.20	10.17	0.89
1.000	0.89	4.083	15.05	7.167	6.20	10.25	0.89
1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89
1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89
1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89
1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89

1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89
1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89
1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89
1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89
1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89
1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89
1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89
2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89
2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89
2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89
2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89
3.083	5.31	6.167	11.51	9.250	1.77		

Unit Hyd Qpeak (cms)= 0.949

PEAK FLOW (cms)= 0.512 (i)

TIME TO PEAK (hrs)= 5.583

RUNOFF VOLUME (mm)= 31.677

TOTAL RAINFALL (mm)= 88.540

RUNOFF COEFFICIENT = 0.358

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

CALIB	
STANDHYD (0007)	Area (ha)= 0.41
ID= 1 DT= 5.0 min	Total Imp(%)= 65.00 Dir. Conn.(%)= 10.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.27	0.14
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	52.28	40.00
Mannings n =	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----
TIME RAIN | TIME RAIN | ' TIME RAIN | TIME RAIN

hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	5.31	6.250	11.51	9.33	0.89
0.167	0.00	3.250	5.31	6.333	6.20	9.42	0.89
0.250	0.00	3.333	15.05	6.417	6.20	9.50	0.89
0.333	0.89	3.417	15.05	6.500	6.20	9.58	0.89
0.417	0.89	3.500	15.05	6.583	6.20	9.67	0.89
0.500	0.89	3.583	15.05	6.667	6.20	9.75	0.89
0.583	0.89	3.667	15.05	6.750	6.20	9.83	0.89
0.667	0.89	3.750	15.05	6.833	6.20	9.92	0.89
0.750	0.89	3.833	15.05	6.917	6.20	10.00	0.89
0.833	0.89	3.917	15.05	7.000	6.20	10.08	0.89
0.917	0.89	4.000	15.05	7.083	6.20	10.17	0.89
1.000	0.89	4.083	15.05	7.167	6.20	10.25	0.89
1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89
1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89
1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89
1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89
1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89
1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89
1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89
1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89
1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89
1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89
1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89
2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89
2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89
2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89
2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89
3.083	5.31	6.167	11.51	9.250	1.77		

Max.Eff.Inten.(mm/hr)=	40.71	98.53
over (min)	5.00	10.00
Storage Coeff. (min)=	2.48 (ii)	9.58 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.29	0.11

TOTALS

PEAK FLOW (cms)=	0.00	0.04	0.043 (iii)
TIME TO PEAK (hrs)=	5.08	5.25	5.25
RUNOFF VOLUME (mm)=	87.54	72.46	73.95
TOTAL RAINFALL (mm)=	88.54	88.54	88.54
RUNOFF COEFFICIENT =	0.99	0.82	0.84

***** 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* = 84.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0009)				
1 + 2 = 3				

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0005):	14.66	0.512	5.58	31.68
+ ID2= 2 (0007):	0.41	0.043	5.25	73.95
=====				
ID = 3 (0009):	15.07	0.531	5.50	32.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0010)				
1 + 2 = 3				

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0008):	55.69	3.188	5.25	72.80
+ ID2= 2 (0009):	15.07	0.531	5.50	32.83
=====				
ID = 3 (0010):	70.76	3.665	5.25	64.29

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

=====

APPENDIX E

WATER BALANCE ASSESSMENT



BARRIE
TEL: (705) 721-7863
FAX: (705) 721-7864

MISSISSAUGA
TEL: (905) 542-7605
FAX: (905) 542-2769

OSHAWA
TEL: (905) 440-2040
FAX: (905) 725-1315

NEWMARKET
TEL: (905) 853-0647
FAX: (905) 881-8335

MUSKOKA
TEL: (705) 721-7863
FAX: (705) 721-7864

HAMILTON
TEL: (905) 777-7956
FAX: (905) 542-2769

June 10, 2026

Reference No. 2603-W021

Page 1 of 7

Sorbara Development Group
3700 Steeles Avenue West
Vaughan, Ontario
L4L 8M9

Attention: Ms. Catherine Pan, RPP, MCIP, Senior Manager, Development

**Re: Pre- and Post-Development Water Balance Assessment for the
Proposed Residential Development
6410 First Line and 8076 Wellington Road 19
Township of Centre Wellington (Fergus)**

Dear Madam,

Soil Engineers Ltd (SEL) has completed a pre- and post-development water balance assessment for the proposed development at 6410 First Line and 8076 Wellington Road 19, in the township of Centre Wellington (Fergus) (the Subject Site). The findings are presented in this Letter Report.

1.0 INTRODUCTION

The Subject Site is located on the northwest of the intersection of First Line and Wellington Road 19, in the township of Centre Wellington (Fergus). **Drawing No. 1**, enclosed, shows the location of the Subject Site for which the current pre- and post-development water balance assessment applies.

2.0 BACKGROUND REVIEW

Based on the Proposed Land Use Plan prepared by Weston Consulting dated January 26, 2026, the proposed development of the residential subdivision at the Subject Site includes the construction of two hundred and three (203) single detached houses (11-12 m), two hundred and five (205) single detached houses (9.75 m), and two hundred and sixty four (264) street townhouses (6.1 m) with an assumed 1-level basement, associated roads, underground services, parks and a Stormwater Management (SWM) pond within the developable portions.

A Hydrogeological Investigation was previously conducted by SEL for the Subject Site, dated April 24, 2026. A summary of the findings is presented below:

- The subsoil investigation has revealed that beneath the topsoil, the Subject Site mainly comprises of silt, silty sand, sandy silt, and sandy silt till deposits extending to the maximum termination depth of investigated at 8.0 metres below ground surface (mbgs).
- The findings of the hydrogeological study confirms that the groundwater level elevations in the



monitoring wells range from El. 426.2 metres above sea level (masl) at BH/MW 2 to 418.4 masl at BH/MW 10. The monitoring program is ongoing and the groundwater levels will be updated to reflect the seasonal high levels upon completion of the fieldwork.

- The Subject Site is located within the West Montrose-Grand River subwatershed that falls in the Ground River Conservation Authority (GRCA) jurisdiction.
- The Subject Site is mainly located within a regional physiography of Southern Ontario known as Guelph Drumlin Field. The Guelph Drumlin Field within the vicinity of the Subject Site comprises of Till Plains (Drumlinized).

3.0 PRE- AND POST-DEVELOPMENT WATER BALANCE

A pre-and post-development water balance analyses were completed to compare pre-development and post-development hydrological conditions to evaluate potential changes in recharge and runoff volumes due to the proposed development.

The discussion below provides details on the methodology used and the results obtained from the analysis. A summary of the calculations is provided in **Appendix A**.

A site scale water balance analysis was completed using the long-term (30-year average from 1981 to 2010) precipitation records for monthly and annual precipitation at a nearby weather station. The water balance method roughly estimates annual evapotranspiration, infiltration and runoff volumes. The annual evapotranspiration, infiltration and runoff volumes were obtained from Fergus Shand Dam weather station (Climate ID. 6142400) located approximately 3.5 km northeast of the Subject Site. The 30-year records for average annual and monthly temperatures were also adopted from this station.

3.1 Methodology

A Site scale water balance analysis was completed in order to estimate the components of the hydrological cycle for the Subject Site, and was modelled using the following equation:

$$P = DGS + ET + R + I$$

Where:

P= Precipitation, which represents the sum of all rainfall and snowfall

DGS=Change in groundwater storage

ET= Evapotranspiration

R= Runoff

I= Infiltration

Although groundwater storage experiences both gains and losses on a short-term basis, the net change in groundwater storage (DGS) over the long-term is generally zero. For this reason, the change in groundwater storage (zero (0)) has not been included in the water balance calculations.

Evapotranspiration (ET) refers to the transfer of water from vegetation and the soil surface to the atmosphere in the form of water vapour. The term considers evaporation from the soil surface and from man-made surfaces together with transpiration from plants. Simulations using Thornthwaite and Mather



model developed by US Geological Survey (USGS) indicates that the average PET and actual evapotranspiration (AET) for the Subject Site is about 549 and 546 mm/year, respectively. As such, an AET value of 546 mm/year has been applied to pre- and post-development water balance assessments for the Subject Site.

In accordance with the former Ministry of Environment and Energy Guidance Manual (MOEE 1995), a series of infiltration components can be applied to the Subject Site based on its slope, soil and vegetation coverage. The cumulative value of these components is termed the infiltration factor, with the values ranging from 0 to 1. The difference between the value 1 and the infiltration factor is referred to as the runoff factor.

Slope has an influence on both infiltration and runoff. The topography of the Subject Site is considered as rolling land to hilly, based on a review of the site topography, the elevation difference within the Subject Site is approximately 14.0 m per 1 km.

The surficial soil at the Subject Site as determined in the reviewed hydrogeological investigation report, which indicates the surficial soil beneath the Subject Site consists mainly of silt and sandy silt.

The pre-development Subject Site comprises mainly of agricultural land and wooded area within the northwest to west portions. Furthermore, a residential building and associated access road and garage present at the Subject Site. Surficial soil, vegetation coverage, and slope also contribute to the infiltration and runoff factors.

The difference between the average annual precipitation and actual evapotranspiration is termed as the water surplus. The precipitation value is 946 mm/year for the vicinity of the Subject Site. Subtracting the averaged Thornthwaite and Mather derived AET estimate of 546 mm/year from the precipitation gives a water surplus estimate of 400 mm/year. The Site's average annual infiltration is calculated by multiplying the cumulative infiltration factor by the water surplus estimate. The Subject Site's runoff is calculated by applying its difference from 1, or 1 minus the cumulative infiltration factor multiplied by water surplus estimate. Based on the former MOECC factors, a cumulative infiltration factor of 0.48 was considered for this assessment. The average annual depth estimates for infiltration and runoff at the Subject Site are presented in **Table 1**.

Table 1- Summary of Estimated Infiltration and runoff

Site Conditions	Infiltration Factors	Estimated Water Surplus (mm/yr.)	Estimated Infiltration (mm/yr.)	Estimated Runoff (mm/yr.)
Soil Type (silt and sandy silt)	0.2	400	$I = 0.48 \times 400$	$R = (1 - 0.48) \times 400$
Slope (Average Slope 14 m per km)	0.16			
Vegetation Cover: (Cultivated Land with same portions of wooded area)	0.12			
Cumulative Infiltration Factor	0.48		192	208

Using the simulated long-term data from the nearest weather station, and considering the accumulative factor, water balance components for the Subject Site are estimated and summarized in **Table 2**.



Table 2- Summary of Water Balance Components

Precipitation (mm/year)	Evapotranspiration (mm/year)	Infiltration (mm/year)	Runoff (mm/year)
946	546	192	208

3.2 Site Water Balance

Water balance analyses were completed for pre-development and post-development conditions, separately with the details presented below:

3.2.1 Pre-Development Water Balance

The pre-development water balance for the Subject Site is calculated by multiplying the existing pervious areas by the various, averaged annualized depth estimates for precipitation, ET, infiltration and runoff. Additionally, estimates for runoff and ET for existing impervious surfaces are 90% and 10% of the average annual precipitation, respectively.

Based on the data provided by Sabourin Kimble & Associates Ltd. via an email, the total area of the Subject Site is considered as 390,600.00 m². Water balance calculations were estimated based on the total area of the Subject Site. The pre-development site statistics were established based on the current site conditions and information provided by Sabourin Kimble & Associates Ltd. Based on the data provided by Sabourin Kimble & Associates Ltd., the Subject Site is currently covered with 390,220.00 m² and 380.00 m² of pervious and impervious areas, respectively. The average annual area-based estimates for each water balance component and the estimated breakdown areas are summarized in **Table 3**.

Table 3- Summary of Pre-Development Volumetric Water Balance Components

Pre-Development Site Breakdown Areas	Coverage Area (m ²)	Precipitation (m ³ /year)	Evapotranspiration (m ³ /year)	Infiltration (m ³ /year)	Run off (m ³ /year)
Existing Impervious Area	380.00	359.48	35.95	0.00	323.53
Existing Pervious Area	390,220.00	369,148.12	213,040.61	74,931.60	81,175.91
Total	390,600.00	369,507.60	213,076.56	74,931.60	81,499.44

The pre-development water balance for the Subject Site area development was calculated based on the annualized depth basis by dividing the annualized volumetric estimates for each water balance component from above by the total Subject Site area. Based on this approach, the annualized depth estimates, presented in mm, for each of the water balance components for the pre-developed site are given as follows:

$$\text{Pre- Development: } P (946) = ET (546) + I (192) + R (208)$$

3.2.2 Post-Development Water Balance

As per data provided by Sabourin Kimble & Associates Ltd., the proposed impervious area for the Subject Site is approximately 179,370.00 m² and pervious area is 211,230.00 m². The post-development water balance is calculated using the same depth, based components that were used for the pre-



development water balance calculations, i.e., average annual precipitation and average annual ET. The estimates for runoff and ET for proposed impervious surfaces are 90% and 10% of the average annual precipitation, respectively. The details of the proposed sub catchment areas and estimated post-development water balance volumes are provided in **Table 4**.

Table 4- Summary of Post-Development Volumetric Water Balance Components

Post-Development Site Breakdown Areas	Coverage Area (m ²)	Precipitation (m ³ /year)	Evapotranspiration (m ³ /year)	Infiltration (m ³ /year)	Run off (m ³ /year)
Impervious Areas (Buildings)	94,540.00	89,434.84	8,943.48	0.00	80,491.36
Impervious Areas (Patios)	4,240.00	4,011.04	401.10	0.00	3,609.94
Impervious Areas (Driveways)	14,370.00	13,594.02	1,359.40	0.00	12,234.62
Impervious Areas (ROW Sidewalks)	6,255.00	5,917.23	591.72	0.00	5,325.51
Impervious Areas (Internal Sidewalks)	4,940.00	4,673.24	467.32	0.00	4,205.92
Impervious Areas (Roads)	45,975.00	43,492.35	4,349.24	0.00	39,143.11
Impervious Areas (Parks)	1,050.00	993.30	99.33	0.00	893.97
Impervious Areas (SWM Pond)	8,000.00	7,568.00	756.80	0.00	6,811.20
Environmental lands NW of trail	26,400.00	24,974.40	14,413.08	5,069.43	5,491.89
Environmental lands SE of trail	63,500.00	60,071.00	34,667.83	12,193.52	13,209.65
Pervious Areas (Front Yards)	15,265.00	14,440.69	8,333.93	2,931.25	3,175.51
Pervious Areas (Rear Yards)	52,745.00	49,896.77	28,796.13	10,128.31	10,972.33
Pervious Areas (ROW)	31,370.00	29,676.02	17,126.45	6,023.79	6,525.78
Pervious Areas (Parks)	13,950.00	13,196.70	7,616.00	2,678.740	2,901.96
Pervious Areas (SWM Pond)	8,000.00	7,568.00	4,367.60	1,536.19	1,664.21
Total	390,600.00	369,507.60	132,289.41	40,561.23	196,656.96

Based on the review of the post-development water balance estimates shown above in **Table 4**, the depth-based post-development water balance components, presented in mm, are given as follows

$$\text{Proposed -Development: } P (946) = ET (339) + I (104) + R (503)$$

3.3 Water Balance Analysis Results

The volumetric comparisons in evapotranspiration, infiltration and runoff between the pre-developed and post-developed Site are summarized in **Table 5**.



Table 5- Pre- and Post-Development Volumetric Water Balance Gain/Loss

	Precipitation (m ³ /year)	Evapotranspiration (m ³ /year)	Infiltration (m ³ /year)	Run off (m ³ /year)
Pre-Development	369,507.60	213,076.56	74,931.60	81,499.44
Post-Development	369,507.60	132,289.41	40,561.23	196,656.96
Loss (-) and Gain (+)	-	-80,787.15	-34,370.37	115,157.52

A review of the findings indicates that a total decrease of 80,787.15 m³/year and 34,370.37 m³/year for ET and infiltration, respectively, and an increase of 115,157.52 m³/year for the post-development Site.

Pre- and post-water balance components for the Subject Site development were also assessed. The results are presented in **Table 6**.

Table 6- Pre- and Post-Development Water Balance Components Gain/Loss

Pre-Development Site Breakdown Areas	Precipitation (mm/year)	Evapotranspiration (mm/year)	Infiltration (mm/year)	Run off (mm/year)
Pre-Development	946	546	192	208
Post-Development	946	339	104	503
Loss (-) and Gain (+)	-	-207	-88	295

Based on a review of **Table 6** indicates that a total loss of 38% and 46% in ET and infiltration and a total gain of 142% is anticipated in runoff for the post-development, respectively.



Sorbara Development Group
June 10, 2026

Reference No. 2603-W021
Page 7 of 7

We trust the above satisfies your present requirements. Should you have any further queries, please feel free to contact this office.

Yours truly,
SOIL ENGINEERS LTD.

Tarek Agha, P.Eng., PMP.
Senior Project Manager

Narjes Alijani, M.Sc., P.Geo.
Department Manager – Hydrogeological Services

ENCLOSURE

*Site Location Plan
Pre- and Post-Development Water Balance Assessment*

*Drawing No. 1
Appendix 'A'*

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Soil Engineers Ltd.

CONSULTING ENGINEERS

GEOTECHNICAL • ENVIRONMENTAL • HYDROGEOLOGICAL • BUILDING SCIENCE

90 WEST BEAVER CREEK ROAD, SUITE 100, RICHMOND HILL, ONTARIO L4B 1E7 · TEL: (416) 754-8515 · FAX: (905) 881-8335

BARRIE
TEL: (705) 721-7863
FAX: (705) 721-7864

MISSISSAUGA
TEL: (905) 542-7605
FAX: (905) 542-2769

OSHAWA
TEL: (905) 440-2040
FAX: (905) 725-1315

NEWMARKET
TEL: (905) 853-0647
FAX: (905) 881-8335

MUSKOKA
TEL: (705) 684-4242
FAX: (705) 684-8522

HAMILTON
TEL: (905) 777-7956
FAX: (905) 542-2769

DRAWINGS

REFERENCE NO. 2603-W021

DRAFT



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N

References: Ontario Ministry of Natural Resources and Forestry
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Key Map

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, Vantor, Earthstar Geographics, and the GIS User Community

Legend

Approximate Boundary Of Subject Site

External Services

Major Road

Local Road

Waterbody

Watercourse

Soil Engineers Ltd.

Site Location Plan

Hydrogeological Assessment
Proposed Residential Development
6410 First Line and 8076 Wellington Road 19
Township of Centre Wellington (Fergus)

Reference No. 2603-W021

Date: April 20, 2026

Scale:

Metres

Drawing No. 1

549500 550000 550500 551000 551500 552000



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TEL: (705) 684-4242
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TEL: (905) 777-7956
FAX: (905) 542-2769

APPENDIX 'A'

PRE- AND POST-DEVELOPMENT WATER BALANCE ASSESSMENT

REFERENCE NO. 2603-W021

Pre- and Post Water Balance - 6410 First Line and 8076 Wellington Road 19, Fergus

Former MOEE Infiltration Factor

Topography (Rolling Land to Hilly)	0.16
Soil (Silt and sandy silt)	0.2
Cover (Cultivated land)	0.12 Small portions of the Site are wooded areas
Infiltration Factor	0.48

1. Climate Information (using USGS Thonthwaite USGS Model)

Precipitation	946 mm/yr	0.946 m/yr
Evapotranspiration (Average Lat 43 and 44)	546 mm/yr	0.546 m/yr
Surplus	400 mm/yr	0.400 m/yr
Runoff (Pervious Surface)	208 mm/yr	0.208 m/yr
Infiltration (Pervious Surface)	192 mm/yr	0.192 m/yr
Runoff (Impervious Surface)	851 mm/yr	0.851 m/yr
Infiltration (Impervious Surface)	0 mm/yr	0.000 m/yr
Evapotranspiration Impervious	95 mm/yr	0.095 m/yr

The site development area is mainly underlain by silt and sandy silt

2. Site Statistics

Pre- Development Site Coverage

	Subcatchment Areas	
Existing Impervious Area (Building, Road, Parking Lot, and Paved Areas)	380 m ²	0.04 ha
Exisiting Pervious Area (Green Areas)	390,220 m ²	39.02 ha
TOTAL	390,600 m ²	39.06 ha

Post-Development Site Coverage

	Subcatchment Areas	
Impervious Areas (Buildings)	94,540 m ²	9.45 ha
Impervious Areas (Patios)	4,240 m ²	0.42 ha
Impervious Areas (Driveways)	14,370 m ²	1.44 ha
Impervious Areas (ROW Sidewalks)	6,255 m ²	0.63 ha
Impervious Areas (Internal Sidewalks)	4,940 m ²	0.49 ha
Impervious Areas (Roads)	45,975 m ²	4.60 ha
Impervious Areas (Parks)	1,050 m ²	0.11 ha
Impervious Areas (SWM Pond)	8,000 m ²	0.80 ha
Environmental lands NW of trail	26,400 m ²	2.64 ha
Environmental lands SE of trail	63,500 m ²	6.35 ha
Pervious Areas (Front Yards)	15,265 m ²	1.53 ha
Pervious Areas (Rear Yards)	52,745 m ²	5.27 ha
Pervious Areas (ROW)	31,370 m ²	3.14 ha
Pervious Areas (Parks)	13,950 m ²	1.40 ha
Pervious Areas (SWM Pond)	8,000 m ²	0.80 ha
TOTAL:	390,600 m ²	39.06 ha

3. Annual Pre-Development Water Balance

Land Use	Area (m ²)	Precipitation (m ³ /yr)	Evapotranspiration (m ³ /yr)	Infiltration (m ³ /yr)	Runoff (m ³ /yr)
Existing Impervious Area (Building, Road, Parking Lot, and Paved Areas)	380.00	359.48	35.95	0.00	323.53
Exisiting Pervious Area (Green Areas)	390,220.00	369,148.12	213,040.61	74,931.60	81,175.91
TOTAL	390,600.00	369,507.60	213,076.56	74,931.60	81,499.44

4. Annual Post-Development Water Balance

Land Use	Area (m ²)	Precipitation (m ³ /yr)	Evapotranspiration (m ³ /yr)	Infiltration (m ³ /yr)	Runoff (m ³ /yr)
Impervious Areas (Buildings)	94,540.00	89,434.84	8,943.48	0.00	80,491.36
Impervious Areas (Patios)	4,240.00	4,011.04	401.10	0.00	3,609.94
Impervious Areas (Driveways)	14,370.00	13,594.02	1,359.40	0.00	12,234.62
Impervious Areas (ROW Sidewalks)	6,255.00	5,917.23	591.72	0.00	5,325.51
Impervious Areas (Internal Sidewalks)	4,940.00	4,673.24	467.32	0.00	4,205.92
Impervious Areas (Roads)	45,975.00	43,492.35	4,349.24	0.00	39,143.11
Impervious Areas (Parks)	1,050.00	993.30	99.33	0.00	893.97
Impervious Areas (SWM Pond)	8,000.00	7,568.00	756.80	0.00	6,811.20
Environmental lands NW of trail	26,400.00	24,974.40	14,413.08	5,069.43	5,491.89
Environmental lands SE of trail	63,500.00	60,071.00	34,667.83	12,193.52	13,209.65
Pervious Areas (Front Yards)	15,265.00	14,440.69	8,333.93	2,931.25	3,175.51
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Pervious Areas (ROW)	31,370.00	29,676.02	17,126.45	6,023.79	6,525.78
Pervious Areas (Parks)	13,950.00	13,196.70	7,616.00	2,678.74	2,901.96
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TOTAL	390,600.00	369,507.60	132,289.41	40,561.23	196,656.96

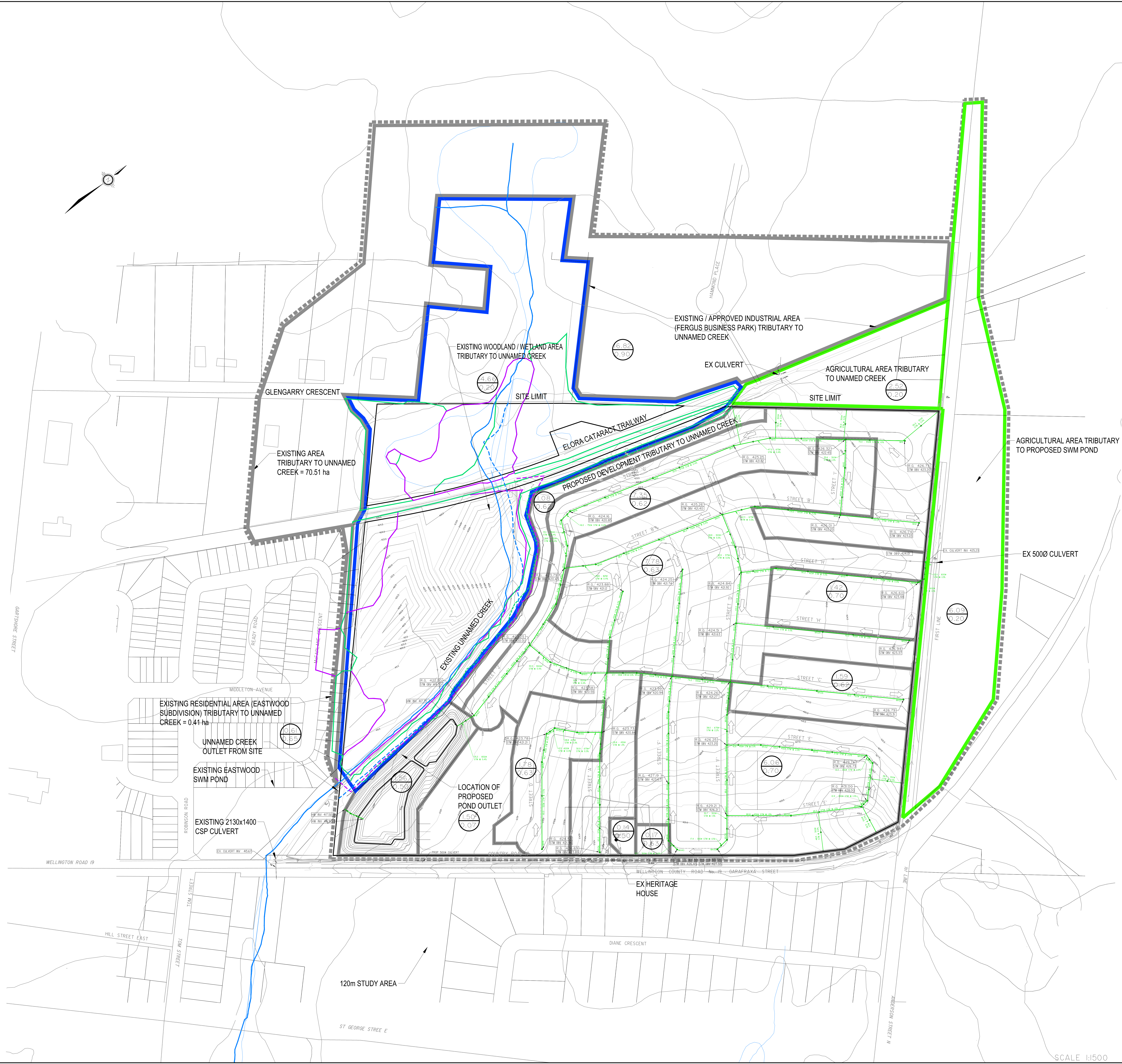
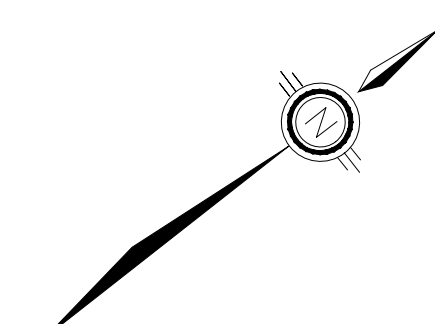
Subject Site Pre- and Post-Development Water Balance Volumetric Gain/Loss

	Precipitation (m ³ /yr)	Evapotranspiration (m ³ /yr)	Infiltration (m ³ /yr)	Runoff (m ³ /yr)
Pre-Development	369,507.60	213,076.56	74,931.60	81,499.44
Post-Development	369,507.60	132,289.41	40,561.23	196,656.96
Gain/Loss (-)		-80,787.15	-34,370.37	115,157.52
Gain/Loss (%)	-	38 ↓	46 ↓	141 ↑

Subject Site Pre- and Post-Development Water Balance Components Gain/Loss

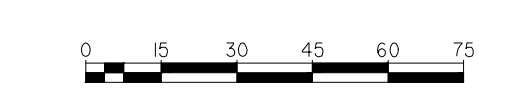
Gain/Loss (mm/yr)	Precipitation (mm/yr)	Evapotranspiration (mm/yr)	Infiltration (mm/yr)	Runoff (mm/yr)
Pre-Development	946	546	192	208
Post-Development	946	339	104	503
Gain/Loss (-)	-	-207	-88	295
Gain/Loss (%)	-	38 ↓	46 ↓	142 ↑

FIGURES AND DRAWINGS



LEGEND:

- AREA (ha)
- RUNOFF COEFFICIENT
- OVERLAND FLOW ARROW
- URBAN CATCHMENT
- AGRICULTURAL CATCHMENT
- WOODLOT / WETLAND CATCHMENT
- EXISTING AREA TRIBUTARY TO UNNAMED CREEK
- WATERCOURSE
- WATERCOURSE SETBACK
- WETLANDS
- WETLANDS SETBACK
- WOODLANDS
- WOODLANDS SETBACK
- DEVELOPMENT LIMIT



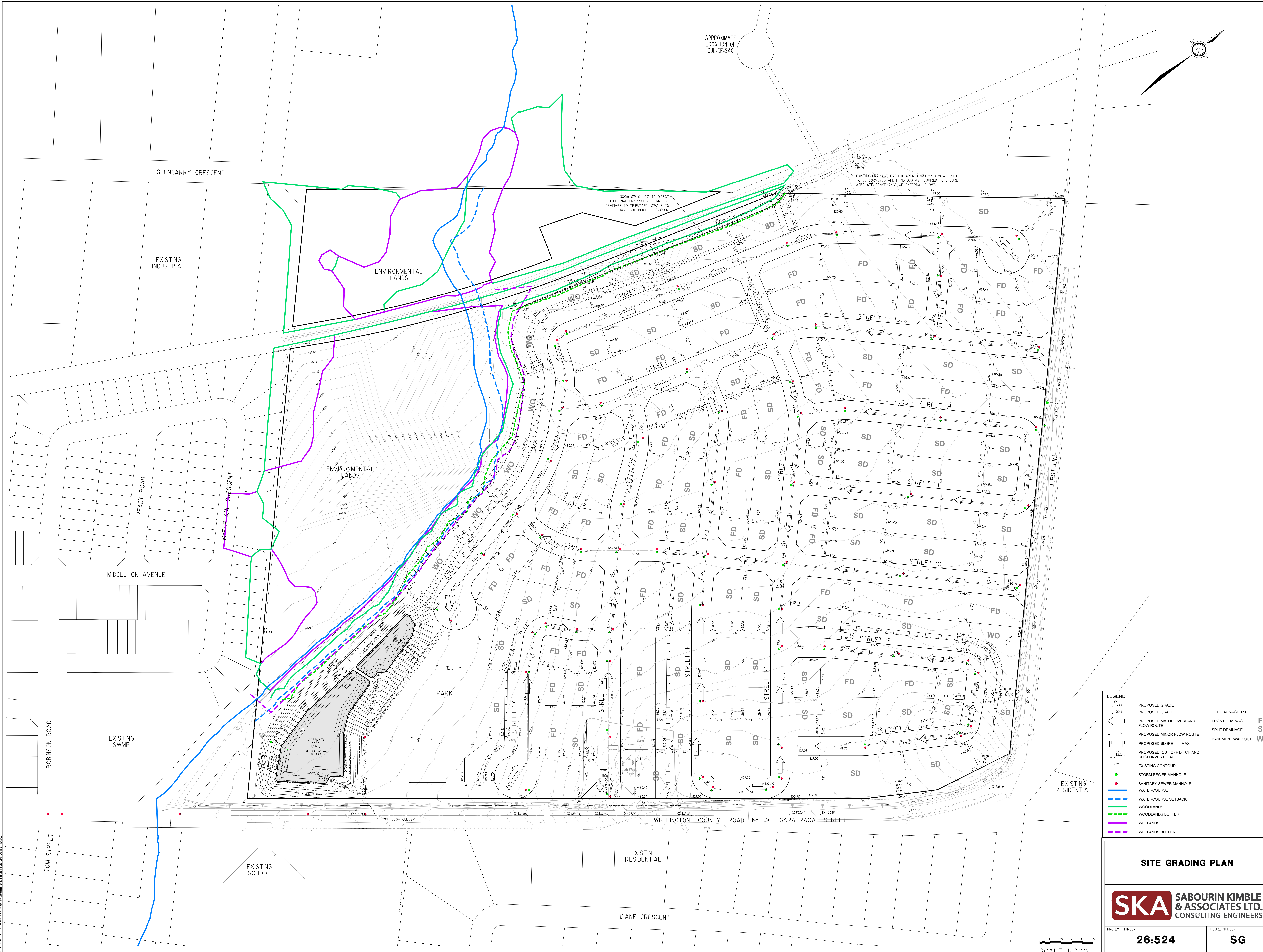
**ENVIRONMENTAL FEATURES
AND STORM DRAINAGE
PROPOSED CONDITIONS**

SKA SABOURIN KIMBLE
& ASSOCIATES LTD.
CONSULTING ENGINEERS

PROJECT NUMBER: 26:524

FIGURE NUMBER: 4

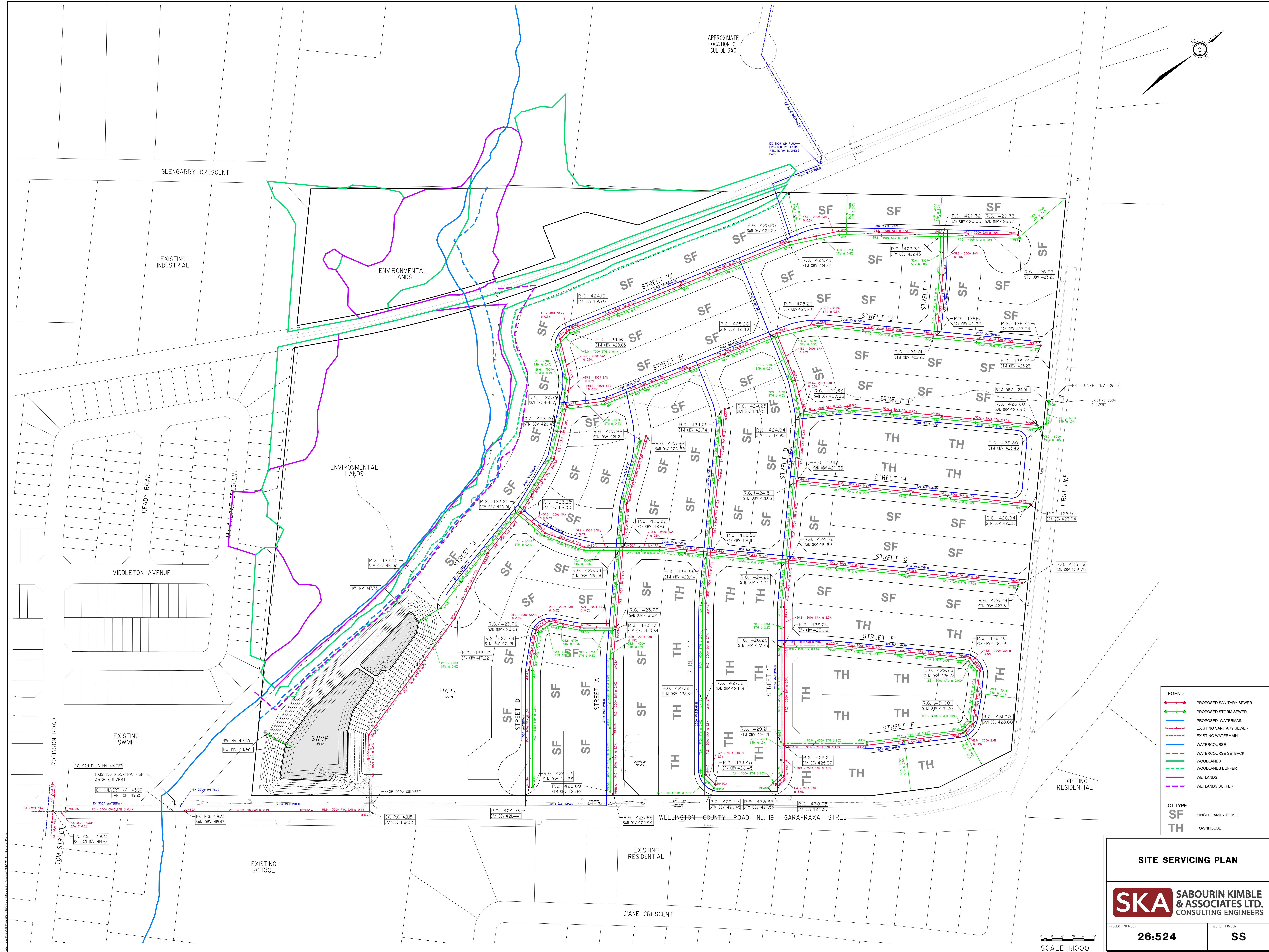
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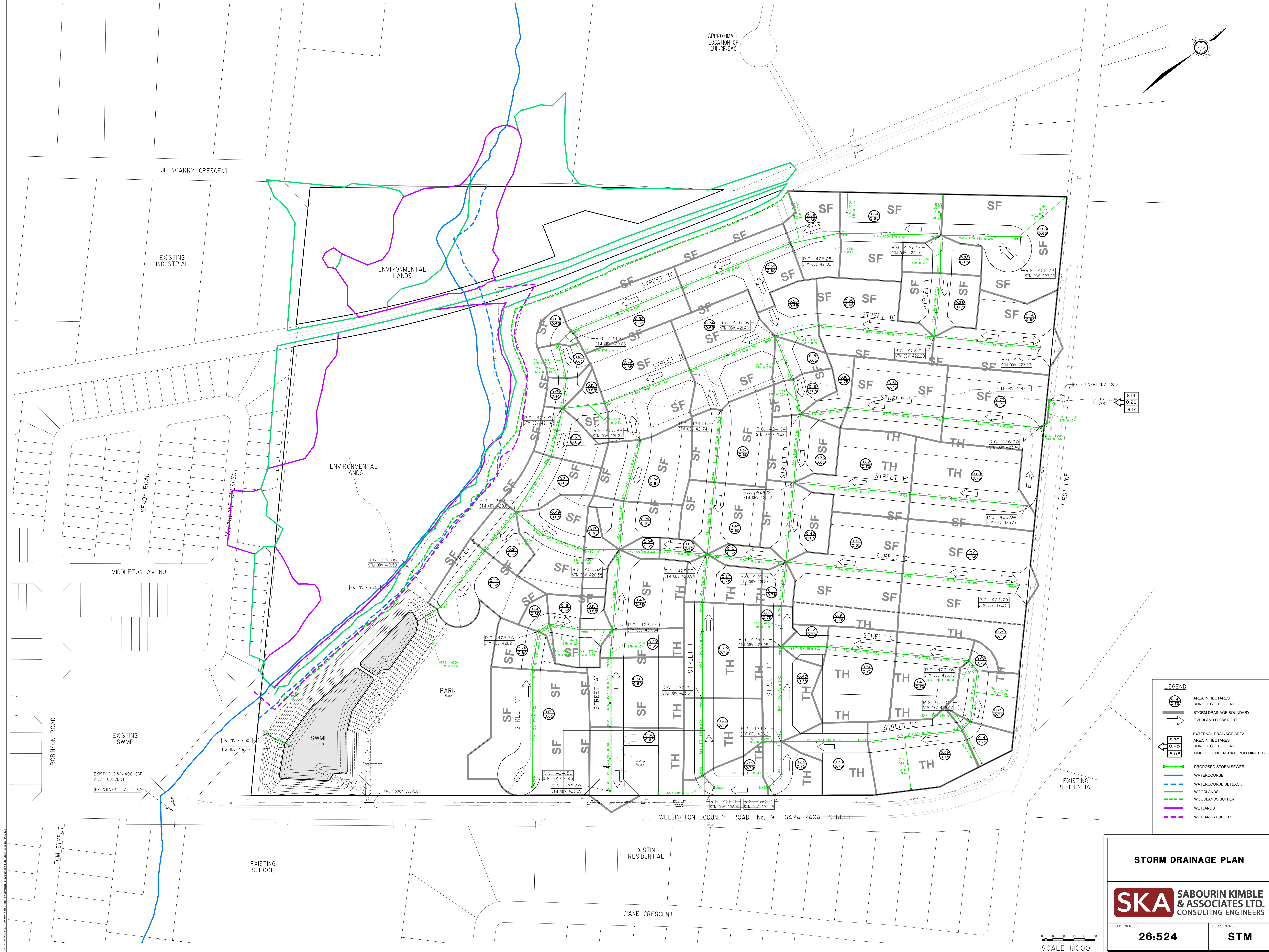


SITE GRADING PLAN

SKA SABOURIN KIMBLE & ASSOCIATES LTD. CONSULTING ENGINEERS

PROJECT NUMBER 26:524 FIGURE NUMBER SG





STORM DRAINAGE PLAN

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PROJECT NUMBER: 26:524 FIGURE NUMBER: STM