FUNCTIONAL SERVICING & STORMWATER MANAGEMENT REPORT

PROPOSED RESIDENTIAL DEVELOPMENT

DORSAY DEVELOPMENT CORPORATION

CITY OF BARRIE

PROJECT 2022-5170 **MAY 2024**

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1 INTRODUCTION

1.1 STUDY OBJECTIVES AND LOCATION

Schaeffer & Associates Ltd. (colloquially known as Schaeffers Consulting Engineers, herein referred to as Schaeffers) was retained by Dorsay Development Corporation to prepare a Functional Servicing & Stormwater Management Report in connection with the proposed residential development in the Hewitt's Secondary Plan Area of City of Barrie.

The subject site is bounded by Mapleview Drive to the north, other Hewitt's developments to the west, Lockhart Road to the south, and 20th Sideroad to the east. A site location plan is shown in **Figure 1.1** for reference. The subject site hosts a total area of 80.23 ha, and approximately 54.36ha of the total area will be developed as illustrated in **Figure 1.2** and the Draft Plan provided in **Appendix A**. The remaining areas are not developed due to the Natural Heritage Systems (NHS) and the associated setbacks surrounding the reaches of Sandy Cove Creek. An engineered channel will be constructed within the study area to connect Reach 2 during post-development conditions. The NHS in the middle of the site (Reach 3&4) divides the subject property into the northern and the southern portions.

The subject site has been explored in both the Stormwater Management Master Plan (SWMMP) that AMEC prepared in October 2013 and the Sub-watershed Impact Study (SIS) that R.J. Burnside prepared in September 2016. Please note that the two studies covered different scopes of the development. In the SWMMP, the entire subject site was covered, however the study only addressed the stormwater management aspect of the development. The SIS explored water supply, sanitary servicing, and stormwater management aspects, but it only covered the northern portion of the subject site (north of Reach 3). Development of the southern portion (south of Reach 4) was scheduled beyond 2031 and was not explored in the SIS.

This report provides a servicing strategy for the entire proposed development regarding water supply, sanitary servicing, and stormwater management. This report will demonstrate that the proposed development can be successfully serviced within the framework of the existing and the planned infrastructure, with considerations for applicable municipal guidelines, policies, design criteria, and previous planning resolutions.

1.2 BACKGROUND

The following reports and resources were considered in preparing the proposed functional servicing strategies for the proposed development. Relevant excerpts from the reports are provided in **Appendix A** to establish context and provide background.

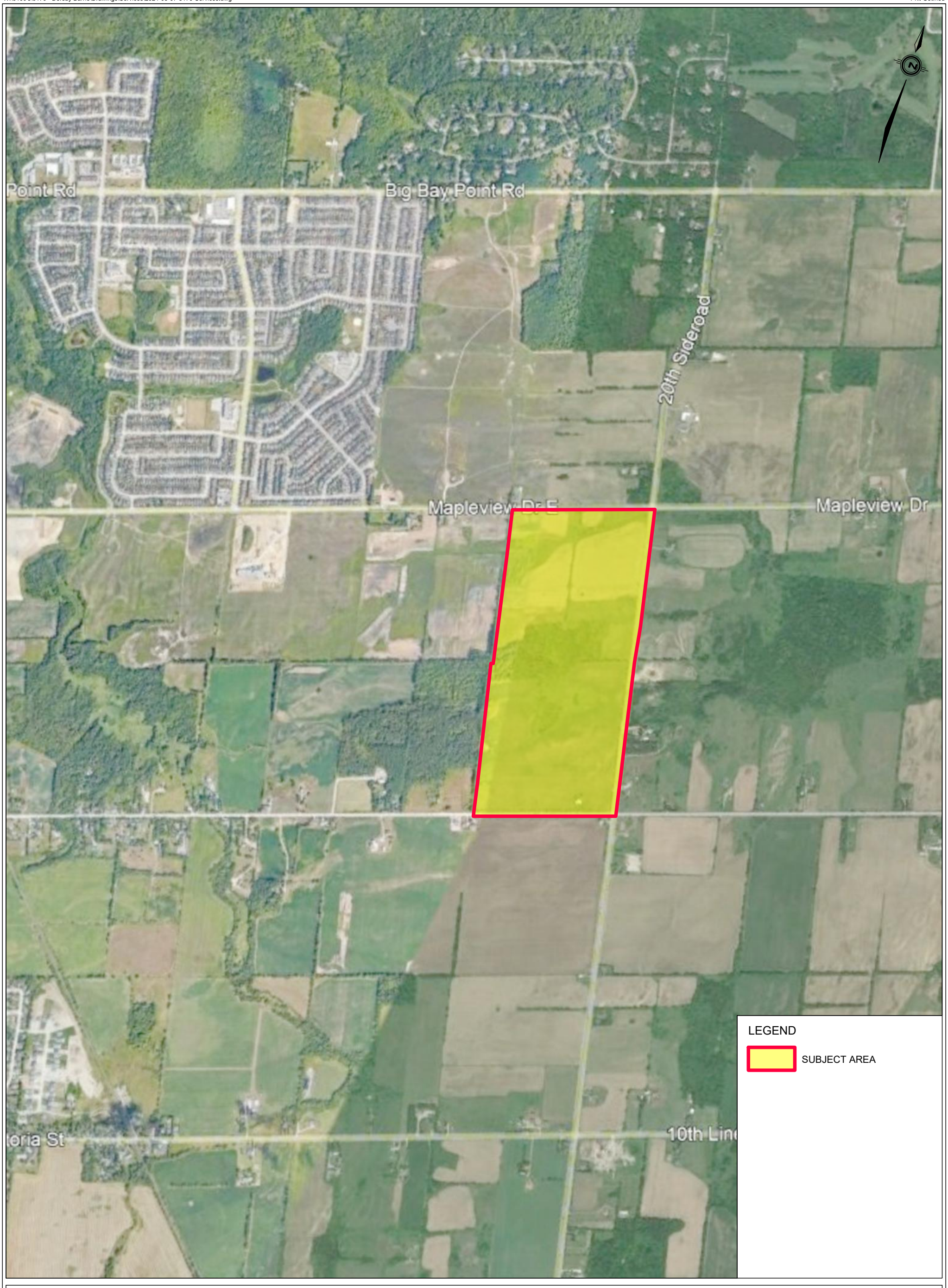
- *Hewitt's Secondary Plan Area Subwatershed Impact Study Lover's, Hewitt's and Sandy Cove Creeks* by R.J. Burnside, September 2016;
- *Intensification & Annexed Lands Drainage and Stormwater Management Master Plan* by AMEC, October 2013;
- *Soil Report for Proposed Residential Subdivision Southwest Corner of Mapleview Drive East and 20th Sideroad* by Soil Engineers Ltd., April 2017;
- *Hydrogeological Assessment Proposed Residential Subdivision Southwest Corner of Mapleview Drive East and 20th Sideroad* by Soil Engineers Ltd., March 2017;
- *Hydrogeological Assessment – Dorsay Lands* by R.J. Burnside, August 2023;
- *Sandy Cove Creek Realignment* by Tatham Engineering, June 2021;
- MECP *Stormwater Management Planning and Design Manual* (March 2003);
- LSRCA *Technical Guidelines for Stormwater Management Submissions* (April 2022);
- City of Barrie *Sanitary Infrastructure Design Standard* (2023);
- City of Barrie *Drinking Water Infrastructure Design Standard* (2024);
- City of Barrie *Stormwater Infrastructure Design Standard* (2023);
- City of Barrie *Low Impact Development Guideline* (2023);

1.3 PROPOSED DEVELOPMENT PLAN AND STATISTICS

The proposed residential development occupies approximately 80.23 ha with a net developable area of 54.36 ha. As per the Draft Plan dated March 18, 2024, the proposed development will consist of single-detached units, semi-detached units, townhouse units, a future development block (low and medium density), a school block, park blocks, a pumping station, stormwater management blocks, and public roads. **Table 1-1** below briefly summarizes the proposed breakdown of the different land use areas and their respective unit counts where applicable. Please refer to **Figure 1.2** for a schematic view of the proposed layout and the Draft Plan in **Appendix A**. The City of Barrie Drinking Water Infrastructure Design Standard (2024) for residential development recommends a population density of 3.25 persons/unit for single and semi-detached dwellings and a population density of 2.57 persons/unit for townhouse units. Additional persons were added for the park and school blocks based on City of Toronto criteria as City of Barrie criteria did not specify densities (10 ppha for parks, 86 ppha for schools). As a result, the design population was determined to be 3954 persons. A summary of the design population can be found below in **Table 1.1**.

Table 1.1: Land Use Summary

Land Use	Units (Max.)	Area (ha)	Population
Low Density Homes (Single/Semi)	757	21.26	2461
Medium Density Homes (Townhouses)	398	6.76	1023
Future Development (2 low density units, 92 medium density units)	94	1.84	243
Elementary School	-	2.29	197
Parks/Parkettes	-	2.93	30
Pumping Station	-	0.17	-
SWM Blocks	-	5.55	-
Roads	-	11.32	-
Road Widening	-	1.90	-
Walkways	-	0.13	-
To be determined (assumed undeveloped EP lands)	-	0.21	-
Natural Heritage System	-	25.87	-
TOTAL	**1249**	**80.23**	**3954**



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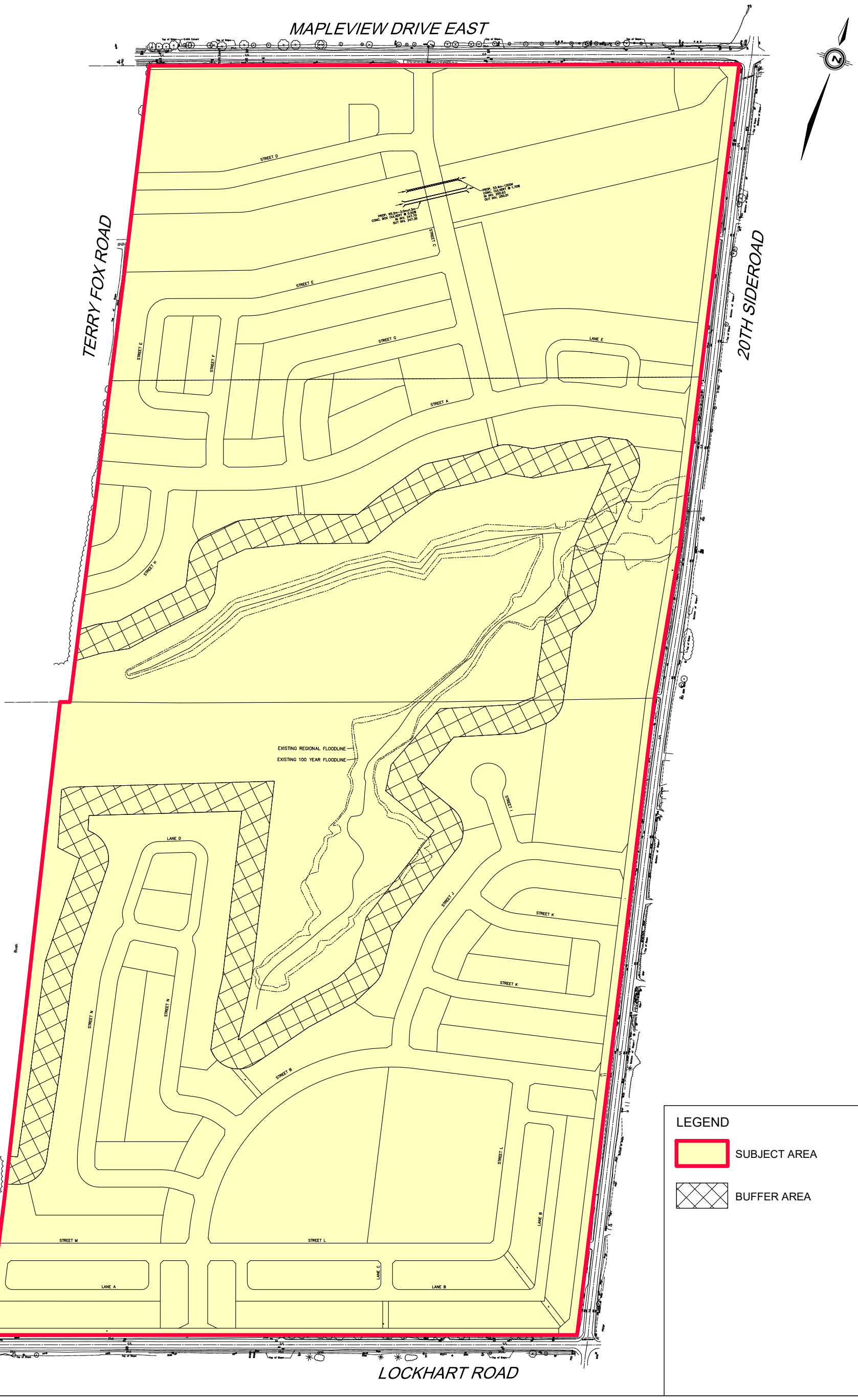
NOTE:

(AS SHOWN ABOVE)

FIGURE 1.1
LOCATION PLAN

2022-5170	MAY 2024	SCALE: N.T.S.



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NOTE:
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FIGURE 1.2
PROPOSED
DEVELOPMENT PLAN

2022-5170	MAY 2024	SCALE: N.T.S.

2 WATER SUPPLY

2.1 EXISTING WATER SUPPLY SERVICES

The subject site is located in Pressure District (PD) 2S. The existing infrastructure present within the vicinity of the site includes (source: Barrie Open Data – Water Main, see **Appendix B**):

- 300 mm diameter watermain along Mapleview Drive East, up to Terry Fox; and,
- 300 mm diameter watermain along Terry Fox, north of Mapleview Drive East.

2.2 WATER SUPPLY DESIGN CRITERIA

The water servicing system was designed in accordance with the City's Drinking Water Infrastructure Design Standard (2024) and Ministry of Environment, Conservation and Parks (MECP) design criteria, summarized below:

- Per City design standards, residential water demands were calculated using an average daily demand of 225 L/cap/day and population density of 3.25 ppu for low-density residential units and 2.57 ppu for medium density residential units. A consumption rate of 28 m^3/ha/day has been considered for Commercial and Institutional blocks;
- In the absence of equivalent population densities for parklands and institutional lands, the City of Toronto's Design Criteria for Sewers and Watermains (January 2021) were referenced: a population density of 10 ppha was used for parklands and a population density of 86 ppha was used for schools. This is a conservative approach since population is only consulted to obtain the peaking factors;
- Per MECP design standards, a maximum day demand peaking factor of 2.50 and peak hour peaking factor of 3.75 were applied for the scenario which only considers buildout of the lands north of Reach 3 or buildout of the lands south of Reach 3;
- Per MECP design standards, a maximum day demand peaking factor of 2.00 and peak hour peaking factor of 3.00 were applied for the scenario which considers buildout of the entirety of the Dorsay lands;
- Under Average and Maximum Day Demand scenarios, City Demand Pattern PAT2S-CAL-RES

was applied for all residential area demands and City Demand Pattern PAT2S-CAL-NON_RES Under the Maximum Day Demand plus Fire Flow scenario, the City Demand Pattern was not applied to the Maximum Day Demand;

- A minimum operational pressure of 275 kPa (40 psi) and a maximum operational pressure of 700 kPa (100 psi) shall be maintained throughout the system during normal operating scenarios (includes average and maximum day demands, excludes fire flow scenarios);

- The minimum fire flow demands shall be used in hydraulic network analysis unless FUS calculations require a higher fire flow. Site specific details are not available, therefore the minimum fire flows recommended by the City are applied:
    - The minimum required fire flow for residential single-family units is 100 L/s;
    - The minimum required fire flow for townhouses is 155 L/s;
    - The minimum required fire flow for institutional lands is 200 L/s;
- A minimum residual pressure of 140 kPa (20 psi) shall be maintained during the maximum day demand plus fire flow scenario;

- Per City design standards, the maximum head loss gradient allowed under normal operating pressures (includes average and maximum day demand scenarios, excludes fire flow scenarios) is 2.5 m/km;

- Per City design standards, the maximum velocity allowed under fire flow conditions is 5 m/s; and,

- Per City design standards, the following Hazen-Williams C-Factors shall be used in the model and are summarized in **Table 2.1.**

Table 2.1: Hazen-Williams Coefficients

Pipe Diameter (mm)	Coefficient
150	100
200-250	110
300-600	120
600+	130

2.3 WATER DEMANDS

Water demands were determined per the latest Conceptual Development Plan by MGP, dated March 18, 2024. Totalized water demands are presented in **Table 2.2**.

Table 2.2: Water Demand Summary

Buildout Scenario	Average Day (L/s)	Max Day (L/s)	Peak Hour (L/s)
Lands North of Reach 3	4.79	11.98	17.97
Lands South of Reach 3	5.74	12.91	19.39
All Dorsay Lands	10.53	21.05	31.58

2.4 PROPOSED WATER SUPPLY SERVICING

RJ Burnside prepared a Subwatershed Impact Study (2016) for the Hewitt's Secondary Plan Area which covered Dorsay lands. As the infrastructure within the planning area will be constructed in phases, water supply servicing of the Dorsay lands is dependent upon the water infrastructure planned to be constructed during the previous phases, as well as any associated infrastructure upgrades required to service the Hewitt's Secondary Plan Area. Development of the watermain network within the Hewitt's Secondary Plan Area is expected to not only provide watermain accessibility to the Dorsay lands, but also the added benefits of watermain looping. Timing of these infrastructure upgrades shall be coordinated with the City of Barrie, as well as landowners within the vicinity of the subject site.

Proposed water supply servicing of the Dorsay lands requires, at the minimum, the following linear upgrades external to the subject lands:

- Extension of the existing 300 mm diameter watermain on Mapleview Drive East from Terry Fox to Street 'C';
- New 400 mm diameter twin watermain along 20th Sideroad from Street 'A' to Street 'B'.

InfoWater water supply modelling shows that a majority of the Dorsay lands can be developed in compliance with the City's water design guidelines. However, the southwest corner of the Dorsay lands south of Reach 3 cannot be adequately serviced as pressures in this area drop below the minimum required 40 psi under the Maximum Day Demand scenario.

Furthermore, the southeast corner of the Hewitt's Gate East – South subdivision, located to the immediate west of the Dorsay lands, may also experience inadequate pressures under the Maximum Day Demand scenario.

For both the Dorsay lands and Hewitt's Gate East – South subdivision, nodes within the vicinity of Lockhart Road are sensitive to grading; given the current grading plans, minimum pressures were observed to be near the minimum required pressure limit. It should be noted that while grading for the Hewitt's Gate East – South subdivision has not yet been finalized, if grading at the southeast corner of the site is approximately 2 m higher than the previously proposed rough grading plan, then pressures under the Maximum Day Demand scenario will be non-compliant with the City's design guidelines.

Hydraulic modelling shows that under the Maximum Day Demand scenario, there is a water volume constraint in the existing Pressure Zone 2S system. Evidently, the water demands within Pressure Zone 2S exceed the available water supply, thus resulting in localized areas where minimum pressure requirements cannot be met. Due to this constraint, full buildout of the Hewitt's Secondary Plan Area cannot be completed until external capital projects are completed to upgrade the City's water supply system. This constraint has been well documented over the past decade in several planning documents, each identifying a forthcoming volume deficiency expected in Pressure District 2S as growth occurs. Excerpts from these documents are included in **Appendix B**:

- Hewitt's Secondary Plan SIS (RJ Burnside, 2016)
- Water Storage and Distribution Master Plan (AMEC, 2013)
- Water Storage and Distribution Master Plan Update (WSP, 2019)
- Water Supply Master Plan Update (WSP, 2019)

The Water Supply Master Plan Update (WSP, 2019) identified the availability of excess groundwater capacity and proposed mixing the surface water supply and groundwater supply as the preferred solution to meet capacity requirements in Zones 2S and 3S. Per the Master Plan, the estimated timeline to perform these upgrades is between 2025 and 2031. As such, full buildout of the Hewitt's Secondary Plan Area and consequentially, the southwest portion of Dorsay lands (see **Figure 2.1**) cannot be completed until these upgrades are performed.

2.5 INFOWATER ANALYSIS

The City of Barrie's InfoWater model, last provided to Schaeffers in July 2021, was used to analyze the proposed water supply servicing scheme of the subject site. Per the City's design guidelines, Average Day, Maximum Day, and Maximum Day plus Fire Flow demand scenarios were hydraulically modelled. The subject site was added to the City's existing water supply model in order to analyze whether the subject site can be serviced under the existing parameters, as well as full buildout of all subdivisions (where draft plan information was available) planned to be constructed during Phases 1 – 3 of the Hewitt's Secondary Plan Area. Note that additional coordination is required to determine development timing and City of Barrie capital project timing to ensure the InfoWater model accurately reflects the planned buildout of the Hewitt's Secondary Plan Area. InfoWater model results for each of the demand scenarios and water quality analysis scenarios are included in **Appendix B** for reference.

2.5.1 Normal Operational Scenarios

The water supply model results demonstrate that the Dorsay lands north of Reach 3, as well as a majority of the lands south of Reach 3 can be adequately serviced in accordance with the City's requirements and assumed boundary conditions. The expected pressure ranges in the system under the Average Day and Maximum Day demand scenarios are summarized in **Table 2.3** below.

Table 2.3: Pressure Range (Normal Operational Scenarios)

Statistic	Node ID (Min/Max Location)	Pressure (psi)	
		Average Day Demand	Maximum Day Demand
Minimum Value	J609	46.44	40.32
Maximum Value	J415	85.80	87.00

2.5.2 Fire Flow Scenario

Fire flow simulations under the Maximum Day plus Fire Flow demand scenario showed that for the serviceable Dorsay lands (southwest corner of the lands south of Reach 3 excluded), fire flows could be achieved while maintaining a residual pressure greater than 20 psi at all nodes and a maximum allowable velocity of 5 m/s in all pipes. **Table 2.4** below summarizes the range of residual pressures at the required fire flow.

Table 2.4: Pressure Range (Fire Flow Scenario)

Statistic	Node ID (Min/Max Location)	Residual Pressure at Required Fire Flow (psi)
Minimum Value	J499	21.43
Maximum Value	J441	68.07

2.1 WATER AGE ANALYSIS

Water quality modelling was conducted to ensure the proposed system is compliant with water age guidelines. Per "Effects of Water Age on Distribution System Water Quality" (AWWA, 2002), a maximum water turnover rate of 3 days was observed in distribution systems. Per AWWA guidelines, the water age for all junctions and pipes are within the required maximum water age limit of 3 days. Water age analysis results are summarized below in **Table 2.5**.

Table 2.5: Water Age Analysis Results Summary

Statistic	Node / Junction ID (Max Location)	Water Age
Maximum Value	J487	55.85 hours (2.33 days)
	P4940	55.94 hours (2.33 days)

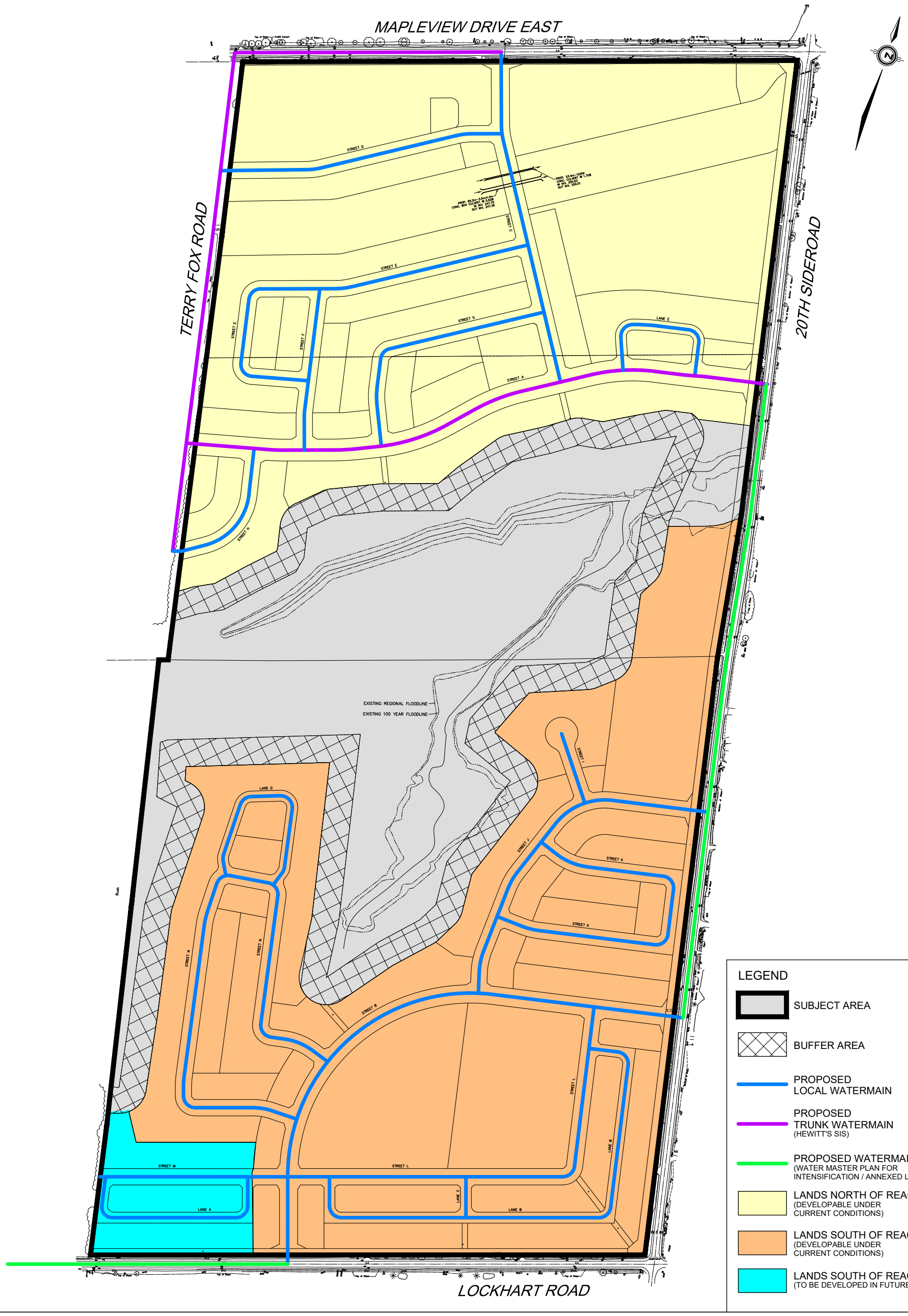

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FIGURE 2.1
PROPOSED
WATER SUPPLY SERVICING PLAN

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3 SANITARY SERVICING

3.1 EXISTING SANITARY INFRASTRUCTURE

Currently there is no existing sanitary infrastructure available to service the subject subdivision within the vicinity. However, as per R.J. Burnside's SIS report (2016) and City of Barrie Wastewater Collection Master Plan (2019), a new East Annex Pumping Station can be expected at the north east corner of the subdivision. The new pump station is expected to convey sewage to the trunk sewer along Mapleview Drive via the new 250mm twin forcemain. Relevant excerpts from the SIS and the City's Master Plan are provided in **Appendix A** for reference.

3.2 SANITARY DESIGN CRITERIA

The proposed sanitary servicing of the subject site will be designed in accordance with the current City of Barrie Sanitary Infrastructure Design Standard (2023). These criteria, where applicable to the proposed residential development, are summarized below:

- Average daily domestic flow = 225 L/cap/day (excluding extraneous flows);
- Peak domestic sewage flows are to be calculated using the following formula:

  $Q_P = P \times q \times M/86400 + I \times A$, where;
  - Q_P = Peak domestic sewage flows (including extraneous flows in L/s)
  - P = Design population
  - q = Average daily per capita domestic flow in L/cap/day (exclusive of extraneous flows)
  - M = Peaking Factor
  - I = Peak extraneous (infiltration) flows in L/s/ha
  - A = Gross Tributary area in hectares

- For the residential development the peaking factor shall be calculated based on the Harmon Formula:

  $M = 1 + 14/ (4+P^{0.5})$, where;
  - P = Population in thousands
  - M (minimum) = 2.0

- Infiltration allowance is 0.1 L/s/ha of gross area;
- In regards to design population, it should be noted that the City's Sanitary and Drinking Water Infrastructure Standards outline different population densities (ppu) for low and medium density developments where the sanitary densities are lower. Hence, to remain conservative and consistent,

the Drinking Water Infrastructure Standard has been used to calculate the design population which is used for both the water supply and sanitary sections of this report;

- Minimum actual velocity of 0.6 m/s must be achieved for all proposed sewers;
- For the most upstream section of sanitary sewer where there is no opportunity to extend the sanitary sewer in the future, the sanitary sewer slope need not exceed 2%;
- For local sewers, 375mm diameter or less, sanitary sewers shall be upsized if future peak flows including inflow and infiltration exceed 50% of full flow under future peak flow conditions including inflow and infiltration (+/- 0.5 depth of flow over diameter of pipe).

3.3 PROPOSED SANITARY SERVICING

To service the subdivision, internal sanitary sewer networks are proposed to collect the wastewater generated on-site and discharge it to sewers along Mapleview Drive and 20th Sideroad. The sewers are proposed to convey the flows to the future East Annex Pumping Station.

Two internal sewer networks have been proposed separating the developments north of Sandy Cove Creek Reach 2 from the developments in the south. Sanitary flows generated from the north will be conveyed northerly to Mapleview Drive, and then directed easterly to the new Pumping Station. Moreover, developments south of Sandy Cove Creek Reach 2 will be conveyed easterly towards 20th Sideroad, and then directed northerly to the Pumping Station via the proposed 20th Sideroad sewer. The sewage from the pumping station will be discharged through the proposed 730m long 250mmØ twin forcemain which will convey flows to a point west of the site prior to gravity conveyance in the Mapleview Drive trunk sewer, according to the City of Barrie Wastewater Collection Master Plan (July 2019) and excerpts are found in **Appendix A**. The proposed sanitary servicing plan can be seen in **Figure 3.1**. The design of the internal sewers shall be conducted at the detailed design stage. The criteria mentioned in Section 3.2 and the other pertinent guidelines outlined in the design standards shall be met.

The sanitary demand expected from the proposed subdivision is summarized in **Table 3-1**. The expected wastewater generation rates have been estimated based on City of Barrie design criteria. It should be noted that as per the Sanitary Drainage Plan and the Sanitary Sewer Design Sheet provided by R.J. Burnside, the future East Annex Pumping Station and the associated forcemains will be designed to accommodate the flows from the entire subdivision. As such, the sanitary sewer design conforms to the concept illustrated in the SIS with the addition of the southern half of the subdivision, and overall, no downstream constraints are anticipated. Detailed sanitary demand calculations are provided in **Appendix C**. Relevant materials

from R.J. Burnside can be found in **Appendix A**.

Table 3.1: Sanitary Demand Summary

Population	Average Demand (L/s)	Peaking Factor	Peak Demand (L/s)	Infiltration (L/s)	Total Peak Flow (L/s)
3954	10.53	3.34	35.13	5.42	40.55

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FIGURE 3.1
PROPOSED
SANITARY SERVICING PLAN

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4 STORMWATER MANAGEMENT

The following section provides details on the existing site drainage and the proposed stormwater management scheme in accordance with the latest design guidelines.

4.1 EXISTING STORMWATER MANAGEMENT CONDITIONS

4.1.1 Existing Drainage Conditions

The existing subject site is predominantly occupied by agricultural lands with a portion designated as Natural Heritage System (NHS). The dominant drainage feature within the subject site is Sandy Cove Creek, whose reaches traverse through the site in the north (Reach 2) and the middle (Reach 3&4). The entire subject site is located in the Sandy Cove Creek sub-watershed and is under the jurisdiction of the Lake Simcoe Region Conservation Authority (LSRCA).

Existing elevations were reviewed using the topographic survey conducted by LLOYD & PURCELL LTD. in January 15, 2015. The existing ground elevation ranges from 245.2 masl in the northeast direction to 268.1 masl in the southwest direction. The site has a split drainage pattern and elevations are generally slopped towards the Reaches of Sandy Cove Creek and the associated NHS. The existing topography splits the subject site into four (4) sub-catchments, with the northern two draining towards Reach 2, and the southern two draining towards Reach 3 & 4. The existing stormwater drainage pattern is illustrated on **Figure 4.1**. The topographic survey map is provided in **Appendix A** for reference.

4.1.2 Existing Stormwater Infrastructure

There are two existing culverts located on 20th Sideroad conveying the flows of Sandy Cove Creek from the subject site towards the east across the road. These two culverts have been analyzed in AMEC's Stormwater Management Master Plan (SWMMP) dated October 2013. The analysis revealed the need for upgrades for both culverts.

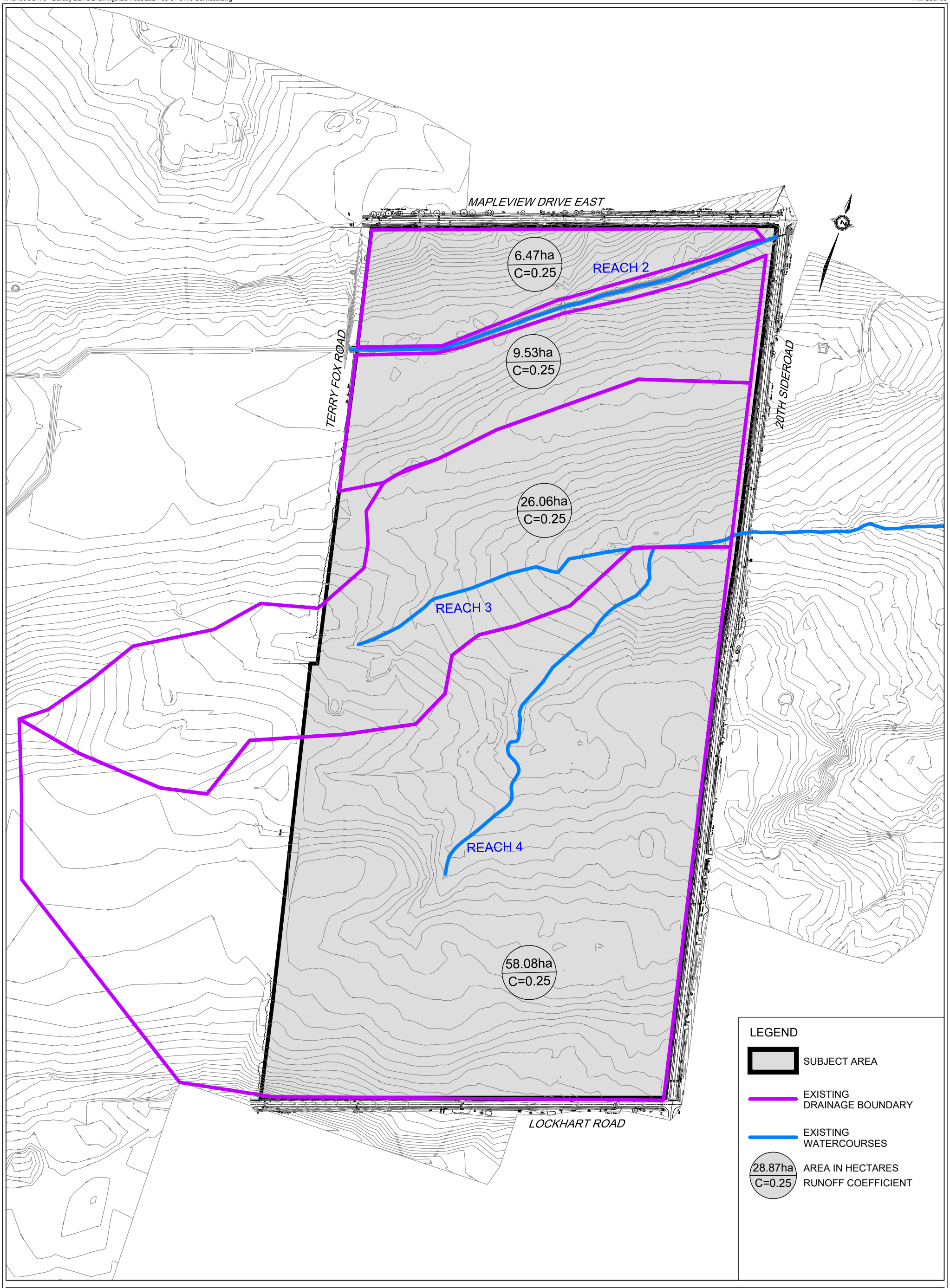
The north culvert in Reach 2 will be designed by TATHAM as part of the channel design which is subject to approval of the Lake Simcoe Region Conservation Authority (LSRCA). The latest design drawings from TATHAM are provided in **Appendix A** for reference. The south culvert along Reach 3 was investigated as part of AMEC's SWMMP and it was recommended to be upgraded from 1400mm CSPs to a 4000mm x 1000mm box culvert. Relevant excerpts of the SWMMP are attached in **Appendix A**.

4.1.3 Existing Soil and Groundwater Conditions

The existing soil conditions and groundwater conditions are reviewed using the Soil Report prepared by Soil Engineers Ltd. dated April 2017, as well as the Hydrogeological Study that R.J. Burnside prepared in August 2023. Relevant excerpts of the reports are provided in **Appendix A**.

The geotechnical report discloses that the subject site is generally underlain by strata of generally dense silty sand till and sandy silt till, and generally stiff silty clay till. The single well response testing results provided in the Hydrogeological Study (2023) indicates moderate hydraulic conductivities in the order of 10^{-4} cm/s to 10^{-5} cm/s for the subject site.

The Hydrogeological Study also investigated the groundwater conditions of the subject site by reviewing the water level monitoring results obtained between June 2019 and June 2023. The Hydrogeological Study revealed shallow groundwater across the site. The groundwater level across the subject site ranged from approximately 248 masl to 258 masl based on the groundwater contour map provided by R.J. Burnside, which can be seen in GR-SS-1 in **Appendix E**.



MAPLEVIEW DRIVE EAST AND 20TH SIDEROAD RESIDENTIAL SUBDIVISION
CITY OF BARRIE

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NOTE:

FIGURE 4.1
EXISTING
DRAINAGE PLAN

2022-5170	MAY 2024	SCALE: N.T.S.

4.2 DESIGN CRITERIA

Stormwater Management Design Criteria for the subject site follows the MECP Stormwater Management Planning and Design Manual (2003), City of Barrie Stormwater Infrastructure Design Standard (2023), and LSRCA Technical Guidelines for SWM submissions (2022) for quality, quantity and erosion control. Additional planning resolutions from AMEC's Stormwater Management Master Plan (2013) and R.J. Burnside's Sub-watershed Impact Study (2016) are incorporated into the design as listed below:

- Quality Control - Enhanced stormwater quality must be provided for the site with 80% TSS removal from 90% of average annual flows (MOECC) via a treatment train solution;
- Quantity Control – Conform to the SIS unitary release rates (2-to-100-year) established for Sandy Cove Creek;
- Critical design storms should be determined using the following storm types for the 2 to 100-year storm events as per City of Barrie requirements:
    - 4-hour Chicago (Barrie IDF)
    - 6, 12 and 24-hour SCS Type II
- Erosion Control – Runoff from a 25mm design storm be detained and released over a period of at least 24 hours, as well as conforming to the requirements of sub-watershed studies. The Hewitt's SIS provides unitary discharge and storage rates for Reaches 2 & 3 of Sandy Cove Creek, as provided in **Table 4.1**;

Table 4.1: SIS Erosion Control Requirements

Sandy Cove Creek	**Unitary Discharge Rate** ($m^3/s/ha$)	**Unitary Storage Reqd.** (m^3/imp. ha)
Reach 2	0.0010	310
Reach 3	0.0011	320

- Volume Control – LSRCA requires runoff volume of 25mm depth from all impervious surfaces be captured and retained on-site. Preference is given to infiltration techniques where possible, otherwise filtration is accepted. If the volume requirement cannot be complied with, LSRCA implements a flexible treatment approach as follows:
    - Alternative #1: Retain runoff from a 12.5 mm event from all impervious surfaces;
    - Alternative #2: Retain runoff from a 5 mm event from all impervious surfaces;
    - Alternative #3: Mitigation of 25mm volume reduction may be done off-site;

- Water Balance - The site is located within Significant Groundwater Recharge Areas (SGRA) and Highly Vulnerable Aquifer (HVA) areas, but not within the Wellhead Protection Q1/Q2 Areas (WHPAs), therefore, BMPs should be used to match post-development infiltration volumes to pre-development levels on an annual basis.
- Site plans including the school block are expected to use Best Management Practices (BMPs) to retain 5mm rainfall on-site.
- Phosphorous – LSRCA requires removal of 80% of the annual Total Phosphorous (TP) load from all major development areas.
- Storm sewer design shall be based on the Rainfall Intensity Curve expressed as Intensity=$A/(t+B)^C$, as provided in **Table 4.2** below:

Table 4.2: City of Barrie IDF

	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
A	675.586	843.019	976.898	1133.123	1251.473	1383.628
B	4.681	4.582	4.745	4.734	4.847	4.905
C	0.780	0.763	0.760	0.756	0.753	0.754

4.3 PROPOSED STORMWATER MANAGEMENT PLAN

Based on the proposed development plan prepared by MGP dated March 18, 2024, the subject site will consist of residential dwellings, public road ROWs, parks, and stormwater management ponds as outlined in **Table 1.1** . The post-development runoff coefficient and imperviousness for the subdivision is calculated for each sub-catchment area based on the land uses. Please refer to **Figure 1.2** for the proposed development plan and **Appendix D** for imperviousness calculations.

The development has been designed to maintain the pre-development drainage pattern to the greatest possible extent, as well as to conform to the SIS concept plans. Following the existing drainage pattern, the proposed grading plan divides the subdivision into three (3) catchments (201, 202, 203) as shown on **Figure 4.2**. Each catchment will have its own stormwater management scheme, with catchment 201 and 203 draining towards Reach 2, catchment 202 draining towards Reach 3 & 4. Each catchment is proposed with a dual drainage system designed in conformance with City of Barrie design guidelines. The minor system consists of the storm sewers, manholes, and catchbasins, which have been designed with sufficient capacity to capture and convey runoff from the 5-year event. The major system, consisting of roadways and overland flow paths, is designed to convey all runoff that is not captured by the minor system (up to and including the 100-year storm event). Please refer to **Figure 4.3** for the proposed SWM servicing plan.

Catchment 201 and 202 will be serviced by stormwater management ponds, referred to as SWM Pond 201 and SWM Pond 202 respectively, as shown on **Figure 4.2**. For the purposes of this report, it is assumed that the ponds will fully service their respective drainage areas. These areas can be refined during the detailed design stage when lot grading information is available. The wet ponds will store and attenuate runoff from 2-to-100-year rainfall events and maintain allowable release rates defined in the SIS. Both ponds will be designed with sufficiently sized permanent pools to achieve overall 80% TSS removal for an Enhanced level of water quality protection. As mentioned previously, shallow groundwater was identified on-site. As such, in regards to LSRCA's volumetric control requirements, a filtration strategy is pursued where both ponds will feature a cell containing a filter bed that will treat the 25mm rainfall volume from all impervious areas. The filtration cells will be designed in conformance with the MECP guidelines to provide effective filtration effects. Detailed discussion about volume control is provided in **Section 4.4**.

Erosion control criteria will be met by controlling release rates based on the storage and discharge rates set out in the SIS for each Reach. LSRCA erosion control criteria pertaining to the extended detention of the 25mm storm event will also be addressed along with the SIS criteria. Catchment 203 (Block 59 on the draft plan) is proposed to be developed in the future. It will feature on-site controls and will be required to meet all stormwater management criteria as described in Section 4.2. It should be noted that the catchment will

drain directly to the watercourse (Reach 2), therefore will not impact the proposed SWM ponds. For the purposes of this report, preliminary calculations and modelling for Catchment 203 have been completed which are discussed in **Section 4.3.4**. The site will also feature uncontrolled area which is proposed to drain directly to the creek (all reaches). The uncontrolled area will consist of primarily backyards which are expected to generate clean runoff. It should be noted that a portion of the uncontrolled area is proposed to include roadways and front yards (in the area of Street 'A' and 20th Sideroad). Although no quantity control is proposed for this area, quality control will be provided by a filtration unit that will treat flows before they discharge to Reach 3. This is further explained in **Section 4.3.5**. Regardless, sufficient control at the SWM facilities will be provided to ensure the overall flows leaving the development are within the allowable release rates.

Both water balance and phosphorous control measures are discussed at the subdivision level. A detailed water balance analysis has been carried out for the subdivision and it is concluded that the pre-development infiltration level can be maintained under post-development conditions with the proposed LID plan. Detailed discussion about water balance can be found in **Section 4.5**. Phosphorous controls for the development are provided in the SWM ponds and the filtration beds with phosphorous adsorptive media, along with upstream LID mitigation measures to achieve pre-development discharge loads or 80% load reduction. To determine the phosphorous removal efficiencies of the proposed measures, an analysis has been conducted using the Lake Simcoe Phosphorus Loading Development Tool (January 2012).

4.3.1 Catchment 201

Catchment 201 is south of Mapleview Drive and north of Sandy Cove Creek Reach 3, occupying 20.06 ha of the subject land. It is proposed to drain this catchment to Sandy Cove Creek Reach 2 via SWM Pond 201 located adjacent to 20th Sideroad. This catchment will have a total imperviousness of 67% (C-value of 0.67) under post development conditions. It should be noted that an external area will also be draining to the pond (EXT-1), consisting of an area of 15.53 ha with an imperviousness of 65%. This results in a total drainage area of 35.59 ha with a weighted imperviousness of 66% draining to Reach 2 via the proposed SWM pond. Please see **Figure 4.2** for the proposed drainage plan and **Figure 4.3** for the proposed servicing plan. The pond design details can be seen on drawings SWM-201-1 and SWM-201-2 provided in **Appendix E**.

4.3.1.1 Quality Control

LSRCA requires the major developments to provide Total Suspended Solids (TSS) removal measures satisfying the Enhanced Level of protection (80% removal) requirement defined in the MECP design guidelines (2003). It is expected to satisfy this requirement via the permanent pool in SWM Pond 201. SWM Pond 201 is a wet pond and it has been designed in conformance with the MECP design guidelines with a permanent pool sufficiently sized to provide 80% TSS removal.

Based on Table 3.2 of the MECP design guidelines, the required permanent pool volume to provide 80% TSS removal is calculated to be 6,252 m^3. The SWM pond has been designed with a permanent pool of 10,700 m^3, exceeding the volume requirement. As such, an Enhanced Level of protection is provided. The detailed permanent pool calculations have been provided in **Appendix D**. The provided permanent pool design can be found on Drawing SWM-1 provided in **Appendix E**.

4.3.1.2 Quantity Control

A detailed PCSWMM modelling exercise was carried out as part of the Subwatershed Impact Study (SIS) prepared by R.J. Burnside dated 2016. The modelling exercise revised the 2-to-100-year unitary discharge rates to Sandy Cove Creek under existing conditions, and set the updated unitary discharge rates as the peak threshold for all future developments.

As mentioned prior, Catchment 201 will be draining to Reach 2 via SWM Pond 201. Catchment 203, the future development area, will also be draining to Reach 2 (discussed further later in this report). As such, to best mimic existing conditions, the pre-development area draining to Reach 2 was considered. As is illustrated on **Figure 4.1**, 16.0 ha from the subject site is draining to Reach 2 in existing conditions. An external area of 15.53 ha (EXT-1) draining to Reach 2 was also considered. The overall allowable release

rates to Reach 2 were determined by multiplying this area (16 + 15.53 = 31.53 ha) with the unitary discharge rates as per the SIS. **Table 4-3** provides a summary of the allowable release rates to Reach 2.

Table 4.3: Reach 2 Allowable Release Rates

Design Storms	SIS Unitary Discharge Rates ($m^3/s/ha$)	Allowable Release Rates (m^3/s)
2-Year	0.002	0.063
5-Year	0.008	0.252
10-Year	0.015	0.473
25-Year	0.024	0.757
50-Year	0.032	1.009
100-Year	0.040	1.261

Given two storage systems will be draining to Reach 2 during post-development conditions (SWM Pond 201 servicing Catchment 201 + EXT-1 = 35.59 ha and Catchment 203 = 2.00 ha), allowable release rates were proportionally assigned based on area. **Table 4-4** provides the release rates based on the areas.

Table 4.4: Catchment 201 & 203 Allowable Release Rates

Design Storms	Allowable Release Rates (m^3/s) – Reach 2	Allowable Release Rates – EXT1+ 201 (m^3/s)	Allowable Release Rates - 203 (m^3/s)
2-Year	0.063	0.060	0.003
5-Year	0.252	0.239	0.013
10-Year	0.473	0.448	0.025
25-Year	0.757	0.716	0.041
50-Year	1.009	0.955	0.054
100-Year	1.261	1.194	0.067

SWM Pond 201 was modelled using Visual OTTHYMO with the established allowable release rates as shown in **Table 4.4** for all design storms as identified in **Section 4.2**. Results of the VO modelling have been summarized in **Table 4.5 and 4.6** below and full outputs are provided in **Appendix D**. As can be seen from **Table 4.5**, the actual release rates are at or below the allowable release rates for all storm events. As per **Table 4.6**, the maximum storage requirement was determined to be 25,034 m^3 for the 100-year 24-hour SCS storm. The pond has been designed with a capacity of 26,200 m^3, exceeding the requirement. It should be noted that the control structure for the pond will be finalized during the detailed design stage.

Table 4.5: SWM Pond 201 Release Rates

Design Storms	Allowable Release Rate (m^3/s)	4 HR Chicago (m^3/s)	6HR SCS (m^3/s)	12HR SCS (m^3/s)	24HR SCS (m^3/s)
2 year	0.060	0.043	0.050	0.054	0.060
5 year	0.239	0.096	0.190	0.189	0.239
10 year	0.448	0.212	0.366	0.349	0.448
25 year	0.716	0.399	0.609	0.581	0.715
50 year	0.955	0.533	0.809	0.771	0.955
100 year	1.194	0.656	1.032	0.988	1.193

Table 4.6: SWM Pond 201 Storage Requirements

Design Storms	4 HR Chicago (m^3)	6HR SCS (m^3)	12HR SCS (m^3)	24HR SCS (m^3)
2 year	8,484	9,878	10,595	11,698
5 year	12,346	14,027	13,991	14,871
10 year	14,405	16,175	16,006	17,011
25 year	16,512	18,950	18,608	20,238
50 year	18,031	21,158	20,790	22,595
100 year	19,519	23,385	22,938	25,034

4.3.1.3 Erosion Control

The erosion control measures for the catchment area to SWM Pond 201 have been designed in conformance with both the LSRCA design guidelines (2022) and the Subwatershed Impact Study (2016). LSRCA requires runoff from a 25mm design storm be detained and released over a period of at least 24 hours, while the SIS defines unitary rates for the required extended detention storage and allowable discharge. Based on the calculations provided in **Appendix D**, it has been shown that the SIS requirements are more stringent compared to the LSRCA requirement as the 25mm rainfall event is released at a higher rate with lower required storages. As such, the erosion control measures for all catchments have been designed following the more conservative SIS requirements, as summarized in **Table 4.1**. As such, by meeting the SIS requirements, the LSRCA requirements are deemed met.

The SIS requirements for the SWM Pond 201 catchment area were based on a total drainage area of 35.59 ha with an imperviousness of 66%. The allowable release rate and required storage targets were determined to be 0.036 m^3/s and 7282 m^3 respectively. These values were considered in the VO modelling for the SWM pond. During detailed design when the control structure is finalized, the SIS criteria shall be respected. Detailed calculations are provided in **Appendix D**.

4.3.1.4 Sediment Forebay Design

The function of the sediment forebay is to facilitate maintenance and improve pollutant removal by trapping larger particles from stormwater runoff near the inlet of the pond. The sizing of the sediment forebay is based on the settling length and dispersion length calculations provided in the MOE SWMPD Manual (March 2003). The forebay has been designed to provide a length to be the greater of the required settling and the dispersion length. The proposed forebay length of the pond is 63 m, exceeding the required length of 59 m. Detailed calculations are provided in **Appendix D**.

4.3.1.5 Emergency Spillway Design

The pond has been preliminarily designed with an emergency spillway to allow storm drainage to safely exit the facility in the event that the control mechanisms fail to function or the storm event exceeds a 100-year return period. The emergency spillway is placed at the maximum surface water elevation of the pond at 250.00 m. The spillway will directly outlet to Reach 2. The maximum capacity of the spillway is 19.41 m^3/s at an elevation of 250.50 m, which exceeds the 12.94 m^3/s 100-year peak uncontrolled inflow from the development. It should be noted that the routed Regional peak flow was determined to be 4.20 m^3/s. This results in an approximate water level of 250.20 m, maintaining a 0.30m freeboard as required by City of Barrie standards. Detailed calculations are provided in **Appendix D**.

4.3.2 Catchment 202

Catchment 202 is located in the west of 20th Sideroad and north of Lockhart Road, occupying 29.06 ha of the subject lands (66% imperviousness) accompanied with 3.80 ha of external drainage area (80% imperviousness) (as indicated in Figure 10 of the SWMPP – found in **Appendix A**). This results in a total drainage area of 32.86 ha with a weighted imperviousness of 68% which is proposed to drain to Sandy Cove Creek Reach 4 via proposed SWM Pond 202. Please see **Figure 4.2** for the proposed drainage plan and **Figure 4.3** for the proposed servicing plan.

4.3.2.1 Quality Control

LSRCA requires the major developments to provide Total Suspended Solids (TSS) removal measures satisfying the Enhanced Level of protection (80% removal) requirement defined in the MECP design guidelines (2003). It is expected to satisfy this requirement via the permanent pool in SWM Pond 202. SWM Pond 202 is a wet pond and it has been designed in conformance with the MECP design guidelines with a permanent pool sufficiently sized to provide 80% TSS removal.

Based on Table 3.2 of the MECP design guidelines, the required permanent pool volume to provide 80% TSS removal is calculated to be 5,926 m^3. The SWM pond has been designed with a permanent pool of 9,400 m^3, exceeding the volume requirement. As such, an Enhanced Level of protection is provided. The detailed permanent pool calculation has been provided in **Appendix D**. The provided permanent pool design can be found on Drawing SWM-2 provided in **Appendix E**.

4.3.2.2 Quantity Control

The allowable release rates for SWM Pond 202 are calculated from the 2-to-100-year unitary discharge rates defined in the SIS, as well as the pre-development drainage condition of Sandy Cove Creek Reach 4. A total pre-development area of 32.86 ha was considered to determine the allowable release rates. This is equal to the post-development area as the entire area is draining to Reach 4 in pre-development and post-development conditions. In other words, the natural drainage pattern is not being altered. The allowable release rates are summarized in **Table 4.7**.

Table 4.7: Reach 4 Allowable Release Rates

Design Storms	SIS Unitary Discharge Rates ($m^3/s/ha$)	Allowable Release Rates (m^3/s)
2-Year	0.002	0.066
5-Year	0.008	0.263
10-Year	0.015	0.493
25-Year	0.024	0.789
50-Year	0.032	1.052
100-Year	0.040	1.314

SWM Pond 202 was modelled using Visual OTTHYMO with the established allowable release rates as shown in **Table 4.7** for all design storms as identified in **Section 4.2**. Results of the VO modelling have been summarized in **Table 4.8 and 4.9** below and full outputs are provided in **Appendix D**. As can be seen from **Table 4.8**, release rates are at or below the allowable release rates for all storm events. As per **Table 4.9**, the maximum storage requirement was determined to be 22,797 m^3 for the 100-year 24-hour SCS storm. The pond has been designed with a capacity of 24,000 m^3, exceeding the requirement. It should be noted that the control structure for the pond will be finalized during the detailed design stage.

Table 4.8: SWM Pond 202 Release Rates

Design Storms	Allowable Release Rate (m^3/s)	4 HR Chicago (m^3/s)	6HR SCS (m^3/s)	12HR SCS (m^3/s)	24HR SCS (m^3/s)
2 year	0.066	0.043	0.054	0.059	0.066
5 year	0.263	0.116	0.210	0.206	0.262
10 year	0.493	0.235	0.394	0.373	0.492
25 year	0.789	0.419	0.664	0.638	0.789
50 year	1.052	0.566	0.889	0.852	1.051
100 year	1.314	0.704	1.137	1.092	1.313

Table 4.9: SWM Pond 202 Storage Requirements

Design Storms	4 HR Chicago (m^3)	6HR SCS (m^3)	12HR SCS (m^3)	24HR SCS (m^3)
2 year	8,004	9,267	9,844	10,737
5 year	11,474	12,863	12,807	13,645
10 year	13,246	14,796	14,611	15,666
25 year	15,016	17,291	17,052	18,478
50 year	16,360	19,288	18,991	20,613
100 year	17,672	21,329	20,954	22,797

4.3.2.3 Erosion Control

The erosion control measures for the catchment have been designed in conformance with the SIS unitary flow rates and storage requirements for Sandy Cove Creek Reach 4, as summarized in **Table 4.1**. As mentioned prior, based on calculations provided in **Appendix D**, meeting the SIS criteria would also satisfy LSRCA criteria for the extended detention of the 25mm rainfall event.

The SIS requirements for the SWM Pond 202 catchment area were based on a total drainage area of 32.86 ha with an imperviousness of 68%. The allowable release rate and required storage targets were determined to be 0.036 m^3/s and 7150 m^3 respectively. These values were considered in the VO modelling for the SWM pond. During detailed design when the control structure is finalized, the SIS criteria shall be respected. Detailed calculations are provided in **Appendix D**.

4.3.2.4 Sediment Forebay Design

The function of the sediment forebay is to facilitate maintenance and improve pollutant removal by trapping larger particles from stormwater runoff near the inlet of the pond. The sizing of the sediment forebay is based on the settling length and dispersion length calculations provided in the MOE SWMPD Manual (March 2003). The forebay has been designed to provide a length to be the greater of the required settling and the dispersion length. The proposed forebay length of the pond is 64 m, exceeding the required length of 56 m. Detailed calculations are provided in **Appendix D**.

4.3.2.5 Emergency Spillway Design

The pond has been preliminarily designed with an emergency spillway to allow storm drainage to safely exit the facility in the event that the control mechanisms fail to function or the storm event exceeds a 100-year return period. The emergency spillway is placed at the maximum surface water elevation of the pond at 254.00 m. The spillway will directly outlet to Reach 2. The maximum capacity of the spillway is 19.25 m^3/s at an elevation of 254.50 m, which exceeds the 12.03 m^3/s 100-year peak uncontrolled inflow from the development. It should be noted that the routed Regional peak flow was determined to be 4.16 m^3/s. This results in an approximate water level of 254.20 m, maintaining a 0.30m freeboard as required by City of Barrie standards. Detailed calculations are provided in **Appendix D**.

4.3.3 SWM Pond Design Summary

Each of the SWM facilities are designed to satisfy Section 4.7 of the *SWM infrastructure Design Standards, 2023.* A summary of each design component per Section 4.7 is provided below.

- 4.7.1 – The forebay length to width ratio achieves a minimum 2:1 ratio in satisfaction of MOE criteria
- 4.7.2 – The sloping of the SWM Ponds is in accordance with standard D780
- 4.7.3 – The water elevations within each facility and the depth of each cell are in accordance with Standard D780. A maximum depth of 2 m is provided for the permanent pool and active storage.
- 4.7.4 – The permanent pool and erosion control of each SWM Pond are designed to satisfy the MOE and LSRCA design standards
- 4.7.5 – The forebay length of each facility satisfies the dispersion length requirements as per MOE standards. A top berm greater than 1 m is provided in each facility. Standard D781 shall be applied at the detailed design stage by the design of a dewatering sump. Geotechnical and hydrogeological recommendations shall be applied to the liner design of each SWM Pond
- 4.7.6 – A spillway depth of 0.50 m is provided in each facility which maintains 0.30 m freeboard.
- 4.7.7 – The berms around the SWM Ponds are 2 m wide with maximum 3:1 side slopes
- 4.7.8 – Sediment drying areas are sized per the standard
- 4.7.9 – 5.0 m wide access roads are provided to grant access for maintenance. The detailed design of the access road cross-section shall be in accordance with Barrie standards and will be provided at the detailed design stage
- 4.7.10 - Fencing shall be provided in SWM Pond 201 if deemed necessary by the City. SWM Pond 202 does not abut private lots.
- 4.7.11 – A SWM Pond landscaping plan shall be provided at the detailed design stage
- 4.7.12 - Warning signage per standard D783 shall be provided at the detailed design stage
- 4.7.13 – Inlet structures to each facility are placed above the permanent pool elevation. The design of each inlet structure shall be completed at the detailed design stage per applicable standards
- 4.7.14 - Outlet structures are preliminarily shown within each SWM Pond. The outlet structure design shall be completed at the detailed design stage in accordance to standards D777 and D778
- 4.7.15 – The spillway within each facility is sized to convey the greater of the 100-year storm flow or the Regional storm flow
- 4.7.16 – Overland flow routes to the SWM Ponds are not provided
- 4.7.17 – Anti-seepage collars shall be provided at the detailed design stage with recommendations by the geotechnical and the hydrogeological consultant
- 4.7.18 – The liner requirements for each facility shall be confirmed at the detailed design stage with recommendations by the geotechnical and the hydrogeological consultant

- 4.7.19 – The ponds are not proposed to be used for Fire flow requirements
- 4.7.20 – Reasonable measures shall be incorporated at the detailed design stage. The depth of the permanent pool of each facility exceeds 1 m.
- 4.7.21 – Appropriate thermal mitigation measures related to landscaping shall be proposed at the detailed design stage. Both facilities shall provide a bottom draw discharge.
- 4.7.22 - Pedestrian trails are not proposed around the perimeter of each facility
- 4.7.23 - Operation and maintenance plan shall be provided at the detailed design stage

4.3.4 Catchment 203

Catchment 203 is south of Mapleview Drive and north of Sandy Cove Creek Reach 2, occupying 2.00 ha of the subject land. This catchment is classified as a future development as per the draft plan (Block 59). It is proposed to drain this catchment to Sandy Cove Creek Reach 2 via on-site controls. The exact specifics of the stormwater management scheme for the block shall be finalized in the future when the area goes to develop. For the purposes of this report, preliminary calculations and modelling has been done. This catchment is assumed to have a conservative imperviousness of 79% (C-value of 0.75) under post development conditions. Please see **Figure 4.2** for the proposed drainage plan and **Figure 4.3** for the proposed servicing plan.

4.3.4.1 Quality Control

As per LSRCA requirements, 80% TSS removal for an Enhanced Level of protection must be provided for the catchment. This could be accomplished through various treatment measures however the specifics of this shall be determined when the site proceeds to development.

4.3.4.2 Quantity Control

The allowable release rates for the catchment are calculated from the 2-to-100-year unitary discharge rates defined in the SIS, as well as the pre-development drainage condition of Sandy Cove Creek Reach 2. The detailed calculation was previously explained in Section 4.3.1.2 which proportionally assigned allowable release rates to Catchment 203 and SWM Pond 201 based on the total allowable discharge to Reach 2 for all storm events. The allowable release rates are provided in **Table 4.10**.

Table 4.10: Catchment 203 Allowable Release Rates

Design Storms	Allowable Release Rates (m^3/s)
2-Year	0.003
5-Year	0.013
10-Year	0.025
25-Year	0.041
50-Year	0.054
100-Year	0.067

The catchment was modelled using Visual OTTHYMO with the established allowable release rates as shown in **Table 4.10** for all design storms as identified in **Section 4.2**. Results of the VO modelling have been summarized in **Table 4.11 and 4.12** below and full outputs are provided in **Appendix D**. As can be seen from **Table 4.11**, release rates are at or below the allowable release rates for all storm events. As per **Table 4.12**, the maximum storage requirement was determined to be 1,527 m^3 for the 100-year 24-hour SCS storm. The design of the storage system and control structure shall be finalized when the site proceeds to development.

Table 4.11: Catchment 203 Release Rates

Design Storms	Allowable Release Rate (m^3/s)	4 HR Chicago (m^3/s)	6HR SCS (m^3/s)	12HR SCS (m^3/s)	24HR SCS (m^3/s)
2 year	0.003	0.002	0.003	0.003	0.003
5 year	0.013	0.004	0.010	0.010	0.013
10 year	0.025	0.011	0.020	0.019	0.025
25 year	0.041	0.022	0.034	0.033	0.041
50 year	0.054	0.030	0.046	0.044	0.054
100 year	0.067	0.037	0.058	0.056	0.067

Table 4.12: Catchment 203 Storage Requirements

Design Storms	4 HR Chicago (m^3)	6HR SCS (m^3)	12HR SCS (m^3)	24HR SCS (m^3)
2 year	537	623	672	750
5 year	775	880	882	932
10 year	902	1005	996	1054
25 year	1027	1163	1143	1239
50 year	1114	1292	1270	1381
100 year	1199	1423	1399	1527

4.3.4.3 Erosion Control

The erosion control measures for the catchment have been designed in conformance with the SIS unitary flow rates and storage requirements for Sandy Cove Creek Reach 2, as summarized in **Table 4.1**. As mentioned prior, based on calculations provided in **Appendix D**, meeting the SIS criteria would also satisfy LSRCA criteria for the extended detention of the 25mm rainfall event.

The SIS requirements for the catchment were based on a total drainage area of 2.00 ha with an imperviousness of 79%. The allowable release rate and required storage targets were determined to be 0.002 m^3/s and 490 m^3 respectively. These values were considered in the VO modelling for the catchment. During detailed design when the control structure is finalized, the SIS criteria shall be respected. Detailed calculations are provided in **Appendix D**.

4.3.5 Uncontrolled Area

Due to grading constraints, there will be approximately 1.13 ha of uncontrolled area in the north of Reach 3, near the channel crossing at 20th Sideroad. This area has an imperviousness of 70%. The proposed plan is to discharge the uncontrolled runoff to Reach 3 & 4 at downstream of the confluence of the two reaches. Prior to discharge, a Jellyfish unit (or an approved equivalent) is proposed to provide 80% TSS removal.

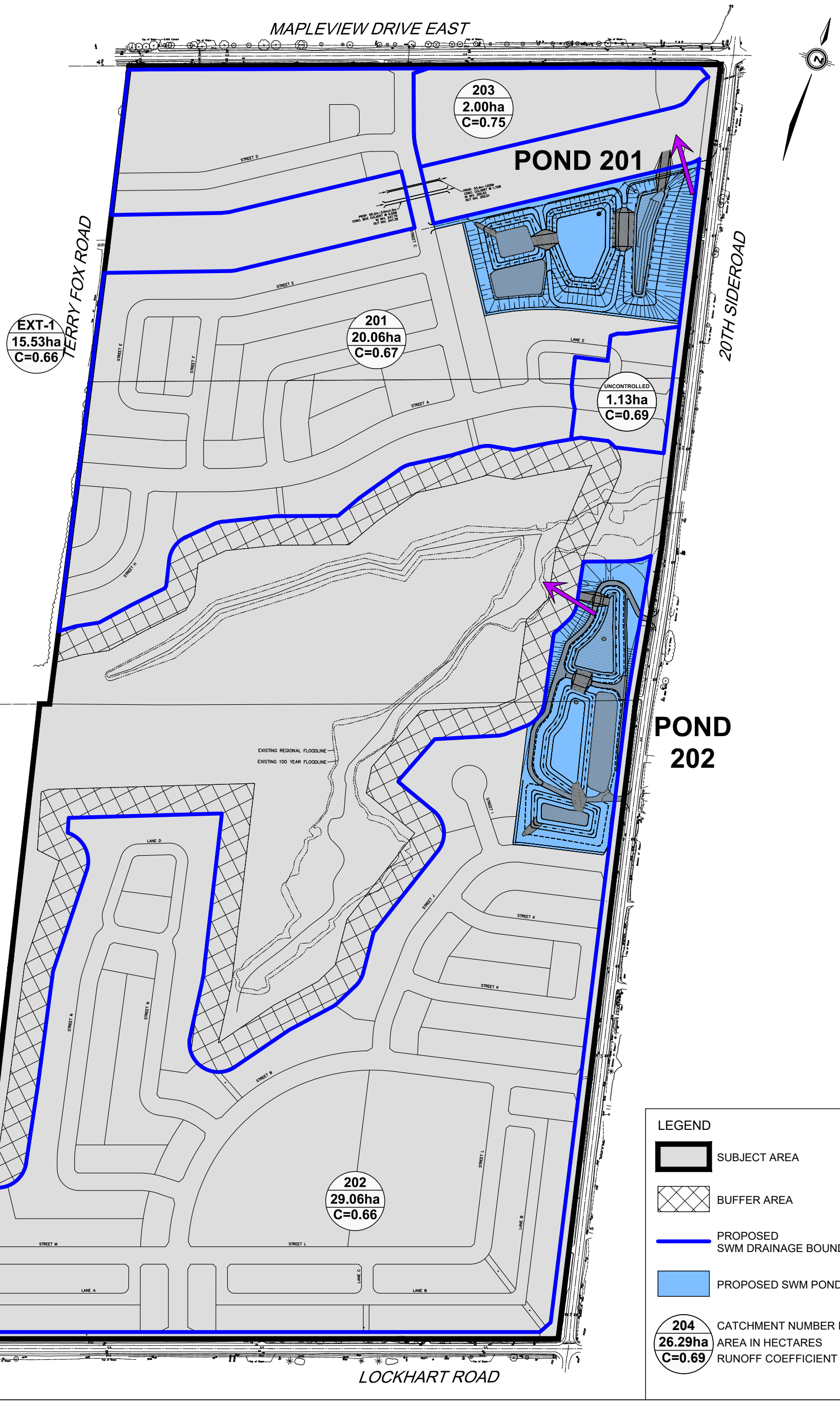
The impact of having the uncontrolled area has been analyzed by comparing the pre and post development flows to Reach 3 & 4 at the location of the proposed outlet. In the pre-development condition, there are total of 84.14 ha of land contributing to Reach 3 and 4, as shown in **Figure 4.1**. The pre-development condition is modelled in VO as shown in **Appendix D** and the results are summarized in **Table 4.13**.

During post-development conditions, the drainage area contributing to Reach 3 & 4 will cover 75.42 ha of lands. This area has been reduced from the pre-development drainage area of 84.14 ha due to a significant portion of the area (8.72ha) has been redirected to the engineered channel (Reach 2) via SWM Pond 201. The flows that remain contributing to Reach 3 & 4 consist of controlled flow from SWM Pond 202, runoff from the NHS area (including Reaches and buffers), and runoff from the uncontrolled area. Post-development flows to Reach 3 & 4 have been simulated using the VO model. In VO, the NHS area is simulated with the same parameters as in the pre-development conditions (including CN, IA, and Tp), but with a smaller area. The modeling results of the post-development condition are summarized in **Table 4.13** with the VO model outputs provided in **Appendix D**.

Table 4.13: Pre- to Post-Development Flows to Reach 3&4

Storm Event	4HR Chicago (m^3/s)		6HR SCS (m^3/s)		12HR SCS (m^3/s)		24HR SCS (m^3/s)	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
2 year	0.234	0.169	0.317	0.222	0.332	0.232	0.392	0.273
5 year	0.482	0.366	0.685	0.566	0.682	0.560	0.798	0.672
10 year	0.689	0.589	1.002	0.902	0.981	0.874	1.146	1.028
25 year	0.995	0.924	1.510	1.371	1.446	1.311	1.704	1.503
50 year	1.277	1.196	1.999	1.740	1.886	1.654	2.271	1.894
100 year	1.577	1.453	2.751	2.138	2.470	2.022	3.398	2.308

Based on the presented results, it is evident that the post-development flow will remain below the pre-development level for all design storms. Consequently, it can be concluded that discharging uncontrolled flows into Reach 3 & 4 will not have any adverse impacts on the receiving watercourse.



LEGEND

- SUBJECT AREA
- BUFFER AREA
- PROPOSED SWM DRAINAGE BOUNDARY
- PROPOSED SWM POND
- 204 / 26.29ha / C=0.69 — CATCHMENT NUMBER ID / AREA IN HECTARES / RUNOFF COEFFICIENT

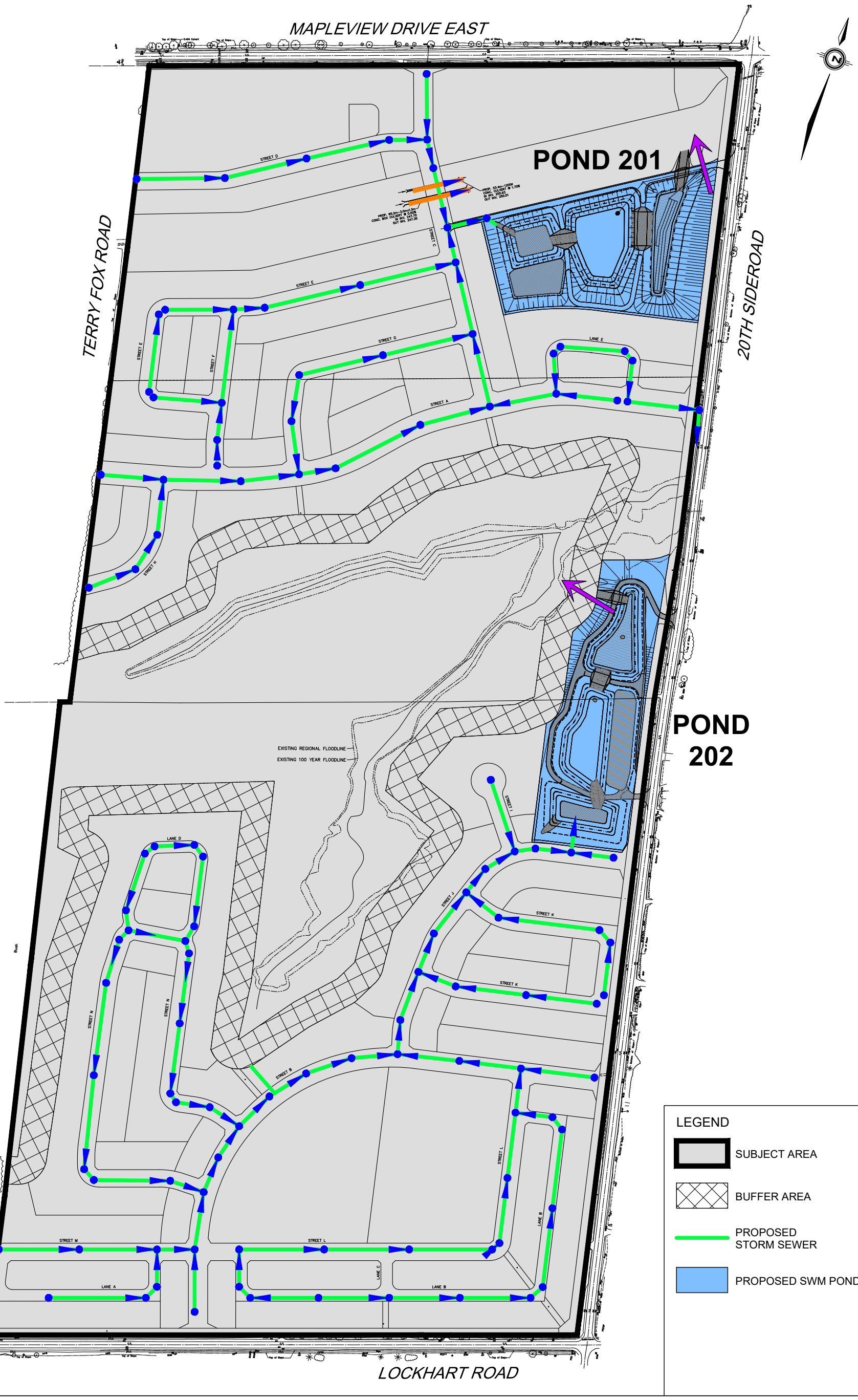
MAPLEVIEW DRIVE EAST AND 20TH SIDEROAD RESIDENTIAL SUBDIVISION
CITY OF BARRIE

SCHAEFFERS
CONSULTING ENGINEERS
6 Ronrose Drive, Concord, Ontario L4K 4R3
Tel: (905) 738-6100 Email: general@schaeffers.com
www.schaeffers.com

NOTE:
- BASED ON PRELIMINARY LOT CONCEPT

FIGURE 4.2
PROPOSED
DRAINAGE PLAN

2022-5170	MAY 2024	SCALE: N.T.S.



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www.schaeffers.com

NOTE:
- BASED ON PRELIMINARY LOT CONCEPT

FIGURE 4.3
PROPOSED
STORM SERVICING PLAN

2022-5170	MAY 2024	SCALE: N.T.S.

4.4 VOLUME CONTROL

As per LSRCA requirements, runoff volume of a 25mm rainfall depth from all impervious surfaces of the proposed development should be captured and retained / treated on-site for volume control purposes. When considering volume reduction techniques, higher priority shall be given to BMPs/LIDs that include volume reduction. Secondary preference is to employ filtration techniques, followed by rate control BMPs.

The hydrogeological studies for the subject site reveal high groundwater conditions across the site, preventing the implementation of centralized subsurface infiltration measures. As such, in order to meet the LSRCA volumetric control requirements, lot-level LID retention measures are proposed. The following table summarizes the proposed measures and relevant details.

Table 4.14: Proposed Retention Measures

Measure	Location	Dimensions
Rain Gardens	Front yards of all lots	1.5m x 1.5m x 0.3m (LxWxD) Total = 168.8 m^3
Bioretention Swales	Public boulevards where separation from groundwater possible	431m x 1m x 0.3m (LxWxD) 51.7 m^3 total
Greenstorm Tanks	Public boulevards where separation from groundwater possible	117m x 1.6m x 0.29m (LxWxD) 53.9 m^3 total
Infiltration Swales	Along NHS buffer	1672 m x 0.3m x 0.3m (LxWxD) 240.8 m^3 total

In addition to the above noted measures, Block 58 as per the draft plan (medium density) is proposed to provide 2.5mm on-site retention. Block 61 (school block) is proposed to provide 4.2mm on-site retention. In regards to Catchment 203 (Block 59 as per draft plan), the future development area, details of how the block will meet LSRCA volume control requirements are to be finalized when the catchment goes to develop. The block is expected to retain 2.5mm on-site. It should also be noted the block is expected to meet all stormwater management requirements including volume control on-site. Please see **Figure 4.4** for the LID plan. Overall, best efforts have been made to retain the post-development runoff from all impervious areas which also provides a water balance benefit (**Section 4.5**).

As a second mitigation layer, each SWM pond is proposed to contain a third cell for filtration of a 25mm storm runoff depth generated from the impervious areas across the subdivision. As shown in the drawings

provided in **Appendix E**, it is proposed to discharge the extended detention flows (as per erosion criteria) from the proposed SWM ponds onto the surface of the filtration bed. A layer of sand filter amended with phosphorus adsorptive media is proposed to provide the required filtration effects and reduce the phosphorus load leaving the site. The proposed sand filtration beds are proposed to be equipped with perforated pipes within washed gravel, wrapped with a filter fabric at the bottom of the sand filter to convey the flows to the outlet after filtration. Fused high-density polyethylene sheets are proposed at the bottom of the sand filter to prevent groundwater contamination.

The proposed sand filtration beds have been designed based on the Darcy Equation (Equation 4.12: Surface Area of Filter from MECP Manual, 2003) with the following design parameters:

- The design volumes for the catchments are calculated based on the 25mm runoff volume from all impervious areas.
- The proposed sand media will have a depth of 0.8 m, with a permeability coefficient of 45 mm/hr.
- The operating heads of water on the filters are expected to be maintained at a maximum of 0.30 m, which is less than the maximum allowable depth of 1.0 m as instructed in the MECP Manual (2003). Therefore, compaction of the sand filter due to water load will not be expected.
- The sand filtration beds are expected to be drained within 48 hours as a grace period between two storm events.

Based on the above design parameters, the minimum footprint required for each sand filtration bed to provide effective filtering and to maintain 48-hour drawdown are calculated and summarized in **Table 4.14** below. Detailed filter sizing calculations can be found in **Appendix D**.

Table 4.15: Proposed Sand Filtration Beds

Catchment/Pond	Design Volume	Required Footprint	Provided Footprint
201	5,872 m^3	2,095 m^2	2,300 m^2
202	5,586 m^3	2,095 m^2	2,095 m^2

Overall, the proposed decentralized LID measures will provide 1.85 mm of retention (refer to **Section 4.5** for water balance), and the proposed filtration beds will filtrate all 25mm runoff generated from the impervious areas across the subdivision, thereby, satisfying the LSRCA criteria for volume control.

4.5 WATER BALANCE

The hydrogeological report prepared by R.J. Burnside dated August 2023 identifies the subject site within the Significant Groundwater Recharge Areas (SGRAs) and Highly Vulnerable Aquifer (HVA) areas, but not within the Wellhead Protection Q1/Q2 Areas (WHPAs). Therefore, BMP should be used to match post-development infiltration volumes to pre-development levels on an annual basis. Relevant excerpts of the report are attached in **Appendix A**.

A detailed subdivision-wide water balance analyses has been completed as per the MECP Stormwater Management Planning and Design Manual (March 2003). The parameters used in the analysis are obtained from R.J. Burnside's SIS and Hydrogeological reports, including annual precipitation, infiltration amount, runoff amount, and annual evapotranspiration. Relevant excerpts of the SIS are attached in **Appendix A**, and the detailed water balance analysis is presented in **Appendix D**.

The water balance analysis was assessed in two stages based on each reach or natural feature:

1. ***Reach 2*****:** Part of Catchment 201 + Catchment 203;
2. ***Reach 3*****:** Remainder of Catchment 201 + Catchment 202;

The analysis reveals a total pre-development annual infiltration amount of 90,819 m^3 and it will drop to 30,840 m^3 under post-development conditions if no mitigations are implemented. Thus, the combined annual pre-to-post-development infiltration deficit is calculated to be 59,979 m^3.

LID measures, like rain gardens in front lawns and bioretention swales in public boulevards, offer significant potential to meet the water balance deficits across the site. Rain gardens are investigated at this stage as they are more appropriate when the groundwater table is generally high due to their smaller depths. However, other alternatives might also demonstrate their capacity to satisfy the site's water balance requirement. These alternatives can be an be explored further during the detailed design stage.

In addition to the scattered rain gardens, the southern area (Part of 201 + Uncontrolled + 202) assumes 4.2mm retention in the school block as well as infiltration swales along the buffer of the NHS area. It should also be noted that Block 58 and 59 as per the draft plan (within Catchment 201 and 203) are expected to do 2.5mm on-site retention. The proposed LID plan for the subdivision can be seen in **Figure 4.4**.

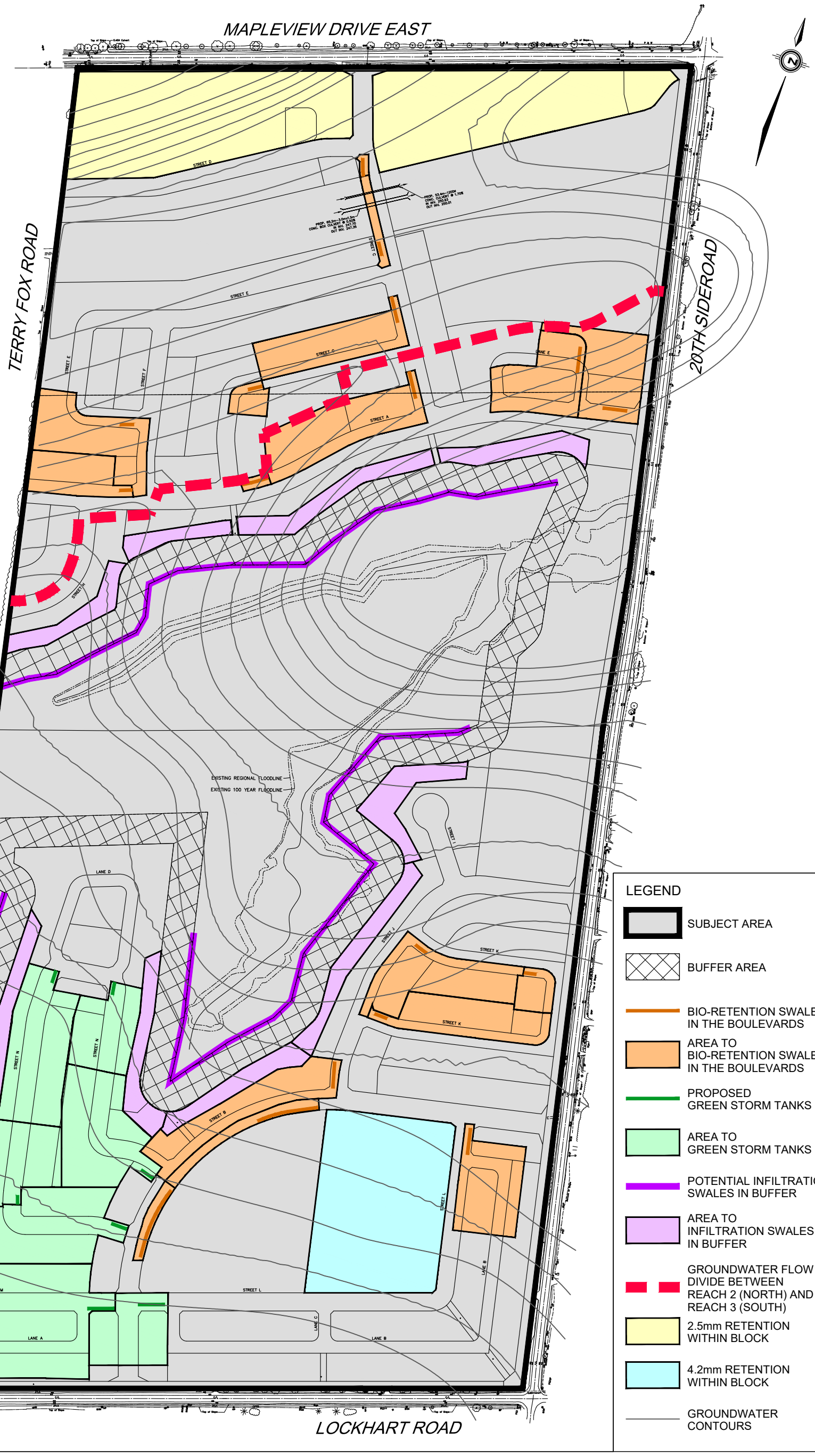
<u>Area North of Reach 3</u>

The infiltration deficit for the northern area is 15,142 m^3/year. The mitigation measures explored at this stage will include proposing a rain garden in the front yards of all residential lots. Each rain garden is sized at 1.50m x 1.50m x 0.30m (LxWxD) providing a volume retention of 0.27 m^3. Bioretention swales are

proposed along select boulevards identified in the LID plan (**Figure 4.4**) with a width of 1.0m, a depth of 0.30m, and a total cumulative length of 99m. The final infiltration measure is the retention of 2.5mm in the site plan areas (Block 58 & 59 per draft plan). Overall, the combined effect of the mitigation measures provides an increase of 15,494 m^3/year in infiltration, eliminating the deficit. Detailed water balance calculations are found in **Appendix D**. While rain gardens have demonstrated their adequacy in achieving water balance in the northern area, it is worthwhile to explore alternative LID options during the detailed design stage.

Area South of Reach 3

The infiltration deficit for the southern area is determined to be 44,837 m^3/year. The rain gardens for this portion of the subdivision are proposed for all lots at 1.50m x 1.50m x 0.30m (LxWxD). Similarly to the northern area, bioretention swales (sized at 1.0m width and 0.30m depth and total boulevard length of 332m) are proposed on select boulevards where 1m separation distance from the groundwater elevation can be provided. Additionally, narrow tanks (Greenstorm) are proposed along some boulevards which will take minor storm flows and provide infiltration within 48 hours. The infiltration tanks are proposed along a total stretch of 117m with a width of 1.60m and depth of 0.29m. Wider infiltration swales are proposed along the buffer zones of the NHS area, namely along Reach 3 and Reach 4. The swales will have a top width of 2.10m and a bottom width of 0.30m, a depth of 0.30m, and a cumulative length of 1672m along the reaches. The final infiltration measure is the retention of 4.2mm in the school block. These measures provide an increase of 44,908 m^3/year in infiltration, eliminating the deficit. Overall, the specified mitigation measures can provide an increase of 60,402 m^3 in annual infiltration volumes, a slight increase from the overall site deficit of 59,925 m^3. Please note that the proposed LID plan is preliminary and alternative measures can be investigated at the detailed design stage to satisfy water balance requirements.



MAPLEVIEW DRIVE EAST AND 20TH SIDEROAD RESIDENTIAL SUBDIVISION
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Tel: (905) 738-6100 Email: general@schaeffers.com
www.schaeffers.com

NOTE:
- BASED ON PRELIMINARY LOT CONCEPT
- RAIN GARDENS ARE PROPOSED ON THE FRONT YARD OF ALL SINGLE DETACHED AND TOWNHOUSE LOTS

FIGURE 4.4
PROPOSED
LID PLAN

2022-5170	MAY 2024	SCALE: N.T.S.

4.6 PHOSPHOROUS CONTROL

According to "*LSRCA Technical Guidelines for Stormwater Management Submission, April 2022"*, major developments shall be accompanied by a stormwater management plan that demonstrates how the loadings from the proposed development shall be minimized through an evaluation of anticipated changes in phosphorus loadings between pre-development and post-development.

In addition to the above, removal of 80% of the annual Total Phosphorus (TP) load from all major development areas will be required. The phosphorus removal rates recommended in the MECP's Lake Simcoe Phosphorus Loading Development Tool has been used in calculations. It should be noted that Catchment 203, the future development, is expected to meet phosphorus control requirements as stipulated by the LSRCA on-site. Hence, calculations pertaining to this have been excluded.

4.6.1 Pre-Development Phosphorus Loading

The subject site is located within the Innisfil Creeks Sub-watershed (Sandy Cove Creek) and is currently occupied for agricultural use. The MECP phosphorus loading rate of 0.19 kg/ha/year for croplands has been used to calculate the pre-development phosphorus loading from the subject site. Based on the developed area of 52.25 ha, the pre-development phosphorus loading is determined as follows:

$$TP_{pre\text{-}development} = 52.25 \text{ ha} \times 0.19 \text{ kg/ha/year} = 9.93 \text{ kg/year.}$$

4.6.2 Post-Development Phosphorus Loading

Based on the MECP Phosphorous Tool, a post-development phosphorus loading rate of 1.32 kg/ha/year is used to calculate the annual phosphorous load for the subject site. Detailed calculations based on a developed area of 52.25 ha and a loading coefficient of 1.32 kg/ha/year are provided in **Appendix D**.

Please note the external drainage areas are not included in the calculation as it is expected that the TP loads from the external areas are to be compensated through the respective applications. Nevertheless, the runoff from the external drainage areas will still be conveyed to the proposed mitigation SWM facilities for treatment. Details about the mitigation measures are discussed in the following section.

4.6.3 Post-Development Mitigation Measures

Treatment train approaches have been proposed to minimize the TP discharge from the catchments as discussed in quality control sections. The proposed phosphorous mitigation treatment approach for Catchments 201 and 202 are comprised of the wet pond, rain gardens, bioswales, and infiltration tanks. It

should be noted that the SWM ponds will be designed with a third cell containing a filter bed with Sorbtive media which will provide phosphorus removal. Catchment 203 (to be developed in the future), will be required to meet phosphorus control requirements to LSRCA's satisfaction on-site. For the purposes of this report, the site plan is assumed to provide a Jellyfish unit (or equivalent) for phosphorus removal purposes. The uncontrolled area will also be subject to phosphorus removal via a proposed Jellyfish unit (or equivalent) as well as bioretention swales as shown on Figure 4.4.

The phosphorous reduction values are obtained from the LSRCA SWM Guidelines (April 2022), and are listed as follows:

- Wet Pond: 63%
- Sorbtive Media: 79%
- Filtration Unit: 40%
- Bioretention Swales: 65%
- Boulevard Infiltration Tanks: 60% (same credit as infiltration trenches)
- Buffer Swales: 65%

Overall, the phosphorous removal efficiency for the subject site (52.25 ha) is calculated to be 89.40%. The calculation performed using the MOECC's Lake Simcoe Phosphorus Loading Development Tool, provided in **Appendix D**, shows that the proposed LID measures will reduce the post-development annual phosphorus loading from 68.97 kg/year to 7.29 kg/year, which is less than the pre-development discharge load.

5 SUMMARY AND CLOSING REMARKS

This Functional Servicing & Stormwater Management Report presents a municipal servicing scheme for the proposed Dorsay development in the Hewitt's Secondary Plan Area within the City of Barrie. The contents of the report demonstrate the requirements and feasibility of the proposed development in order to be successfully serviced within the framework of the current and future infrastructure.

Water Supply:

It is proposed to supply domestic and fire flow demands to the lands north of Reach 3 via upgrades along Mapleview Drive East and Terry Fox Drive; however insufficient water volumes are available in PD 2S. As a result, the Dorsay lands cannot be fully serviced water until developments to the west are complete and solutions are implemented to address water volume shortage in the pressure district. A possible solution identified in the Water Supply Master Plan Update (WSP, 2019) is to use surface water supply along with excess groundwater supply.

Sanitary Servicing:

In order to service the proposed subdivision, a pumping station is proposed southwest of the intersection at Mapleview Drive East and 20th Sideroad. Two internal sanitary sewer networks are proposed with Sandy Cove Creek Reach 2 being the divide. Each internal system will discharge flows to the pumping station which will pump flows west via a 250mmØ twin forcemain. The future East Annex pumping Station and associated forcemains will be designed adequately to service the Dorsay lands, according to the Sanitary Drainage Plan and Sanitary Sewer Design Sheet prepared by R.J. Burnside.

Stormwater Management:

The Dorsay development consists of two drainage outlets under existing conditions; drainage to Sandy Cove Creek Reach 2, and drainage to Sandy Cove Creek Reach 3. The site is split up into four catchments during post-development conditions; 201, 202, 203, and uncontrolled. Catchments 201 and 202 will feature a wet pond each to provide erosion, quantity, quality, volume, and phosphorus control.

The permanent pools within each pond have been sufficiently sized to provide 80% TSS removal for an enhanced level of protection. Quantity control is based on allowable release rates determined by the unitary discharge rates to Sandy Cove Creek as defined in the SIS. Sufficient active storage has been provided in ponds to meet the allowable release rates for all design storms. Erosion control criteria is based on the unitary discharge and storage rates provided by R.J. Burnside in the Hewitt's Secondary Plan Area SIS

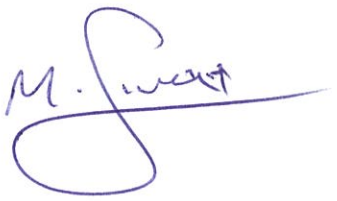
(2016). The required erosion discharge and storage rates are maintained in the filtration beds proposed for both ponds. The filtration beds also provide the required volumetric control as defined by LSRCA to treat a runoff volume of 25mm. As groundwater levels are consistently high in the subject lands, it was determined that infiltrating the 25mm volume is unfeasible. Additionally, phosphorous adsorptive media (Sorbtive media) is proposed to be embedded within the filtration beds to reduce the Total Phosphorous (TP) load leaving the ponds. Since the site is within a Significant Groundwater Recharge Area (SGRA), a pre-development and post-development water balance analysis has been completed. In order to maintain existing infiltration levels, rain gardens are proposed for all residential lots, bioretention swales and infiltration tanks are proposed along the ROW boulevards, and swales are proposed along the buffers of the NHS area. It should be noted that 2.5mm on-site retention is proposed for the medium density block (Block 58 as per the draft plan) and 4.2mm on-site retention is proposed for the school block.

Catchment 203 is a future development area which will provide all stormwater management controls on-site. These controls shall be finalized during the site plan application stage. It should be noted that 2.5mm on-site retention is proposed for the catchment. There is also an uncontrolled area (1.13ha) draining directly to Reach 3 due to grading constraints. It has been demonstrated through modelling that the uncontrolled flows from this area will not negatively impact the receiving watercourse. Note however, quality control for this area is proposed to be provided via a filter unit (80% TSS removal).

We trust that you will find the contents of this report satisfactory. Please contact the undersigned if you have any questions or concerns.

Respectfully Submitted,

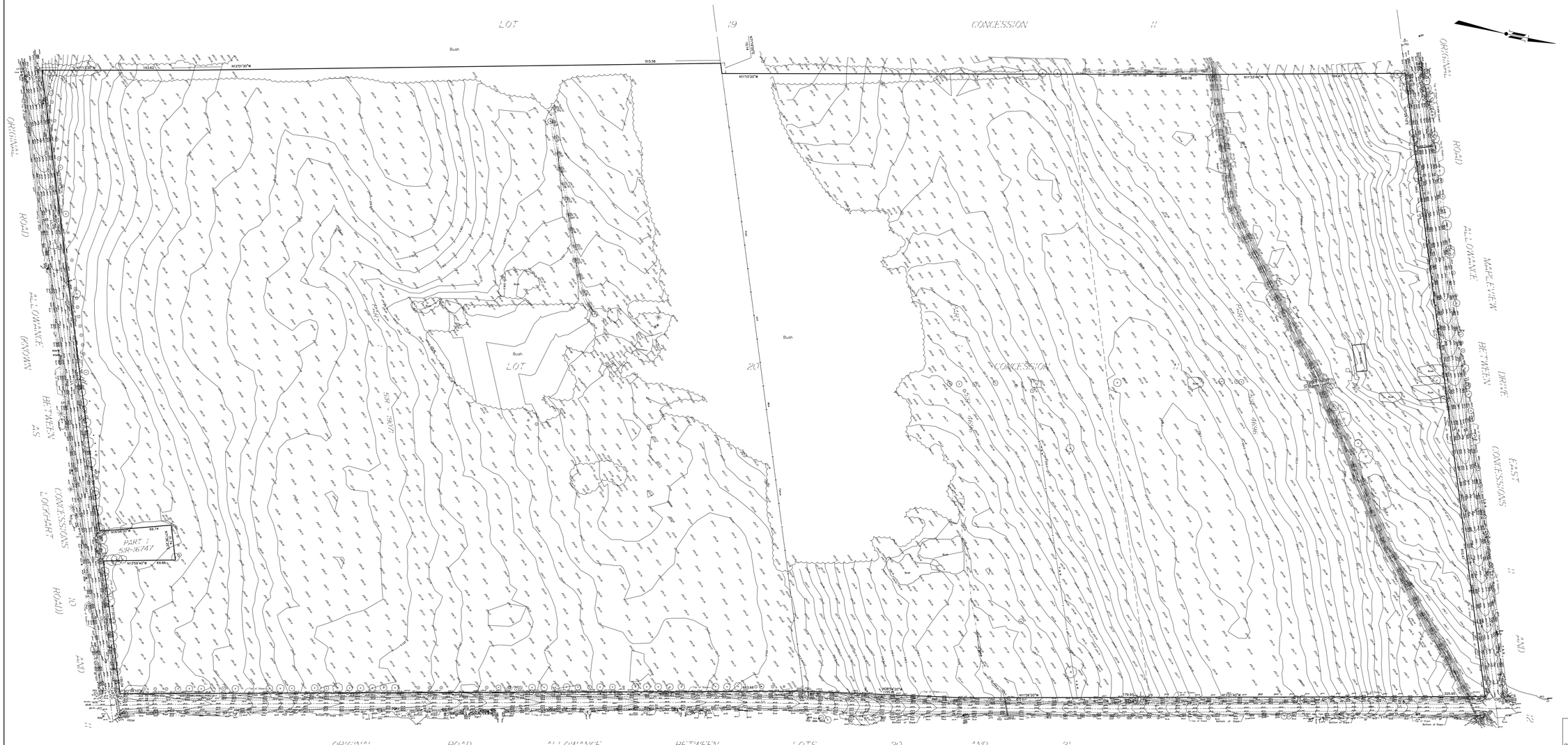
SCHAEFFER & ASSOCIATES LTD.



Mohandeep Singh, M.Eng., ENV SP, EIT
Water Resources Analyst

Sadh Katukurunde, P.Eng.
Junior Associate

APPENDIX A: Background Information


LOT 19 CONCESSION 11
LOT 20 CONCESSION 11
ORIGINAL ROAD ALLOWANCE BETWEEN LOTS 20 AND 21
ORIGINAL ROAD ALLOWANCE (KNOWN AS LOCKHART CONCESSIONS 10 AND 11)
ORIGINAL ROAD ALLOWANCE MAPLEVIEW DRIVE BETWEEN CONCESSIONS 11 AND 12
PART 1 51R-16747
Bush
N11°10'20"W
N11°37'40"W
N11°26'20"W
N15°05'40"W
N75°54'20"E
N75°54'40"E
N75°54'20"E
N15°05'40"W
N75°54'40"E
N15°05'40"W
N75°54'20"E
N11°37'40"W
N11°26'20"W
N11°37'40"W
N11°26'20"W
N11°37'40"W
N11°26'20"W

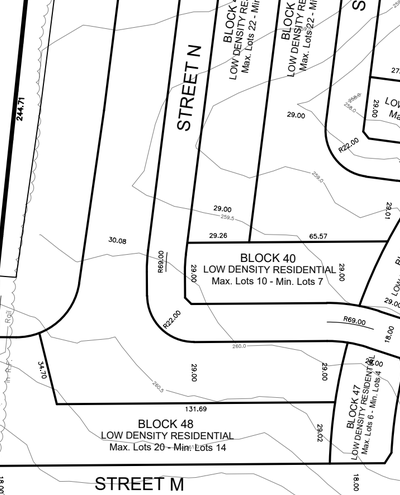
DRAFT PLAN OF SUBDIVISION

Part of Lot 20
Concession 11
City of Barrie
Former Town of Innisfil, now
County of Simcoe

Prepared For:

DIV Development (Barrie) Ltd.

KEY PLAN



SUBJECT PROPERTY

SCHEDULE OF LAND USE

BLOCK	LAND USE	UNITS	AREA (ha)
1-48	11.0m Single Detached - 7.6m Semi Detached	533-757	21.26
49	6.1m Street Townhouses	40	0.70
50-53	6.5m Rear Lane Townhouses	98	1.95
54-57	6.5m B2B Townhouses	126	1.69
58	Medium Density	134	2.42
59	Future Development		1.84
60	Elementary School		2.29
61	Park		2.43
62-63	Parkettes		0.50
66-65	Stormwater Management		5.55
66-68	Natural Heritage System		25.87
69	Pumping Station		0.17
70	To be determined		0.21
71-76	Walkways		0.13
77-79	Road Widenings		1.90
	Public Roads 24.0m R.O.W. 625m 20.0m R.O.W. 955m 18.0m R.O.W. 3,455m 16.0m R.O.W. 60m 12.0m Lanways 1,190m		11.32
Totals	6,285m	931-1155	80.23

OWNER'S AUTHORIZATION

I hereby authorize Malone Given Parsons Ltd. to prepare and submit this Draft Plan of Subdivision to the City of Barrie.

Amanda Santo
DIV Development (Barrie) Ltd.
August 25, 2023
Date

Geoffrey Grayhurst
DIV Development (Barrie) Ltd.
August 25, 2023
Date

SURVEYOR'S CERTIFICATE

I hereby certify that the boundaries of the lands to be subdivided as shown on this Plan and their relationship to the adjacent lands are accurately and correctly shown.

Dan Dzaldov
SCHAEFFER DZALDOV PURCELL LTD.
Date

ADDITIONAL INFORMATION

AS REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT, CHAPTER P.13(R.S.O. 1990).
(a),(e),(f),(g),(j),(l) - As shown of the Draft Plan.
(b),(c) - As shown on the Draft and Key Plan.
(d) - Land to be used in accordance with the Schedule of Land Use.
(i) - Soil is silt and clay loam.
(h),(k) - Full municipal services to be provided.

Date	Revision

MGP File No.: 12-2089
Date: Mar 18, 2024

Malone Given Parsons
140 Renfrew Drive, Suite 201 | Markham, ON | L3R 6B3
905 513 0170 | mgp.ca

LEGEND

ANNEXATION BOUNDARY
1.0m CONTOUR INTERVAL
WATERCOURSE
LOV3 TRIBUTARY NUMBER
SUBWATERSHED BOUNDARY
SUBCATCHMENT BOUNDARY
S□0 / □□□05 □ SUBCATCHMENT NUMBER / SUBCATCHMENT AREAS (ha)
9545 EXISTING FLOW NODE

L□□d □□□ □S□□r□□ LSRCA□

ACTIVE AGGREGATE
INACTIVE AGGREGATE
COMMERCIAL
ESTATE RESIDENTIAL
GOLF COURSE
INDUSTRIAL
INSTITUTIONAL
INTENSIVE AGRICULTURE
MANICURED OPEN SPACE
NATURAL HERITAGE FEATURE
NON-INTENSIVE AGRICULTURE
RURAL DEVELOPMENT
URBAN

L□□d □□□ □S□□r□□ NVCA□

CONIFEROUS FOREST
DECIDUOUS FOREST
GOLF COURSE
HAY_PASTURE
MIXED FOREST
OPEN WETLAND
QUARRY
ROAD
ROW CROP
TRANSITIONAL
URBAN IMPERVIOUS
URBAN PERVIOUS
WATER
WOODY WETLAND

LONG□ OOD RD
□ ILKINSON ST
BIG BAY PT RD
HEWITTS CREEK
SANDRING□AM DR
BIRKHALL PL
WINCHESTER TRAIL
PRINCE WILLIAM WAY
DEAN AVE
MADELAINE DR
YONGE ST
LOVER'S CREEK
MAPLEVIE□ DR□ EAST
LOCK□ART RD
SIDEROAD
LOCKHART RD
Sandy Cove Creek
Lover's Creek
Hewitts Creek
SANDY COVE CREEK
LOV3
HEW1
HEW2
HEW3
HEW4
HEW5
SAN1
SAN2
SAN3
SAN4
9105
9140
9284
9260
9231
9230
9210
9257
9225
9251
9135
9130
251
S□0 7□□1
S□0 71□□□
17□ 7.0□□
1□5 1□□□
155 77□1 □□
175 □□□□ □□
1□0 77□□
150 0 □□
1□5 □15□□
S□70 □□□5 □□
S□0 □□7 □□
S□50 115□5 □□
1□□ 1□75 □□
1□□ □□15
S□51 10□□□ □□
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□□7 100□5 □□
230
0 250 500 1000

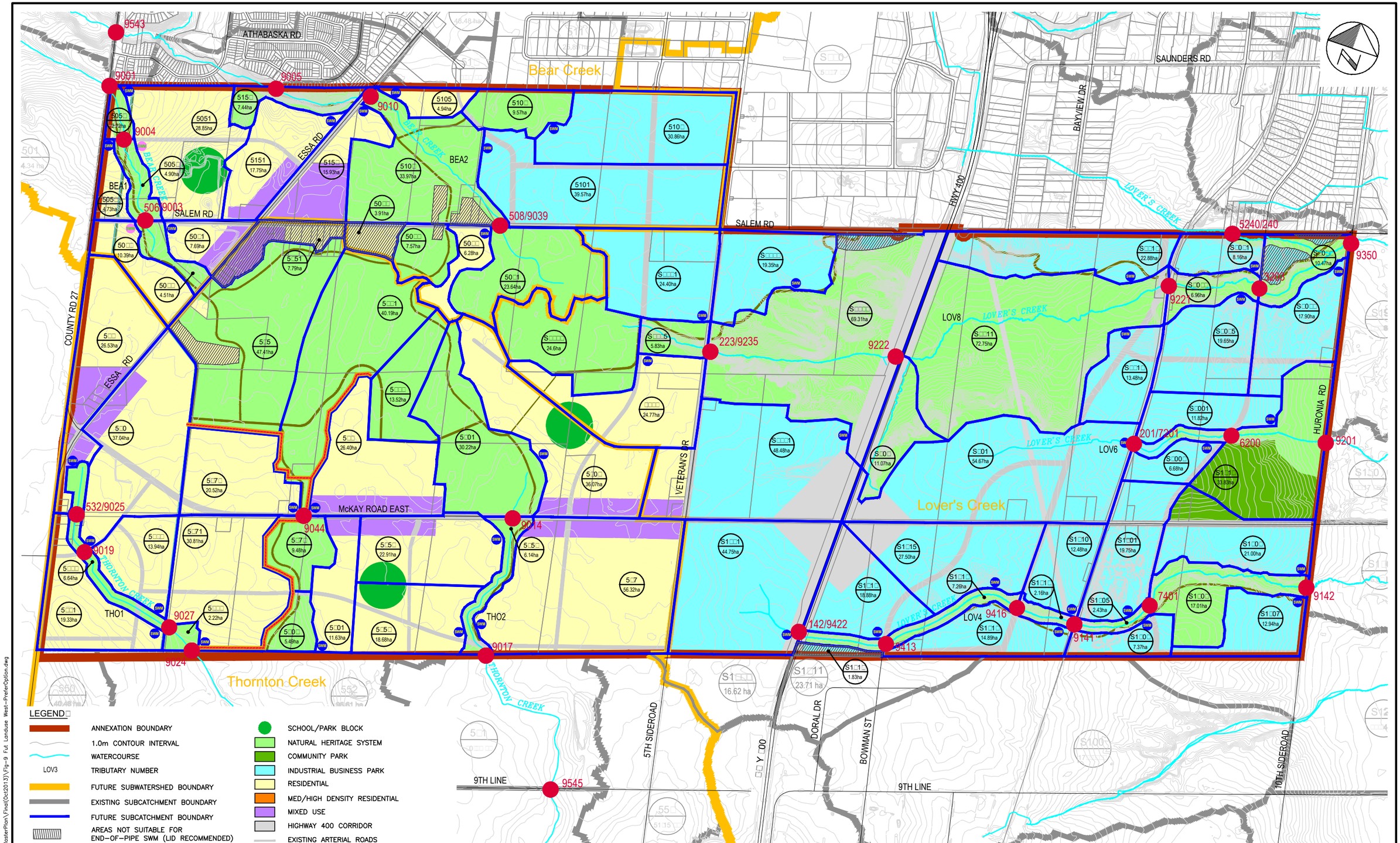
DRAINAGE & STORMWATER MASTER PLAN
CITY OF BARRIE

EXISTING LAND USE AND SUBCATCHMENT PLAN ANNEX EAST

amec

Scale 1:17000
Consultant File No. TP110135
Figure No. 8

P:\Work\110135\water\dwg\MasterPlan\Final(Oct2013)\Fig-8 ex. landuse & sub East Existing Flow Node.dwg



P:\Work\110135\water\dwg\MasterPlan\Final(Oct2013)\Fig-9 Fut Landuse West-PreferOption.dwg

DRAINAGE & STORMWATER MASTER PLAN

CITY OF BARRIE

FUTURE LAND USE PREFERRED OPTION SWM AND SUBCATCHMENT PLAN ANNEX WEST

amec

Scale 1:17000

Consultant File No. TP110135

Figure No. 9

LEGEND

- ANNEXATION BOUNDARY
- 1.0m CONTOUR INTERVAL
- WATERCOURSE
- LOV3 — TRIBUTARY NUMBER
- FUTURE SUBWATERSHED BOUNDARY
- EXISTING SUBCATCHMENT BOUNDARY
- FUTURE SUBCATCHMENT BOUNDARY
- AREAS NOT SUITABLE FOR END-OF-PIPE SWM (LID RECOMMENDED)
- 5401 / 14.14ha — SUBCATCHMENT NUMBER / SUBCATCHMENT AREA (ha)
- SWM FACILITY
- OPTIONAL SWM FACILITY
- PROPOSED CHANNELIZATION
- 9554 — FLOW NODE LOCATION
- SCHOOL/PARK BLOCK
- NATURAL HERITAGE SYSTEM
- COMMUNITY PARK
- INDUSTRIAL BUSINESS PARK
- RESIDENTIAL
- MED/HIGH DENSITY RESIDENTIAL
- MIXED USE
- HIGHWAY 400 CORRIDOR
- EXISTING ARTERIAL ROADS
- RAILWAY CORRIDOR
- PATHWAYS MED/HIGH DENSITY RESIDENTIAL

BIG BAY PT RD
HEWITTS CREEK
9165
BIRKHALL PL
SANDRINGHAM DR
WINCHESTER TRAIL
YONGE ST
Hewitts Creek
1161
PRINCE WILLIAM WAY
9260
LOVER'S CREEK
Lover's Creek
9231
MAPLEVIEW DR. EAST
9140
20TH SIDEROAD
9284
9230
9221
9282
SAN1
SAN2
9257
9401
HEW4
SANDY COVE CREEK
225/9281
SAN3
SAN4
2208/6208
9251
LOV3
9135
9327
9326
HEW3
HEW2
HEW5
9509
LOCKHART RD
125
9130
251
YONGE ST.
Sandy Cove Creek

0 250 500 1000

DRAINAGE & STORMWATER MASTER PLAN CITY OF BARRIE	FUTURE LAND USE PREFERRED OPTION SWM AND SUBCATCHMENT PLAN ANNEX EAST	amec	Scale 1:17000 Consultant File No. TP110135 Figure No. 10

P:\Work\110135\water\dwg\MasterPlan\Final(Oct2013)\Fig-10 Fut Landuse East-PreferOption.dwg

Table 4.2.3: Proposed Annexed Lands Culvert Sizes								
Culvert No[4]	Location	VO2 Node (Ex/Fut)	Design Peak Flow (m^3/s)		HEC-RAS Cross Section No.	Structure		
			100 Yr[3]	Regulatory[4]		Type	Minimum Size Specified for NHS (mm)	Proposed (mm)
Bear Creek								
1	County Rd 27[1]	9001	2.31	11.54	1260	High Span	2000 x 1800	2000 x 1500
4[6]	Essa Rd	NA	NA	NA	NA	High Span	2000 x 1800	2000 x 1800
3	Salem Rd	9003/506	0.48	2.22	1963.4	High Span	2000 x 1800	2000 x 750
5	Essa Rd	9010	3.23	36.87	3145	High Span	3500 Span	5000 x 1000
10	Salem Rd	9039/508	0.71	2.14	4092.76	High Span	2000 x 1800	2000 x 750
Thornton Creek								
13	McKay Rd E	9025/9019	2.66	12.96	2635.648	High Span	2000 x 1800	3500 x 1000
48	McKay Rd E	9014	2.36	8.37	8092.48	High Span	-	4000 x 800
Lover's Creek								
12	Veteran's Drive	223/9235	2.62	15.23	3835	High Span	2000 x 1800	2000 x 1800
21	Huronia Road	9350	29.88	94.01	256.03	High Span	5500 Span	9000 x 2100
23	Huronia Road	9201	4.11	27.14	150	High Span	2900 Span	3000 x 1500
27	Huronia Road	9142	7.05	56.48	718.3	High Span	6000 Span	6000 x 1500
29	Lockhart Rd	251	4.80	8.44	1924.424	High Span	4000 Span	6000 x 1500
49	Railway	9141	4.44	41.38	2031.18	*No Upgrade*		
50	Highway 400	9222	6.41	34.31	2901.05	High Span	-	2400 x 1200
51	Railway	9221	8.28	31.32	1349.69	High Span	-	3000 x 1500
52	Railway	201	2.21	19.98	460	High Span	-	1800 x 1200
53	Highway 400	142/9422	2.25	16.54	3406	High Span	-	3000 x 1800
Hewitts Creek								
30	Mapleview Dr E	9140	34.39	87.52	3430.690	High Span	6500 Span	6500 x 2100
32	Lockhart Rd	135	17.45	13.59	550	High Span	3000 Span	3000 x 1800
33	Lockhart Rd	9130	26.64	67.27	5592.376	High Span	3800 Span	6000 x 2400
Sandy Cove Creek								
36	20th Side Rd[2]	225/9281	3.73	8.12	697.9092	High Span	2800 Span	4000 x 1000
37	20th Side Rd[2]	9284	5.44	23.40	5497.131	High Span	2400 Span	4000 x 1000

Note:
[1] Boundary road with Essa Township. Structure may be subject to different sizing criteria
[2] Boundary road with Town of Innisfil. Structure may be subject to different sizing criteria
[3] 100 Year SCS Type II 24 hour design storm (existing land use condition) has established culvert sizing to satisfy freeboard criteria, except culvert 50 & 53 which have applied the 50 Year SCS Type II 24 hour design storm in accordance with MTO (ref. Table 4.2.1)
[4] The Future Regulatory peak flow has established culvert sizing to satisfy MNR overtopping criteria (ref. Table 4.2.2)
[5] Refer to Figures 15 & 16 for culvert locations
[6] No watercourse present for Culvert 4. Culvert required as part of NHS strategy.
[7] Refer to Appendix B for culvert cost estimates and Class EA Schedules.

The hydraulic models have been used to simulate the Preferred Land Use Option and proposed hydraulic conditions (i.e. with culvert upgrades). The culvert upgrades proposed, in addition to meeting the requisite provincial criteria (where possible), represent an opportunity to reduce the extents of the Regulatory floodplain and in some places generate additional developable land. The potential future land use Regulatory floodplain with proposed culvert upgrades has been delineated on Figures 12 and 13 (also on Figures B1 and B2, Appendix 'B').

Hydrogeological Study in Support of Draft Plan - Dorsay Lands Phase 1

Dorsay Development Corporation
Barrie, Ontario

R.J. Burnside & Associates Limited
292 Speedvale Avenue West Unit 20
Guelph ON N1H 1C4 CANADA

December 2020
300043693.0000

The bedrock underlying the subject lands is mapped as the Verulam Formation which consists of grey limestone with alternating shale and claystone (Figure 5). The southwest corner of the subject lands is mapped as the Lindsay Formation of the Simcoe Group, which consists of limestone and shale (OGS, 2007). The overburden has been estimated to be over 145 m thick in the vicinity of the subject lands (ORMGP, 2020).

4.0 Hydrogeology

4.1 Regional Hydrostratigraphy

The regional hydrogeology of an area describes the major aquifers and aquitards and the interactions between these types of hydrogeological units. Local conditions may vary from the regional interpretations, however major groundwater flow systems are assumed to be regional in nature.

The overburden deposits underlying the subject lands have been interpreted by regional studies such as the Tier 3 Water Balance (AquaResource, 2011) and Source Water Protection Assessment Report (LSRCA, 2012) to consist of alternating sequences of coarser-grained permeable layers (aquifers) and finer-grained less permeable layers (aquitards) of varying thicknesses. This sequence of layers was also supported by the SIS (Burnside, 2016). The basic hydrostratigraphic sequence that was interpreted for the area of the subject lands includes four main aquifer layers (A1 to A4) and four main aquitards (C1 to C4) with a confining layer (UC) overlying the uppermost aquifer (A1).

A description of the interpreted regional hydrostratigraphic framework is provided below based on the Source Water Protection Assessment Report (LSRCA, 2012):

- Surficial Geology Layer – This layer represents coarse grained sediments in stream beds and at surface surficial geology areas that overly the UC. The thickness ranges from 5 m to 15 m.
- UC – Upper Confining Layer – Represents smaller areas of less permeable surficial material. The upper confining layer has been mapped as coarse-grained lacustrine deposits which are part of a regionally extensive sand plain (LSRCA, 2012). Regional studies such as the AquaResource (2011) report indicate that the confining layer (UC) is patchy in the Barrie area.

- A1 – Represents the uppermost aquifer – Occasionally exists as a surficial unconfined aquifer and is stratigraphically equivalent to the Oak Ridges Moraine. It is generally associated with coarse grained glacial and interglacial sediments mapped as ice contact stratified drift. The majority of the local domestic wells in the Barrie area are completed within this aquifer.

- C1 – Upper aquitard – Described as varved clay and silt (LRSCA, 2012).

- A2 – Intermediate aquifer which is stratigraphically equivalent to areas within the Northern Till. The aquifer is generally described as being composed of sand with some clast rich portions (LRSCA, 2012). This area is used for the Innisfil Heights water supply.

- C2 – Intermediate aquitard.

- A3 – This area constitutes the main Barrie municipal aquifer and is the source of the Stroud water supply; it is stratigraphically equivalent to the Thorncliffe deposits in the Upland regions.

- C3 – Lower aquitard.

- A4 – Lower aquifer, thin and sometimes combined with A3 where C3 is thin or absent.

- C4 – Lower aquitard but may also represent weathered bedrock.

4.2 Local Stratigraphy

Thirteen boreholes were drilled across the Phase 1 lands as part of geotechnical investigations by Soil Engineers Ltd. (Soil Eng.) in 2016. The locations of the boreholes are shown on Figure 5 and the borehole logs are provided in Appendix B. The boreholes indicated that the overburden is generally composed of layers of sandy silt to silty sand till overlying silty sand and sand. The till deposits also had varying amounts of clay and gravel. Localized units of sandy silt and silty clay were also encountered. The lithology encountered by the boreholes is generally consistent with the lithology shown on the geological maps.

To illustrate the shallow stratigraphy of the subject lands, schematic geologic cross-sections have been prepared (Figures 6 and 7) using the soils information collected during drilling of boreholes and monitoring wells (Appendix B). The locations of the cross-sections are illustrated on Figure 5 along with the locations of water wells and boreholes used in the construction of the cross-sections.

The cross-sections (Figures 6 and 7) show that the subject lands are underlain by a sand, silt and silty sand till that is 5 m to 15 m thick. There are occasional clay and silt deposits at surface. The sand and silty sand till is underlain by a confining clay and silt layer 15 m to 25 m thick. A regional sand / gravel aquifer is interpreted below the clay silt layer.

4.3 Soil Hydraulic Conductivity

Hydraulic conductivity is a measure of a soil's ability to transmit groundwater. There are various methods that can be used to assess soil hydraulic conductivity depending on the available instrumentation. Grainsize data and soil characteristics collected during a geotechnical investigation can be used to provide a general estimate of hydraulic conductivity. Single well response tests such as in situ bail-down or slug-testing methods are used in groundwater monitoring wells to assess in situ hydraulic conductivity of the soils represented across the screened interval of the well. Both methods have been used to estimate the hydraulic conductivity of the soils encountered in the boreholes completed on the subject lands as discussed below.

4.3.1 Grainsize Analysis

During geotechnical investigations on the subject lands, representative soil samples were collected and analyzed for grainsize distribution (Appendix C). To estimate hydraulic conductivity based on grainsize analysis, an empirical formula method known as the Hazen estimation is used. This method is an approximation of hydraulic conductivity based on grainsize curves for sandy soils. The approximation does not strictly apply to finer grained materials however, it is still considered useful to provide a general indication of the range of the hydraulic conductivity values. Hydraulic conductivity values were derived empirically using the Hazen method when applicable for eight soil samples collected from boreholes on the Phase 1 lands. The grainsize distribution graphs of the soil samples are provided in Appendix C-1 and are summarized in Table 1.

Table 1: Estimated Hydraulic Conductivity Based on Grainsize Analyses

Sample ID	Depth of Sample (mbgs*)	Soil Classification	% Fines	Hydraulic Conductivity (cm/sec)
BH5-SS8	7.8	Silty Sand Till	47	9.0×10^{-6}
BH6-SS5	3.3	Silty Sand	49	2.3×10^{-4}
BH1-SS14	13.9	Silty Clay	96	na
BH1-SS13	12.4	Sandy Silt	58	6.3×10^{-4}
BH2-SS7	6.4		65	2.6×10^{-4}
BH9-SS3	1.8	Silty Clay Till	60	na
BH7-SS10	7.9	Sandy Silt Till	55	2.3×10^{-6}
BH1-SS7	4.9	Sand, some silt.	12	2.7×10^{-3}

*metres below ground surface
na – Hazen formulae not applicable

Grainsize analyses results indicate that the sediments within the overburden range in composition from sand some silt (12% fines) to silty clay (96% fines). The greater amounts of fines within a deposit impacts the ability of the material to transmit water and

generally lowers the overall hydraulic conductivity. Groundwater flow is generally limited by fine grained sediments with lower hydraulic conductivity. The grainsize analyses indicate that the sediments encountered on the subject lands are mainly sand and silty sand with occasional layers with a greater percentage of fines. Computed hydraulic conductivities based on these analyses indicate a range of 10^{-3} to 10^{-6} cm/sec which is regarded as moderate to low.

4.3.2 Single Well Response Tests

Single well response tests were completed by Soil Engineers Limited at seven monitoring wells in 2016. The results of the tests are provided in Appendix C-2 and summarized in Table 2 below. To confirm the results of the previous testing bail-down tests and slug test) were conducted by Burnside at two monitoring wells. The results from the tests were plotted (Appendix C-2) and analyzed to calculate hydraulic conductivity of the sediments screened. A summary the calculated hydraulic conductivities is provided below in Table 2.

Table 2: Single Well Response Testing Results

Monitoring Well	Screen Interval (mbgs)*	Formation Screened	Hydraulic Conductivity (cm/sec)
DS-MW1	13.4 – 16.9	Silty Clay, Silty Sand	3.5×10^{-4}
			4.7×10^{-5}
DS-MW3	4.0 – 7.6	Silty Sand and Sandy Silt	4.7×10^{-5}
DS-MW5	4.0 – 7.6	Silty Sand Till	1.5×10^{-4}
DS-MW7	5.3 – 9.0	Sandy Silt Till	4.9×10^{-5}
DS-MW8	2.6 – 6.2	Gravelly Sand and Sandy Silt Till	1.4×10^{-4}
DS-MW9	5.3 – 9.0	Silty Sand Till	4.3×10^{-5}
DS-MW12d	3.7 – 5.8	Silty Sand Till, Silty Sand	5.6×10^{-4}
			8.7×10^{-4}

*metres below ground surface

Single well response tests in wells screened in the silty sand till indicated moderate hydraulic conductivities in the order of 10^{-4} cm/sec to 10^{-5} cm/sec.

4.4 Local Groundwater Use

The City of Barrie obtains its water supply from a combination of groundwater and surface water based sources. Municipal servicing is assumed to be available for lands within the municipal city boundary and areas outside of the city are privately serviced. It is our understanding that municipal servicing is being extended into the area as part of the development of the Hewitt's Secondary Plan Area. Areas that were previously

privately serviced are assumed to still have individual private water supply wells as the servicing works are not yet complete.

A review of the MECP water well records indicated that there are approximately 7 water supply well records within 500 m of the subject lands. Based on the well records and interpreted hydrostratigraphy, most of these wells are completed in the surficial (local) aquifer with depths ranging from 9.1 m to 29 m. The cross-sections completed indicate that the top of the shallow productive aquifer zone is located at elevations around 225 masl to 230 masl). The locations of the MECP water well records are shown on Figure 9.

There are no municipal water supply wells located in the vicinity of the subject lands. The closest municipal supply wells are located on the west and northern sides of the city and more than 5 kilometers from the subject lands. The subject lands do not fall within any wellhead protection areas or intake protection zones associated with the City of Barrie water supply systems (LSRCA, 2012). The City of Barrie groundwater supply wells are located in deep aquifers (A3 and A4 in the regional hydrostratigraphy). These aquifers are interpreted to be found at elevations of 150 masl to 195 masl and 115 masl to 160 masl respectively and are therefore significantly below (approximately 100 to 150 m below the surficial layer found on the subject lands) and separated from any potential impact due to the proposed development (AquaResource et al., 2011).

4.5 Water Level Monitoring Results

Groundwater levels were monitored at 8 monitoring wells including one nest across the subject lands in order to gain information on groundwater distribution and fluctuations. Groundwater levels were monitored at the on-site monitoring wells between June 2019 and October 2020. Groundwater level data is provided in tables and hydrographs in Appendix D. Groundwater elevations are plotted with daily precipitation data obtained from a nearby climate station – Barrie-Oro (Climate Station ID# 6117700) which is the closest station with daily precipitation values for 2019. In 2020 precipitation data is obtained from the Barrie Landfill Climate Station (Climate Station ID#6110556) since the Barrie-Oro climate station data was not available.

In addition to the manual water level measurements recorded at each location, automatic water level recorders were installed in DS-MW1, DS-MW9, DS-MW12d and DS-PZ1d to record continuous water levels. The datalogger data collected are included on the hydrographs provided in Appendix D.

The groundwater monitoring data show the following (refer to Figure 2 for the monitoring locations and the data tables and hydrographs in Appendix D):

- Shallow wells in southern Ontario typically show a pattern of groundwater fluctuations that is related to seasonal variations in precipitation and infiltration. This

pattern shows the highest groundwater levels occurring in the spring, levels declining throughout the summer and early fall and then rising again in the late fall/early winter. This pattern is apparent in the wells located on the subject lands (Figures D-1 to D-11, in Appendix D). The seasonal variation in water levels shows a range from 0.7 m to 1.5 m (Figures D-1 to D-7). Seasonal variations at drive-point piezometers (Figures D-8 and D-9) were generally less than 1 m.

- Continuous water level data obtained from dataloggers at one-hour frequency were plotted against precipitation to determine whether there is a correlation between precipitation events (recharge events) and changes in water level (Figures D-1, D-4, D-6 and D-7). Water level response is observed at DS-MW7 following three days of heavy rain at the end of October 2019 (Figure D-4, Appendix D). At DS-MW12d water levels increased 0.5 m in response to a large rain event in January 12, 2020. Water levels also increased 0.6 m after three days of heavy rain at the end of October 2019 (Figure D-7, Appendix D). At DS-MW1, water levels show a response of 0.5 m after a heavy rainfall in July 2020 (Figure D-1, Appendix D).

- Groundwater levels at the monitoring wells ranged from above grade to 5.3 meters below ground surface for wells completed in the shallow subsurface.

- Groundwater levels in DS-MW8 and DS-MW9 appear to be under pressure heads with water level being noted to be seasonally near or above grade (Figures D-4 and D-5, Appendix D). These wells are screened within a sandy silt till layer. These pressures are observed to locally extend into the overlying sand and silt till.

4.6 Interpreted Groundwater Flow Pattern

Groundwater flow within the shallow overburden (water table) is interpreted to be influenced by the surface topography with groundwater flow from the topographically higher areas towards topographically lower areas and surface water features (Figure 10). Groundwater elevation data (March 2020) obtained from the monitoring wells are shown on Figure 10, along with the interpreted groundwater elevation contours for the area. Arrows perpendicular to the groundwater elevation contours shown on Figure 10 illustrate the interpreted direction of the groundwater movement. On Figure 10, groundwater is interpreted to flow towards the tributaries of Sandy Cove Creek.

4.7 Recharge and Discharge Conditions

Areas where water from precipitation infiltrates into the ground and moves downward (i.e., areas of downward hydraulic gradients) are known as recharge areas. Recharge areas are generally located where there is relatively higher topographic elevation. Areas where groundwater moves upward (i.e., areas of upward hydraulic gradients) are discharge areas and these generally occur in areas of relatively lower topographic elevation, such as into wetlands and along watercourses.

When evaluating groundwater recharge or discharge conditions, nested wells (two wells screened at different depths at the same location) can be used to determine vertical hydraulic gradients and groundwater recharge or discharge conditions in the subsurface.

At a monitoring well nest DS-MW12s/d located in the southeast corner of the Phase 1 lands the groundwater levels in the deep well are similar to the shallow well or slightly higher indicating a small upward gradient and potential for groundwater discharge (Figure D-7, Appendix D).

4.7.1 Groundwater Surface Water Interactions

To assess shallow groundwater conditions and gradients near the watercourses and wetlands two drive-point piezometer nests were monitored.

PZ1s/d is located along the north tributary of Sandy Cove Creek near SW1 (Figure 2). The water levels in PZ1d took four months to recover from installation. Once groundwater reached static levels an upward gradient (shallow water level lower than deep water level) is observed at PZ1s/d in 2020 and this confirms that groundwater discharge conditions exist in this area (Figure D-8, Appendix D). The volume of discharge will be minimal due to the low hydraulic conductivity of the soils.

DS-PZ2s/d is located in the wetland along the southern tributary of Sandy Cove Creek near SW3 (Figure 2). The water levels in DS-PZ2s/d took three months to recover after installation in June indicating very tight soils. The water levels measured were above grade from November 2019 to October 2020 with water levels frozen during the winter months (December, January, February). A downward gradient is observed in the fall and winter and an upward gradient is observed in April, June and October 2020 (Figure D-9).

4.7.2 Significant Groundwater Recharge Areas and Ecologically Significant Groundwater Recharge Areas

Significant Groundwater Recharge Areas (SGRAs) can be described as areas that can effectively move water from the surface through the unsaturated soil zone to replenish available groundwater resources (LSRCA, 2012). SGRAs were mapped by the Source Water Protection Assessment Report (LSRCA, 2012) as a requirement of the Clean Water Act, 2006 and based on guidance provided by the MECP. The delineation of these areas was completed using numerical models and analyses that included the evaluations of numerous factors including precipitation, temperature and other climate data along with land use, soil type, topography and vegetation to predict groundwater recharge, runoff and evapotranspiration. SGRAs represent areas where the annual recharge rate is greater than 115% of the average recharge of 164 mm/year across the Lake Simcoe watershed (or greater than the threshold recharge rate of 189 mm/year) (LSRCA, 2012).

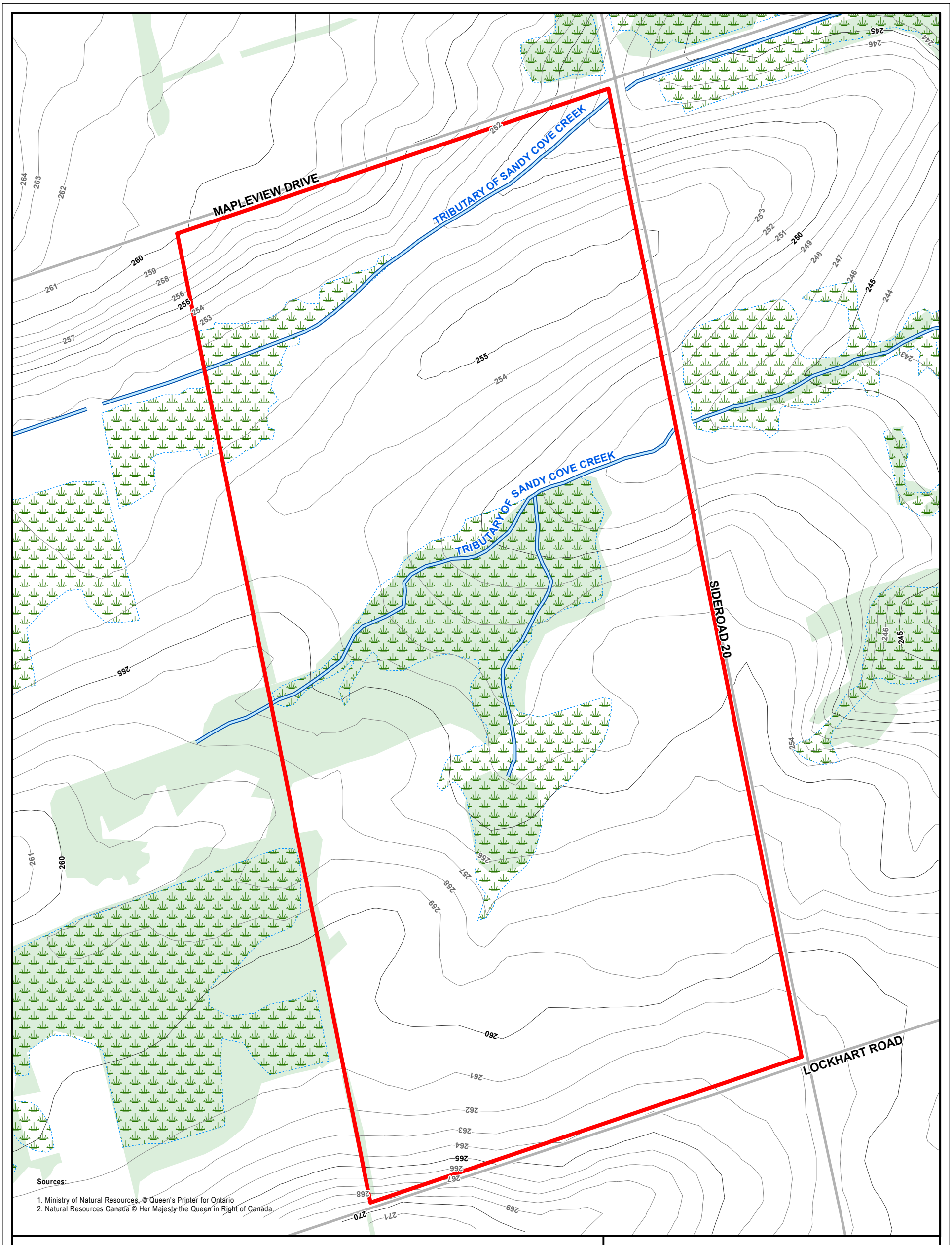
Ecologically Significant Groundwater Recharge Areas (ESGRAs) were delineated for the Barrie Creek, Lovers Creek and Hewitt's Creek subwatersheds by Earthfx (2012) using the groundwater model developed by AquaResources for the Source Protection studies. ESGRAs were defined as areas of land that are assumed to support groundwater systems or environmentally sensitive features like lakes, cold water streams and wetlands (Earthfx, 2012). ESGRAs were delineated in the groundwater model by identifying pathways in which recharge, if it occurred, would reach an ecologically significant feature. Ecologically significant features used for the delineation of the ESRGAs included headwater streams, cold water fisheries, wetlands, and brook trout and sculpin capture sites. ESGRAs and SGRAs are not mutually exclusive. ESGRAs are determined based on the linkage between a recharge area and an ecologically sensitive area while SGRAs are located where high volumes of recharge are assumed to occur. There are no ESGRAs mapped on the subject lands.

The locations of mapped SGRAs in the vicinity of the subject lands are shown in Figure 11. SGRAs mapped on the subject lands correspond to surficial geology mapping of glaciofluvial ice-contact stratified sediments (Figure 4).

5.0 Surface Water Monitoring

To characterize the flow conditions of watercourses on the subject lands monitoring locations were established and flow conditions were measured during monitoring events. Surface water flow monitoring was conducted at three monitoring locations, SW1, SW2 and SW3 (Figure 2). Monitoring data over the period of this study is provided in Appendix E and summarized below.

- SW1 is located along the northern tributary of Sandy Cove Creek which flows west to east across the subject lands. The tributary at SW1 is an incised channel that flows through the agricultural lands. Flows observed at SW1 ranged from 2.9 L/s to 14.4 L/s. Standing water (no flow) were observed in the summer months (July, August, September 2019) and frozen conditions were observed in the winter months (December, January, March).
- SW2 is downstream of SW1 along the tributary of Sandy Cove Creek as the tributary leaves the subject lands at Sideroad 20. The tributary between SW1 and SW2 is incised, and tile drain outlets were observed along its southern banks. Flow was found to be present on all monitoring visits except for during the winter months when conditions were reported as frozen. Flows observed at SW2 ranged from <0.5 L/s to 22.1 L/s and show an increase in flow from SW1 (indicating a gaining stream).
- SW3 is located along the southern tributary of Sandy Cove Creek which flows through the Natural Heritage System on the subject lands at the culvert along Sideroad 20. Flows were observed at SW3 ranging from 0.4 L/sec to 16.1 L/sec. In the summer months (July and August 2019) no flow was observed. Frozen conditions were observed in the winter months (Nov to March).



LEGEND

- SUBJECT LANDS
- WATERCOURSE
- ROADWAY
- CONTOUR (5m intervals - masl)
- CONTOUR (1m intervals - masl)
- WETLAND
- WOODED AREA

0 100 200 300 400 500
Metres

N

BURNSIDE

Client / Report

DIV DEVELOPMENT (BARRIE) LTD.
INNISFIL, ONTARIO

HYDROGEOLOGICAL ASSESSMENT

Figure Title

TOPOGRAPHY AND DRAINAGE

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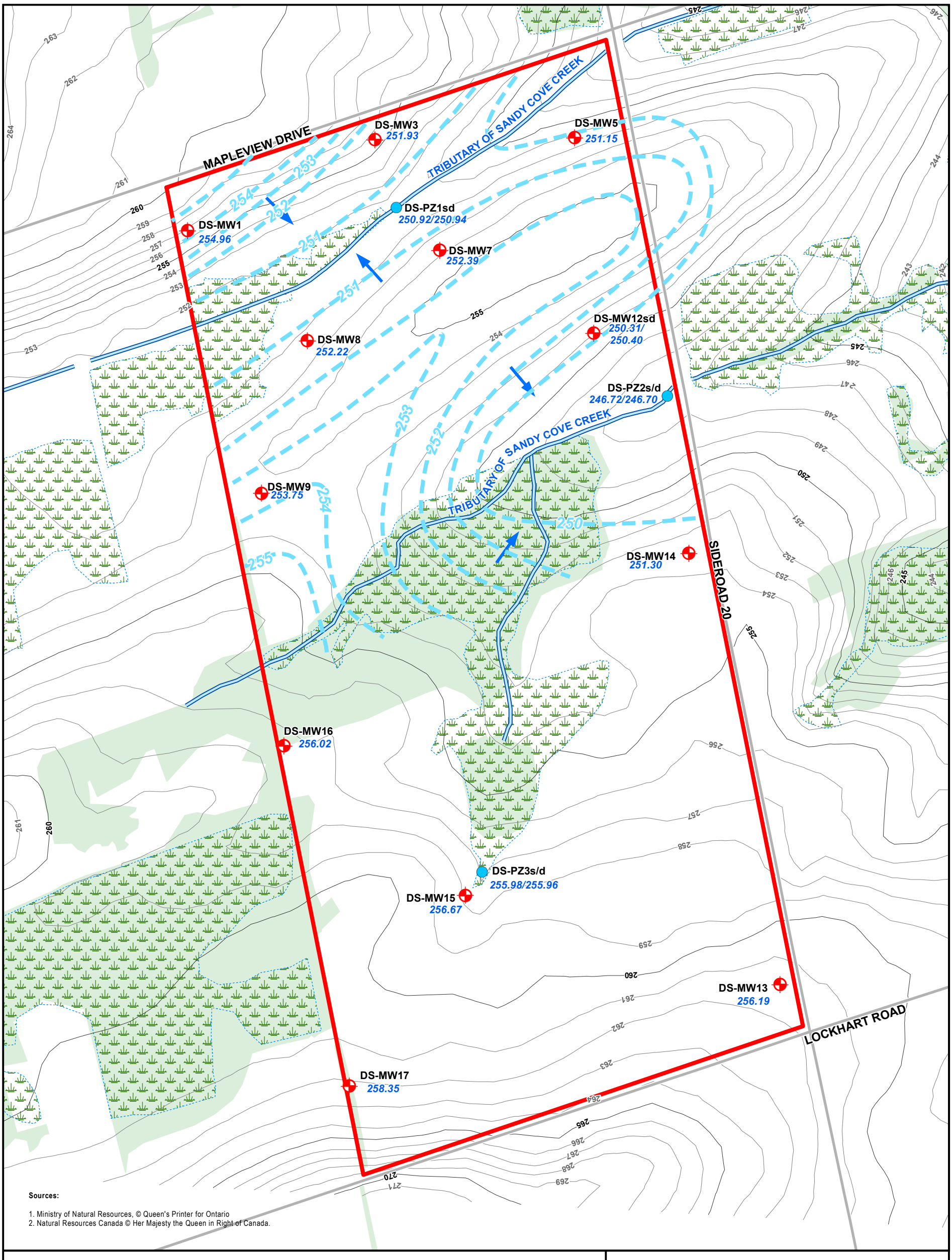

LEGEND

- SUBJECT LANDS
- ROADWAY
- WATERCOURSE
- CONTOUR (5m intervals - masl)
- CONTOUR (1m intervals - masl)
- WETLAND
- MONITORING WELL (SOIL ENG., 2016)
- DRIVE POINT PIEZOMETER
- INTERPRETED GROUNDWATER CONTOUR (masl)
- INTERPRETED GROUNDWATER FLOW DIRECTION
- 177.95 MEASURED WATER LEVEL (MARCH 2, 2022)

0 100 200 300 400 500
Metres

N

BURNSIDE

Client / Report

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HYDROGEOLOGICAL ASSESSMENT

Figure Title

INTERPRETED GROUNDWATER FLOW

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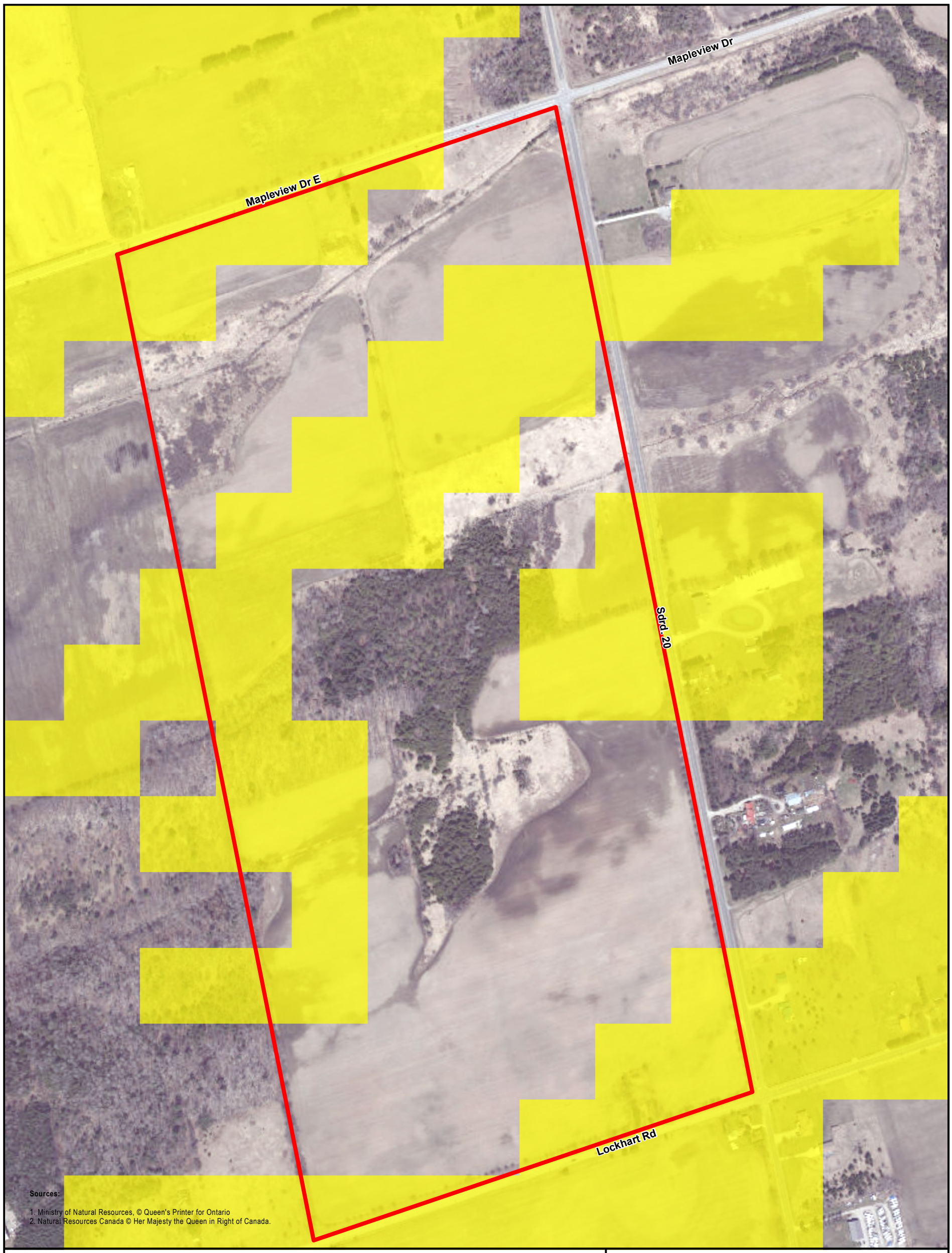

LEGEND

- SUBJECT LANDS
- SIGNIFICANT GROUNDWATER RECHARGE AREAS (SGRA, LSRCA)

0 100 200 300 400 500
Metres

N

BURNSIDE

Client / Report

DIV DEVELOPMENT (BARRIE) LTD.
INNISFIL, ONTARIO

HYDROGEOLOGICAL ASSESSMENT

Figure Title

RECHARGE AREAS

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A REPORT TO
DIV DEVELOPMENT (BARRIE) LTD.

PROPOSED RESIDENTIAL SUBDIVISION

SOUTHWEST CORNER OF MAPLEVIEW DRIVE EAST AND 20TH SIDEROAD

CITY OF BARRIE

REFERENCE NO. 1610-S116

APRIL 2017

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erosion from the higher areas may also occur. In order to prevent overstripping, diligent control of the stripping operation will be required for site development.

4.2 **Silty Sand Till/Sandy Silt Till** (All Boreholes)

The sandy silt till or silty sand till is dominant in the revealed stratigraphy in most of the boreholes. It consists of a random mixture of soil particle sizes ranging from clay to gravel, with the silt or sand being the predominant fraction. Its structure is heterogeneous, indicating a glacial deposit.

The natural water content was determined, and the results are plotted on the Borehole Logs; the values range from 4% to 14%, with a median of 9%, showing the silt till and sand till are in a damp to moist condition.

The obtained 'N' values range from 4 to over 50 blows, with a median of 34 blows per 30 cm of penetration, showing that the relative density of the till is loose to very dense, being generally dense. The loose layer is generally restricted to the weathered zone near the ground surface.

Grain size analyses were performed on 1 representative sample of the silt till and 1 sample of the sand till; the results are plotted on Figures 13 and 14, respectively.

The deduced engineering properties pertaining to the project are given below:

- Moderately high frost susceptibility.
- Moderately low water erodibility.
- Relatively low permeability, with an estimated coefficient of permeability of 10^{-6} to 10^{-7} cm/sec, depending on the clay and silt content, an average percolation rate of 60 to 80 min/cm, and runoff coefficients of:

Slope	
0% - 2%	0.11 to 0.15
2% - 6%	0.16 to 0.20
6% +	0.23 to 0.28

- Frictional-cohesive soils, their shear strength is density dependent and is augmented by cementation and cohesion.
- They will generally be stable in a relatively steep cut; however, they will slough slowly if submerged in an unconfined state, or from an open-face cut under seepage conditions, particularly in the zone where wet sand and silt layers are prevalent.
- A poor to fair pavement-supportive material, with an estimated California Bearing Ratio (CBR) value of 5% to 10%.
- Moderate corrosivity to buried metal, an estimated electrical resistivity of 4000 to 4500 ohm·cm.

4.3 **Silty Fine Sand/Sandy Silt/Silt** (Boreholes 1 to 4, inclusive, 6, 9, 10 and 12)

Deposits of silt, sandy silt or silty fine sand were encountered in the lower zone of the revealed stratigraphy, and are dominant in the stratigraphy at Boreholes 1, 3, 4 and 10. The laminated structure shows that they are lacustrine deposits, with various amount of clay.

The obtained 'N' values range from 13 to over 50, with a median of 41 blows per 30 cm of penetration, indicating that the relative density of the deposits is compact to very dense, being generally dense. Due to the groundwater seepage encountered in the wet silt, some of the low 'N' values may have resulted from disturbance by hydrostatic pressure during the drilling process.

6.0 DISCUSSION AND RECOMMENDATIONS

The investigation has disclosed that beneath topsoil and ploughed earth, the site is generally underlain by strata of loose to very dense, generally dense silty sand till and sandy silt till, and firm to very stiff, generally stiff silty clay till.

The groundwater and cave-in levels measured on completion of the drilling range from 1.2 to 4.5 m below the prevailing ground surface. On November 18, 2016, the stabilized groundwater levels in the monitoring wells were recorded to range from El. 249.2 to 254.4 m. The groundwater level lowers to the southeast, and will fluctuate with the seasons.

The geotechnical findings which warrant special consideration are presented below:

1. The thickness of topsoil or ploughed earth disclosed by the boreholes ranges from 23 to 41 cm. However, thicker topsoil is likely to occur in places, particularly in localized depressions filled by past cultivation, or erosion in from the higher area. Diligent control of the stripping process will be required to prevent overstripping.
2. As noted, the topsoil contains an appreciable amount of humus and may generate volatile gases under anaerobic conditions. For the environmental as well as the geotechnical well-being of the future development, it should not be buried below any structures or deeper than 1.2 m below the exterior finished grade. Any topsoil removed from the area of construction can only be used for general landscaping purposes.
3. The native soils are weathered within depths of 0.5 to 1.1 m. For structural use, the weathered soils should be subexcavated, aerated, sorted free of topsoil inclusions and recompacted.

4. The sound natural soils below the topsoil and weathered soils are suitable for supporting the building foundations on normal spread and strip footings. The footing subgrade must be inspected by either a geotechnical engineer, or a geotechnical technician under the supervision of a geotechnical engineer, to ensure that its condition is compatible with the design of the foundation.
5. All the basement structures must be constructed above the saturated soils, otherwise permanent dewatering from sumps will be required for the individual house lots.
6. For basement structures above the saturated zone, perimeter subdrains and dampproofing of foundation walls will be required. The subdrains should be shielded by a fabric filter to prevent blockage by silting.
7. A Class 'B' bedding, consisting of compacted 20-mm Crusher-Run Limestone, is recommended for the construction of the underground services above the saturated zone. Where wet or water-bearing silt or sand is present, a concrete bedding should be considered. The pipe joints should be leak-proof, or wrapped with an appropriate waterproof membrane.
8. Open excavation should be carried out in accordance with Ontario Regulation 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 **Foundations**

It is recommended that normal spread and strip footings be placed onto the sound natural soil strata, or onto engineered fill. As a general guide, the recommended soil

7.0 LIMITATIONS OF REPORT

This report was prepared by Soil Engineers Ltd. for the account of DIV Development (Barrie) Ltd., and for review by their designated consultants and government agencies. Use of the report is subject to the conditions and limitations of the contractual agreement. The material in the report reflects the judgement of Geoff Peng Gao, EIT, M.Eng., and Bennett Sun, 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.

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GPG/BS:dd

BURNSIDE

Hydrogeological Assessment
Dorsay Lands

DIV Development (Barrie) Ltd.
Barrie, Ontario

Hydrogeological Assessment - Dorsay Lands

DIV Development (Barrie) Ltd.
Barrie, Ontario

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August 2023
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R.J. Burnside & Associates Limited

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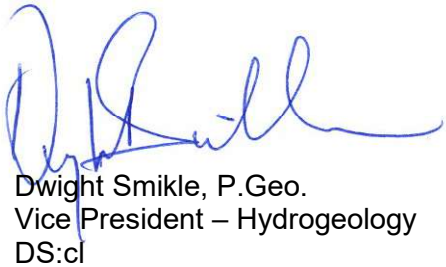

Dwight Smikle, P.Geo.
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1.0 Introduction

R.J. Burnside & Associates Limited (Burnside) has been retained by DIV Development (Barrie) Ltd. to complete a hydrogeological assessment for the Dorsay lands located south of Mapleview Drive, north of Lockhart Road and west of Sideroad 20 in the City of Barrie, Ontario (Figure 1). The lands are located within the Barrie Annexed Lands and the OPA 39 Hewitt's Secondary Plan Area (SPA) on the southern boundary of the City of Barrie. In 2016, a Subwatershed Impact Study (SIS) for the Hewitt's SPA was completed for the Hewitt's Creek Landowners Group that included an assessment of regional hydrogeology (Burnside, 2016). The SIS included recommendations for additional studies to be done in support of draft plan approvals for the individual parcels within the Hewitt's SPA.

The current assessment is aimed at updating information contained in the SIS and providing more detailed site-specific information in support of an application for draft plan approval.

1.1 Scope of Work

The scope of work completed for the hydrogeological assessment was developed to build upon the more regional work completed for the Hewitt's SPA (Burnside, 2016) and to address requirements for hydrogeological studies in support of draft plan approval. The scope of work for the hydrogeological assessment included the completion of the following site-specific tasks:

1. Review of published geological and hydrogeological information: A review of background material for the area, including topography, surficial geology and bedrock geology mapping and existing geotechnical and hydrogeological reports was completed to assess the regional and local hydrogeological setting.

2. Review of the Ministry of the Environment, Conservation and Parks (MECP) water well records: The MECP maintains a database that provides geological records of water supply wells drilled in the province. A list of the available MECP water well records for local wells is provided in Appendix A and the well locations are plotted on Figure 9. It is noted that the well locations listed in the MECP records are approximations only and may not be representative of the precise well locations in the field. These well data were compiled and mapped to characterize the local groundwater resources and assess potential impacts to the local private wells from development of the subject lands.

3. Establish groundwater monitoring network: Groundwater monitoring locations were established to characterize seasonal variations in the water table in both the upper surficial and first encountered aquifers. Monitoring wells previously

constructed by Soil Engineers Ltd. were incorporated into the monitoring network. An additional five monitoring wells were installed by Burnside in 2019 and three piezometer nests were installed along water courses to observe groundwater surface water interactions. The locations of the monitoring wells and piezometers are shown on Figure 2 and monitoring well construction details are provided on the borehole logs in Appendix B.

4. Hydraulic conductivity testing: Burnside conducted single well response tests in order to determine soil hydraulic conductivity. Single well response tests were completed at two groundwater monitoring wells (DS-MW1 and DS-MW12d) in 2020. Hydraulic conductivity testing completed by Soil Engineers Ltd. in 2017 was reviewed and included in the current study. The hydraulic conductivity field testing results are provided in Appendix C.

5. Monitoring of groundwater levels: Monitoring has been completed to measure the depth to the water table and assess the horizontal and vertical groundwater flow conditions. Groundwater level monitoring was completed between June 2019 and June 2023 in monitoring wells and piezometers. Automatic water level recorders (dataloggers) were installed in four monitoring wells (DS-MW1, DS-MW7, DS-MW9 and DS-MW12d) and one piezometer (PZ1d) to document the range of groundwater fluctuations and the response of the groundwater table to precipitation events. Barometric data from a barologger installed in the vicinity of the subject lands was used for calibration of the datalogger results. The groundwater monitoring data and hydrographs are provided in Appendix D.

6. Monitoring of surface water: Surface water monitoring was completed at three monitoring stations located along watercourses that traverse the subject lands (Figure 2). The stations were inspected for water depth and flow on each site visit. The surface water monitoring data are summarized in Appendix E.

7. Water quality testing: Water quality data were collected from selected monitoring locations to typify the groundwater and surface water quality in the Phase 1 lands. Samples were collected in 2020 from two monitoring wells: DS-MW12d and DS-MW17 and two surface water locations SW1 and SW3. The water samples were submitted to an accredited laboratory for analyses of general water quality indicators (e.g., pH, hardness, and conductivity), basic ions (including chloride and nitrate) and selected metals to characterize the background water quality at the property. The laboratory water quality data are provided in Appendix F.

8. Water balance calculations: Pre-development and post-development water balance calculations have been completed to assess the groundwater infiltration

volumes for the subject lands. The local climate data and detailed water balance calculations are provided in Appendix G.

9. Reporting: All the data compiled as part of the assessment was reviewed in order to develop an understanding of site-specific hydrogeological conditions. The data were used to construct maps and figures and geological cross-sections in support of the interpreted geological conditions.

2.0 Topography and Drainage

The subject lands are located within the Innisfil Creek and Hewitt's Creek subwatershed of the larger Lake Simcoe watershed (Figure 3). The topography of the subject lands is generally flat to gently rolling. Elevations range from a high of 260 meters above sea level (masl) in the northwest corner of the subject lands to a low of 248 masl along Sideroad 20 along the tributaries of Sandy Cove Creek.

Tributaries of Sandy Cove Creek traverse the subject lands from west to east and southwest to east and northeast. One tributary is located on the northern portion of the subject lands, flows east and leaves the subject lands at Sideroad 20 near Mapleview Drive. Another tributary originates within the Natural Heritage System located in the middle of the Dorsay lands, two branches flowing east and north merge and then flow east leaving the subject lands at a culvert along Sideroad 20. Wetland features are associated with the tributaries mapped as unevaluated wetlands as per the Ontario Wetland Evaluation System the drainage network is illustrated on Figure 3.

3.0 Geology

The subject lands are located in the physiographic region known as the Peterborough Drumlin Field. The region is characterized as a rolling drumlinized till plain. The drumlins through the region are comprised of highly calcareous till (Chapman & Putnam, 1984). The overburden in the vicinity of the subject lands was deposited as a series of advances and retreats of the Simcoe glacial ice lobe. This has resulted in drumlinized sheets of glacial till (Newmarket till), stratified glaciolacustrine deposits of sand and gravel, littoral-foreshore deposits and massive-well laminated deposits of sand and gravel (OGS, 2003).

A review of the quaternary geology mapping for the area (OGS, 2003) indicates that the overburden sediments of the subject lands consist of silty to sandy glacial till and ice-contact stratified deposits (Figure 4).

The bedrock underlying the subject lands is mapped as the Verulam Formation which consists of grey limestone with alternating shale and claystone (Figure 5). The southwest corner of the subject lands is mapped as the Lindsay Formation of the Simcoe Group, which consists of limestone and shale (OGS, 2007). The overburden has been estimated to be over 145 m thick in the vicinity of the subject lands (ORMGP, 2020).

4.0 Hydrogeology

4.1 Regional Hydrostratigraphy

The regional hydrogeology of an area describes the major aquifers and aquitards and the interactions between these types of hydrogeological units. Local conditions may vary from the regional interpretations, however major groundwater flow systems are assumed to be regional in nature.

The overburden deposits underlying the subject lands have been interpreted by regional studies such as the Tier 3 Water Balance (AquaResource, 2011) and Source Water Protection Assessment Report (LSRCA, 2012) to consist of alternating sequences of coarser-grained permeable layers (aquifers) and finer-grained less permeable layers (aquitards) of varying thicknesses. This sequence of layers was also supported by the SIS (Burnside, 2016). The basic hydrostratigraphic sequence that was interpreted for the area of the subject lands includes four main aquifer layers (A1 to A4) and four main aquitards (C1 to C4) with a confining layer (UC) overlying the uppermost aquifer (A1).

A description of the interpreted regional hydrostratigraphic framework is provided below based on the Source Water Protection Assessment Report (LSRCA, 2012):

- Surficial Geology Layer – This layer represents coarse grained sediments in stream beds and at surface surficial geology areas that overly the UC. The thickness ranges from 5 m to 15 m.
- UC – Upper Confining Layer – Represents smaller areas of less permeable surficial material. The upper confining layer has been mapped as coarse-grained lacustrine deposits which are part of a regionally extensive sand plain (LSRCA, 2012). Regional studies such as the AquaResource (2011) report indicate that the confining layer (UC) is patchy in the Barrie area.

- A1 – Represents the uppermost aquifer – Occasionally exists as a surficial unconfined aquifer and is stratigraphically equivalent to the Oak Ridges Moraine. It is generally associated with coarse grained glacial and interglacial sediments mapped as ice contact stratified drift. The majority of the local domestic wells in the Barrie area are completed within this aquifer.

- C1 – Upper aquitard – Described as varved clay and silt (LRSCA, 2012).

- A2 – Intermediate aquifer which is stratigraphically equivalent to areas within the Northern Till. The aquifer is generally described as being composed of sand with some clast rich portions (LRSCA, 2012). This area is used for the Innisfil Heights water supply.

- C2 – Intermediate aquitard.

- A3 – This area constitutes the main Barrie municipal aquifer and is the source of the Stroud water supply; it is stratigraphically equivalent to the Thorncliffe deposits in the Upland regions.

- C3 – Lower aquitard.

- A4 – Lower aquifer, thin and sometimes combined with A3 where C3 is thin or absent.

- C4 – Lower aquitard but may also represent weathered bedrock.

4.2 Local Stratigraphy

A total of 17 boreholes were drilled across the subject lands as part of geotechnical investigations by Soil Engineers Ltd. in 2016 and drilling by Burnside in 2019. The locations of the boreholes are shown on Figure 6 and the borehole logs are provided in Appendix B. The boreholes indicated that the overburden is generally composed of layers of sandy silt to silty sand till overlying silty sand and sand. The till deposits also had varying amounts of clay and gravel. Localized units of sandy silt and silty clay were also encountered. The lithology encountered by the boreholes is generally consistent with the lithology shown on the geological maps.

To illustrate the shallow stratigraphy of the subject lands, schematic geologic cross-sections have been prepared (Figures 7 and 8) using the soils information collected during drilling of boreholes and monitoring wells (Appendix B). The locations of the cross-sections are illustrated on Figure 6 along with the locations of water wells and boreholes used in the construction of the cross-sections.

The cross-sections (Figures 7 and 8) show that the subject lands are underlain by a sand, silt and silty sand till that is 5 m to 15 m thick. There are occasional clay and silt deposits at surface. The sand and silty sand till is underlain by a confining clay and silt layer 15 m to 25 m thick. A regional sand/gravel aquifer is interpreted below the clay silt layer.

4.3 Soil Hydraulic Conductivity

Hydraulic conductivity is a measure of a soil's ability to transmit groundwater. There are various methods that can be used to assess soil hydraulic conductivity depending on the available instrumentation. Grainsize data and soil characteristics collected during a geotechnical investigation can be used to provide a general estimate of hydraulic conductivity. Single well response tests such as in situ bail-down or slug-testing methods are used in groundwater monitoring wells to assess in situ hydraulic conductivity of the soils represented across the screened interval of the well. Both methods have been used to estimate the hydraulic conductivity of the soils encountered in the boreholes completed on the subject lands as discussed below.

4.3.1 Grainsize Analysis

During geotechnical investigations on the subject lands, representative soil samples were collected and analyzed for grainsize distribution (Appendix C). To estimate hydraulic conductivity based on grainsize analysis, an empirical formula method known as the Hazen estimation is used. This method is an approximation of hydraulic conductivity based on grainsize curves for sandy soils. The approximation does not strictly apply to finer grained materials however, it is still considered useful to provide a general indication of the range of the hydraulic conductivity values. Hydraulic conductivity values were derived empirically using the Hazen method when applicable for eight soil samples. The grainsize distribution graphs of the soil samples are provided in Appendix C and are summarized in Table 1.

Table 1: Estimated Hydraulic Conductivity Based on Grainsize Analyses

Sample ID	Depth of Sample (mbgs*)	Soil Classification	% Fines	Hydraulic Conductivity (cm/sec)
BH5-SS8	7.8	Silty Sand Till	47	9.0×10^{-6}
BH6-SS5	3.3	Silty Sand	49	2.3×10^{-4}
BH1-SS14	13.9	Silty Clay	96	na
BH1-SS13	12.4	Sandy Silt	58	6.3×10^{-4}
BH2-SS7	6.4		65	2.6×10^{-4}
BH9-SS3	1.8	Silty Clay Till	60	na
BH7-SS10	7.9	Sandy Silt Till	55	2.3×10^{-6}
BH1-SS7	4.9	Sand, some silt.	12	2.7×10^{-3}

*metres below ground surface
na – Hazen formulae not applicable

Grainsize analyses results indicate that the sediments within the overburden range in composition from sand some silt (12% fines) to silty clay (96% fines). The greater amounts of fines within a deposit impacts the ability of the material to transmit water and generally lowers the overall hydraulic conductivity. Groundwater flow is generally limited

by fine grained sediments with lower hydraulic conductivity. The grainsize analyses indicate that the sediments encountered on the subject lands are mainly sand and silty sand with occasional layers with a greater percentage of fines. Computed hydraulic conductivities based on these analyses indicate a range of 10^{-3} to 10^{-6} cm/sec which is regarded as moderate to low.

4.3.2 Single Well Response Tests

Single well response tests were completed by Soil Engineers Limited at seven monitoring wells in 2016. The results of the tests are provided in Appendix C and summarized in Table 2 below. To confirm the results of the previous testing bail-down tests and slug test) were conducted by Burnside at two monitoring wells. The results from the tests were plotted (Appendix C) and analyzed to calculate hydraulic conductivity of the sediments screened. A summary of the calculated hydraulic conductivities is provided below in Table 2.

Table 2: Single Well Response Testing Results

Monitoring Well	Screen Interval (mbgs)*	Formation Screened	Hydraulic Conductivity (cm/sec)
DS-MW1	13.4 – 16.9	Silty Clay, Silty Sand	3.5×10^{-4}
			4.7×10^{-5}
DS-MW3	4.0 – 7.6	Silty Sand and Sandy Silt	4.7×10^{-5}
DS-MW5	4.0 – 7.6	Silty Sand Till	1.5×10^{-4}
DS-MW7	5.3 – 9.0	Sandy Silt Till	4.9×10^{-5}
DS-MW8	2.6 – 6.2	Gravelly Sand and Sandy Silt Till	1.4×10^{-4}
DS-MW9	5.3 – 9.0	Silty Sand Till	4.3×10^{-5}
DS-MW12d	3.7 – 5.8	Silty Sand Till, Silty Sand	5.6×10^{-4}
			8.7×10^{-4}

*metres below ground surface

Single well response tests in wells screened in the silty sand till indicated moderate hydraulic conductivities in the order of 10^{-4} cm/sec to 10^{-5} cm/sec.

4.4 Local Groundwater Use

The City of Barrie obtains its water supply from a combination of groundwater and surface water based sources. Municipal servicing is assumed to be available for lands within the municipal city boundary and areas outside of the city are privately serviced. It is our understanding that municipal servicing is being extended into the area as part of the development of the Hewitt's Secondary Plan Area. Areas that were previously privately serviced are assumed to still have individual private water supply wells as the servicing works are not yet complete.

A review of the MECP water well records indicated that there are approximately 39 water supply well records within 500 m of the subject lands. Of the 39 well records, 22 are identified as private water supply wells. Based on the well records and interpreted hydrostratigraphy, most of these wells are completed in the first encountered (local) aquifer with depths ranging from 9.1 m to 29 m with five of the wells located in the deep aquifer with depths greater than 30 m. The cross-sections completed indicate that the top of the first encountered aquifer zone is located at elevations around 225 masl to 230 masl. The locations of the MECP water well records are shown on Figure 9.

There are no municipal water supply wells located in the vicinity of the subject lands. The closest municipal supply wells are located on the west and northern sides of the city and more than 5 kilometers from the subject lands. The subject lands do not fall within any wellhead protection areas or intake protection zones associated with the City of Barrie water supply systems (LSRCA, 2012). The City of Barrie groundwater supply wells are located in deep aquifers (A3 and A4 in the regional hydrostratigraphy). These aquifers are interpreted to be found at elevations of 150 masl to 195 masl and 115 masl to 160 masl respectively and are therefore significantly below (approximately 100 to 150 m below the surficial layer found on the subject lands) and separated from any potential impact due to the proposed development (AquaResource et al., 2011).

4.5 Water Level Monitoring Results

Groundwater levels were monitored at 8 monitoring wells including one nest across the subject lands in order to gain information on groundwater distribution and fluctuations. Groundwater levels were monitored at the on-site monitoring wells between June 2019 and June 2023. Groundwater level data is provided in tables and hydrographs in Appendix D. Groundwater elevations are plotted with daily precipitation data obtained from a nearby climate station – Barrie-Oro (Climate Station ID# 6117700) which is the closest station with daily precipitation values for 2019, 2021 and 2022. In 2020 precipitation data is obtained from the Barrie Landfill Climate Station (Climate Station ID#6110556) since the Barrie-Oro climate station data was not available.

In addition to the manual water level measurements recorded at each location, automatic water level recorders were installed in DS-MW1, DS-MW9, DS-MW12d, DS-PZ1d and DS-PZ3d to record continuous water levels. The datalogger data collected are included on the hydrographs provided in Appendix D.

The groundwater monitoring data show the following (refer to Figure 2 for the monitoring locations and the data tables and hydrographs in Appendix D):

- Shallow wells in southern Ontario typically show a pattern of groundwater fluctuations that is related to seasonal variations in precipitation and infiltration. This pattern shows the highest groundwater levels occurring in the spring, levels declining throughout the summer and early fall and then rising again in the late fall/early

winter. This pattern is apparent in the wells located on the subject lands (Figures D-1 to D-12, in Appendix D). The seasonal variation in water levels shows a range from 0.7 m to 1.5 m (Figures D-1 to D-12). Seasonal variations at drive-point piezometers (Figures D-13, D-14 and D-15) were generally less than 1 m.

- Continuous water level data obtained from dataloggers at one-hour frequency were plotted against precipitation to determine whether there is a correlation between precipitation events (recharge events) and changes in water level (Figures D-1, D-4, D-6 and D-7). Water level response is observed at DS-MW7 following three days of heavy rain at the end of October 2019 (Figure D-4, Appendix D). At DS-MW12d water levels respond to precipitation events such as a large rain event in January 12, 2020 (0.5 m increase). Water levels also increased 0.6 m after three days of heavy rain at the end of October 2019 (Figure D-7, Appendix D). At DS-MW1, water levels show a response of 0.5 m after a heavy rainfall in July 2020 (Figure D-1, Appendix D).

- Groundwater potentiometric levels at the monitoring wells ranged from above grade to 5.6 meters below ground surface for wells completed in the shallow subsurface.

- Groundwater levels in DS-MW8 and DS-MW9, DS-MW15 appear to be under pressure heads with water level being noted to be seasonally near or above grade (Figures D-5, D-6 and D-10, Appendix D). DS-MW8 and DS-MW9 are screened within a sandy silt till layer. DS-MW15 is screened in shallow sands. These pressures are interpreted to be generated due to the elevation of the recharge areas and the confining influence of less permeable layers in the subsurface. Where lithology allows, the potentiometric heads are observed to locally extend into the surrounding sand and silt till.

4.6 Interpreted Groundwater Flow Pattern

Groundwater flow within the shallow surficial soils (water table) is interpreted to be influenced by the surface topography with groundwater flow from the topographically higher areas towards topographically lower areas and surface water features (Figure 10). Groundwater elevation data (March 2020) obtained from the monitoring wells are shown on Figure 10, along with the interpreted groundwater elevation contours for the area. Arrows perpendicular to the groundwater elevation contours shown on Figure 10 illustrate the interpreted direction of the groundwater movement. On Figure 10, groundwater is interpreted to flow towards the tributaries of Sandy Cove Creek.

4.7 Recharge and Discharge Conditions

Areas where water from precipitation infiltrates into the ground and moves downward (i.e., areas of downward hydraulic gradients) are known as recharge areas. Recharge

areas are generally located where there is relatively higher topographic elevation. Areas where groundwater moves upward (i.e., areas of upward hydraulic gradients) are discharge areas and these generally occur in areas of relatively lower topographic elevation, such as into wetlands and along watercourses.

When evaluating groundwater recharge or discharge conditions, nested wells (two wells screened at different depths at the same location) can be used to determine vertical hydraulic gradients and groundwater recharge or discharge conditions in the subsurface.

At monitoring well nest DS-MW12s/d, the groundwater levels in the deep well are similar to the shallow well or slightly higher indicating a small upward gradient and potential for groundwater movement from the deep to the shallow zones (Figure D-7, Appendix D).

4.7.1 Groundwater Surface Water Interactions

To assess shallow groundwater conditions and gradients near the watercourses and wetlands two drive-point piezometer nests were monitored.

PZ1s/d is located along the north tributary of Sandy Cove Creek near SW1 (Figure 2). The water levels in PZ1d took four months to recover from installation. Once groundwater stabilized in the piezometer an upward gradient (shallow water level lower than deep water level) is observed, showing the potential for groundwater discharge conditions exist in this area (Figure D-13, Appendix D). The actual volume of discharge will be minimal due to the low hydraulic conductivity of the soils.

DS-PZ2s/d is located in the wetland along the southern tributary of Sandy Cove Creek near SW3 (Figure 2). The water levels in DS-PZ2s/d took three months to recover after installation indicating very tight soils. After stabilization, the water levels were generally above grade showing an upward gradient (Figure D-14) and the potential for groundwater discharge to the wetland.

DS-PZ3s/d is located in a wetland in the south-central portion of the subject lands (Figure 2). A slight downward gradient is observed during the duration of monitoring (Figure D-15). There is a strong seasonal trend in water levels and water levels respond rapidly to precipitation events.

4.7.2 Significant Groundwater Recharge Areas and Ecologically Significant Groundwater Recharge Areas

Significant Groundwater Recharge Areas (SGRAs) can be described as areas that can effectively move water from the surface through the unsaturated soil zone to replenish available groundwater resources (LSRCA, 2012). SGRAs were mapped by the Source Water Protection Assessment Report (LSRCA, 2012) as a requirement of the Clean Water Act, 2006 and based on guidance provided by the MECP. The delineation of

these areas was completed using numerical models and analyses that included the evaluations of numerous factors including precipitation, temperature and other climate data along with land use, soil type, topography and vegetation to predict groundwater recharge, runoff and evapotranspiration. SGRAs represent areas where the annual recharge rate is greater than 115% of the average recharge of 164 mm/year across the Lake Simcoe watershed (or greater than the threshold recharge rate of 189 mm/year) (LSRCA, 2012).

Ecologically Significant Groundwater Recharge Areas (ESGRAs) were delineated for the Barrie Creek, Lovers Creek and Hewitt's Creek subwatersheds by Earthfx (2012) using the groundwater model developed by AquaResources for the Source Protection studies. ESGRAs were defined as areas of land that are assumed to support groundwater systems or environmentally sensitive features like lakes, cold water streams and wetlands (Earthfx, 2012). ESGRAs were delineated in the groundwater model by identifying pathways in which recharge, if it occurred, would reach an ecologically significant feature. Ecologically significant features used for the delineation of the ESRGAs included headwater streams, cold water fisheries, wetlands, and brook trout and sculpin capture sites. ESGRAs and SGRAs are not mutually exclusive. ESGRAs are determined based on the linkage between a recharge area and an ecologically sensitive area while SGRAs are located where high volumes of recharge are assumed to occur.

The locations of mapped SGRAs and ESGRAs on the subject lands are shown in Figure 11. SGRAs mapped on the subject lands correspond to surficial geology mapping of glaciofluvial ice-contact stratified sediments (Figure 4).

5.0 Surface Water Monitoring

To characterize the flow conditions of watercourses on the subject lands monitoring locations were established and flow conditions were measured during monitoring events. Surface water flow monitoring was conducted at three monitoring locations, SW1, SW2 and SW3 (Figure 2). Monitoring data over the period of this study is provided in Appendix E and summarized below:

- SW1 is located along the northern tributary of Sandy Cove Creek which flows west to east across the subject lands. The tributary at SW1 is an incised channel that flows through the agricultural lands. Flows observed at SW1 ranged from 2.9 L/s to 39.5 L/s. Standing water (no flow) was generally observed in the summer months (July, August, September) and frozen conditions were observed December 2019, January and March 2020, December 2022 and February and March 2023.

- SW2 is downstream of SW1 along the tributary of Sandy Cove Creek as the tributary leaves the subject lands at Sideroad 20. The tributary between SW1 and SW2 is incised, and tile drain outlets were observed along its southern banks. Flow was

found to be present on all monitoring visits except for during the winter months when conditions were reported as frozen. Flows observed at SW2 ranged from <0.5 L/s to 24.2 L/s and show an increase in flow from SW1 (indicating a gaining stream).

- SW3 is located along the southern tributary of Sandy Cove Creek which flows through the Natural Heritage System on the subject lands at the culvert along Sideroad 20. Flows were observed at SW3 ranging from 0.4 L/sec to 16.1 L/sec. In July and August 2019 no flow was observed. Frozen conditions were observed in the winter months (November to March).

6.0 Water Quality

6.1 Groundwater Quality

Water quality data was collected from two monitoring wells to typify the groundwater quality in the vicinity of the subject lands. Groundwater sampling was completed on June 1, 2020 at two groundwater monitoring wells (DS-MW12d and DS-MW17). The water samples were submitted to an accredited laboratory for analyses of general water quality indicators (e.g., pH, hardness, and conductivity), basic ions (including chloride and nitrate) and selected metals to characterize the background water quality.

For comparison purposes, the Ontario Drinking Water Quality Standards (ODWQS) and the Provincial Water Quality Objectives (PWQO) are provided with the results on Table E-1, Appendix E. The groundwater will not be used for drinking water however the ODWQS provides an indication of acceptable concentrations for potable water. The PWQO provides an indication of whether the groundwater on the subject lands could be discharged to surface water should pumping associated to construction be required. The groundwater testing results from the analytical laboratory are provided in Table F-1, Appendix F and discussed below:

- All samples exceeded the ODWQS for total hardness (100 mg/L) with values of 193 mg/L (DS-MW17) and 262 mg/L (DS-MW12d). Hardness in groundwater is caused by dissolved calcium and magnesium and is typically related to the geologic material of the aquifer. Elevated values are typical for aquifers in Southern Ontario.

- All samples exceeded the ODWQS for turbidity (5 NTU) with values ranging from 601 NTU (DS-MW12d) and 13500 NTU (DS-MW17). The high turbidity is likely a result of high silt content in the samples. It is noted that the monitoring wells were originally constructed as geotechnical boreholes and are not likely to have been developed as part of construction. The high silt content is likely related to the lack of well development and is not considered to be a water quality issue in this area.
- Nitrate was detected in both of the samples with values of 0.22 mg/L (DS-MW17) and 9.6 mg/L (DS-MW12d). Elevated nitrate at DS-MW12d (9.6 mg/L) is likely a

result of agricultural activities in the area of the subject lands. The concentration is close to the ODWQS for nitrate which is 10 mg/L.

- Total phosphorus was reported in the samples at 0.29 mg/L and 1.92 mg/L which exceeds the PWQO of 0.03 mg/L. Total phosphorus is a measure of all forms of phosphorus (dissolved or particulate) that are found in the water sample. There was very little dissolved phosphorus (ortho-phosphate) reported in the groundwater samples suggesting the reported concentrations are particulate in the groundwater sample.

6.2 Surface Water Quality

Surface water quality data was collected at SW1, SW2 and SW3 to typify the surface water quality in the vicinity of the subject lands. Sampling was conducted in June 2020 and submitted to an accredited laboratory for analyses of general water quality indicators (e.g., pH, hardness, and conductivity), basic ions (including chloride and nitrate) and selected metals. The surface water quality testing results from the analytical laboratory are provided in Table F-2, Appendix F and have been compared to the Provincial Water Quality Objectives (PWQO):

- The results showed that the water generally met the Provincial Water Quality Objectives (PWQO).

- Total phosphorus at SW3 was reported at a concentration of 0.05 mg/L which exceeds the PWQO of 0.03 mg/L. Total phosphorus is a measure of all forms of phosphorus (dissolved or particulate) that are found in the water sample. There was no dissolved phosphorus (ortho-phosphate) reported in the sample suggesting the reported concentrations are particulate.

- At SW1, uranium was reported at a concentration of 0.006 mg/L which exceeds the PWQO of 0.005 mg/L. Uranium can be found in phosphate fertilizers and may have been associated with the agricultural land use that occurred on the subject lands. There was no uranium detected in the surface water sample from SW3 and no uranium detected in the groundwater samples. It is anticipated that the cessation of agricultural use will remove the source of uranium.

As part of the field surface water monitoring, when flow was present surface water chemistry field parameters were collected. The results of the monitoring are provided in Table F-3, Appendix F. Parameters collected included temperature, conductivity, total dissolved solids and total suspended solids. Temperatures at the surface water monitoring locations ranged from 1.6 deg Celsius to 19.5 deg Celsius. Total suspended solids ranged from 0 mg/L to 58 mg/L.

7.0 Water Balance

In order to assess potential land development impacts on the local groundwater conditions, a detailed water balance analysis has been completed to determine the pre-development recharge volumes (based on existing land use conditions) and the post-development recharge volumes that would be expected based on the proposed land use plan. The detailed water balance calculations are provided in Appendix G.

The water balance computed as part of the current study was completed using a similar approach as that completed for the SIS (Burnside, 2016). It was noted at the SIS level that subsequent studies should complete individual water balance assessments at a site-specific level in order to determine the potential impacts of development on local features and to evaluate the need for Low Impact Development (LID) measures.

7.1 Water Balance Components

A water balance is a planning tool that provides an accounting of the water resources within a given area. The water balance uses regional and site-specific information to estimate the resulting parameters. It is important to understand that the water balance is a diagnostic tool that provides an order of magnitude understanding of water resources. Based on the assumptions and simplification required to undertake these assessments, it should be noted that predictions from a water balance provide more of an understanding of the nature of an impact rather than a precise measure of the impact.

As a concept, the water balance is relatively simple and may be estimated from the following equation:

$$P = S + ET + R + I$$

Where:

	P	=	precipitation
	S	=	change in groundwater storage
	ET	=	evapotranspiration/evaporation
	R	=	surface water runoff
	I	=	infiltration

The components of the water balance vary in space and time and depend on climatic conditions as well as the soil and land cover conditions (i.e., rainfall intensity, land slope, soil hydraulic conductivity and vegetation). Runoff, for example, occurs particularly during periods of snowmelt when the ground is frozen, or during intense rainfall events. Precise measurement of the water balance components is difficult and as such, approximations and simplifications are made to characterize the water balance of an area. The information collected as part of the current study including field observations of the drainage conditions, land cover and soil types, groundwater levels and local climatic records are important input considerations for the water balance calculations.

These input parameters have been estimated for the subject lands and are discussed below:

Precipitation (P)

Precipitation represents the main input to the water balance calculation. Precipitation for the subject lands was estimated based on the climate normal (the long-term average annual precipitation for the 30-year period 1981 to 2010). The normal precipitation for the area of the subject lands was determined to be 933 mm based on data from the Environment Canada Barrie WPCC (Station 6110557, 44°22'33.012" N, 79°41'23.010" W, elevation 221.0 masl). The climate station is located 5 km northeast of the subject lands. The normal monthly records of precipitation and temperature from this station have been used for the water balance calculations in this study (Appendix G). It is noted that the actual precipitation of the subject lands may vary from the documented normal.

Storage (S)

Although there are groundwater storage gains and losses on a short-term basis, the net change in groundwater storage on a long-term basis is assumed to be zero so this term is dropped from the equation for the purposes of the water balance calculation. This does not impact the evaluation as the water balance is considered at the annual scale where annual losses and annual gains are expected to balance out.

Evapotranspiration (ET)

Evapotranspiration and evaporation components vary based on the characteristics of the land surface cover (i.e., type of vegetation, soil moisture conditions, perviousness of surfaces, etc.). Potential evapotranspiration (PET) refers to the water loss from a vegetated surface to the atmosphere under conditions of an unlimited water supply. The actual rate of evapotranspiration (AET) is generally less than the PET under dry conditions (i.e., during the summer when there is a soil moisture deficit). In this assessment, the PET has been calculated using a climate variable approach and corrections for latitude and heat index. The AET is calculated using a soil-moisture balance approach.

Water Surplus (R + I)

The difference between the mean annual P and the mean annual ET is referred to as the water surplus. Part of the water surplus travels across the surface of the soil as surface or overland runoff (R) and the remainder infiltrates the surficial soil (I). The infiltration is comprised of two end member components: one component that moves vertically downward to the groundwater table (referred to as recharge) and a second component that moves laterally through the topsoil profile or shallow soils as interflow that

re-emerges locally to surface (i.e., as runoff) at some short time following cessation of precipitation. As opposed to the “direct” component of surface runoff that occurs during precipitation or snowmelt events, interflow becomes an “indirect” component of runoff. The interflow component of surface runoff is not accounted for in the water balance equation cited above since it is often difficult to distinguish between interflow and direct (overland) runoff, however both interflow and direct runoff together form the total surface water runoff component.

7.2 Water Balance Approach and Methodology

The analytical approach to calculate the water balance involves monthly soil-moisture balance calculations to determine the pre-development (based on existing land use) infiltration volumes. A soil-moisture balance approach assumes that soils do not release water as potential recharge while a soil moisture deficit exists. During wetter periods, any excess of precipitation over evapotranspiration first goes to restore soil moisture. Once the soil moisture deficit is overcome, any further excess water can then pass through the soil as infiltration and either become interflow (indirect runoff) or recharge (deep infiltration).

A soil moisture storage capacity of 150 mm was selected as a representative value for the existing vegetation and soil conditions which consists of predominantly short to moderate-rooted vegetation in the fields and agricultural areas (Table G-1, Appendix G). A soil moisture storage capacity of 300 mm was used to represent the woodland located in the Natural Heritage System (Table G-2, Appendix G). A soil moisture storage capacity of 75 mm was used to represent the post-development vegetation which will be dominantly urban lawn (Table G-3, Appendix G). Tables G-1 to G-3 in Appendix G details the monthly potential evapotranspiration calculations accounting for latitude and climate, and then calculate the actual evapotranspiration and water surplus components of the water balance based on the monthly precipitation and soil moisture conditions.

The MECP SWM Planning and Design Manual (2003) methodology for calculating total infiltration based on topography, soil type and land cover was used, and a corresponding runoff component was calculated for the soil moisture storage conditions. The calculated water balance components from this table are then used to assess the pre-development and post development volumes for runoff and infiltration as presented on Table G-4 in Appendix G.

7.3 Water Balance Component Values

The detailed monthly calculations of the water balance components are provided in Tables G-1 to G-3 in Appendix G. The infiltration and runoff components have been calculated using the infiltration factor methodology from Table 3.1 of MECP SWM Planning and Design Manual (2003). The methodology accounts for topography, soil type and land cover assigning a factor between 0.1 and 0.3 to each component. The

calculations show that a water surplus is generally available from November to May and the period of surplus is illustrated in Figure G-1. The monthly water balance calculations illustrate how infiltration occurs during periods when there is sufficient water available to overcome the soil moisture storage requirements. The monthly calculations are summed to provide estimates of the annual water balance component values (Tables G-1 to G-3, Appendix G). A summary of these values is provided in Table 3.

Table 3: Water Balance Component Values

Water Balance Component	Agricultural	Woodland	Urban Lawn
Average Precipitation	933 mm/year	933 mm/year	933 mm/year
Actual Evapotranspiration	593 mm/year	593 mm/year	555 mm/year
Water Surplus	340 mm/year	340 mm/year	378 mm/year
Infiltration	170 mm/year	204 mm/year	189 mm/year
Runoff	170 mm/year	136 mm/year	189 mm/year

7.4 Pre-Development Water Balance (Existing Conditions)

The pre-development water balance calculations are presented in Table G-4 in Appendix G for the subject lands. The water balance component values from Tables G-1 to G-3 were used to calculate the average annual volume of infiltration for the area under consideration. The infiltration factors used in the calculations reflect the site-specific information that has become available from work conducted by Burnside and others and deviates from the factors used during the SIS. Soil factors and land cover were selected based on site specific data versus the regional data used for the SIS. Slope was computed based on available topographic data for the subject lands in both pre and post-development scenarios. Based on these component values, the pre-development infiltration volume for the subject lands is calculated to be about 144,700 m^3/year (Table G-4, Appendix G).

It is acknowledged that infiltration rates are directly dependent upon the hydraulic conductivity of soils that may naturally vary over several orders of magnitude. Recognizing the wide margins of error associated with this type of analysis, the calculated infiltration volume is considered simply as a reasonable estimate that can serve as a target for post development infiltration.

7.5 Potential Urban Development Impacts to Water Balance

Development of an area affects the natural water balance and results in differences between pre-development and post development water balance due to the changes to various parameters caused by the development process. The most significant change in conditions is due to the addition of impervious surfaces as a type of surface cover

(i.e., roads, parking lots, driveways, and rooftops). Impervious surfaces prevent infiltration of water into the soils and the removal of the vegetation removes the evapotranspiration component of the natural water balance. The evaporation component from impervious surfaces is relatively minor (estimated to be 10% to 20% of precipitation) compared to the evapotranspiration component that occurs with vegetation in this area (about 64% of precipitation in the study area). So, the net effect of the construction of impervious surfaces is that most of the precipitation that falls onto impervious surfaces becomes surplus water and direct runoff. The natural infiltration components (interflow and deep recharge) are reduced.

A water balance calculation of the potential water surplus for impervious areas is shown at the bottom of Table G-1 in Appendix G. For the purposes of the calculations in this study, the evaporation has been estimated to be 15% of precipitation. The remaining 85% of the precipitation that falls on impervious surfaces is assumed to become runoff. Therefore, assuming an evaporation/loss from impervious surfaces of 15% of the precipitation, there is a potential water surplus from impervious areas of 793 mm/year.

It is noted that the proposed development will be serviced by municipal water supply and wastewater services. Therefore, there will be no impact on the water balance and local groundwater or surface water quantity and quality conditions related to any on-site groundwater supply pumping or disposal of septic effluent.

7.6 Post-Development Water Balance with No Mitigation

To assess potential development impacts on infiltration, the post-development infiltration volumes have been calculated for the subject lands on Table G-4 in Appendix G. The total areas for the proposed land uses and the associated percentage imperviousness were provided by Schaeffers Consulting Engineers (the design engineers).

The infiltration and runoff components for the post-development land uses have been calculated using the MECP SWM Planning and Design Manual (2003) methodology based on topography, soil type and land cover as shown on Table G-3 in Appendix G. The calculated post-development infiltration volume (without mitigation) is calculated to be about 80,900 m^3/year (Table G-4, Appendix G).

Comparing the pre- and post-development infiltration volumes, shows that development has the potential to reduce the average infiltration on the subject lands from 144,700 m^3/year to 80,900 m^3/year, i.e., a reduction of about 63,800 m^3/year or 44%. These calculations assume no low impact development (LID) measures for stormwater management are in place.

7.7 Water Balance Mitigation Strategies

It is recommended to minimize the potential development impacts to infiltration through the use of 'low impact development' (LID) measures for stormwater management to ensure the post development groundwater infiltration volume is maintained as close to the predevelopment infiltration volume as possible.

The proposed LID measures for the subject lands as described in the Stormwater Management Report completed by Schaeffers Consulting Engineers include the following:

- Directing roof leaders to rain gardens at front yards of all single detached and backyards of northern townhouse lots
- Infiltration swales within NHS buffer; and
- Bio-swales along municipal boulevards.

The proposed LID measures were chosen based on the suitability of the soils and groundwater levels.

Grainsize analysis of the soils on the subject lands indicate soils are generally sand and silty sand and can be considered to be classified as Hydrologic Soil Group A & B (sandy, sandy loam, silt loam). Information provided by Schaeffers indicates that the base of the bioswales and infiltration swales has been designed to have a minimum of 1.0 m separation from seasonal groundwater high elevations.

Water balance calculations based on post-development with the use of LIDs are included in the SWM Report provided by Schaeffers.

8.0 Development Considerations

8.1 Construction Below the Water Table

Based on groundwater level data collected as part of this study, water table on the subject lands ranges from 0 m to 5 m below ground surface. Groundwater has been interpreted to exist within the local supply aquifer with seasonal variations, discharge gradients and local semi-confining conditions resulting in shallow groundwater conditions on a temporal and spatial basis.

Should excavations, completed, during construction of servicing extend below the water table the local soils may need to be dewatered. The volume of water required for dewatering is dependent on the hydrogeological properties of the sediments and the depth of the excavation. Hydraulic conductivity testing of the soils estimated the hydraulic conductivity to range between 10^{-5} to 10^{-8} m/sec. Significant groundwater flows may be encountered in the higher permeability sand layers while groundwater

flows are expected to be minimal in the shallower low permeability till sediments. An evaluation of volumes should be completed once servicing depths are available.

The construction of buried services below the water table has the potential to capture and redirect groundwater flow through more permeable fill materials typically placed in the base of excavations. Groundwater may also infiltrate into joints in storm sewers and manholes. Over the long-term, these impacts can lower the groundwater table across the development area. To mitigate this effect, services to be installed below the water table should be constructed to prevent redirection of groundwater flow. This will involve the use of anti-seepage collars or clay plugs surrounding the pipes to provide barriers to flow and prevent groundwater flow along granular bedding material and erosion of the backfill materials.

Due to the potential for encountering the water table during construction, the dewatering of local aquifers may be required in order for services to be installed below the water table. The undertaking of dewatering according to industry standards and in accordance with a MECP processes will ensure that adequate attention is paid to potential adverse impacts to the environment. Currently the MECP allows for construction dewatering of less than 400,000 L/d to proceed under the Environmental Activity Sector Registry (EASR) process. If dewatering is to be above this threshold, then the standard Permit to Take Water (PTTW) process applies. In both cases, a scientific study is required in support of EASR registration or PTTW application. This scientific study must review the potential for environmental impacts and provide mitigation and monitoring measures to the satisfaction of the MECP or other review agency. The requirements for construction dewatering will be confirmed by geotechnical/hydrogeological investigations completed in support of detailed design.

8.2 Local Groundwater Supply Wells

The area surrounding the subject lands is not currently serviced and residences are supplied by private wells. A water well survey study was completed on behalf of the Hewitt's SPA Landowner's Group for residences within 300 m of the Hewitt's SPA lands to assess the potential for impacts to private supply wells (Burnside, 2018). The report, which included the subject lands identified potentially vulnerable wells in the vicinity of the subject lands and outlined a monitoring and mitigation plan. This report was submitted to the Town of Barrie and a domestic well monitoring program was initiated in 2019. It is expected that the monitoring will continue for 5 years within the Phase 1 lands and potentially for 10 years within Phase 2. During this period, the interference protocol outlined in the report will be implemented should any episode of interference occur.

8.3 Well Decommissioning

Prior to or during construction, it is necessary to ensure that all inactive wells within the development footprint have been located and properly decommissioned by a licensed

water well contractor according to Ontario Regulation 903. This regulation applies to private domestic wells and to the groundwater observation wells installed for this study unless they are maintained throughout the construction for monitoring purposes.

9.0 References

AquaResource et al. 2011. City of Barrie Tier Three Water Balance and Local Area Risk Assessment Groundwater Flow Model, AquaResource, Golder and IWC, 2011.

Burnside, 2016. Hewitt's Secondary Plan Area Hydrogeological Assessment, Hewitt's Landowners Group, R.J. Burnside & Associates Limited, June 2016.

Burnside, 2018. Hewitt's SPA Lands Well Survey Report, Hewitt's Creek Landowners Group, Barrie, Ontario. R.J. Burnside & Associates Limited, October 2018.

Chapman, L.J. and D.F. Putnam, 1984. The Physiography of Southern Ontario, Third Edition; Ontario Geological Survey, Special Volume 2, 270p. Accompanied by Map 2715.

Earthfx, 2012. Barrie, Lovers, and Hewitt Creeks – Ecologically Significant Groundwater Recharge Area Assessment and Sensitivity Analysis, Earthfx Incorporated, June 2012.

Ontario Geological Survey. 2003. Surficial Geology of Southern Ontario, Open File 3300, Scale 1:50,000.

OGS, 2007. Paleozoic Geology of Southern Ontario; Ontario Geological Society, Miscellaneous Release – Data 219, 2007.

Ontario Ministry of the Environment, Conservation and Parks, Water Well Records.

Soil Eng., 2017a. Hydrogeological Assessment, Proposed Residential Subdivision, Southwest Corner of Mapleview Drive East and 20th Sideroad, City of Barrie. Soil Engineers Ltd., March 2017.

Soil Eng., 2017b. A Report to DIV Development (Barrie) Ltd., Proposed Residential Subdivision, Southwest Corner of Mapleview Drive East and 20th Sideroad, City of Barrie. Soil Engineers Ltd., April 2017.

BURNSIDE

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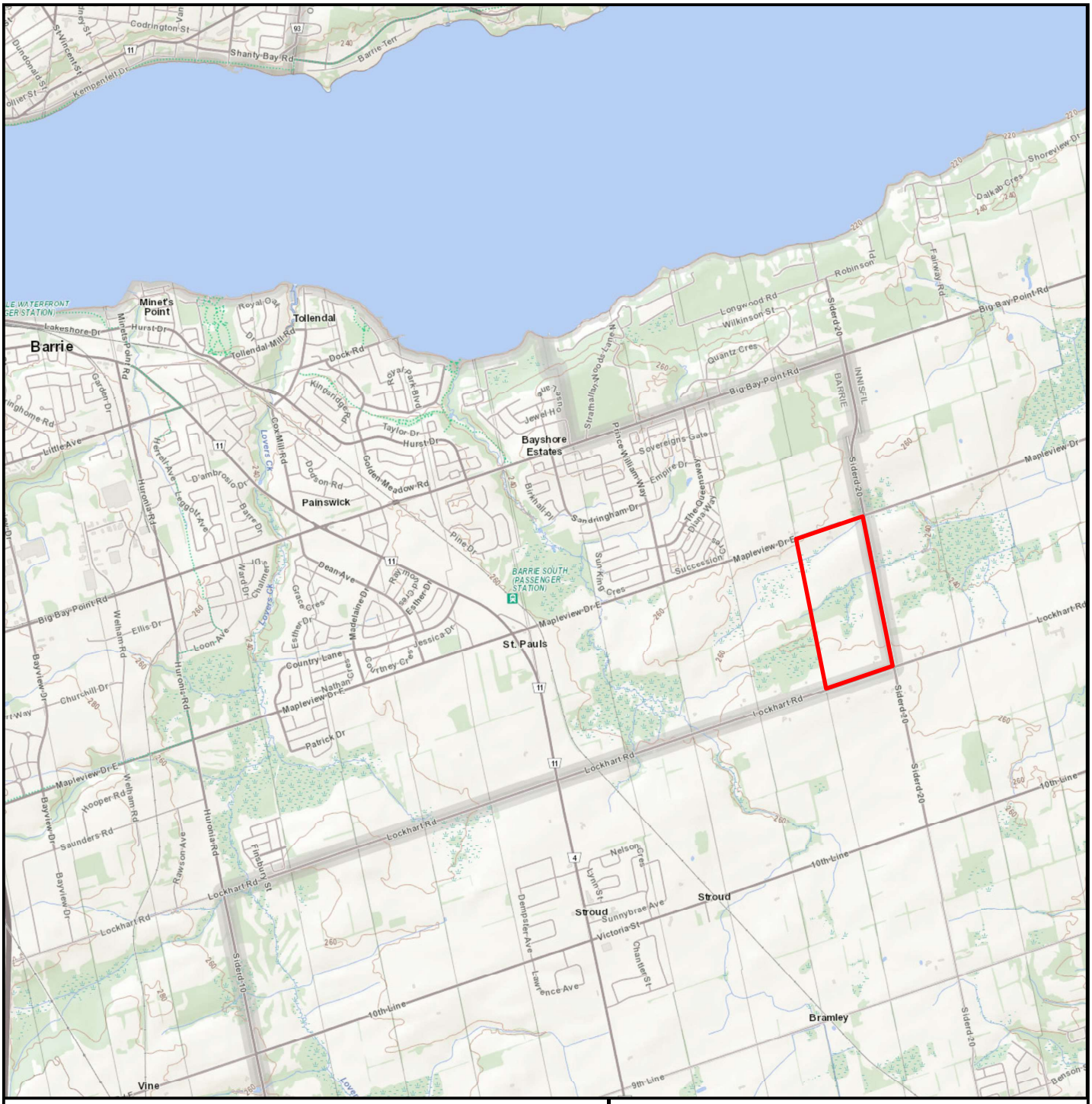
Figures



LEGEND

SUBJECT LANDS

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Metres

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BURNSIDE

Client / Report

DIV DEVELOPMENT (BARRIE) LTD.
INNISFIL, ONTARIO

HYDROGEOLOGICAL ASSESSMENT

Figure Title:

SITE LOCATION

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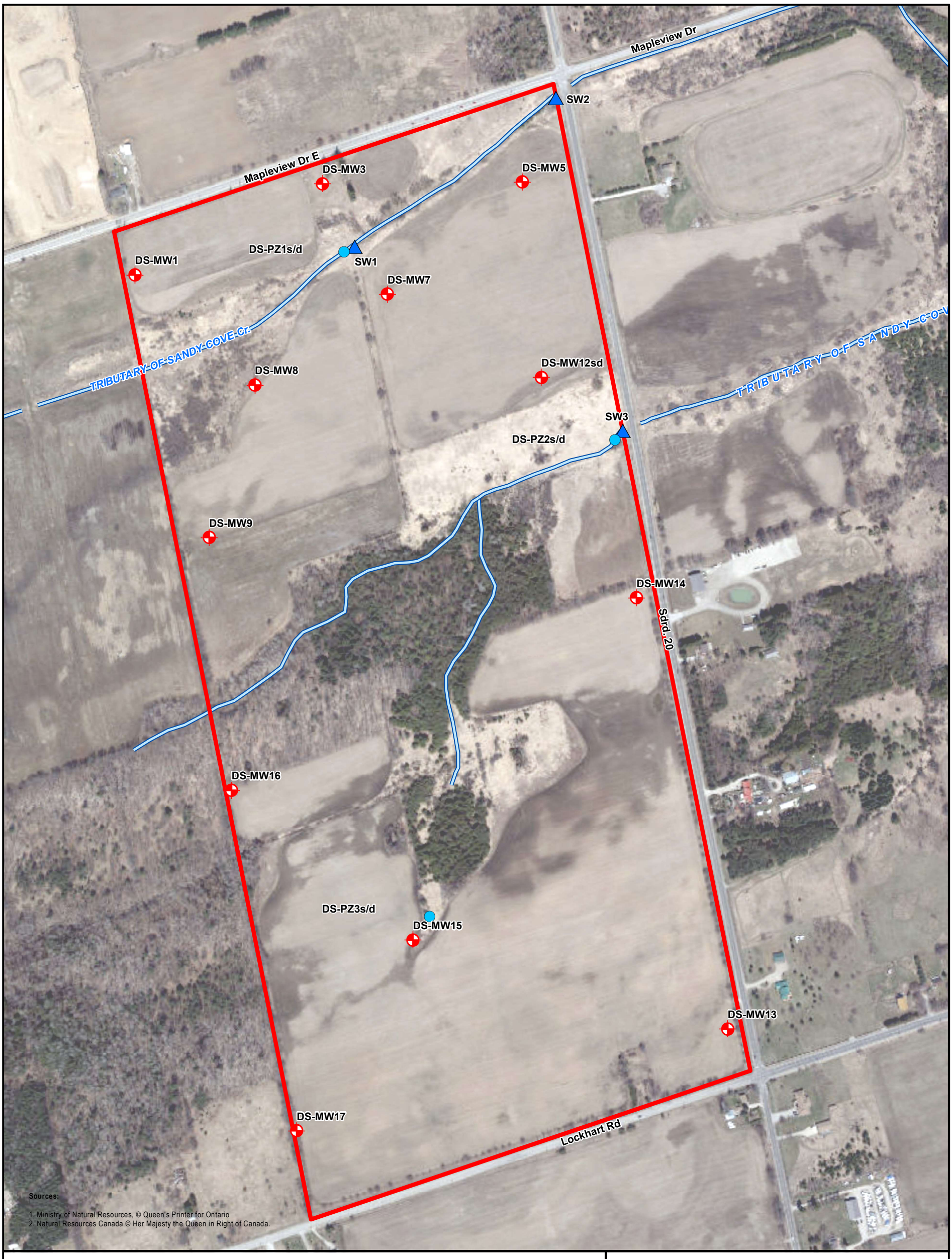

LEGEND

- SUBJECT LANDS
- WATERCOURSE
- MONITORING WELL (SOIL ENG., 2016)
- DRIVE POINT PIEZOMETER
- SURFACE WATER MONITORING LOCATION

0 100 200 300 400 500
Metres

N

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Figure Title

MONITORING LOCATIONS

Drawn	Checked	Date	Figure No.
SK	SC	AUGUST 2023	2
Scale		Project No.	
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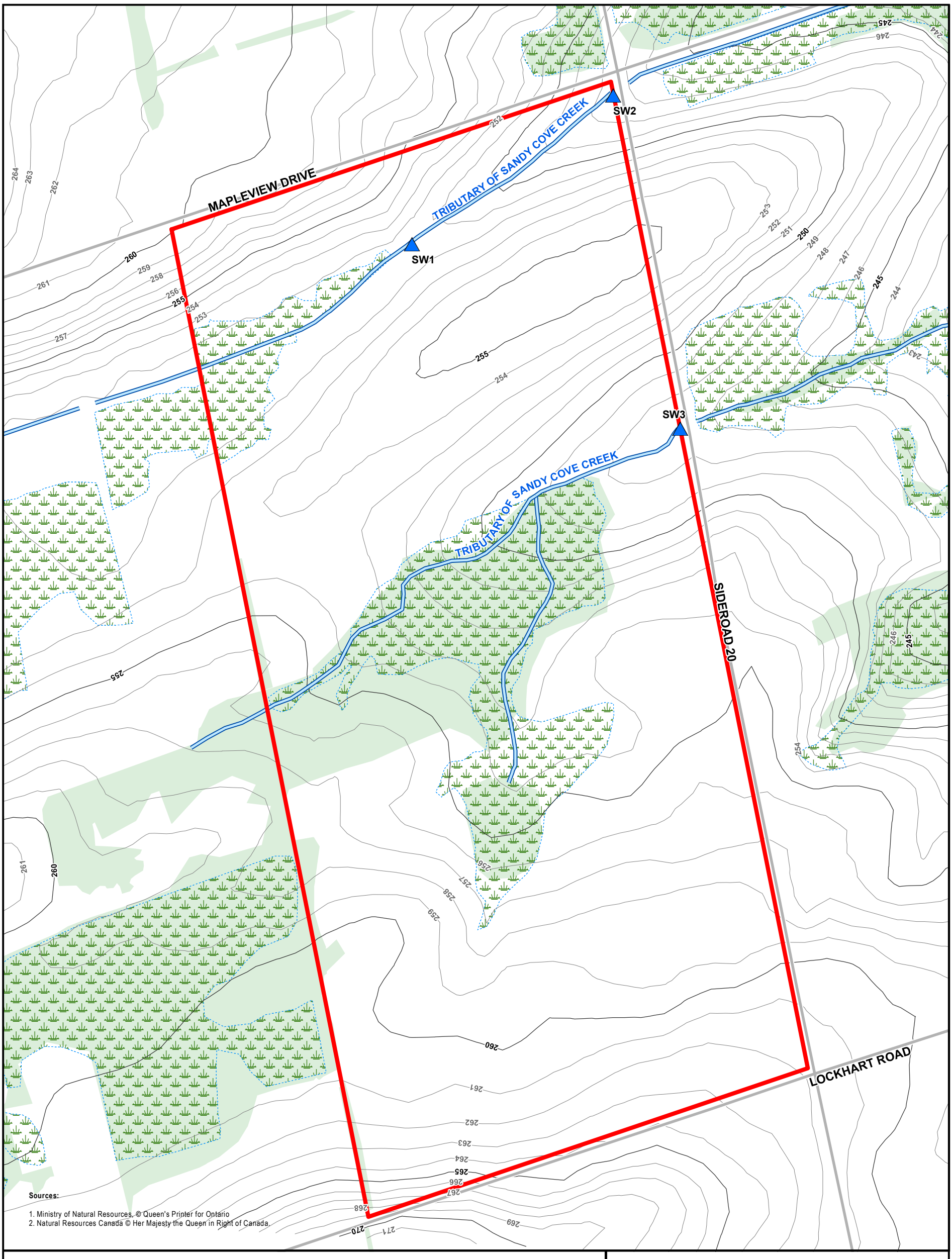

LEGEND

- SUBJECT LANDS
- WATERCOURSE
- ROADWAY
- CONTOUR (5m intervals - masl)
- CONTOUR (1m intervals - masl)
- WETLAND
- WOODED AREA
- SURFACE WATER MONITORING LOCATION

0 100 200 300 400 500
Metres

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HYDROGEOLOGICAL ASSESSMENT

Figure Title

TOPOGRAPHY AND DRAINAGE

Drawn	Checked	Date	Figure No.
SK	SC	AUGUST 2023	3
Scale		Project No.	
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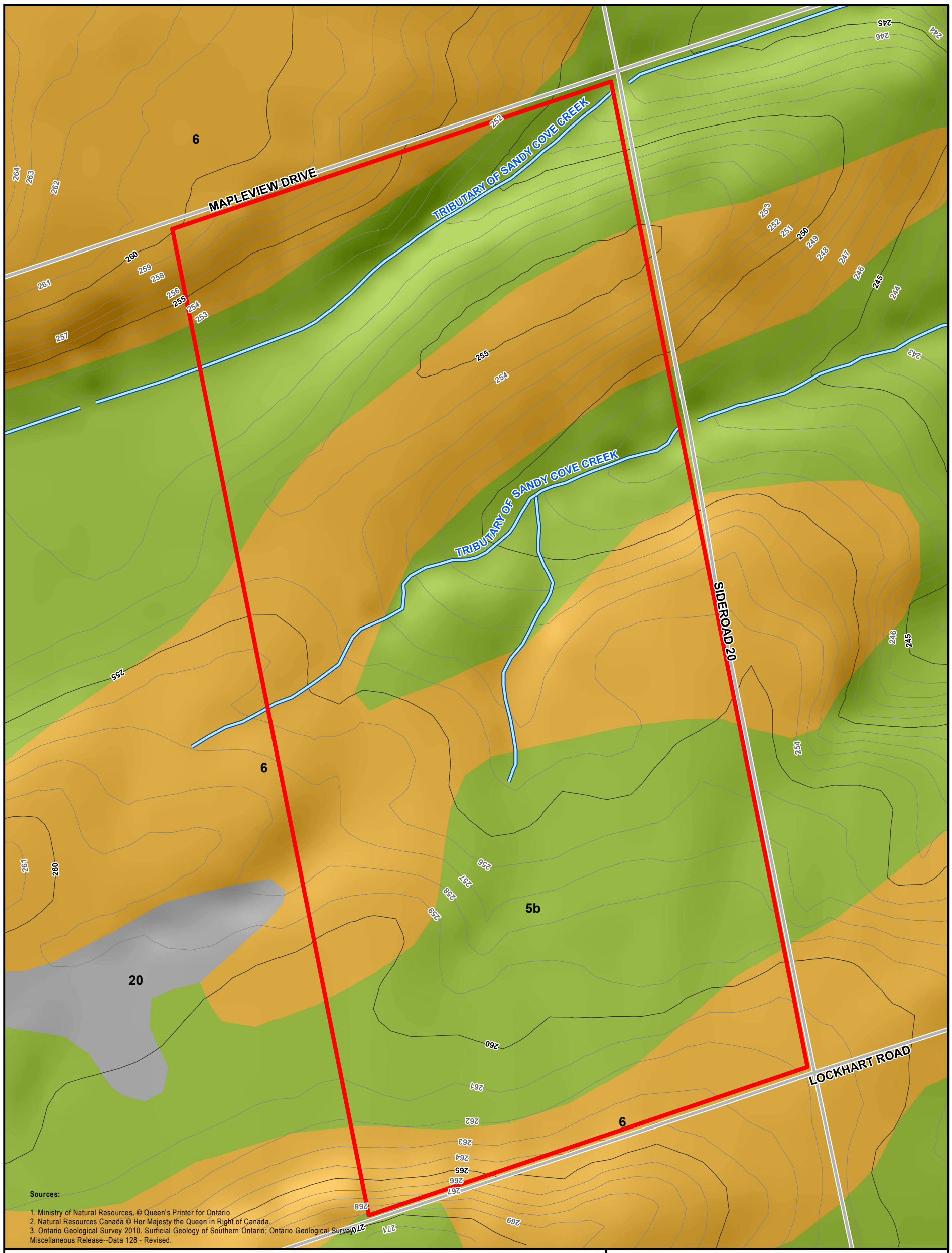
File Path: A:\043693 Dorsay\06_GIS\Hydrogeological Assessment\043693 Topography & Drainage.mxd Print Date: 2023/08/10 Time: 01:06 PM



LEGEND

- SUBJECT LANDS
- WATERCOURSE
- ROADWAY
- CONTOUR (5m intervals - masl)
- CONTOUR (1m intervals - masl)
- 5b: Till: Stone-poor, carbonate-derived silty to sandy till
- 6: Ice-contact stratified deposits: sand, gravel, sandy gravel
- 20: Organic deposits

0 100 200 300 400 500
Metres

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HYDROGEOLOGICAL ASSESSMENT

Figure Title

SURFICIAL GEOLOGY

Drawn	Checked	Date	Figure No.
SK	SC	AUGUST 2023	4
Scale		Project No.	
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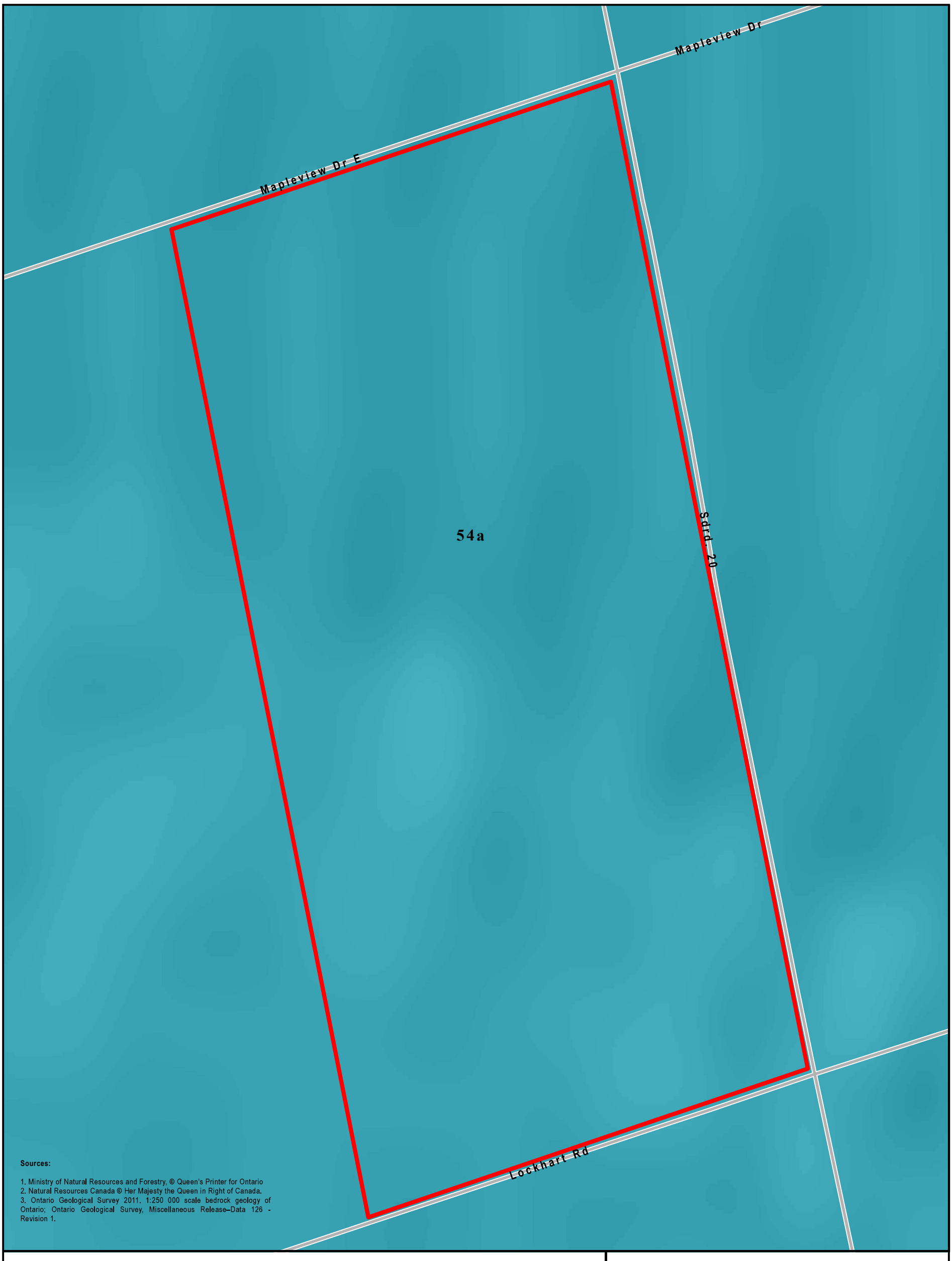
File Path: Nigel/ Shared Work Areas/A:\043693 Dorsay\06_GIS\Hydrogeological Assessment\043693 Surficial Geology.mxd Print Date: 2023/08/10 Time: 01:09 PM



LEGEND

SUBJECT LANDS

ROADWAY

MIDDLE ORDOVICIAN - 54 Limestone, dolostone, shale, arkose, sandstone

54a Ottawa Gp.; Simcoe Gp.; Shadow Lake Fm.

0 100 200 300 400 500

Metres

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Figure Title

BEDROCK GEOLOGY

Drawn	Checked	Date	Figure No.
SK	SC	AUGUST 2023	5
Scale		Project No.	
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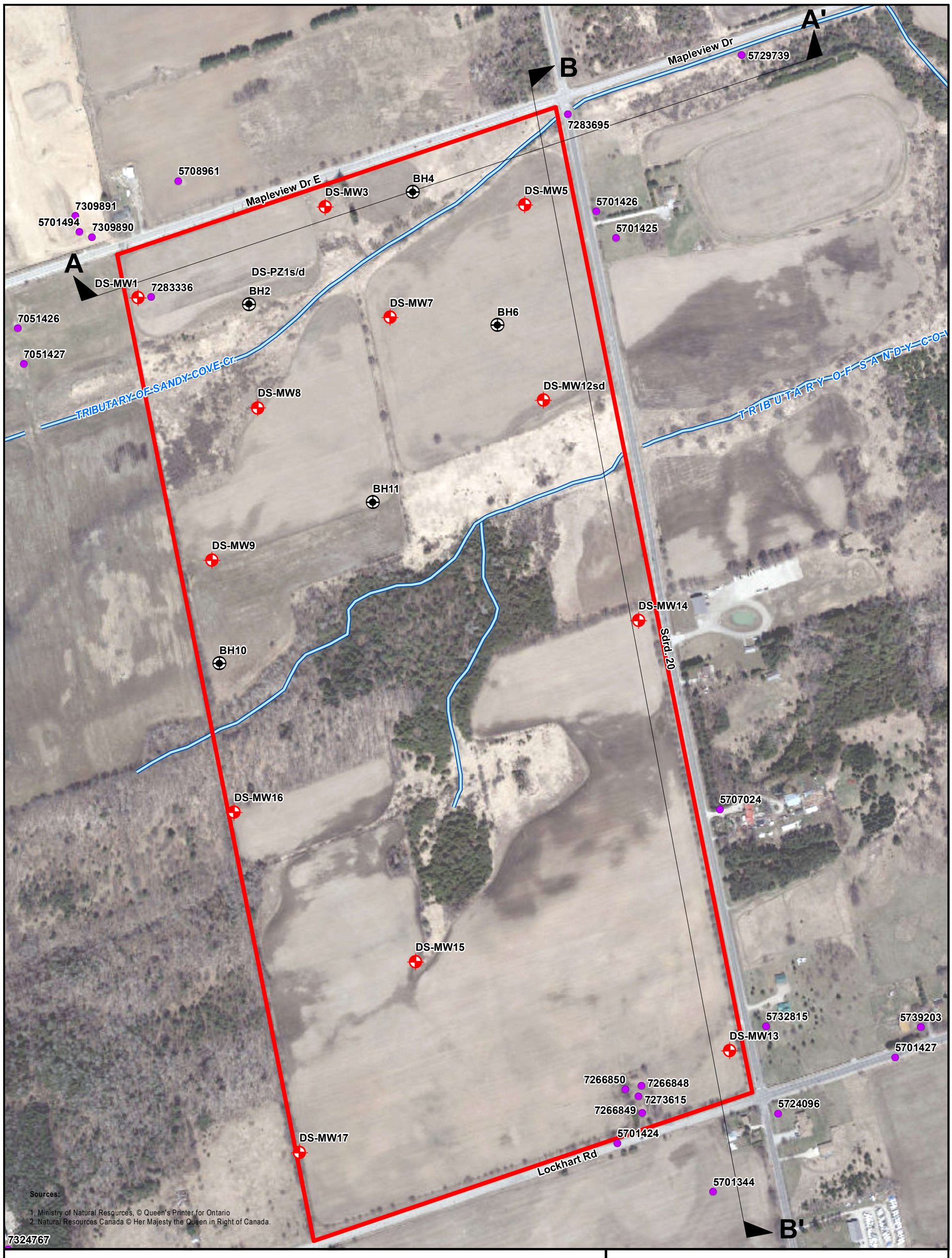
File Path: A:\043693 Dorsay\06_GIS\Hydrogeological Assessment\043693 Bedrock Geology.mxd Print Date: 2023/08/10 Time: 01:12 PM



LEGEND

- SUBJECT LANDS
- WATERCOURSE
- MONITORING WELL (SOIL ENG., 2016)
- BOREHOLE (SOIL ENG. 2016)
- MECP WELL RECORD LOCATION
- CROSS-SECTION LOCATION KEY

0 100 200 300 400 500
Metres

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Figure Title

BOREHOLE, WELL AND CROSS-SECTION LOCATIONS

Drawn	Checked	Date	Figure No.
SK	SC	AUGUST 2023	6
Scale		Project No.	
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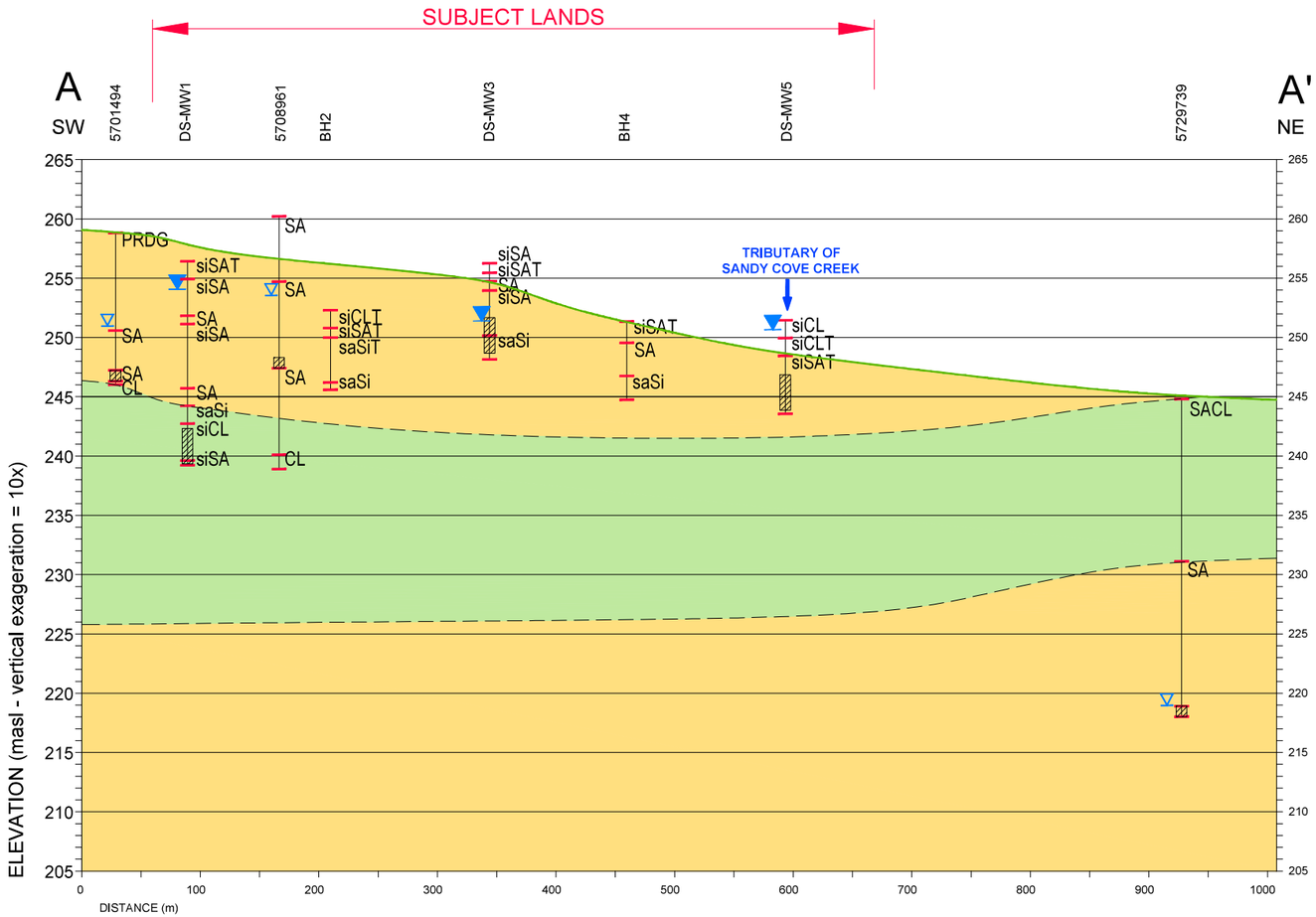

LEGEND

BH1 — WELL NUMBER / ID

EXISTING GROUND PROFILE

GEOLOGICAL CONTACT

STATIC WATER LEVEL (MECP WELL RECORD)

MEASURED WATER LEVEL (MARCH 2, 2020)

WELL SCREEN

si	SILTY
sa	SANDY
cl	CLAYEY
PRDG	PRE-DUG
GR	GRAVEL
SA	SAND
Si	SILT
CL	CLAY
T	TILL

— — — INTERPRETED STRATIGRAPHY

SAND / SILT / GRAVEL

SILT CLAY TILL

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INNISFIL, ONTARIO

HYDROGEOLOGICAL ASSESSMENT

Figure Title

INTERPRETED GEOLOGICAL CROSS-SECTION A-A'

Drawn	Checked	Date	Figure No.
SK	SC	AUGUST 2023	7
Scale		Project No.	
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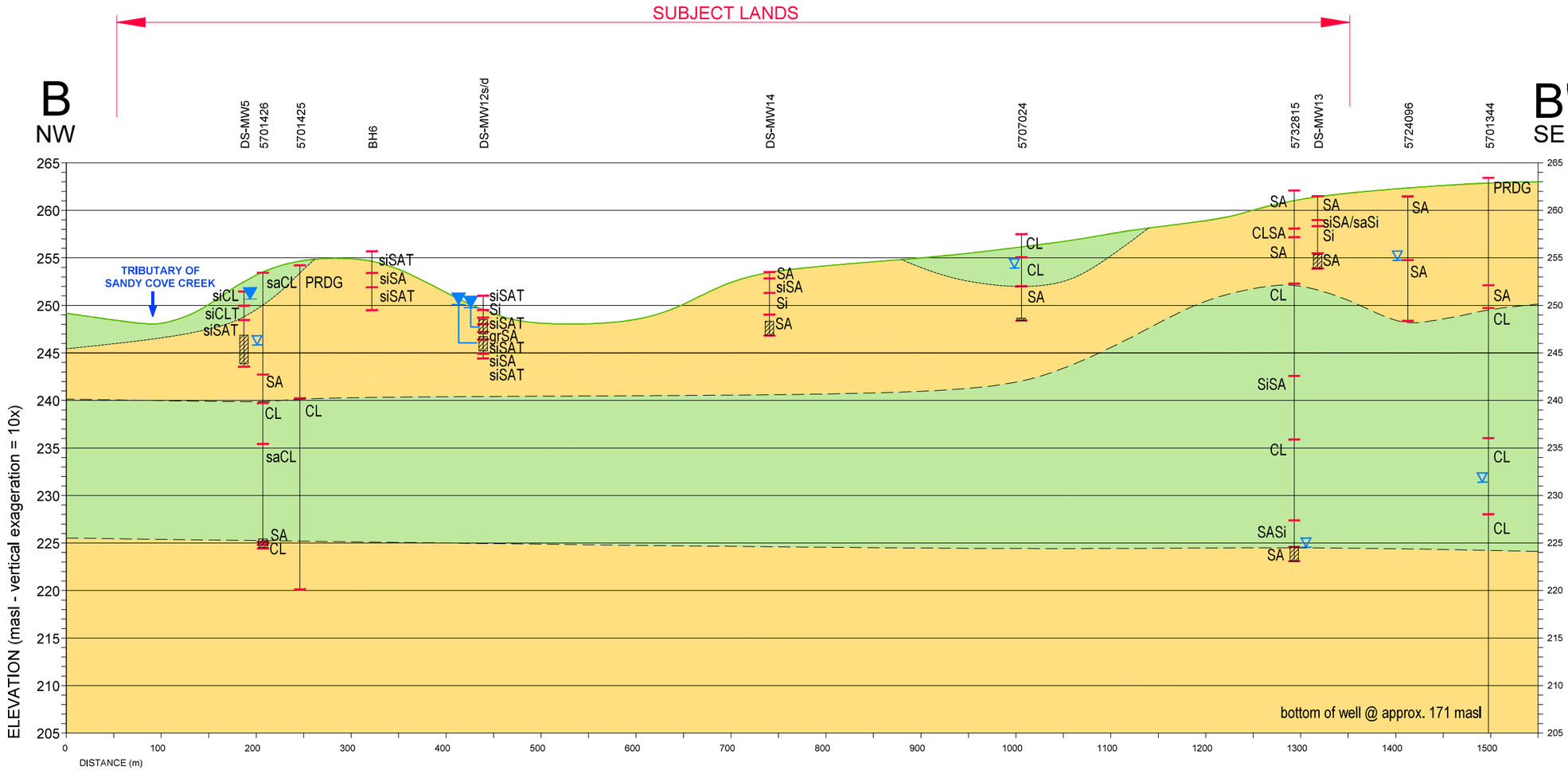

LEGEND

BH1 — WELL NUMBER / ID

EXISTING GROUND PROFILE

GEOLOGICAL CONTACT

STATIC WATER LEVEL (MECP WELL RECORD)

MEASURED WATER LEVEL (MARCH 2, 2020)

WELL SCREEN

si	SILTY
sa	SANDY
cl	CLAYEY
PRDG	PRE-DUG
GR	GRAVEL
SA	SAND
Si	SILT
CL	CLAY
T	TILL

— — — INTERPRETED STRATIGRAPHY

SAND / SILT / GRAVEL

SILT CLAY TILL

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Figure Title

INTERPRETED GEOLOGICAL CROSS-SECTION B-B'

Drawn	Checked	Date	Figure No.
SK	SC	AUGUST 2023	8
Scale		Project No.	
1:5,000		300043693	

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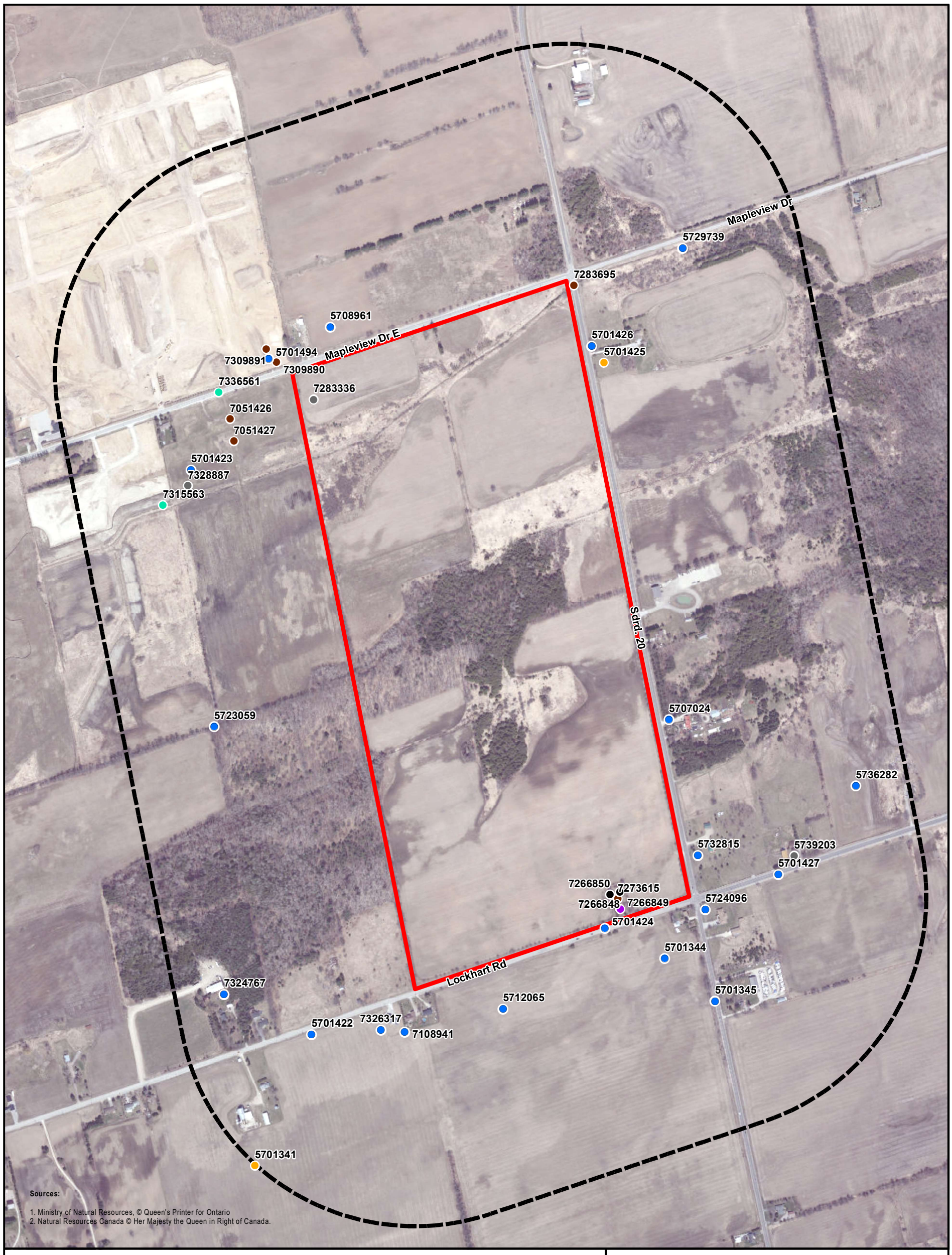

LEGEND

- SUBJECT LANDS
- BUFFER (500m)
- ABANDONED - SUPPLY
- UNKNOWN

WELL STATUS:

- WATER SUPPLY
- OBSERVATION
- MONITORING AND TEST HOLE
- TEST HOLE
- ABANDONED - OTHER

0 100 200 300 400 500 600 700 800 900
Metres

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Figure Title

MECP WELL RECORD LOCATIONS

Drawn	Checked	Date	Figure No.
SK	SC	AUGUST 2023	9
Scale		Project No.	
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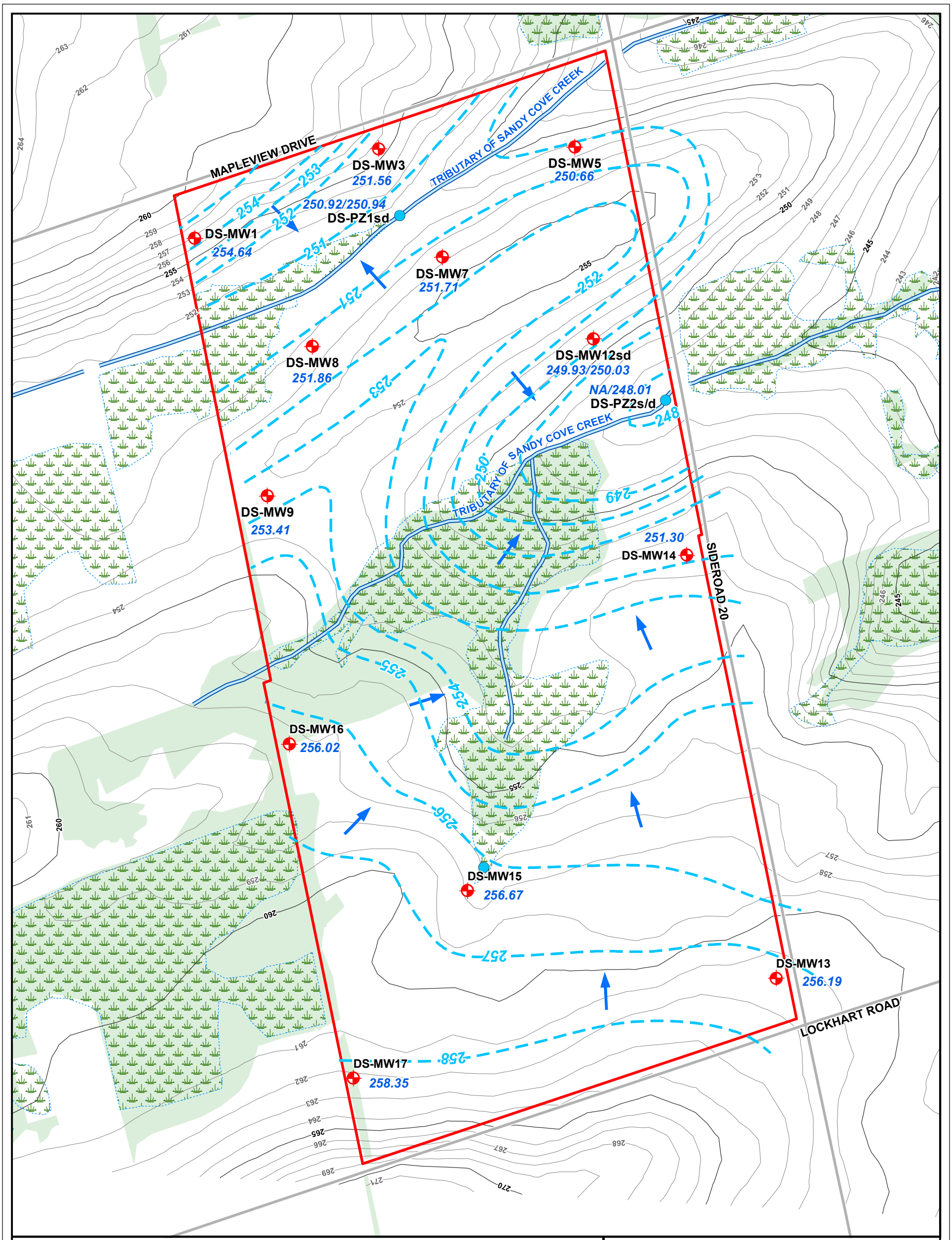
File Path: Nigel\Shared Work Areas\A:\043693 Dorsay\06_GIS\Hydrogeological Assessment\043693 MECP Well Locations.mxd Print Date: 2023/08/10 Time: 01:22 PM



LEGEND

- WATERCOURSE
- SUBJECT LANDS
- ROADWAY
- CONTOUR (5m intervals - masl)
- CONTOUR (1m intervals - masl)
- WETLAND
- WOODED AREA
- MONITORING WELL (SOIL ENG., 2016)
- DRIVEPOINT PIEZOMETER

- INTERPRETED GROUNDWATER CONTOUR (masl)
- INTERPRETED GROUNDWATER FLOW DIRECTION
- 177.95 MEASURED WATER LEVEL (MARCH 2, 2020)

Sources:

1. Ministry of Natural Resources and Forestry, © Queen's Printer for Ontario
2. Natural Resources Canada © Her Majesty the Queen in Right of Canada.

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0 100 200 300 400
Metres

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Figure Title

INTERPRETED GROUNDWATER FLOW

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Scale		Project No.	
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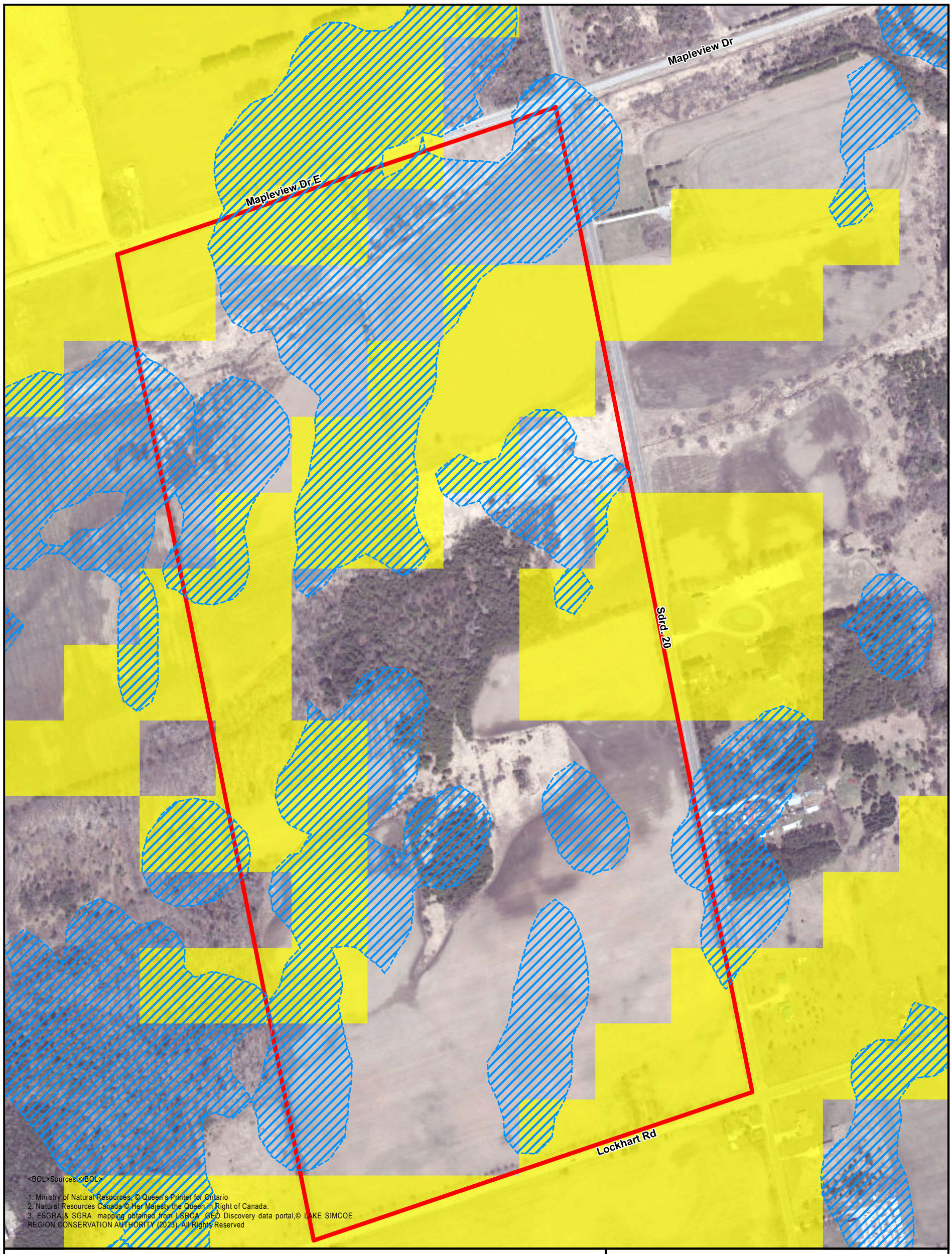
File Path: NigelA:\043693 Dorsay\06_GIS\Hydrogeological Assessment\043693 Groundwater Flow.mxd Print Date: 2023/08/10 Time: 01:40 PM



LEGEND

- SUBJECT LANDS
- SIGNIFICANT GROUNDWATER RECHARGE AREAS (SGRA, LSRCA)
- ECOLOGICALLY SIGNIFICANT GROUNDWATER RECHARGE AREAS (ESGRA)

0 100 200 300 400 500
Metres

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HYDROGEOLOGICAL ASSESSMENT

Figure Title

RECHARGE AREAS

Drawn	Checked	Date	Figure No.
SK	SC	AUGUST 2023	11
Scale		Project No.	
1:5,000		300043693	

File Path: Nigel/Shared Work Areas/A:\043693 Dorsay\06_GIS\Hydrogeological Assessment\043693 Recharge Areas.mxd Print Date: 2023/08/10 Time: 01:34 PM

COLE

July 15, 2019
Reference No. 2017-0331

Tom Reeve
City of Barrie
City Hall
70 Collier Street
Barrie, ON, L4M 4T5

Attention: **Tom Reeve, P.Eng.**
Senior Infrastructure Planning Coordinator

City of Barrie Wastewater Collection Master Plan Update
Final Master Plan Report

We are pleased to submit the final City of Barrie Wastewater Collection Master Plan for your information and use. It has been a pleasure to work with City of Barrie staff on this project and we look forward to future assignments.

Best Regards,
COLE ENGINEERING GROUP LTD.

Christine Hill, M.Eng., P.Eng.
Project Manager

CH/ad

C. L. MOROZ
100162855
PROVINCE OF ONTARIO
Dec 9/2019

COLE ENGINEERING GROUP LTD.

OAKVILLE OFFICE
2620 Bristol Circle, Suite 300, Oakville, ON Canada L6H 6Z7
T. 905 940 6161 | 416 987 6161 F. 905 940 2064
www.coleengineering.ca

2018 SME CANADA'S TOP SMALL & MEDIUM EMPLOYERS

Table 11.1 Recommended Projects

Project ID	Description	Estimated Project Cost	Class EA Schedule	Phasing
21302	New forcemain for West Annex Pumping Station, Twin 578 of 250mm diameter forcemain from West Annex Pumping Station to MH673.	$2,226,000	A+	2024-2031
22102	Mapleview East Trunk sewer from East Annex Pumping Station Discharge Location to Hewitt's Creek Trunk Sewer, 1530m – 525mm	$3,119,000	A+	2021
22101	Extension to existing Hewitt's Trunk Sewer, 1050m-525mm, from MH 68 to MH SAH09099.	$2,587,000	A+	2021
22301	Extension to existing Hewitt's Trunk Sewer, 575m-450mm, from Lockhart Road to MH 68.	$905,000	A+	2021
22302	New East Annex Pumping Station with capacity of 80 L/s. (One duty and one standby pump, each rated to 50L/s).	$11,967,000	B	2026-2031
22303	New twin forcemain for East Annex Pumping Station, 730m of 250mm diameter forcemain from East Annex Pumping Station to MH 201 along Mapleview Drive.	$2,811,000	A+	2026-2031
23401	Decommission existing Lockhart Pumping Station (PS4) and construct 750m of 300mm sanitary sewer to Lockhart Road	$930,000	A+	Post 2031
21402	Second phase of West Annex Pumping Station. Add pump at rated capacity of 50L/s.	$350,000	A+	Post 2031
21401	Second phase of East Annex Pumping Station. Add pump at rated capacity of 40L/s.	$350,000	A+	Post 2031
21303	Construct 552mm of 450mm from West Annex PS forcemain discharge to Project 21102	$959,000	A+	2024-2031

Table 11.1 Recommended Projects

Project ID	Description	Estimated Project Cost	Class EA Schedule	Phasing
	Construct new 525mm diameter sanitary sewer from Holly PS to Lougheed	$367,000	A+	2019-2023
WC2019-01	Inflow and infiltration monitoring, investigation, condition assessment, remediation and rehabilitation of sanitary sewer system and private property program to address sources on private property. Program to begin with Priority areas FM2, FM9A and FM11 followed by Secondary Priority Areas.	$10,000,000	-	2021
WC2019-02	Tiffin Street Sanitary Sewer replacement, 114m-600mm	$196,000	A+	Post 2031
WC2019-03	Stunden Lane Sanitary Sewer replacement, 281m – 525mm	$709,000	A+	Post 2031
WC2019-04	Twin Lakeshore South Trunk Sewer, 3175m – 1050mm	$24,619,000	A+	Post 2031
WC2019-05	Easement south of Tiffin Street replacement, 707m - 750mm	$1,455,000	A+	Post 2031
WC2019-06	Mapleview Drive West sanitary sewer replacement, 2259m – 675mm	$4,876,000	A+	Post 2031
WC2019-07	Brock Street sanitary sewer replacement, 16009m – 900mm	$3,756,000	A+	Post 2031
WC2019-08	Kierland Road sanitary sewer replacement, 446m – 600mm	$671,000	A+	Post 2031
WC2019-09	Patterson Road sanitary sewer replacement, 10m – 300mm	$15,000	A+	Post 2031
WC2019-10	Tiffin Street sanitary sewer replacement, 1352m – 900mm	$3,717,000	A+	2021
WC2019-11	Tiffin Street sanitary sewer replacement, 240m – 900mm	$639,000	A+	2021
WC2019-12	Sanitary sewer downstream of Minets Points Pumping Station forcemain discharge replacement, 220m – 375mm	$325,000	A+	2021

Table 11.1 Recommended Projects

Project ID	Description	Estimated Project Cost	Class EA Schedule	Phasing
WC2019-13	Mapleview Drive east of Holly Street forcemain discharge sanitary sewer replacement, 28m – 525mm	$52,000	A+	2021
WC2019-14	Penvil Trail sanitary sewer replacement, 737m -375mm, 212m-450mm and 64m – 300mm	$904,000	A+	2021
WC2019-15	Replace existing 840m-250mm diameter sanitary sewer with new 375mm diameter sanitary sewer from MH SAI13075 to MH SAI11024 (south of Bear Eco Creek Park).	$1,198,000	A+	2021
WC2019-16	Ardagh Sanitary sewer replacement, 220m – 300mm	$249,000	A+	2021
WC2019-17	Morrow Road sanitary sewer replacement, 595m – 375mm	$730,000	A+	2021
WC2019-18	Monitoring and assessment of Penetanguishene Road sanitary sewer downstream of PS1 to confirm need for sewer replacement	$100,000	-	2021
WC2019-19	Monitoring and assessment of Lougheed Road sanitary sewer to confirm need for sewer replacement	$100,000	-	2021
WC2019-20	Monitoring and assessment of Montserrand Street sanitary sewer downstream of PS1 to confirm need for sewer replacement	$100,000	-	2021
WC2019-21	PS 1 improvements, increase wet well storage by 95 m^3	$628,000	-	Post 2031
WC2019-22	Twin 253m – 400mm diameter forcemain from PS1	$713,000	A+	2021
WC2019-23	Twin 343m- 250mm diameter forcemain from PS2	$487,000	A+	2021
WC2019-24	Pump replacement to provide sufficient firm capacity to handle peak flows. (PS12)	$254,000	A+	2031
WC2019-25	Twin forcemain for PS12, 375m-100mm diameter	$483,000	A+	2021

In addition to the projects listed in **Table 11.1**, an equalization storage facility is proposed at the Barrie WwTF. This facility would provide equalization storage for wet weather flow control and for operational flexibility. The Wastewater Treatment Master Plan contains details on the size, cost, and Class EA schedule for this project.

The findings of this Master Plan will be used as baseline information to determine the City of Barrie's development cost charges. Included in Appendix C is a summary of the projects proposed in this Master Plan and the percentage of each project allocated to growth.

With regard to the improvement projects identified for the existing system, it should be noted that these improvements were identified as required to provide the City's level of service (d/D<0.7 for sewers with diameters greater than 375mm and d/D<0.5 for sewers with diameters of 375mm or less) for a 25-year storm event. The location of these improvements is shown in **Figure 10-1** and **Figure 10-2** while cost estimates are provided in **Appendix C**. We recommend that the City undertake additional flow monitoring and analysis as part of design to confirm that these improvements are needed. Needed improvements could be considered as part of future road reconstruction or underground sewer or watermain replacement projects.

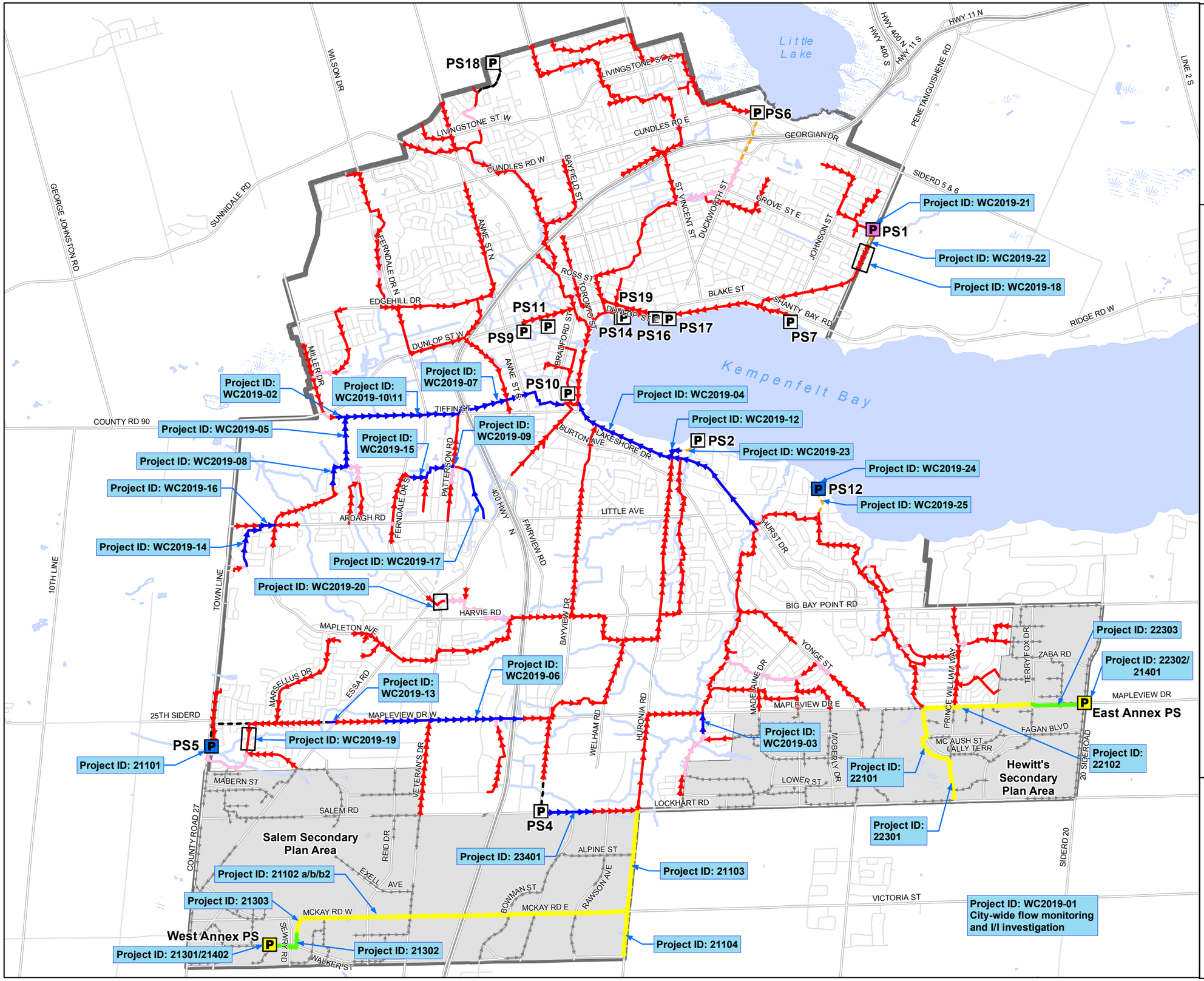
11.2 Preferred Alternative Performance

The performance of the preferred alternative was tested using the hydraulic model with several different scenarios. These included the following:

- 2041 growth projections;
- 2071 growth projections; and,
- High flow scenario that considered 2041 growth, process wastewater for existing and future industrial, commercial and institutional lands within the City and a higher peaking factor for wastewater flows. For all lands identified as industrial, commercial or institutional in the City's land use information, an additional flow allowance of 28m^3/d/ha was used to calculate the process wastewater contribution. A peaking factor of 4 was applied to all contributing areas. Sanitary sewers are normally designed with the Harmon Peaking Factor which is a function of population. The Harmon Peaking Factor is intended to be conservative for design purposes and for a small area, a value of 4 can be calculated. Actual flow monitoring data shows much smaller peaking factors. For this study, measured peaking factors ranged from 1.38 to 2.2. For the high flow scenario, the peaking factor was increased to introduce additional conservatism.

Figures 11-2, 11-3 and **11-4** present the results of these analyses and identify sanitary trunks sewers where the City's design criteria is exceeded. These figures also show where surcharge conditions are predicted.

Figure 11-1
City of Barrie
Preferred Alternative



- New Sanitary Trunk Sewer
- Infrastructure Upgrades for Growth
- Infrastructure Upgrades for Existing Conditions
- New Forcemain
- Forcemain Twinning
- Forcemain
- Sanitary Trunk Sewer
- Future Annexed Lands Sewers
- Pumping Stations
- Pumping Stations Capacity Upgrades for Growth
- Pumping Station Wet Well Upgrade
- New Pumping Stations
- Monitioring and Assessment Project
- Secondary Plan Boundaries
- City of Barrie Limits

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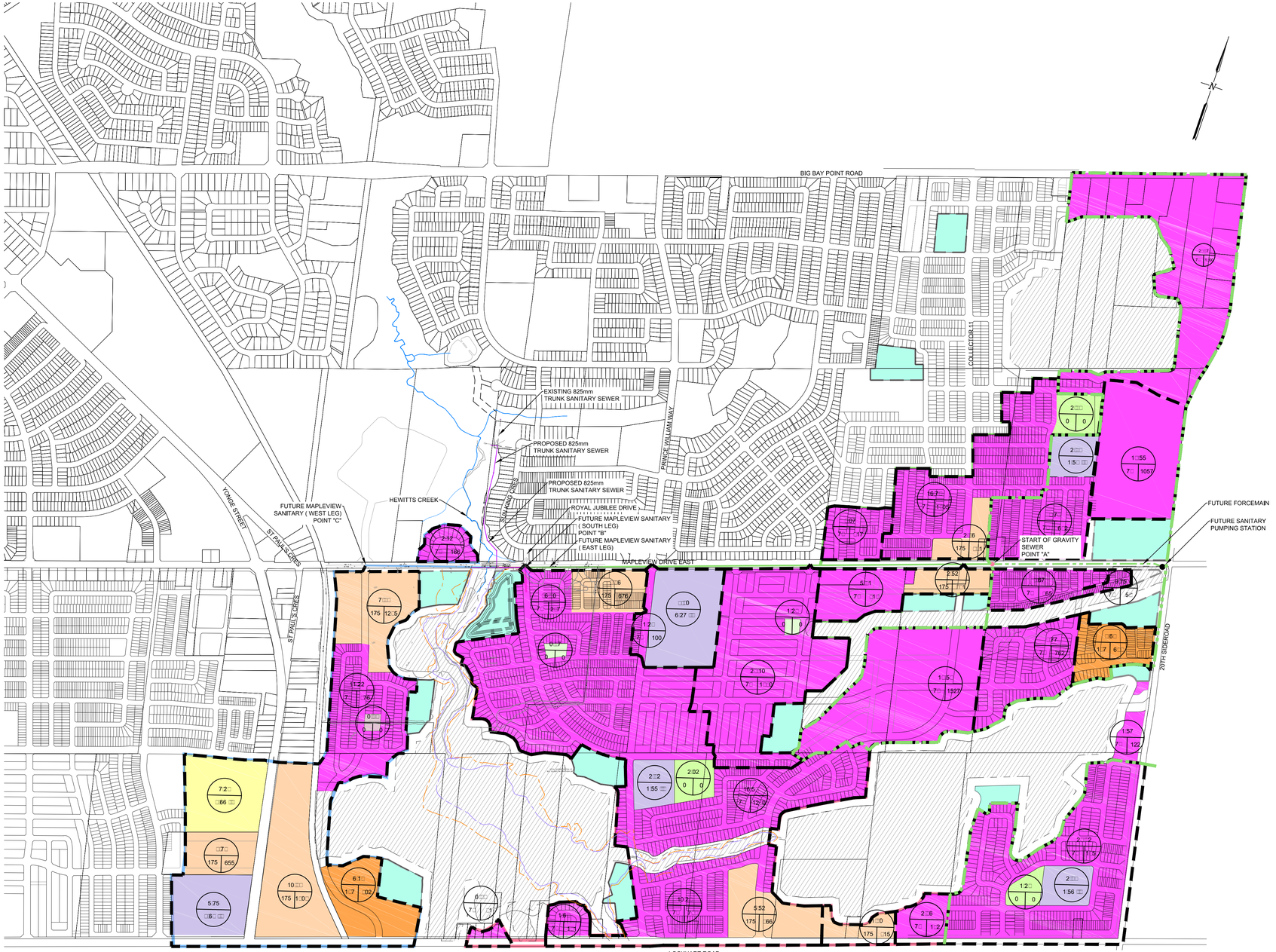
0 0.25 0.5 1 1.5 2
Kilometers

Updated: 7/17/2019



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CITY OF BARRIE
ACCEPTED
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DIRECTOR O□ EN□INEERIN□

The City of
BARRIE
ENGINEERING DEPARTMENT

BURNSIDE

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CRISDAWN CONSTRUCTION
27 CLAPPERTON STREET
BARRIE□ON
L□M□E6

D□□□□TLE
HEWITT'S CREE□ TRUN□ SANITARY

SANITARY DRAINA□E PLAN

D□□□	Ch□□□d	D□□□□d	Ch□□□d	D□t□	D□□□□□ N□□
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SANITARY SEWER DESIGN SHEET

HEWITT'S CREEK TRUNK SEWER

HEWITT'S CREEK SANITARY TRUNK SEWER, CITY OF BARRIE

BURNSIDE
[THE DIFFERENCE IS OUR PEOPLE]

Project #: 32860.0
Date: 6-Feb-17
Designed: EG
Checked: BR

Min Diameter = 200 mm
Mannings 'n'= 0.013
Min. Velocity = 0.60 m/s
Max. Velocity = 3.65 m/s

Avg. Domestic Flow = 225.0 l/c/d
Infiltration = 0.100 l/s/ha
Max. Peaking Factor (Harmon) = 4.00
Min. Peaking Factor (Harmon)= 2.00

Factor of Safety = 10%

LD = Low Density @ 78ppHa
MDT = Medium Density (Towns) @ 147ppHa
MDA=Medium Density (Apts) @ 175 ppHa
Comm\Rec\Inst @ 0.32 l/s/Ha x 2.0 (Peaking)=0.64 l/s/Ha

NOMINAL PIPE SIZE USED

DESCRIPTION	FROM MH	TO MH		RESIDENTIAL AREA (ha)	RESIDENTIAL ACC. AREA (ha)	RESIDENTIAL UNITS (#)	RESIDENTIAL DENSITY (P/ha)	RESIDENTIAL DENSITY (P/unit)	RESIDENTIAL POP	RESIDENTIAL ACCUM. RES. POP.	COMMERCIAL/INDUSTRIAL/INSTITUTIONAL AREA (ha)	COMMERCIAL/INDUSTRIAL/INSTITUTIONAL ACC. AREA (ha)	COMMERCIAL/INDUSTRIAL/INSTITUTIONAL EQUIV. POP. (p/ha)	COMMERCIAL/INDUSTRIAL/INSTITUTIONAL FLOW RATE (l/s/ha)	COMMERCIAL/INDUSTRIAL/INSTITUTIONAL EQUIV. POP.	COMMERCIAL/INDUSTRIAL/INSTITUTIONAL ACCUM. EQUIV. POP.	FLOW CALCULATIONS INFILTRATION (l/s)	FLOW CALCULATIONS TOTAL ACCUM. POP.	FLOW CALCULATIONS PEAKING FACTOR	FLOW CALCULATIONS POP. FLOW (l/s)	FLOW CALCULATIONS CONSTANT COMM. FLOW (l/s)	FLOW CALCULATIONS ACCUM. COMM. FLOW (l/s)	FLOW CALCULATIONS TOTAL FLOW (l/s)	PIPE DATA LENGTH (m)	PIPE DATA SLOPE (%)	PIPE DATA PIPE DIAMETER (mm)	PIPE DATA FULL FLOW CAPACITY (l/s)	PIPE DATA FULL FLOW VELOCITY (m/s)	PIPE DATA ACTUAL VELOCITY (m/s)	PIPE DATA PERCENT FULL (%)	
TO PUMPING STATION			LD	19.58	19.58		78		1528	1528							2.0	1528	3.67	14.6			16.6								
			LD	24.37	43.95		78		1901	3429							4.4	3429	3.39	30.3			34.7								
			LD	13.55	57.50		78		1057	4486							5.8	4486	3.29	38.4			44.2								
			LD	8.74	66.24		78		682	5168							6.6	5168	3.23	43.5			50.1								
			LD	4.67	70.91		78		365	5533							7.1	5533	3.20	46.2			53.3								
			LD	0.75	71.66		78		59	5592							7.2	5592	3.20	46.6			53.8								
			LD	9.77	81.43		78		763	6355							8.1	6355	3.15	52.1			60.2								
			MDT	4.68	86.11		147		688	7043							8.6	7043	3.10	56.9			65.5								
			LD	1.57	87.68		78		123	7166							8.8	7166	3.10	57.8			66.6								
			LD	23.82	109.93		78		1858	8901							11.0	8901	3.00	69.6			80.6								
			INST		109.93					8901	2.48	2.48		0.64			11.2	8901	3.00	69.6	1.6	1.6	82.5								
			PRK	2.33	112.26					8901							11.2	8901	3.00	69.6		1.6	82.5								
			INST		112.26					8901	2.44	4.92		0.64			11.7	8901	3.00	69.6	1.6	3.1	84.5								
			PRK	1.29	113.55					8901		4.92					11.8	8901	3.00	69.6		3.1	84.6	0.40	375	110.9	1.00	1.11	76%		
TO MAPLEVIEW EAST LEG			LD	16.73	16.73		78		1305	1305							1.7	1305	3.72	12.7			14.3								
			MDA	2.46	19.19		175		431	1736							1.9	1736	3.63	16.4			18.3								
			MDA	2.52	21.71		175		441	2177							2.2	2177	3.56	20.2			22.3								
			LD	5.31	27.02		78		415	2592							2.7	2592	3.50	23.6			26.3								
			LD	4.07	31.09		78		318	2910							3.1	2910	3.45	26.2			29.3								
			LD	24.10	55.19		78		1880	4790							5.5	4790	3.26	40.7			46.2								
			PRK	1.29	56.48					4790							5.6	4790	3.26	40.7			46.3								
			INST		56.48					4790	9.80	9.80		0.64			6.6	4790	3.26	40.7	6.3	6.3	53.6								
			LD	1.28	**57.76**		78		100	**4890**		**9.80**					6.8	4890	3.25	41.4		6.3	**54.5**	0.40	375	110.9	1.00	1.00	49%		
ADD FORCEMAIN					**171.31**					**13791**		**14.72**					18.6	13791	2.81	101.1		9.4	**129.1**	0.40	450	180.3	1.13	1.23	72%		Point "A"
TO MAPLEVIEW SOUTH LEG			LD	36.90	36.90		78		2879	2879							3.7	2879	3.46	25.9			29.6								
PHASE 1)			PRK	0.37	37.27					2879							3.7	2879	3.46	25.9			29.6								
(PHASE 1)			MDA	3.86	41.13		175		676	3555							4.1	3555	3.38	31.3			35.4								
					41.13					**3555**							4.1	3555	3.38	31.3			**35.4**	0.40	525	272.0	1.26	0.87	13%		
(PHASE 3)			INST								2.42	2.42		0.64			0.2				1.5	1.5	1.8								
			PRK	2.02	2.02							2.42					0.4					1.5	2.0								
			LD	16.54	18.56		78		1291	1291		2.42					2.1	1291	3.73	12.5		1.5	16.2								
			LD	1.68	20.24		78		132	1423		2.42					2.3	1423	3.70	13.7		1.5	17.5								
			LD	0.39	20.63		78		31	1454		2.42					2.3	1454	3.69	14.0		1.5	17.8								
			LD	1.68	22.31		78		132	1586		2.42					2.5	1586	3.66	15.1		1.5	19.1								
			LD	10.23	30.86		78		798	2252		2.42					3.3	2252	3.55	20.8		1.5	25.7								
			MDA	5.52	36.38		175		966	3218		2.42					3.9	3218	3.42	28.6		1.5	34.1								
			MDA	1.80	38.18		175		315	3533		2.42					4.1	3533	3.38	31.1		1.5	36.7								
			LD	2.46	40.64		78		192	3725		2.42					4.3	3725	3.36	32.6		1.5	38.5								
					40.64					**3725**		**2.42**					4.3	3725	3.36	32.6		1.5	**38.5**	0.40	525	272.0	1.26	0.89	14%		
ADD PHASE 1					**81.77**					**7280**		**2.42**					8.4	7280	3.09	58.6		1.5	**68.6**	0.40	525	272.0	1.26	1.05	25%		
MV SOUTH AND EAST					**253.08**					**21071**		**17.14**					27.0	**21071**	2.63	144.3		11.0	**182.3**	0.30	750	609.8	1.38	1.21	30%		Point "B"
TO MAPLEVIEW WEST LEG			LD	11.22	11.22		78		876	876							1.1	876	3.84	8.8			9.9								
(NORTH)			PRK	0.34	11.56					876							1.2	876	3.84	8.8			9.9								
			MDA	7.34	18.90		175		1285	2161							1.9	2161	3.56	20.0			21.9								
			LD	2.12	**21.02**		78		166	**2327**							2.1	**2327**	3.53	21.4			**23.5**	0.40	250	37.6	0.77	0.81	63%		
(SOUTHWEST)			INST								5.75	5.75		0.64			0.6				3.7	3.7	4.3								
			MDA	10.88	10.88		175		1904	1904		5.75					1.7	1904	3.60	17.9		3.7	23.2								
			MDA	3.74	14.62		175		655	2559		5.75					2.0	2559	3.50	23.3		3.7	29.0								
			REC		14.62					2559	7.28	**13.03**		0.64			2.8	**2559**	3.50	23.3	4.7	8.3	**34.4**	0.40	300	61.2	0.87	0.89	56%		
(SOUTHEAST)			MDT	6.13	**6.13**		147		902	**902**							0.6	902	3.83	9.0			**9.6**	0.40	250	37.6	0.77	0.64	26%		
TOTAL MV WEST					**41.77**					**5788**		**18.78**					6.1	**5788**	3.19	48.0		8.3	**62.4**	1.45	300	116.4	1.65	0.86	54%		Point "C"
PROPOSED SEWERS																																
	100304672	100304673		294.85	294.85					26859	35.92	35.92		0.64			33.1	26859	2.52	176.6	23.0	23.0	232.7	59.9	0.40	825	907.8	1.70	1.42	26%	
	100304673	100304674			294.85					26859		35.92					33.1	26859	2.52	176.6		23.0	232.7	48.1	0.40	825	907.8	1.70	1.42	26%	
	100304674	100304675			294.85					26859		35.92					33.1	26859	2.52	176.6		23.0	232.7	61.0	0.40	825	907.8	1.70	1.42	26%	
	100304675	100304676			294.85					26859		35.92					33.1	26859	2.52	176.6		23.0	232.7	57.2	0.40	825	907.8	1.70	1.42	26%	
	100304676	100304677			294.85					26859		35.92					33.1	26859	2.52	176.6		23.0	232.7	125.7	0.40	825	907.8	1.70	1.42	26%	
	100304677	100304687			294.85					26859		35.92					33.1	26859	2.52	176.6		23.0	232.7	96.8	0.40	825	907.8	1.70	1.42	26%	

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ISSUED FOR CONSTRUCTION

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5	LOWERED SEWER	17□0□□21	E□ □
6	LSRCA□CITY COMMENTS	17□0□□10	E□ □
7	ISS□ED □OR CONSTR□CTION	17□0□□21	E□ □

L□C□□□ PRO□ESSIONAL ENGINEER E. GROSKOPFS PROVINCE O□ ONTARIO

CITY OF BARRIE
ACCEPTED
DATE□□□□□□□□□□□□
□□□□□□□□□□□□□□□□
DIRECTOR O□ EN□INEERIN□

The City of BARRIE
ENGINEERING DEPARTMENT

BURNSIDE
R□J□B□r□□□d□ & A□□□□□□□□□L□ □□d
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CRISDAWN CONSTRUCTION
27 CLAPPERTON STREET
BARRIE□ON
L□M□□E6

Dr□□□ TE□
HEWITT S CREE□ TRUN□ SANITARY
SANITARY DESI□N SHEET

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NOT TO SCALE					

SANDY COVE CREEK REALIGNMENT

SANDY COVE CREEK LAND OWNERS GROUP

CITY OF BARRIE

INDEX

Dwg.No.	Description
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417427-DP-1	PROPOSED CONDITION CATCHMENT PLAN
417427-FLD-1	EXISTING CONDITION REGIONAL FLOODPLAIN MAPPING PLAN
417427-FLD-2	PROPOSED CONDITION REGIONAL FLOODPLAIN MAPPING PLAN
417427-FLD-3	PROPOSED INTERIM CONDITION REGIONAL FLOODPLAIN MAPPING PLAN
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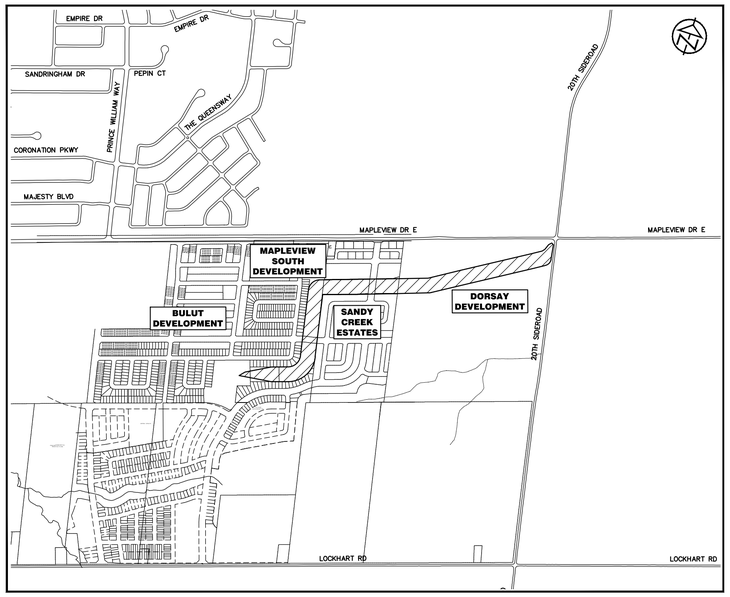
Drawing No.2	PHASE 1 INTERIM CONDITION REACH 1 AND REACH 2
Drawing No.3	PHASE 1 INTERIM CONDITION REACH 3 AND REACH 4
Drawing No.4	PHASE 2 SLOPE PLANTINGS REACH 1 AND REACH 2
Drawing No.5	PHASE 2 SLOPE PLANTINGS REACH 3 AND REACH 4
Drawing No.6	FINAL CONDITION REACH 1 AND REACH 2
Drawing No.7	FINAL CONDITION REACH 3 AND REACH 4
Drawing No.8	DETAILS



KEY PLAN

N.T.S.

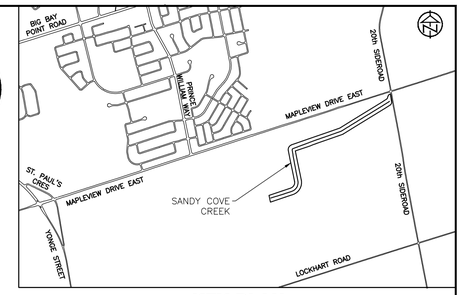
TATHAM ENGINEERING

417427

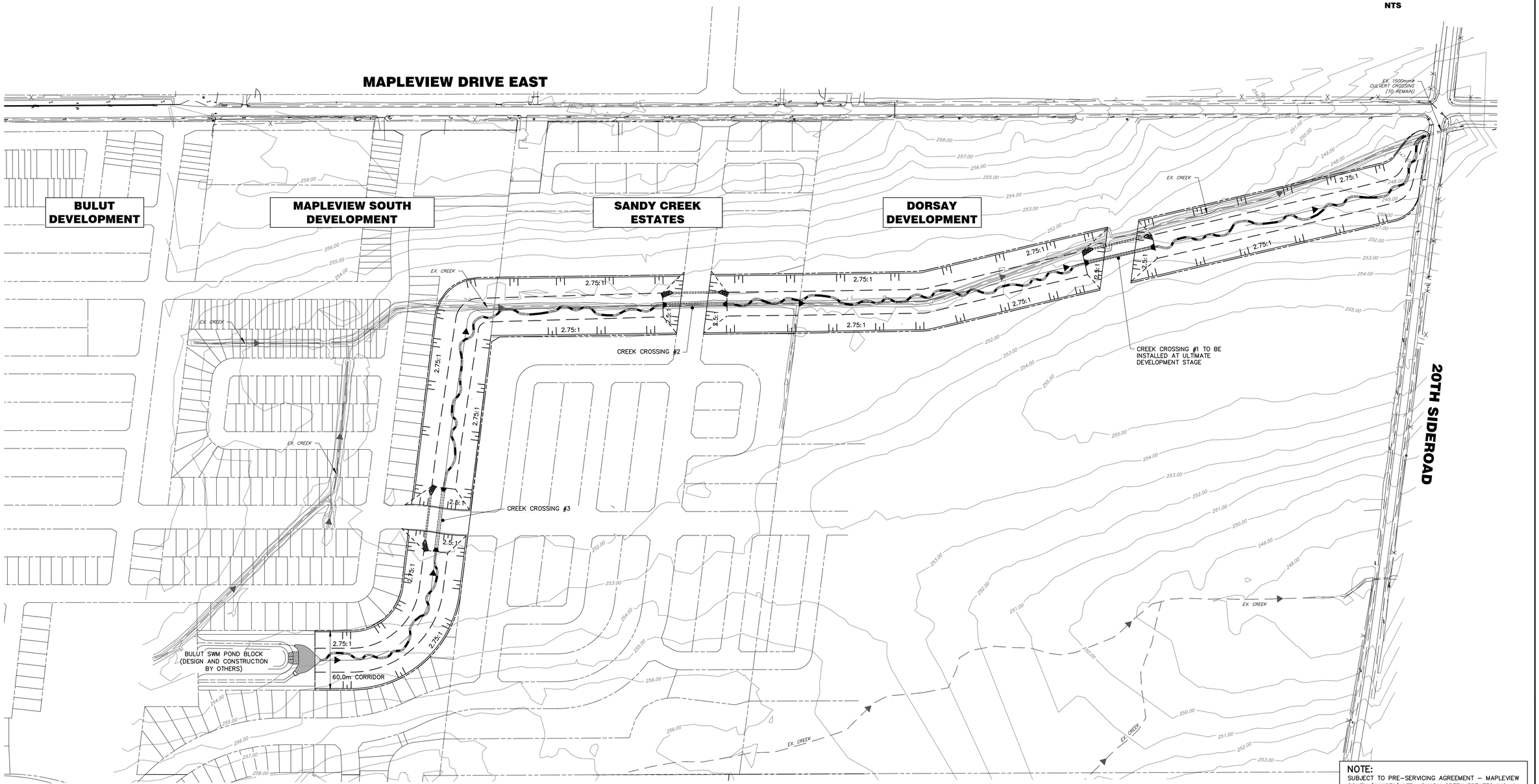
ISSUED FOR TENDER - JUNE 3, 2021

LEGEND

253.00	EXISTING CONTOUR
	EXISTING PROPERTY LINE
	EXISTING EDGE OF PAVEMENT
	EXISTING EDGE OF GRAVEL
	EXISTING C/L DITCH
	EXISTING TOP OF DITCH
	EXISTING FENCE LINE
	EXISTING WOOD FENCE
	EXISTING C/L OF CREEK
	EXISTING BANKS
	EXISTING EDGE OF VEGETATION
	EXISTING CULVERT
HP	EXISTING HYDRO POLE
CB	EXISTING CATCHBASIN
WV	EXISTING WATER VALVE
LS	EXISTING LIGHT STANDARD
SIGN	EXISTING ROAD SIGN
B	EXISTING BELL PEDESTAL
TBM	EXISTING TEMPORARY BENCHMARK
	PROPOSED GRADE SLOPE
	PROPOSED BOTTOM OF SLOPE
	PROPOSED CREEK CENTERLINE
	LIMIT OF GRADING
	PROPOSED POOLS AND RIFFLES
	PROPOSED CULVERT



KEY PLAN
NTS



NOTE:
SUBJECT TO PRE-SERVICING AGREEMENT – MAPLEVIEW SOUTH (INNISFIL) LTD., SNADY CREEK ESTATES INC. & DIV DEVELOPMENT (BARRIE) LTD.

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BENCHMARKS

VERTICAL BENCHMARK: 03120110016 (2nd ORDER)
ELEVATION: 268.852

HORIZONTAL BENCHMARK: 03120110016 (2nd ORDER)
NORTHING: 4911024.443 EASTING: 612156.298

VERTICAL BENCHMARK: 03120110020 (2nd ORDER)
ELEVATION: 261.551

HORIZONTAL BENCHMARK: 03120110020 (2nd ORDER)
NORTHING: 4912264.861 EASTING: 611717.143

NOTES

TOPOGRAPHIC INFORMATION SHOWN ON THIS PLAN PROVIDED BY LLOYD & PURCELL LTD. COMPLETED JANUARY 2015. RECIEVED OCTOBER 17, 2016.

TOPOGRAPHIC INFORMATION SHOWN ON THIS PLAN PROVIDED BY RUDY MAK SURVEYING LTD. COMPLETED JULY 2012. RECIEVED OCTOBER 25, 2018.

GROUNDWATER ELEVATIONS ARE INFERRED FROM LIMITED SUBSURFACE INFORMATION. FIELD CONDITIONS MAY VERY.

No.	REVISION DESCRIPTION	DATE
1.	1ST SUBMISSION	JULY 18/19
2.	2ND SUBMISSION	SEPT 18/19
3.	3RD SUBMISSION	APR 27/21
4.	ISSUED FOR TENDER	JUNE 3/21

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N.A. MILLINGTON
100190121
JUNE 3, 2021
PROVINCE OF ONTARIO

SANDY COVE CREEK LANDOWNERS GROUP
SANDY COVE CREEK REALIGNMENT
CITY OF BARRIE

TATHAM ENGINEERING

GENERAL PLAN

DESIGN: NM	FILE: 417427	DWG: GP-1
DRAWN: LCG	DATE: JAN 2019	
CHECK: DRT	SCALE: 1:2000	

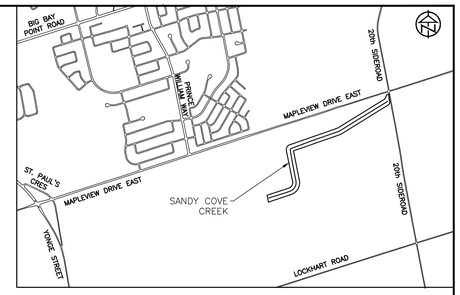
WELL ID	GROUNDWATER ELEVATION	DATE
AZIMUTH (FINGER LAKES)		
MW 101	256.80	N/A
MW 102	254.60	N/A
MW 103A	252.30	N/A
MW 103B	252.30	N/A
MW 106	253.10	N/A
MW 107	255.80	N/A
MW 108	254.70	N/A
MW 109	N/A	N/A
MW 109B	252.25	N/A
TP1	257.90	N/A
TP2	DRY	N/A
TP3	253.20	N/A
TP4	DRY	N/A
TP5	254.70	N/A
TP6	251.30	N/A
TP7	251.10	N/A
TP8	251.50	N/A
TP9	252.20	N/A
CAMBIUM (MVS)		
BH101–18	255.80	NOV 5 2018
BH102–18	255.70	NOV 5 2018
BH103–18	255.69	NOV 5 2018
BH104–18	254.90	NOV 5 2018
BH105–18	253.84	NOV 5 2018
BH106–18	252.98	NOV 5 2018
BH107–18	255.01	NOV 5 2018
BH108–18	253.50	NOV 5 2018
BH109–18	252.50	NOV 5 2018
BH110–18	253.26	NOV 5 2018
BH111–18	253.48	NOV 5 2018
BH112–18	253.22	NOV 5 2018
BH113–18	255.65	NOV 5 2018
BH114–18	255.46	NOV 5 2018
BH115–18	255.62	NOV 5 2018
CAMBIUM (SANDY COVE CREEK)		
BH201–18	250.41	SEPT 26 2018
BH202–18	249.88	SEPT 26 2018
BH203–18	249.13	SEPT 26 2018
BH204–18	249.79	SEPT 26 2018
BH205–18	–	SEPT 26 2018
BH206–18	–	SEPT 26 2018
BH207–18	253.68	SEPT 26 2018
BH208–18	255.69	SEPT 26 2018
SOIL ENGINEERS LTD. (DORSAY)		
BH 1	254.40	NOV 18 2016
BH 2	NO WELL	NOV 18 2016
BH 3	251.00	NOV 18 2016
BH 4	NO WELL	NOV 18 2016
BH 5	249.50	NOV 18 2016
BH 6	NO WELL	NOV 18 2016
BH 7	250.60	NOV 18 2016
BH 8	251.40	NOV 18 2016
BH 9	252.60	NOV 18 2016
BH 10	NO WELL	NOV 18 2016
BH 11	NO WELL	NOV 18 2016
BH 12D/S	249.20	NOV 18 2016

LEGEND
- SOIL ENGINEERS LTD. (DORSAY)
- CAMBIUM (MVS)
- CAMBIUM (SANDY COVE CREEK)
- AZIMUTH (FINGER LAKES)

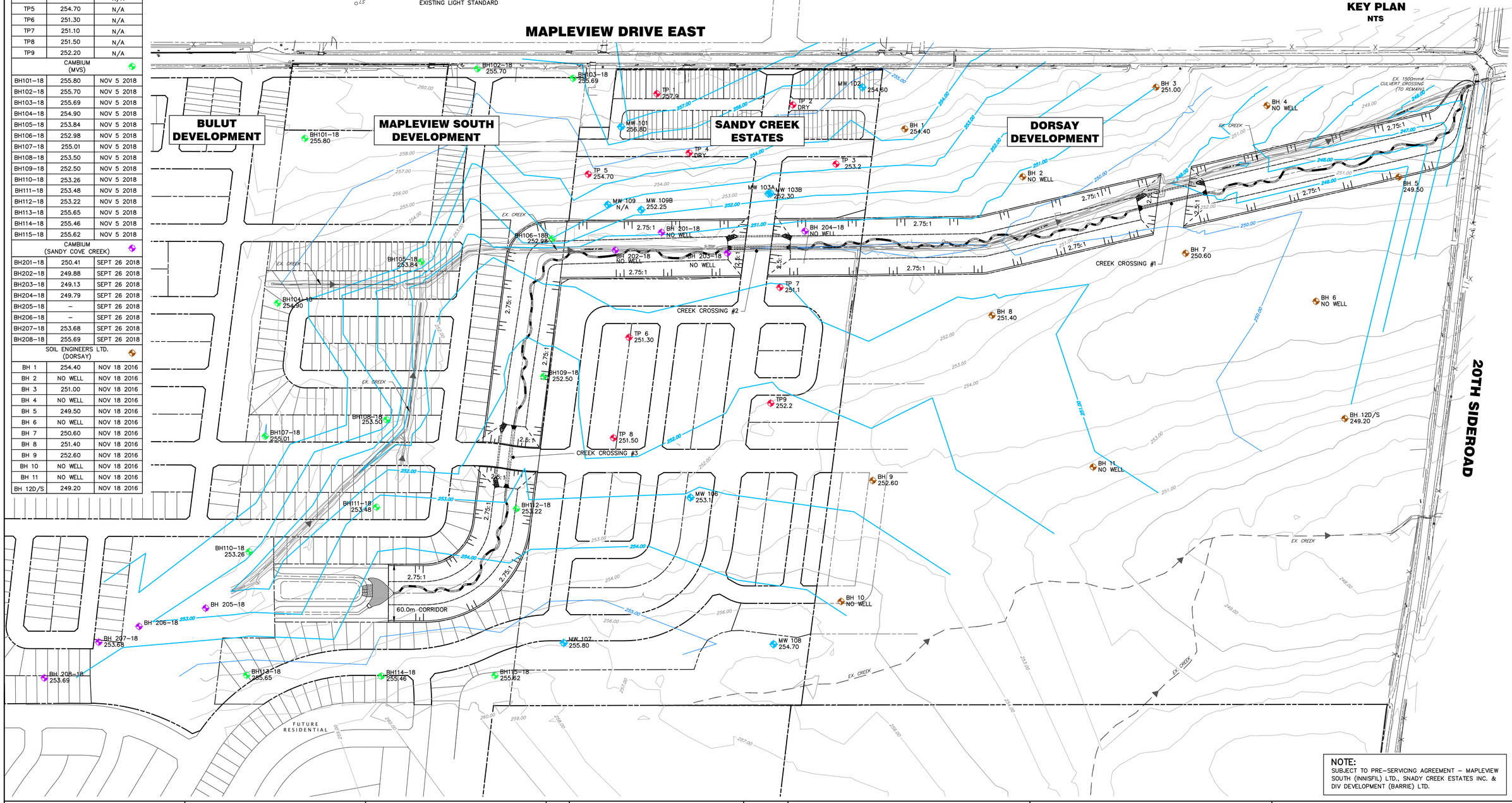
LEGEND

EXISTING CONTOUR	EXISTING ROAD SIGN
EXISTING PROPERTY LINE	EXISTING BELL PEDESTAL
EXISTING EDGE OF PAVEMENT	EXISTING TEMPORARY BENCHMARK
EXISTING EDGE OF GRAVEL	PROPOSED GRADE SLOPE
EXISTING C/L DITCH	PROPOSED BOTTOM OF SLOPE
EXISTING TOP OF DITCH	PROPOSED CREEK CENTERLINE
EXISTING FENCE LINE	LIMIT OF GRADING
EXISTING WOOD FENCE	PROPOSED POOLS AND RIFFLES
EXISTING C/L OF CREEK	PROPOSED CULVERT
EXISTING BANKS	APPROXIMATE GROUNDWATER ELEV.(m)
EXISTING EDGE OF VEGETATION	MW/BH LOCATION
EXISTING CULVERT	
EXISTING HYDRO POLE	
EXISTING CATCHBASIN	
EXISTING WATER VALVE	
EXISTING LIGHT STANDARD	

NOTE:
GROUNDWATER ELEVATIONS ARE INFERRED FROM LIMITED SUBSURFACE INFORMATION. FIELD CONDITIONS MAY VARY.



KEY PLAN
NTS



NOTE:
SUBJECT TO PRE-SERVICING AGREEMENT – MAPLEVIEW SOUTH (INNISFIL) LTD., SNADY CREEK ESTATES INC. & DIV DEVELOPMENT (BARRIE) LTD.

DISCLAIMER AND COPYRIGHT

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

TATHAM ENGINEERING LIMITED CLAIMS COPYRIGHT TO THIS DRAWING WHICH MAY NOT BE USED FOR ANY PURPOSE OTHER THAN THAT PROVIDED IN THE CONTRACT BETWEEN THE OWNER/CLIENT AND THE ENGINEER WITHOUT THE EXPRESS CONSENT OF TATHAM ENGINEERING LIMITED.

BENCHMARKS

VERTICAL BENCHMARK: 03120110016 (2nd ORDER)
ELEVATION: 268.852

HORIZONTAL BENCHMARK: 03120110016 (2nd ORDER)
NORTHING: 4911024.443 EASTING: 612156.298

VERTICAL BENCHMARK: 03120110020 (2nd ORDER)
ELEVATION: 261.551

HORIZONTAL BENCHMARK: 03120110020 (2nd ORDER)
NORTHING: 4912264.861 EASTING: 611717.143

NOTES

TOPOGRAPHIC INFORMATION SHOWN ON THIS PLAN PROVIDED BY LLOYD & PURCELL LTD. COMPLETED JANUARY 2015. RECIEVED OCTOBER 17, 2016.

TOPOGRAPHIC INFORMATION SHOWN ON THIS PLAN PROVIDED BY RUDY MAK SURVEYING LTD. COMPLETED JULY 2012. RECIEVED OCTOBER 25, 2018.

GROUNDWATER ELEVATIONS ARE INFERRED FROM LIMITED SUBSURFACE INFORMATION. FIELD CONDITIONS MAY VERY.

No.	REVISION DESCRIPTION	DATE
1.	1ST SUBMISSION	JULY 18/19
2.	2ND SUBMISSION	SEPT 18/19
3.	3RD SUBMISSION	APR 27/21
4.	ISSUED FOR TENDER	JUNE 3/21

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N.A. MILLINGTON
100190121
JUNE 3, 2021
PROVINCE OF ONTARIO

SANDY COVE CREEK LANDOWNERS GROUP
SANDY COVE CREEK REALIGNMENT
CITY OF BARRIE

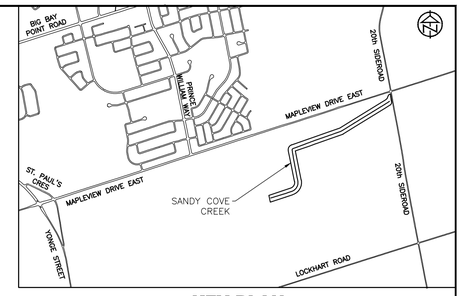
GROUNDWATER MAPPING PLAN

TATHAM ENGINEERING

DESIGN: NM	FILE: 417427	DWG:	
DRAWN: LCG	DATE: JAN 2019		**GW-1**
CHECK: DRT	SCALE: 1:2000		

LEGEND

- EXISTING CONTOUR (253.00)
- EXISTING PROPERTY LINE
- EXISTING EDGE OF PAVEMENT
- EXISTING EDGE OF GRAVEL
- EXISTING C/L DITCH
- EXISTING TOP OF DITCH
- EXISTING FENCE LINE
- EXISTING WOOD FENCE
- EXISTING C/L OF CREEK
- EXISTING BANKS
- EXISTING EDGE OF VEGETATION
- EXISTING CULVERT
- EXISTING HYDRO POLE (HP)
- EXISTING CATCHBASIN (CB)
- EXISTING WATER VALVE (WV)
- EXISTING LIGHT STANDARD (LS)
- EXISTING ROAD SIGN (SIGN)
- EXISTING BELL PEDESTAL
- EXISTING TEMPORARY BENCHMARK (TBM)
- PROPOSED GRADE SLOPE
- PROPOSED BOTTOM OF SLOPE
- PROPOSED CREEK CENTERLINE
- LIMIT OF GRADING
- PROPOSED POOLS AND RIFFLES
- PROPOSED CULVERT
- POST-DEVELOPMENT OVERLAND FLOW DIRECTION
- POST-DEVELOPMENT CATCHMENT BOUNDARY
- 201 — POST-DEVELOPMENT CATCHMENT ID
- 1.00 | 91.4 — POST-DEVELOPMENT CATCHMENT CURVE NUMBER/ IMPERVIOUS FRACTION
- POST-DEVELOPMENT CATCHMENT AREA (ha)



KEY PLAN
NTS

MAPLEVIEW DRIVE EAST

12-103 | 0.15 | 0.65
12-104 | 2.72 | 0.65
12-102 | 0.42 | 59
18-102 | 0.35 | 50
12-105 | 1.78 | 50
18-101 | 5.99 | 0.65
12-101 | 4.88 | 0.65
11-103 | 0.29 | 0.65
00-101 | 0.46 | 0.50
01-03 | 4.39 | 50
13-105 | 1.88 | 50
01-02 | 2.53 | 50
11-102 | 37.48 | 0.65
11-101 | 5.90 | 0.65
13-102 | 0.19 | 0.65
13-104 | 9.90 | 0.65
17-102 | 0.65 | 50
17-101 | 4.83 | 0.65
13-103 | 13.72 | 0.65
00-102 | 0.54 | 0.50
01-01 | 1.30 | 50
11-104 | 3.06 | 50
00-103 | 0.82 | 0.50
13-101 | 1.81 | 0.65

BULUT DEVELOPMENT
MAPLEVIEW SOUTH DEVELOPMENT
SANDY CREEK ESTATES
DORSAY DEVELOPMENT
20TH SIDEROAD

SWMF #12
SWMF #16
SWMF #13
SWMF #17
SWMF #11
BULUT SWM POND BLOCK (DESIGN AND CONSTRUCTION BY OTHERS)
CREEK CROSSING #1
CREEK CROSSING #2
CREEK CROSSING #3
EX. CREEK
FUTURE RESIDENTIAL

NOTE:
SUBJECT TO PRE-SERVICING AGREEMENT – MAPLEVIEW SOUTH (INNISFIL) LTD., SNADY CREEK ESTATES INC. & DIV DEVELOPMENT (BARRIE) LTD.

DISCLAIMER AND COPYRIGHT

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BENCHMARKS

VERTICAL BENCHMARK: 03120110016 (2nd ORDER)
ELEVATION: 268.852

HORIZONTAL BENCHMARK: 03120110016 (2nd ORDER)
NORTHING: 4911024.443 EASTING: 612156.298

VERTICAL BENCHMARK: 03120110020 (2nd ORDER)
ELEVATION: 261.551

HORIZONTAL BENCHMARK: 03120110020 (2nd ORDER)
NORTHING: 4912264.861 EASTING: 611717.143

NOTES

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GROUNDWATER ELEVATIONS ARE INFERRED FROM LIMITED SUBSURFACE INFORMATION. FIELD CONDITIONS MAY VERY.

No.	REVISION DESCRIPTION	DATE
1.	1ST SUBMISSION	JULY 18/19
2.	2ND SUBMISSION	SEPT 18/19
3.	3RD SUBMISSION	APR 27/21
4.	ISSUED FOR TENDER	JUNE 3/21

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N. A. MILLINGTON
100190121
JUNE 3, 2021
PROVINCE OF ONTARIO

SANDY COVE CREEK LANDOWNERS GROUP
SANDY COVE CREEK REALIGNMENT
CITY OF BARRIE

PROPOSED CONDITION CATCHMENT PLAN

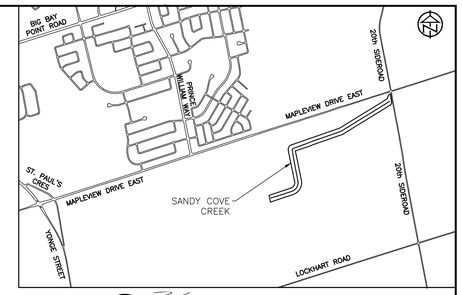
TATHAM ENGINEERING

DESIGN: NM	FILE: 417427	DWG: DP-1
DRAWN: LCG	DATE: JAN 2019	
CHECK: DRT	SCALE: 1:2000	

LEGEND

- EXISTING CONTOUR (253.00)
- EXISTING PROPERTY LINE
- EXISTING EDGE OF PAVEMENT
- EXISTING EDGE OF GRAVEL
- EXISTING C/L DITCH
- EXISTING TOP OF DITCH
- EXISTING FENCE LINE
- EXISTING WOOD FENCE
- EXISTING C/L OF CREEK
- EXISTING BANKS
- EXISTING EDGE OF VEGETATION
- EXISTING CULVERT
- EXISTING HYDRO POLE (HP)
- EXISTING CATCHBASIN (CB)
- EXISTING WATER VALVE (WV)
- EXISTING LIGHT STANDARD (LS)
- EXISTING ROAD SIGN (SIGN)
- EXISTING BELL PEDESTAL
- EXISTING TEMPORARY BENCHMARK (TBM)
- HYDRAULIC CROSS SECTION
- REGIONAL FLOODPLAIN
- 112.91 / 246.10 — CROSS SECTION ID / REGIONAL FLOOD ELEVATION (m)

FLOOD VOLUME TABLE	
FLOOD EVENT	VOLUME
REGIONAL	36380m³



KEY PLAN
NTS

MAPLEVIEW DRIVE EAST

20TH SIDEROAD

EX. 1500mmø CULVERT CROSSING (TO REMAIN)

EX. CREEK

NOTE:
SUBJECT TO PRE-SERVICING AGREEMENT – MAPLEVIEW SOUTH (INNISFIL) LTD., SNADY CREEK ESTATES INC. & DIV DEVELOPMENT (BARRIE) LTD.

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BENCHMARKS

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NORTHING: 4911024.443 EASTING: 612156.298

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ELEVATION: 261.551

HORIZONTAL BENCHMARK: 03120110020 (2nd ORDER)
NORTHING: 4912264.861 EASTING: 611717.143

NOTES

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No.	REVISION DESCRIPTION	DATE
1.	1ST SUBMISSION	JULY 18/19
2.	2ND SUBMISSION	SEPT 18/19
3.	3RD SUBMISSION	APR 27/21
4.	ISSUED FOR TENDER	JUNE 3/21

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N. A. MILLINGTON
100190121
JUNE 3, 2021
PROVINCE OF ONTARIO

SANDY COVE CREEK LANDOWNERS GROUP
SANDY COVE CREEK REALIGNMENT
CITY OF BARRIE

EXISTING CONDITION REGIONAL FLOODPLAIN MAPPING PLAN

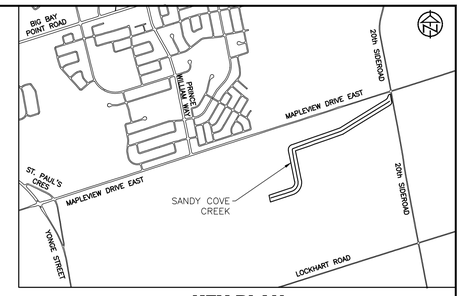
TATHAM ENGINEERING

DESIGN: NM	FILE: 417427	DWG: FLD-1
DRAWN: LCG	DATE: JAN 2019	
CHECK: DRT	SCALE: 1:2000	

LEGEND

- EXISTING CONTOUR (253.00)
- EXISTING PROPERTY LINE
- EXISTING EDGE OF PAVEMENT
- EXISTING EDGE OF GRAVEL
- EXISTING C/L DITCH
- EXISTING TOP OF DITCH
- EXISTING FENCE LINE
- EXISTING WOOD FENCE
- EXISTING BANKS
- EXISTING EDGE OF VEGETATION
- EXISTING CULVERT
- EXISTING HYDRO POLE (HP)
- EXISTING CATCHBASIN (CB)
- EXISTING WATER VALVE (W)
- EXISTING LIGHT STANDARD (LS)
- EXISTING ROAD SIGN (RSIGN)
- EXISTING BELL PEDESTAL
- EXISTING TEMPORARY BENCHMARK (TBM)
- PROPOSED GRADE SLOPE
- PROPOSED BOTTOM OF SLOPE
- PROPOSED CREEK CENTERLINE
- LIMIT OF GRADING
- PROPOSED POOLS AND RIFFLES
- PROPOSED CULVERT
- HYDRAULIC CROSS SECTION
- REGIONAL FLOODPLAIN
- 112.91 / 246.10 — CROSS SECTION ID / REGIONAL FLOOD ELEV. (m)

FLOOD VOLUME TABLE		
FLOOD EVENT	PROP. VOLUME	EX. VOLUME
REGIONAL	58486m³	36380m³



KEY PLAN
NTS

MAPLEVIEW DRIVE EAST

BULUT DEVELOPMENT

MAPLEVIEW SOUTH DEVELOPMENT

SANDY CREEK ESTATES

DORSAY DEVELOPMENT

20TH SIDEROAD

STREET "2"

FUTURE RESIDENTIAL

BULUT SWM POND BLOCK

60.0m CORRIDOR

EX. 1500mmø CULVERT CROSSING (TO REMAIN)

CREEK CROSSING #1

CREEK CROSSING #2

CREEK CROSSING #3

EX. CREEK

2.75:1

2.5:1

1216.57 / 252.06
1252.25 / 252.06
1150.00 / 252.05
1100.00 / 252.05
1034.32 / 252.05
1018.82 / 252.02
959.18 / 250.67
941.70 / 250.68
850.00 / 250.65
800.00 / 250.64
750.00 / 250.64
700.00 / 250.63
650.00 / 250.63
602.55 / 250.63
588.95 / 250.59
521.75 / 248.81
512.22 / 248.61
450.00 / 248.14
400.00 / 248.00
350.00 / 247.96
300.00 / 247.92
266.29 / 247.91
252.54 / 247.91
210.21 / 247.91
1302.27 / 252.07
1400.22 / 252.08
1376.19 / 252.08
1456.30 / 253.37
1471.11 / 253.40
1502.28 / 253.40
1552.28 / 253.40
1652.27 / 253.41
1649.12 / 253.41
1602.28 / 253.40

NOTE:
SUBJECT TO PRE-SERVICING AGREEMENT – MAPLEVIEW SOUTH (INNISFIL) LTD., SNADY CREEK ESTATES INC. & DIV DEVELOPMENT (BARRIE) LTD.

DISCLAIMER AND COPYRIGHT

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BENCHMARKS

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ELEVATION: 268.852

HORIZONTAL BENCHMARK: 03120110016 (2nd ORDER)
NORTHING: 4911024.443 EASTING: 612156.298

VERTICAL BENCHMARK: 03120110020 (2nd ORDER)
ELEVATION: 261.551

HORIZONTAL BENCHMARK: 03120110020 (2nd ORDER)
NORTHING: 4912264.861 EASTING: 611717.143

NOTES

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1.	1ST SUBMISSION	JULY 18/19
2.	2ND SUBMISSION	SEPT 18/19
3.	3RD SUBMISSION	APR 27/21
4.	ISSUED FOR TENDER	JUNE 3/21

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N.A. MILLINGTON
100190121
JUNE 3, 2021
PROVINCE OF ONTARIO

SANDY COVE CREEK LANDOWNERS GROUP
SANDY COVE CREEK REALIGNMENT
CITY OF BARRIE

PROPOSED ULTIMATE CONDITION REGIONAL FLOODPLAIN MAPPING PLAN

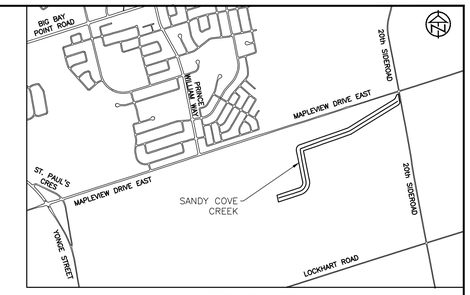
TATHAM ENGINEERING

DESIGN: NM	FILE: 417427	DWG: FLD-2
DRAWN: LCG	DATE: JAN 2019	
CHECK: DRT	SCALE: 1:2000	

LEGEND

- EXISTING CONTOUR (253.00)
- EXISTING PROPERTY LINE
- EXISTING EDGE OF PAVEMENT
- EXISTING EDGE OF GRAVEL
- EXISTING C/L DITCH
- EXISTING TOP OF DITCH
- EXISTING FENCE LINE
- EXISTING WOOD FENCE
- EXISTING BANKS
- EXISTING EDGE OF VEGETATION
- EXISTING CULVERT
- EXISTING HYDRO POLE (HP)
- EXISTING CATCHBASIN (CB)
- EXISTING WATER VALVE (W)
- EXISTING LIGHT STANDARD (LS)
- EXISTING ROAD SIGN (RSGN)
- EXISTING BELL PEDESTAL
- EXISTING TEMPORARY BENCHMARK (TBM)
- PROPOSED GRADE SLOPE
- PROPOSED BOTTOM OF SLOPE
- PROPOSED CREEK CENTERLINE
- LIMIT OF GRADING
- PROPOSED POOLS AND RIFFLES
- PROPOSED CULVERT
- HYDRAULIC CROSS SECTION
- REGIONAL FLOODPLAIN
- 112.91 / 246.10 — CROSS SECTION ID / REGIONAL FLOOD ELEV. (m)

FLOOD VOLUME TABLE		
FLOOD EVENT	PROP. VOLUME	EX. VOLUME
REGIONAL	81864m³	36380m³



KEY PLAN
NTS

MAPLEVIEW DRIVE EAST

BULUT DEVELOPMENT

MAPLEVIEW SOUTH DEVELOPMENT

SANDY CREEK ESTATES

DORSAY DEVELOPMENT

20TH SIDEROAD

STREET "2"

1216.57 / 251.59
1252.25 / 251.60
1150.00 / 251.58
1100.00 / 251.57
1034.32 / 251.57
1018.82 / 251.51
959.18 / 250.19
941.70 / 250.16
850.00 / 249.92
800.00 / 249.78
750.00 / 249.64
700.00 / 249.49
650.00 / 249.31
602.55 / 249.12
588.95 / 249.04
512.22 / 248.61
450.00 / 248.14
400.00 / 248.00
350.00 / 247.96
300.00 / 247.92
251.75 / 248.68
266.29 / 247.91
252.54 / 247.91
210.21 / 247.91

CREEK CROSSING #2

1302.27 / 251.62
1400.22 / 251.68
1376.19 / 251.67

CREEK CROSSING #3

1456.30 / 252.96
1471.11 / 253.00
1502.28 / 253.00
1552.28 / 253.01
1602.28 / 253.01
1649.12 / 253.02
1652.27 / 253.02

2.75:1
2.5:1

BULUT SWM POND BLOCK
60.0m CORRIDOR

EX. 1500mmø CULVERT CROSSING (TO REMAIN)

EX. CREEK

FUTURE RESIDENTIAL

NOTE:
SUBJECT TO PRE-SERVICING AGREEMENT – MAPLEVIEW SOUTH (INNISFIL) LTD., SNADY CREEK ESTATES INC. & DIV DEVELOPMENT (BARRIE) LTD.

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BENCHMARKS

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ELEVATION: 268.852

HORIZONTAL BENCHMARK: 03120110016 (2nd ORDER)
NORTHING: 4911024.443 EASTING: 612156.298

VERTICAL BENCHMARK: 03120110020 (2nd ORDER)
ELEVATION: 261.551

HORIZONTAL BENCHMARK: 03120110020 (2nd ORDER)
NORTHING: 4912264.861 EASTING: 611717.143

NOTES

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TOPOGRAPHIC INFORMATION SHOWN ON THIS PLAN PROVIDED BY RUDY MAK SURVEYING LTD. COMPLETED JULY 2012. RECIEVED OCTOBER 25, 2018.

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No.	REVISION DESCRIPTION	DATE
1.	1ST SUBMISSION	JULY 18/19
2.	2ND SUBMISSION	SEPT 18/19
3.	3RD SUBMISSION	APR 27/21
4.	ISSUED FOR TENDER	JUNE 3/21

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N. A. MILLINGTON
100190121
JUNE 3, 2021
PROVINCE OF ONTARIO

SANDY COVE CREEK LANDOWNERS GROUP
SANDY COVE CREEK REALIGNMENT
CITY OF BARRIE

PROPOSED INTERIM CONDITION REGIONAL FLOODPLAIN MAPPING

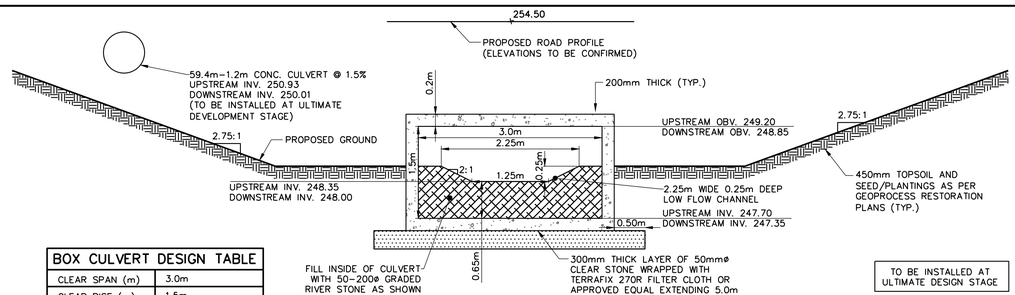
TATHAM ENGINEERING

DESIGN: NM	FILE: 417427	DWG: FLD-3
DRAWN: LCG	DATE: JAN 2019	
CHECK: DRT	SCALE: 1:2000	

LEGEND

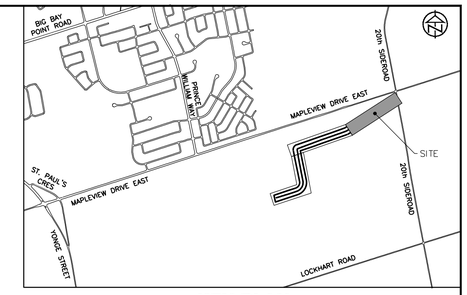
- EXISTING CONTOUR (253.00)
- EXISTING PROPERTY LINE
- EXISTING EDGE OF PAVEMENT
- EXISTING EDGE OF GRAVEL
- EXISTING C/L DITCH
- EXISTING TOP OF DITCH
- EXISTING FENCE LINE
- EXISTING WOOD FENCE
- EXISTING C/L OF CREEK
- EXISTING BANKS
- EXISTING EDGE OF VEGETATION
- EXISTING CULVERT
- EXISTING HYDRO POLE
- EXISTING CATCHBASIN
- EXISTING WATER VALVE
- EXISTING LIGHT STANDARD
- EXISTING ROAD SIGN
- EXISTING BELL PEDESTAL
- EXISTING TEMPORARY BENCHMARK
- PROPOSED GRADE SLOPE
- PROPOSED BOTTOM OF SLOPE
- PROPOSED CREEK CENTERLINE
- LIMIT OF GRADING
- PROPOSED POOLS AND RIFFLES
- PROPOSED CULVERT

NOTE:
SUBJECT TO PRE-SERVICING AGREEMENT - MAPLEVIEW SOUTH (INNISFIL) LTD., SNADY CREEK ESTATES INC. & DIV DEVELOPMENT (BARRIE) LTD.



TO BE INSTALLED AT ULTIMATE DESIGN STAGE

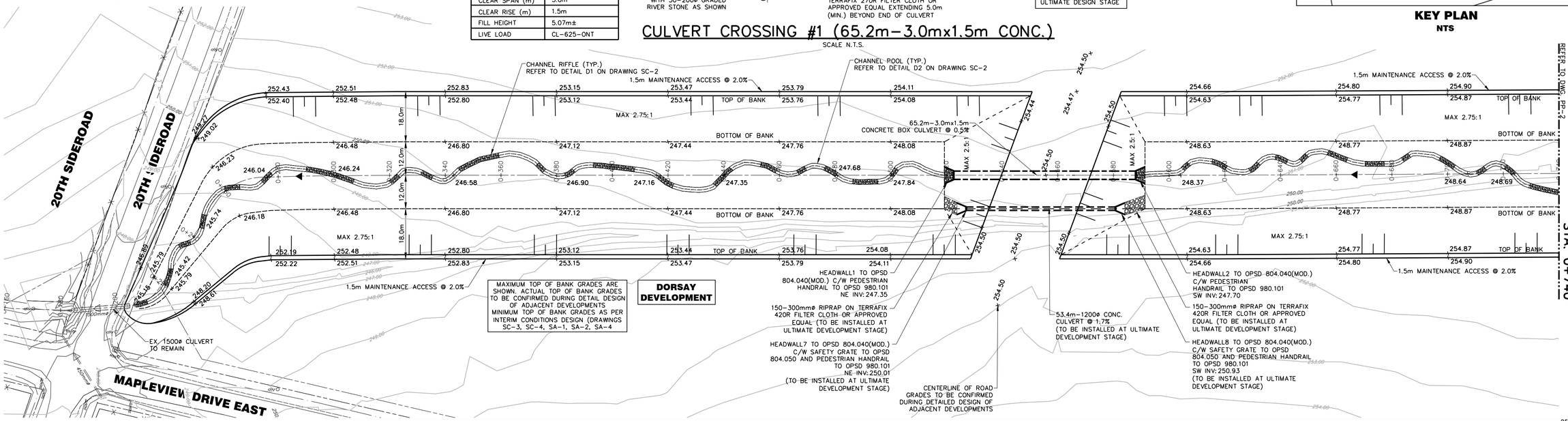
BOX CULVERT DESIGN TABLE	
CLEAR SPAN (m)	3.0m
CLEAR RISE (m)	1.5m
FILL HEIGHT	5.07m±
LIVE LOAD	CL-625-ONT

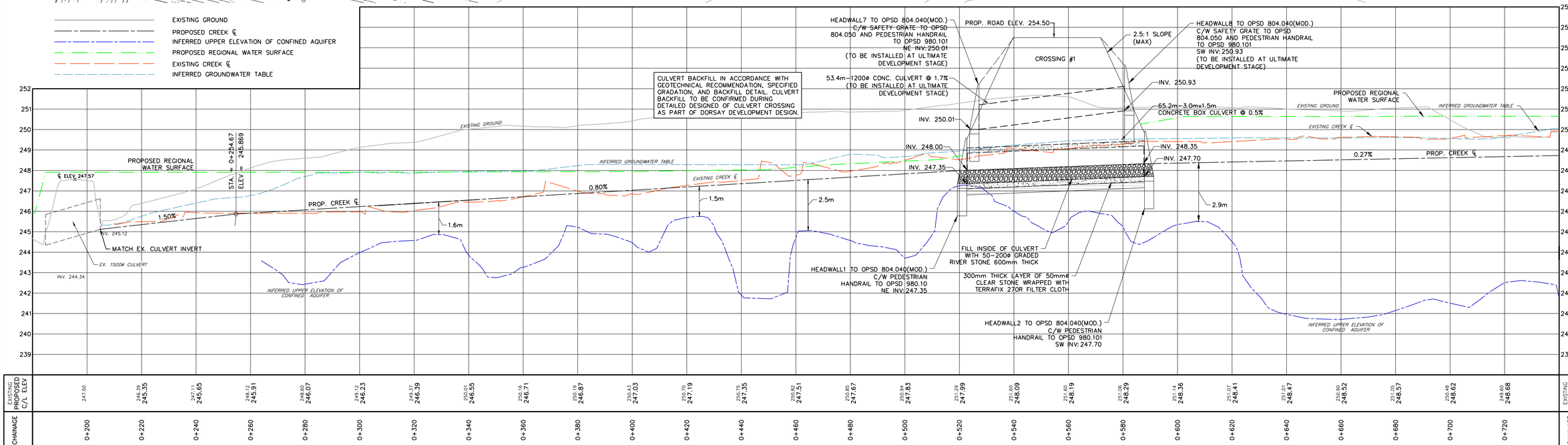


KEY PLAN
NTS

CULVERT CROSSING #1 (65.2m-3.0mx1.5m CONC.)

SCALE N.T.S.





EXISTING C/L ELEV	PROPOSED C/L ELEV	CHAINAGE
247.50	246.35	0+200
246.39	245.65	0+220
247.11	245.91	0+240
248.12	246.07	0+260
248.60	246.23	0+280
249.12	246.39	0+300
249.37	246.55	0+320
250.01	246.71	0+340
250.16	246.87	0+360
250.19	247.03	0+380
250.43	247.19	0+400
250.70	247.35	0+420
250.75	247.51	0+440
250.82	247.67	0+460
250.85	247.83	0+480
250.94	247.99	0+500
251.29	248.09	0+520
251.60	248.19	0+540
251.60	248.29	0+560
251.06	248.36	0+580
251.14	248.41	0+600
251.07	248.47	0+620
251.01	248.52	0+640
250.90	248.57	0+660
251.05	248.62	0+680
250.48	248.68	0+700
249.60		0+720

DISCLAIMER AND COPYRIGHT

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BENCHMARKS

VERTICAL BENCHMARK: 03120110016 (2nd ORDER)
ELEVATION: 268.852

HORIZONTAL BENCHMARK: 03120110016 (2nd ORDER)
NORTHING: 4911024.443 EASTING: 612156.298

VERTICAL BENCHMARK: 03120110020 (2nd ORDER)
ELEVATION: 261.551

HORIZONTAL BENCHMARK: 03120110020 (2nd ORDER)
NORTHING: 4912264.861 EASTING: 611717.143

NOTES

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TOPOGRAPHIC INFORMATION SHOWN ON THIS PLAN PROVIDED BY RUDY MAK SURVEYING LTD. COMPLETED JULY 2012. RECIEVED OCTOBER 25, 2018.

GROUNDWATER ELEVATIONS ARE INFERRED FROM LIMITED SUBSURFACE INFORMATION. FIELD CONDITIONS MAY VERY.

No.	REVISION DESCRIPTION	DATE
1.	1ST SUBMISSION	JULY 18/19
2.	2ND SUBMISSION	SEPT 18/19
3.	3RD SUBMISSION	APR 27/21
4.	ISSUED FOR TENDER	JUNE 3/21

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N. A. MILLINGTON
100190121
JUNE 3, 2021
PROVINCE OF ONTARIO

SANDY COVE CREEK LANDOWNERS GROUP
SANDY COVE CREEK REALIGNMENT
CITY OF BARRIE

TATHAM ENGINEERING

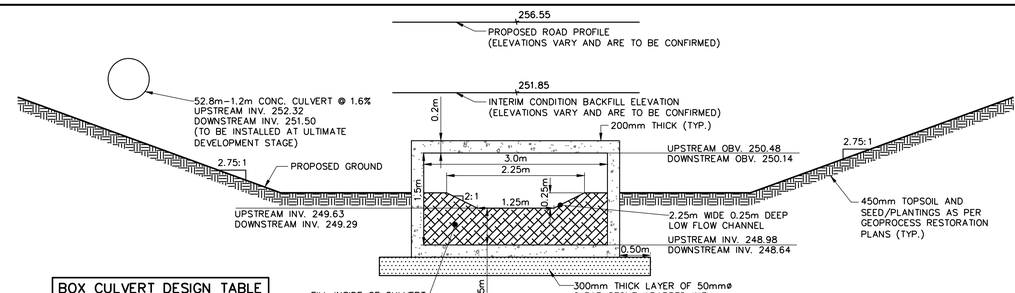
PLAN & PROFILE
STA. 0+180 TO 0+740

DESIGN: NM	FILE: 417427	DWG:
DRAWN: LCG	DATE: JAN 2019	PP-1
CHECK: DRT	SCALE: 1:750H 1:100V	

LEGEND

253.00	EXISTING CONTOUR
	EXISTING PROPERTY LINE
	EXISTING EDGE OF PAVEMENT
	EXISTING EDGE OF GRAVEL
	EXISTING C/L DITCH
	EXISTING TOP OF DITCH
X X	EXISTING FENCE LINE
	EXISTING WOOD FENCE
	EXISTING C/L OF CREEK
	EXISTING BANKS
	EXISTING EDGE OF VEGETATION
	EXISTING CULVERT
HP	EXISTING HYDRO POLE
CB	EXISTING CATCHBASIN
WV	EXISTING WATER VALVE
LS	EXISTING LIGHT STANDARD
SIGN	EXISTING ROAD SIGN
B	EXISTING BELL PEDESTAL
TBM	EXISTING TEMPORARY BENCHMARK
	PROPOSED GRADE SLOPE
	PROPOSED BOTTOM OF SLOPE
	PROPOSED CREEK CENTERLINE
	LIMIT OF GRADING
	PROPOSED POOLS AND RIFFLES
	PROPOSED CULVERT

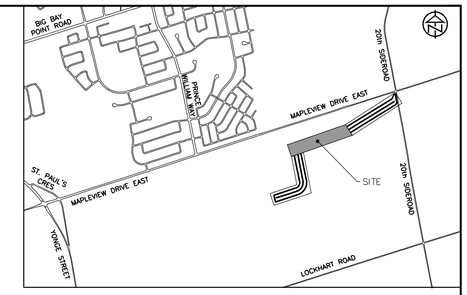
NOTE:
SUBJECT TO PRE-SERVICING AGREEMENT – MAPLEVIEW SOUTH (INNISFIL) LTD., SNADY CREEK ESTATES INC. & DIV DEVELOPMENT (BARRIE) LTD.



BOX CULVERT DESIGN TABLE	
CLEAR SPAN (m)	3.0m
CLEAR RISE (m)	1.5m
FILL HEIGHT	5.85m±
LIVE LOAD	CL-625-ONT

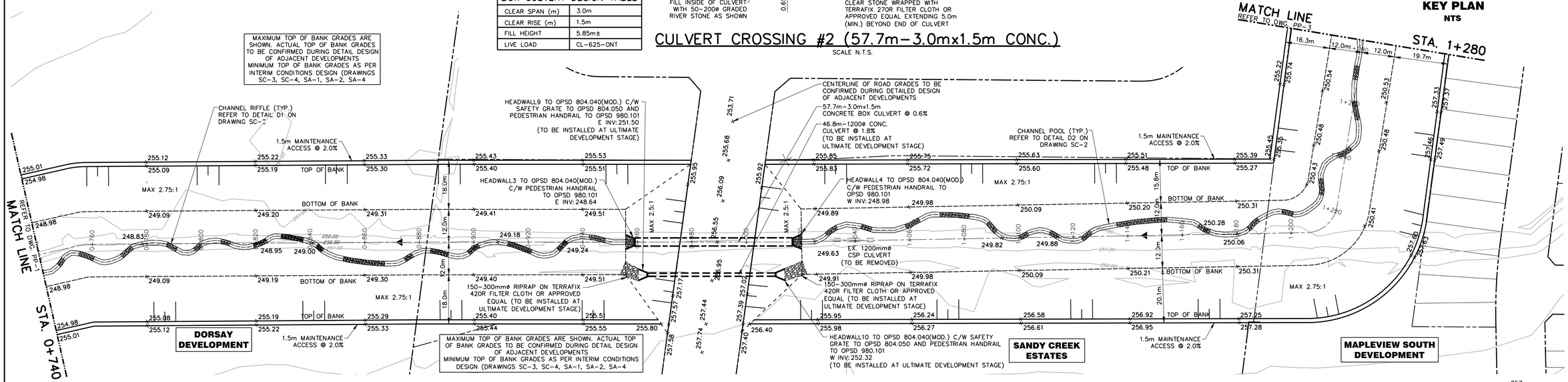
CULVERT CROSSING #2 (57.7m-3.0mx1.5m CONC.)

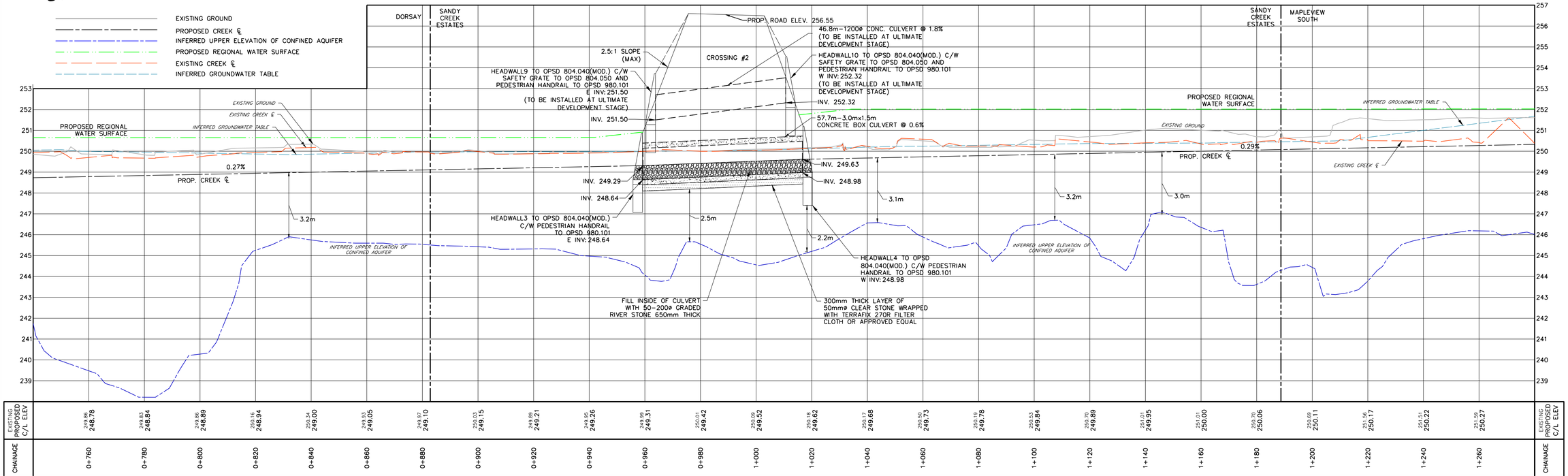
SCALE N.T.S.



KEY PLAN
NTS

MAXIMUM TOP OF BANK GRADES ARE SHOWN. ACTUAL TOP OF BANK GRADES TO BE CONFIRMED DURING DETAIL DESIGN OF ADJACENT DEVELOPMENTS
MINIMUM TOP OF BANK GRADES AS PER INTERIM CONDITIONS DESIGN (DRAWINGS SC-3, SC-4, SA-1, SA-2, SA-4





CHAINAGE	0+760	0+780	0+800	0+820	0+840	0+860	0+880	0+900	0+920	0+940	0+960	0+980	1+000	1+020	1+040	1+060	1+080	1+100	1+120	1+140	1+160	1+180	1+200	1+220	1+240	1+260
EXISTING C/L ELEV	249.86	249.83	249.86	250.16	250.24	249.83	249.97	250.03	249.89	249.95	249.89	250.01	250.09	250.18	250.17	250.50	250.79	250.53	250.70	251.01	251.01	250.70	250.69	251.56	251.51	251.59
PROPOSED C/L ELEV	248.78	248.84	248.89	248.94	249.00	249.05	249.10	249.15	249.21	249.26	249.31	249.42	249.52	249.62	249.68	249.73	249.78	249.84	249.89	249.95	250.00	250.06	250.11	250.17	250.22	250.27

DISCLAIMER AND COPYRIGHT

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BENCHMARKS

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ELEVATION: 268.852

HORIZONTAL BENCHMARK: 03120110016 (2nd ORDER)
NORTHING: 4911024.443 EASTING: 612156.298

VERTICAL BENCHMARK: 03120110020 (2nd ORDER)
ELEVATION: 261.551

HORIZONTAL BENCHMARK: 03120110020 (2nd ORDER)
NORTHING: 4912264.861 EASTING: 611717.143

NOTES

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2.	2ND SUBMISSION	SEPT 18/19
3.	3RD SUBMISSION	APR 27/21
4.	ISSUED FOR TENDER	JUNE 3/21

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N.A. MILLINGTON
100190121
JUNE 3, 2021
PROVINCE OF ONTARIO

SANDY COVE CREEK LANDOWNERS GROUP
SANDY COVE CREEK REALIGNMENT
CITY OF BARRIE

PLAN & PROFILE
STA. 0+740 TO 1+280

TATHAM ENGINEERING

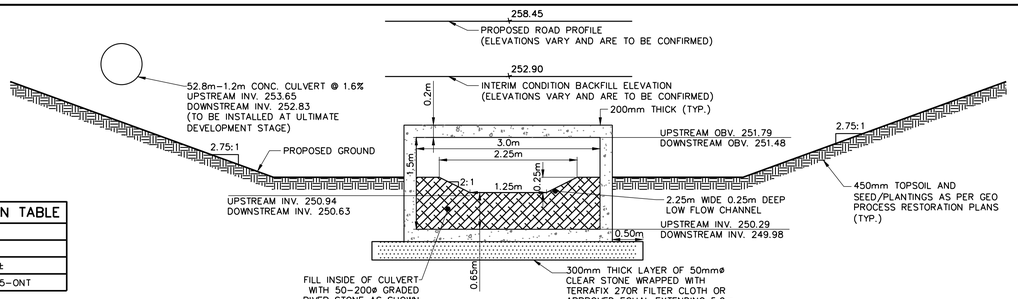
DESIGN: NM	FILE: 417427	DWG:
DRAWN: LCG	DATE: JAN 2019	**PP-2**
CHECK: DRT	SCALE: 1:750H 1:100V	

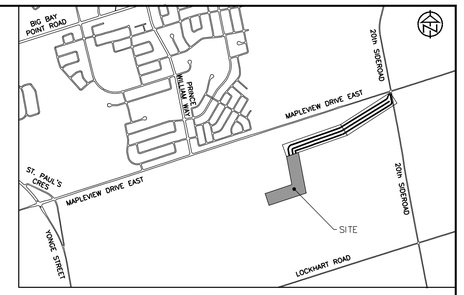
LEGEND

EXISTING CONTOUR	EXISTING ROAD SIGN
EXISTING PROPERTY LINE	EXISTING BELL PEDESTAL
EXISTING EDGE OF PAVEMENT	EXISTING TEMPORARY BENCHMARK
EXISTING EDGE OF GRAVEL	PROPOSED GRADE SLOPE
EXISTING C/L DITCH	PROPOSED BOTTOM OF SLOPE
EXISTING TOP OF DITCH	PROPOSED CREEK CENTERLINE
EXISTING FENCE LINE	LIMIT OF GRADING
EXISTING WOOD FENCE	PROPOSED POOLS AND RIFFLES
EXISTING C/L OF CREEK	PROPOSED CULVERT
EXISTING BANKS	
EXISTING EDGE OF VEGETATION	
EXISTING CULVERT	
EXISTING HYDRO POLE	
EXISTING CATCHBASIN	
EXISTING WATER VALVE	
EXISTING LIGHT STANDARD	

NOTE:
SUBJECT TO PRE-SERVICING AGREEMENT – MAPLEVIEW SOUTH (INNISFIL) LTD., SNADY CREEK ESTATES INC. & DIV DEVELOPMENT (BARRIE) LTD.

BOX CULVERT DESIGN TABLE	
CLEAR SPAN (m)	3.0m
CLEAR RISE (m)	1.5m
FILL HEIGHT	6.17m±
LIVE LOAD	CL-625-ONT

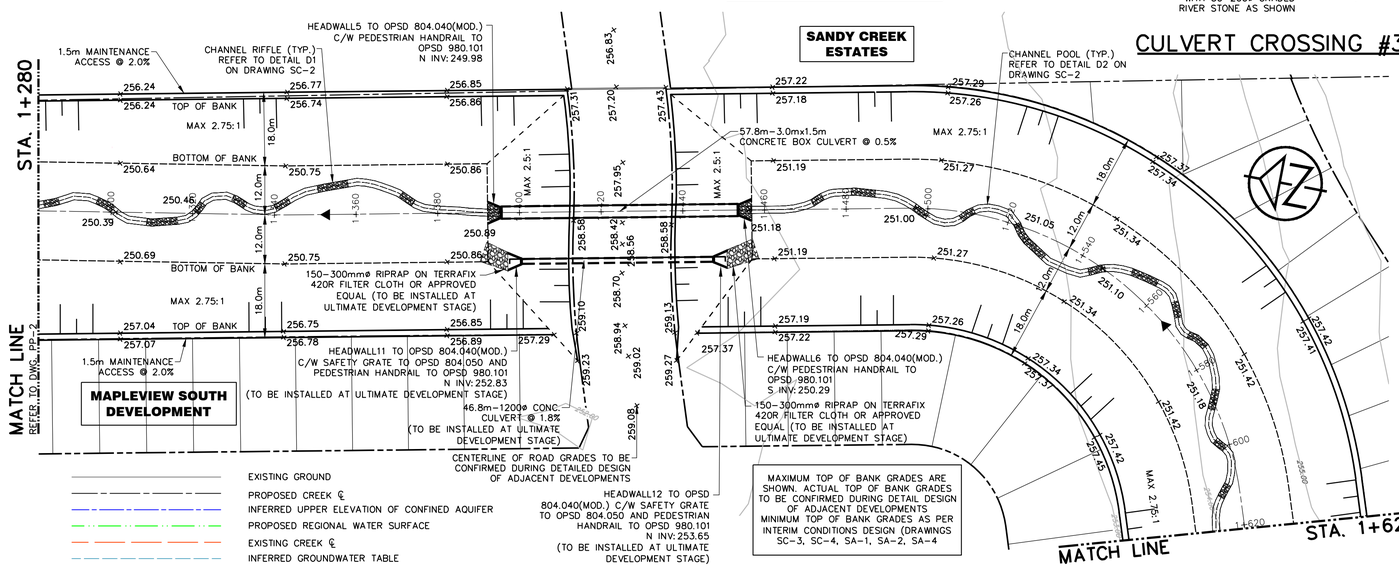


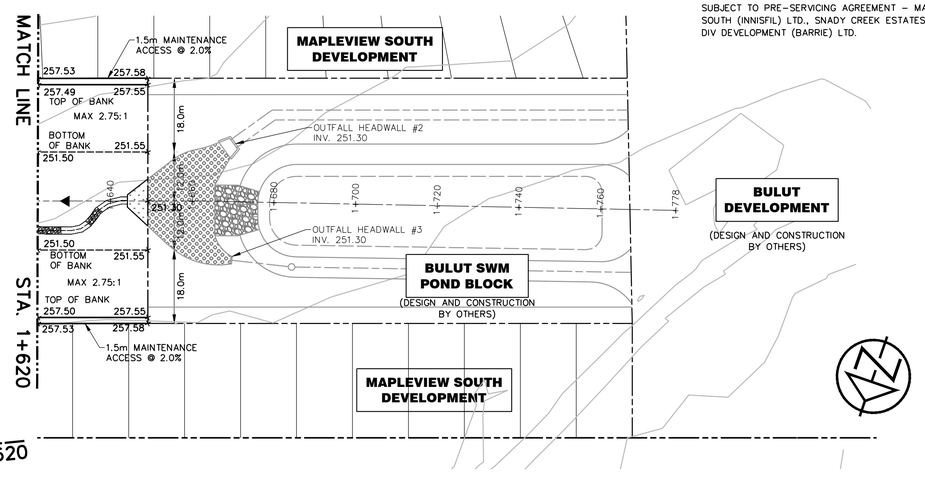


KEY PLAN
NTS

CULVERT CROSSING #3 (57.8m-3.0mx1.5m CONC.)

SCALE N.T.S.





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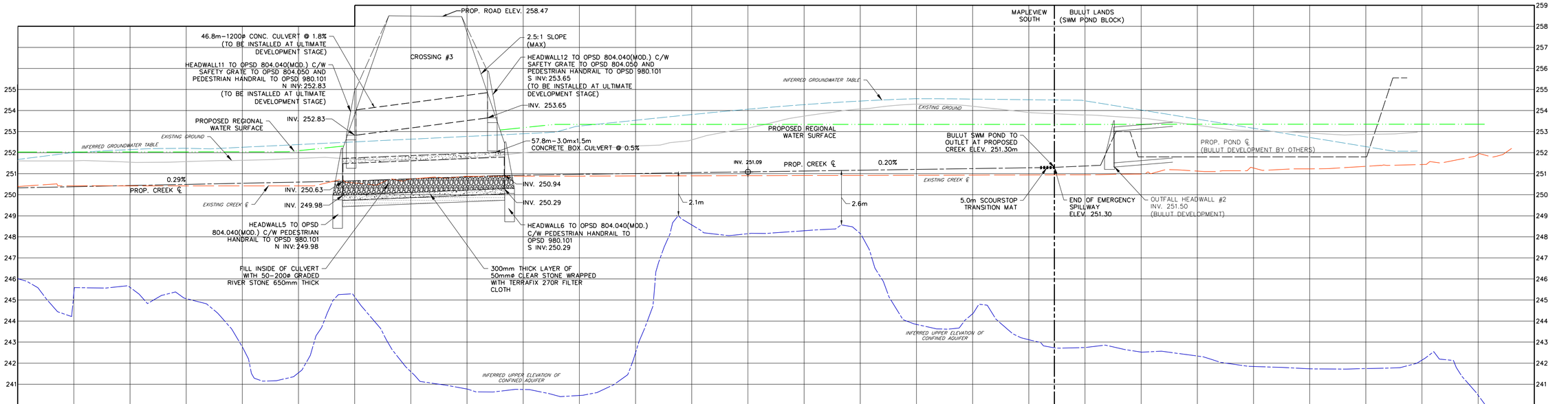
EXISTING GROUND
PROPOSED CREEK ℄
INFERRED UPPER ELEVATION OF CONFINED AQUIFER
PROPOSED REGIONAL WATER SURFACE
EXISTING CREEK ℄
INFERRED GROUNDWATER TABLE



EXISTING C/L ELEV	PROPOSED C/L ELEV	CHAINAGE
251.61	250.38	1+300
251.55	250.44	1+320
251.58	250.49	1+340
251.63	250.55	1+360
251.73	250.60	1+380
251.69	250.66	1+400
251.65	250.76	1+420
251.73	250.86	1+440
251.99	250.93	1+460
252.11	250.97	1+480
252.01	251.01	1+500
251.81	251.05	1+520
253.16	251.09	1+540
253.73	251.13	1+560
254.07	251.16	1+580
254.30	251.20	1+600
254.20	251.24	1+620
253.91	251.28	1+640
253.79		1+660
253.64		1+680
253.30		1+700
253.04		1+720
252.93		1+740
252.87		1+760
		1+780
		1+800

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ELEVATION: 268.852

HORIZONTAL BENCHMARK: 03120110016 (2nd ORDER)
NORTHING: 4911024.443 EASTING: 612156.298

VERTICAL BENCHMARK: 03120110020 (2nd ORDER)
ELEVATION: 261.551

HORIZONTAL BENCHMARK: 03120110020 (2nd ORDER)
NORTHING: 4912264.861 EASTING: 611717.143

NOTES

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4.	ISSUED FOR TENDER	JUNE 3/21

ENGINEER STAMP

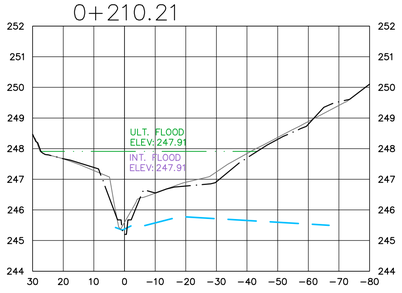
LICENSED PROFESSIONAL ENGINEER
N.A. MILLINGTON
100190121
JUNE 3, 2021
PROVINCE OF ONTARIO

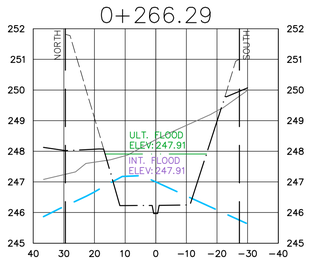
SANDY COVE CREEK LANDOWNERS GROUP
SANDY COVE CREEK REALIGNMENT
CITY OF BARRIE

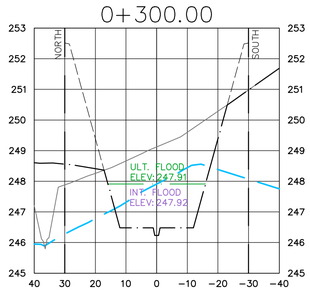
PLAN & PROFILE
STA. 1+280 TO 1+768

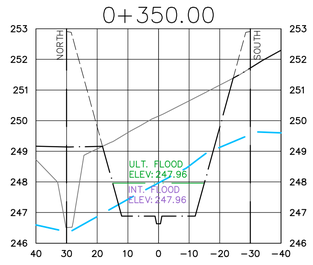
TATHAM ENGINEERING

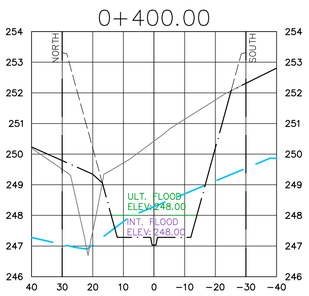
DESIGN: NM	FILE: 417427	DWG: PP-3
DRAWN: LCG	DATE: JAN 2019	
CHECK: DRT	SCALE: 1:750H 1:100V	

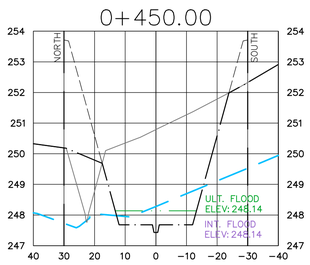


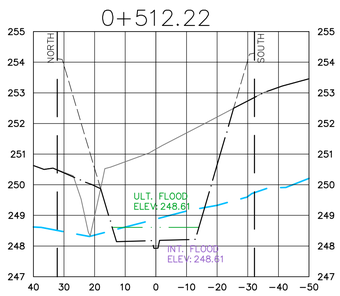


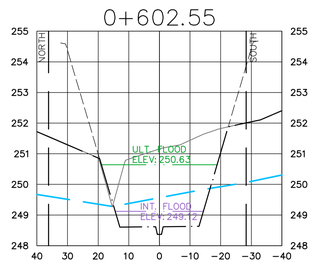


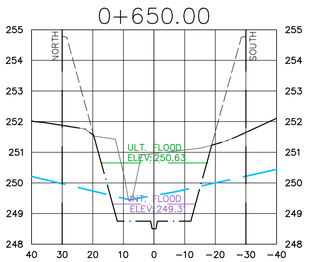


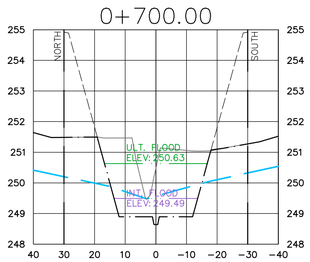


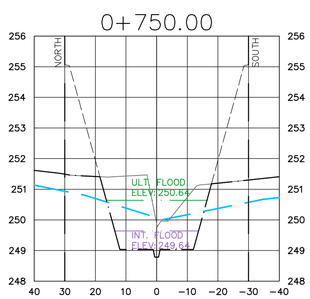


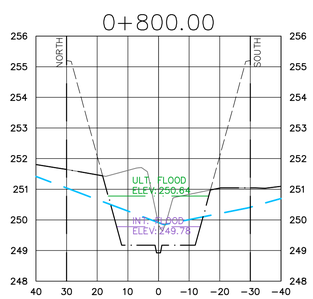


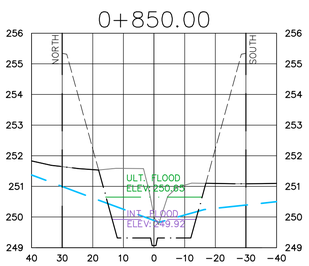


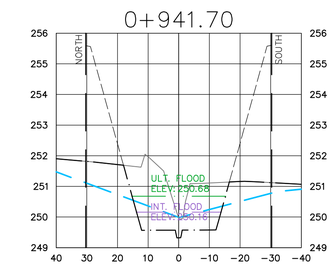


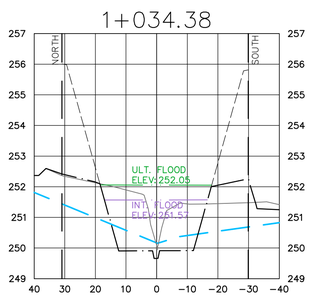


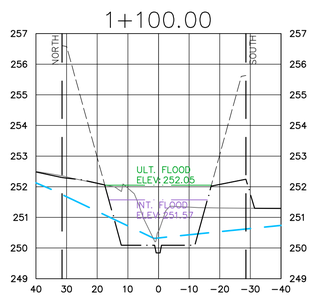


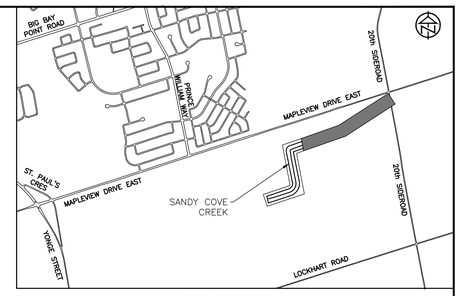












KEY PLAN
NTS

LEGEND

- EXISTING GROUND
- PROPOSED CREEK ℄
- INFERRED GROUNDWATER ELEVATION
- PROPOSED ULTIMATE REGIONAL WATER SURFACE
- PROPOSED INTERIM REGIONAL WATER SURFACE
- PROPOSED ULTIMATE SURFACE
- PROPOSED INTERIM SURFACE

NOTE:
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BENCHMARKS

VERTICAL BENCHMARK: 03120110016 (2nd ORDER)
ELEVATION: 268.852

HORIZONTAL BENCHMARK: 03120110016 (2nd ORDER)
NORTHING: 4911024.443 EASTING: 612156.298

VERTICAL BENCHMARK: 03120110020 (2nd ORDER)
ELEVATION: 261.551

HORIZONTAL BENCHMARK: 03120110020 (2nd ORDER)
NORTHING: 4912264.861 EASTING: 611717.143

NOTES

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2.	2ND SUBMISSION	SEPT 18/19
3.	3RD SUBMISSION	APR 27/21
4.	ISSUED FOR TENDER	JUNE 3/21

ENGINEER STAMP

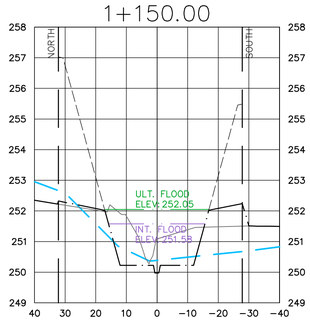
LICENSED PROFESSIONAL ENGINEER
N.A. MILLINGTON
100190121
JUNE 3, 2021
PROVINCE OF ONTARIO

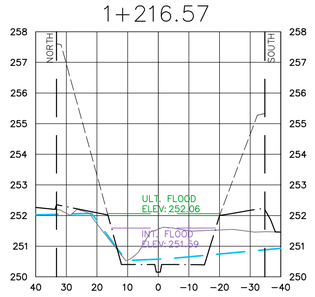
SANDY COVE CREEK LANDOWNERS GROUP
SANDY COVE CREEK REALIGNMENT
CITY OF BARRIE

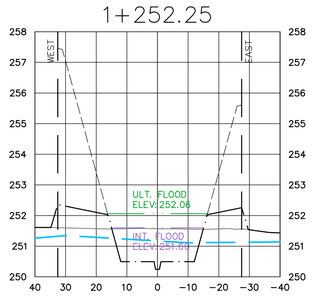
SECTIONS
STA. 0+210.21 TO STA. 1+100
INTERIM & ULTIMATE CONDITIONS

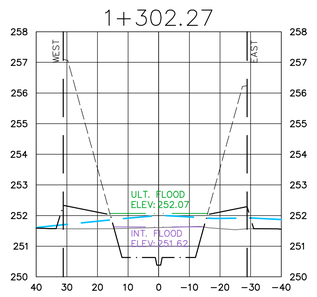
TATHAM ENGINEERING

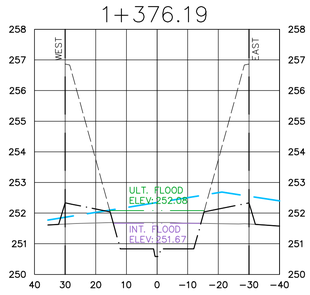
DESIGN: NM	FILE: 417427	DWG:
DRAWN: LCG	DATE: JAN 2019	**SC-1**
CHECK: DRT	SCALE: HORZ: 1:1000 VERT: 1:100	

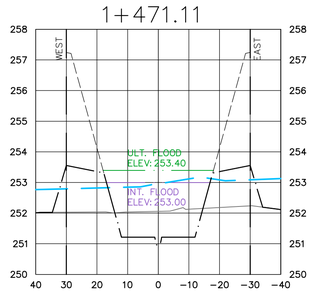


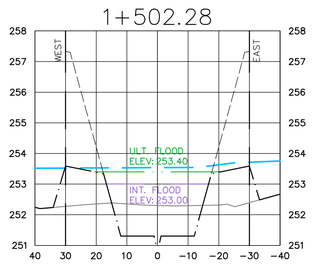


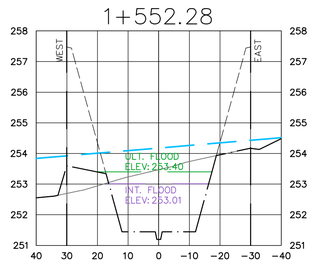


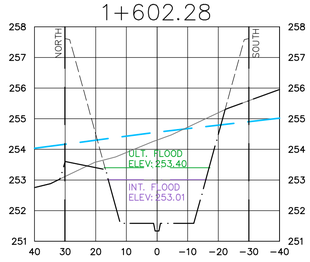


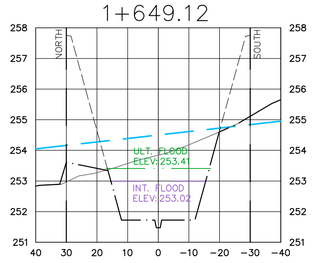












LEGEND

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NOTE:
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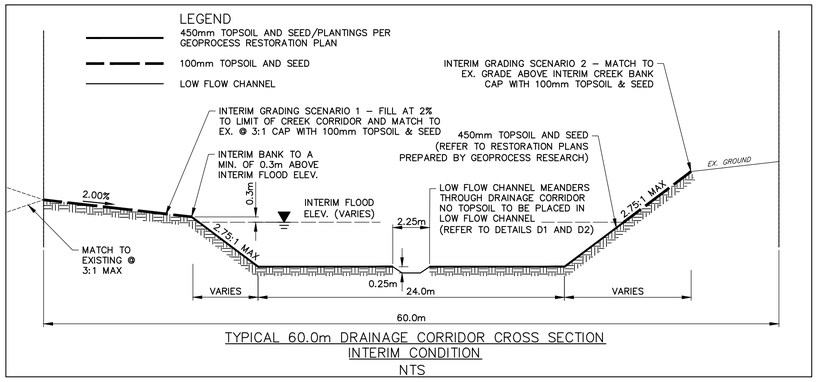
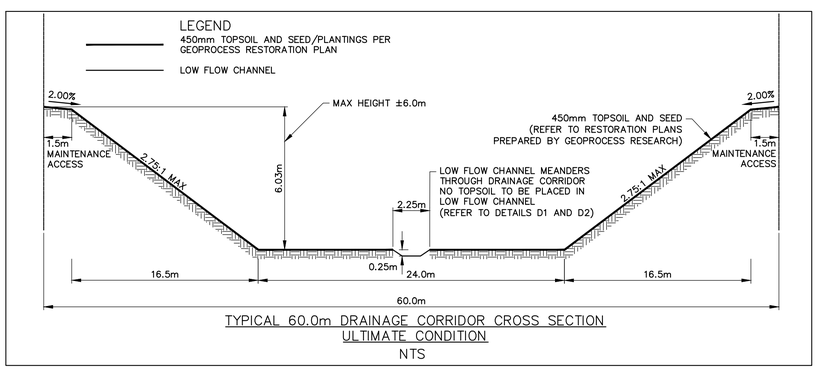


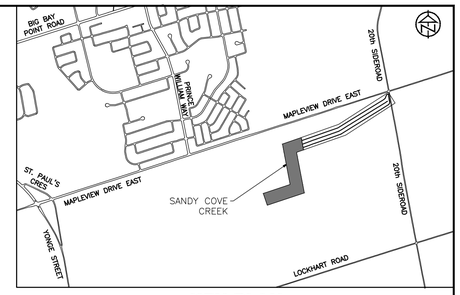
TYPICAL 60.0m DRAINAGE CORRIDOR CROSS SECTION
INTERIM CONDITION
NTS



TYPICAL 60.0m DRAINAGE CORRIDOR CROSS SECTION
ULTIMATE CONDITION
NTS

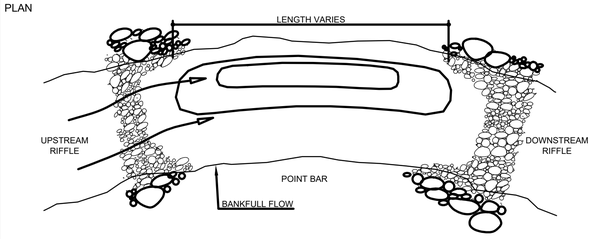
STONE SIZING GRADATION 100mmRIFFLE STONE (mm)	
200–250	5%
150–200	15%
100–150	30%
50–100	25%
25–50	15%
GRANULAR B	10%
SUM	100%

ADD ADDITIONAL GRANULAR B TO FILL INTERSTITIAL VOIDS AS NECESSARY

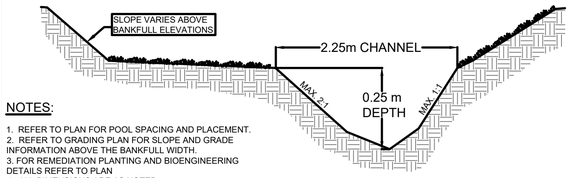


KEY PLAN
NTS

PLAN



SECTION

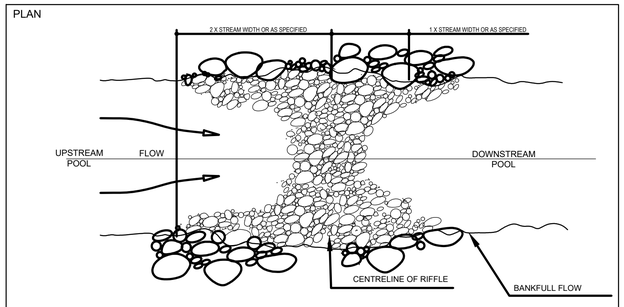


NOTES:

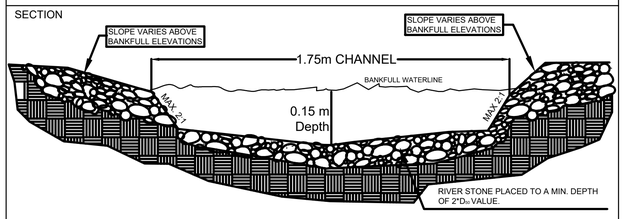
1. REFER TO PLAN FOR POOL SPACING AND PLACEMENT.
2. REFER TO GRADING PLAN FOR SLOPE AND GRADE INFORMATION ABOVE THE BANKFULL WIDTH.
3. FOR REMEDIATION PLANTING AND BIOENGINEERING DETAILS REFER TO PLAN
4. ALL DIMENSIONS ARE AS NOTED

D2 CHANNEL POOL (TYPICAL)
N.T.S.
DETAIL PROVIDED BY WATER'S EDGE

PLAN



SECTION



NOTES:

1. REFER TO PLAN FOR STONE DEPTHS.
2. REFER TO PLAN FOR POOL SPACING AND PLACEMENT.
3. ALL DIMENSIONS ARE AS NOTED
5. REFER TO GRADING PLAN FOR SLOPE AND GRADE INFORMATION ABOVE THE BANKFULL WIDTH.

**D_{50} refers to the average sediment diameter of riverstone material. Material to consist of a range of sediment sizes, with the majority being of D_{50}.

D1 CHANNEL RIFFLE (TYPICAL)
N.T.S.
DETAIL PROVIDED BY WATER'S EDGE

DISCLAIMER AND COPYRIGHT

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BENCHMARKS

VERTICAL BENCHMARK: 03120110016 (2nd ORDER)
ELEVATION: 268.852

HORIZONTAL BENCHMARK: 03120110016 (2nd ORDER)
NORTHING: 4911024.443 EASTING: 612156.298

VERTICAL BENCHMARK: 03120110020 (2nd ORDER)
ELEVATION: 261.551

HORIZONTAL BENCHMARK: 03120110020 (2nd ORDER)
NORTHING: 4912264.861 EASTING: 611717.143

NOTES

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1.	1ST SUBMISSION	JULY 18/19
2.	2ND SUBMISSION	SEPT 18/19
3.	3RD SUBMISSION	APR 27/21
4.	ISSUED FOR TENDER	JUNE 3/21

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N.A. MILLINGTON
100190121
JUNE 3, 2021
PROVINCE OF ONTARIO

SANDY COVE CREEK LANDOWNERS GROUP
SANDY COVE CREEK REALIGNMENT
CITY OF BARRIE

SECTIONS AND DETAILS STA. 1+150 TO STA. 1+800 INTERIM & ULTIMATE CONDITIONS

TATHAM ENGINEERING

DESIGN: NM	FILE: 417427	DWG:	
DRAWN: LCG	DATE: JAN 2019		SC-2
CHECK: DRT	SCALE: HORZ:1:1000 VERT:1:100		

LEGEND

- EXISTING CONTOUR — 179.00
- EXISTING BELL PEDESTAL
- EXISTING HYDRO POLE — HP
- EXISTING CULVERT
- EXISTING BOREHOLE/MONITORING WELL # — BH/MW1
- HEAVY DUTY SILT FENCE (BSD-23E)
- FIBRE ROLL FLOW CHECK DAM (OPSD 219.191)
- PROPOSED SWALE
- EXISTING MONITORING WELL — MW 107 255.80
- CREEK MEANDER — CHANNEL RIFFLE / CHANNEL POOL

NOTES

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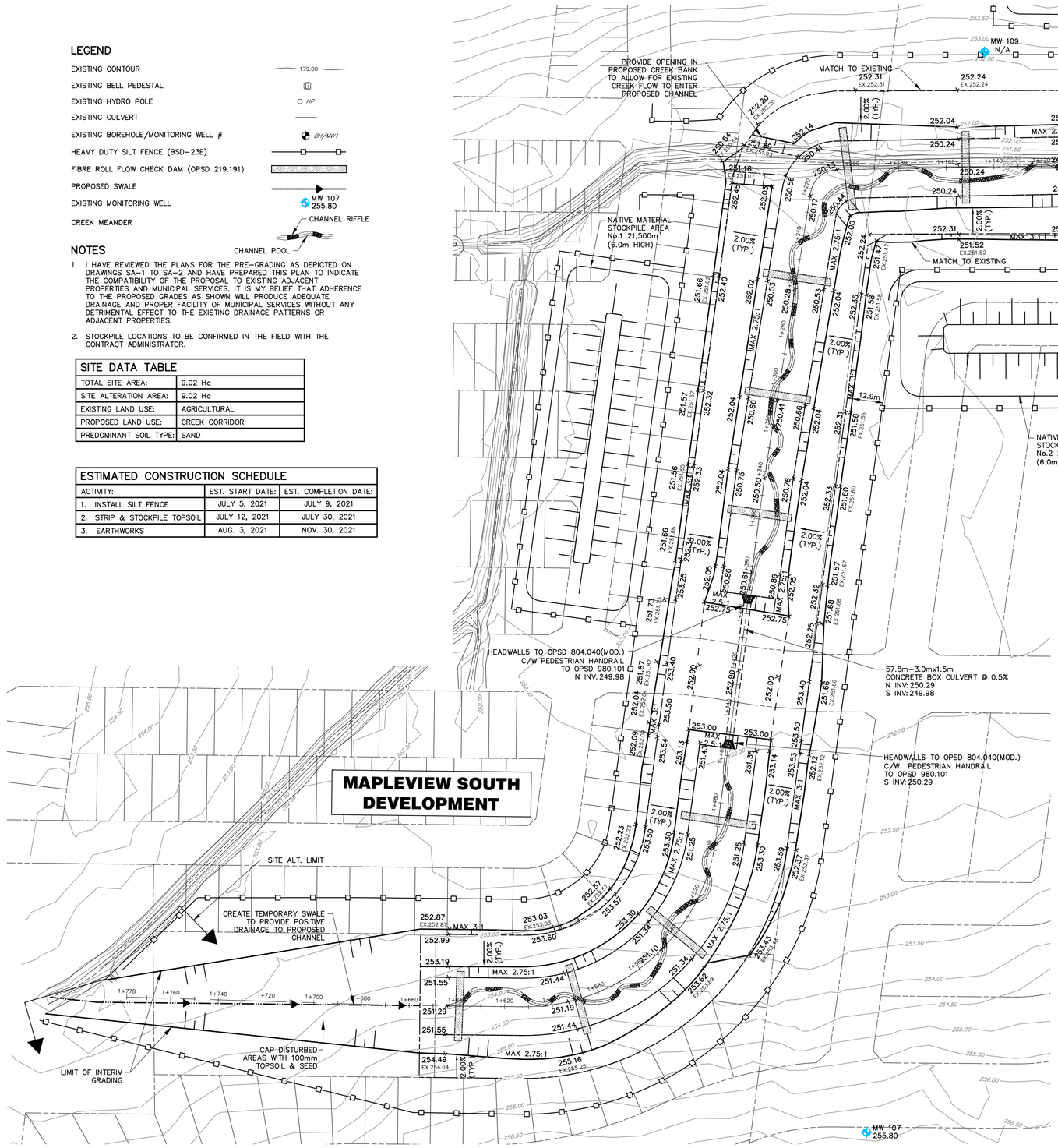
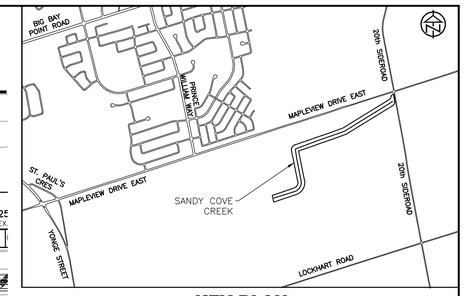
2. STOCKPILE LOCATIONS TO BE CONFIRMED IN THE FIELD WITH THE CONTRACT ADMINISTRATOR.

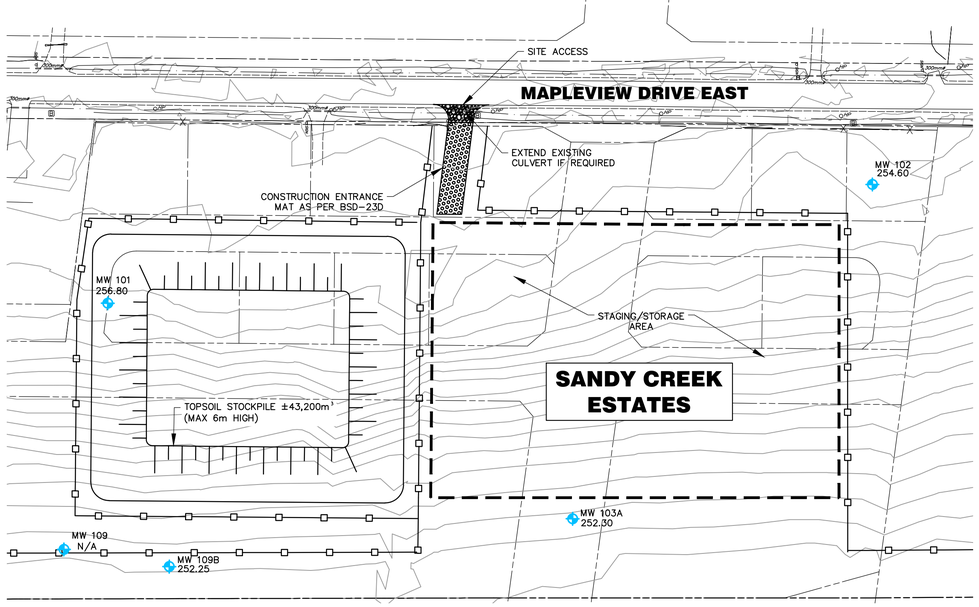
SITE DATA TABLE	
TOTAL SITE AREA:	9.02 Ha
SITE ALTERATION AREA:	9.02 Ha
EXISTING LAND USE:	AGRICULTURAL
PROPOSED LAND USE:	CREEK CORRIDOR
PREDOMINANT SOIL TYPE:	SAND

ESTIMATED CONSTRUCTION SCHEDULE		
ACTIVITY:	EST. START DATE:	EST. COMPLETION DATE:
1. INSTALL SILT FENCE	JULY 5, 2021	JULY 9, 2021
2. STRIP & STOCKPILE TOPSOIL	JULY 12, 2021	JULY 30, 2021
3. EARTHWORKS	AUG. 3, 2021	NOV. 30, 2021





KEY PLAN
NTS



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NORTHING: 4912264.861 EASTING: 611717.143

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3.	ISSUED FOR TENDER	JUNE 3/21

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER — N.A. MILLINGTON — 100190121 — JUNE 3, 2021 — PROVINCE OF ONTARIO

SANDY COVE CREEK LANDOWNERS GROUP
SANDY COVE CREEK REALIGNMENT
CITY OF BARRIE

SITE ALTERATION PLAN INTERIM CONDITION

TATHAM ENGINEERING

DESIGN: NM	FILE: 417427	DWG:
DRAWN: LCG	DATE: AUG 2019	**SA-1**
CHECK: DRT	SCALE: 1:1000	

LEGEND

EXISTING CONTOUR — 179.00

EXISTING BELL PEDESTAL

EXISTING HYDRO POLE — HP

EXISTING CULVERT

EXISTING BOREHOLE/MONITORING WELL # — BH/MW1

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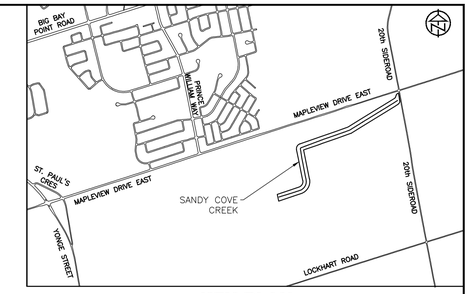
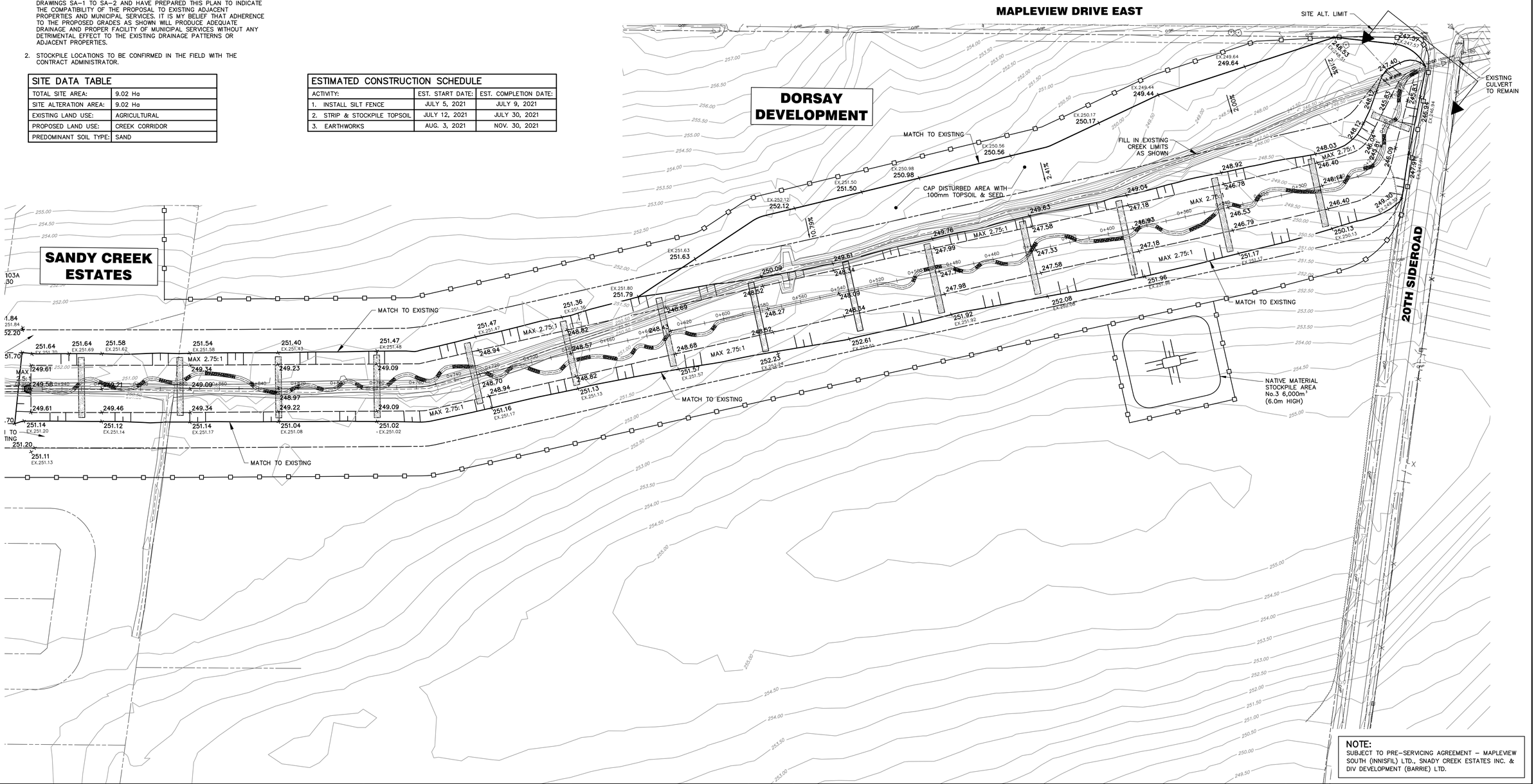


KEY PLAN
NTS



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GROUNDWATER ELEVATIONS ARE INFERRED FROM LIMITED SUBSURFACE INFORMATION. FIELD CONDITIONS MAY VERY.

No.	REVISION DESCRIPTION	DATE
1.	2ND SUBMISSION	SEPT 18/19
2.	3RD SUBMISSION	APR 27/21
3.	ISSUED FOR TENDER	JUNE 3/21

ENGINEER STAMP

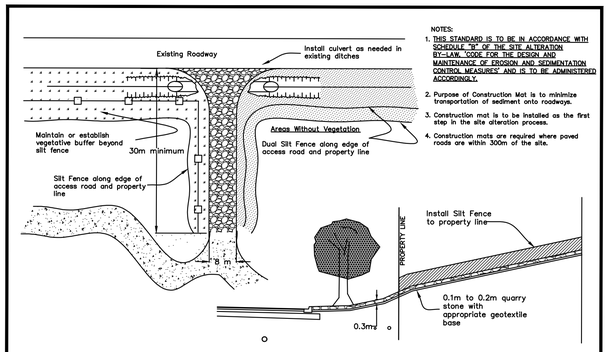
LICENSED PROFESSIONAL ENGINEER
N. A. MILLINGTON
100190121
JUNE 3, 2021
PROVINCE OF ONTARIO

SANDY COVE CREEK LANDOWNERS GROUP
SANDY COVE CREEK REALIGNMENT
CITY OF BARRIE

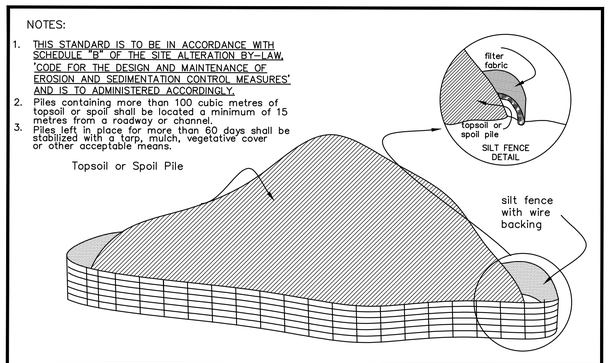
SITE ALTERATION PLAN INTERIM CONDITION

TATHAM ENGINEERING

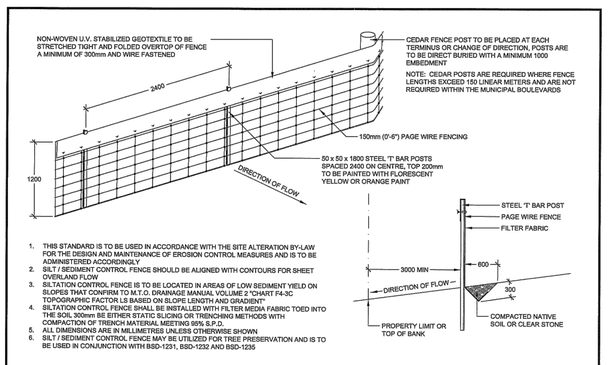
DESIGN: NM	FILE: 417427	DWG:
DRAWN: LCG	DATE: AUG 2019	**SA-2**
CHECK: DRT	SCALE: 1:1000	



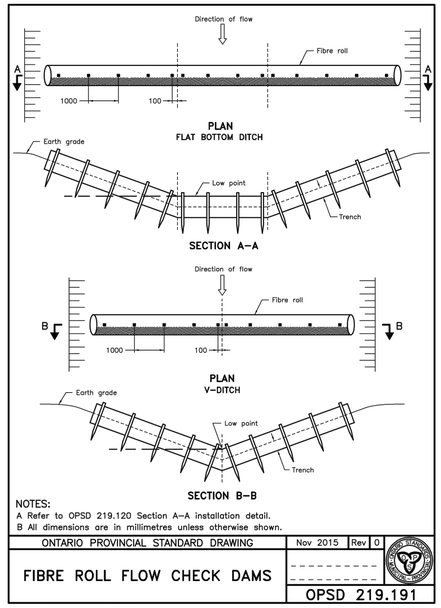
CITY OF BARRIE STANDARD	NO.	REVISION	APR'D	DATE		
CONSTRUCTION ENTRANCE MAT	1.	Standardized Dimension Text	J.S.	05.10.28	APP'D: R.G.N.	DATE: 04.03.16
					DRAWN: A.S.C	SCALE: N.T.S
					BSD-23D	



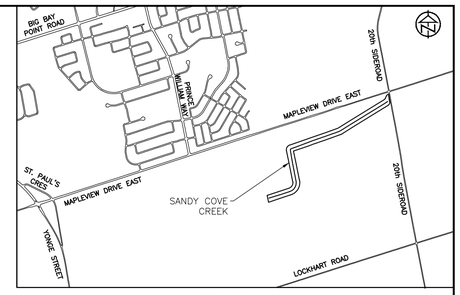
CITY OF BARRIE STANDARD	NO.	REVISION	APR'D	DATE		
TOPSOIL OR SPOIL PILE SILTATION CONTROL					APP'D: R.G.N.	DATE: 04.03.16
					DRAWN: A.S.C	SCALE: N.T.S
					BSD-23E	



Barrie STANDARD DETAIL	SILTATION CONTROL FENCING	REV No.	DATE: OCT 2017	APPROVED
		1	SCALE: N.T.S.	DATE Oct 10/17
		BSD-1233	FORMERLY BSD-23A	DIRECTOR OF ENGINEERING



ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev	0
FIBRE ROLL FLOW CHECK DAMS			
OPSD 219.191			



KEY PLAN
NTS

NOTES

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2. STOCKPILE LOCATIONS TO BE CONFIRMED IN THE FIELD WITH THE CONTRACT ADMINISTRATOR.

EROSION & SEDIMENT CONTROL

1. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND SHALL REMAIN IN PLACE UNTIL ALL DISTURBED AREAS HAVE BEEN STABILIZED. EROSION AND SEDIMENT CONTROL MEASURES THAT ARE DESIGNED TO CONTROL RUNOFF FROM SPECIFIC AREAS MUST BE INSTALLED PRIOR TO ANY DISTURBANCE OF THAT PART OF THE SITE. THE LOCATION OF ALL EROSION AND SEDIMENT CONTROL WORKS TO BE REVIEWED ON SITE AND MAY BE REVISED AS DIRECTED BY THE ENGINEER.
2. THE CONTRACTOR MAY CONSIDER ALTERNATIVE EROSION AND SEDIMENT CONTROL MEASURES. SUCH MEASURES MUST BE PRESENTED IN WRITING TO THE ENGINEER FOR APPROVAL BY THE CITY OF BARRIE.
3. THE CONTRACTOR SHALL HAVE MATERIALS AVAILABLE ON-SITE TO REPAIR SEDIMENT AND EROSION CONTROL MEASURES IN THE EVENT OF UNFORESEEN CONDITIONS: HIGH WATER, EXTREME RAINFALL EVENTS, ETC.
4. ALL EROSION AND SEDIMENT CONTROL MEASURES MUST BE INSPECTED, CLEANED AND MAINTAINED BY THE CONTRACTOR AFTER EACH STORM EVENT. ALL WORKS WILL BE INSPECTED BY THE ENGINEER BI-WEEKLY AND AFTER EACH MAJOR STORM EVENT.
5. CONSTRUCTION OF ALL EROSION AND SEDIMENT CONTROL WORKS ARE TO BE IN ACCORDANCE WITH THE FOLLOWING STEPS:
   - INSTALL STONE MUD MAT AS PER BSD-23E.
   - INSTALL SILT FENCE AS PER BSD-1233.
   - INSTALL FIBRE ROLL FLOW CHECK DAMS AS PER OPSD 219.191.
   - INSTALL ROCK FLOW CHECK DAM AS PER OPSD 219.210.
6. ALL CONSTRUCTION VEHICLES TO ACCESS SITE USING THE DESIGNATED CONSTRUCTION ENTRANCES OR AS DIRECTED BY THE CONTRACT ADMINISTRATOR.
7. EROSION AND SEDIMENT CONTROL MEASURES TO BE REMOVED BY THE CONTRACTOR ONCE GROUND COVER IS ESTABLISHED AND LANDSCAPING IS COMPLETE AND AS APPROVED BY THE ENGINEER.
8. ALL STOCKPILE LOCATIONS ARE TO BE APPROVED BY THE ENGINEER.
9. PROVIDE SNOW FENCE OR APPROVED EQUAL ACROSS ALL CONSTRUCTION ENTRANCES DURING PERIODS OF INACTIVITY.
10. CONSTRUCTION AREAS THAT EXCEED 30 DAYS OF INACTIVITY SHALL BE STABILIZED BY SEEDING. THIS SHALL INCLUDE STOCKPILES OF FILL AND TOPSOIL.

CULVERT NOTES

1. ALL DESIGN LOADS NOTED ON DRAWINGS ARE WORKING LOADS.
2. THE CONC. BOX CULVERT INSTALLATION SHALL INCLUDE ALL REMOVALS, DISPOSAL, REINSTATEMENT, EXCAVATION, DEWATERING, SUPPLY, PLACEMENT AND COMPACTION OF BEDDING, EMBEDMENT WITHIN THE PIPE, COVER AND BACKFILL, RIP-RAP AND RIVER STONE NECESSARY TO COMPLETE THE WORK.
3. PIPE EMBEDMENT SHALL BE IN ACCORDANCE WITH OPSD 802.020, 802.024, 803.031, WHERE "f" IS EQUAL TO 1.6m.
4. THE CONC. BOX CULVERT WORKS SHALL BE CONSTRUCTED UNDER DRY CONDITIONS. THE CONTRACTOR SHALL MAKE ALL PROVISIONS NECESSARY TO PREVENT FLOW OF WATER INTO THE EXCAVATION AND SHALL PROVIDE AND KEEP IN OPERATION ON EACH SECTION OF THE WORK WHEN AND WHERE NECESSARY, DEWATERING SYSTEMS OF SUFFICIENT CAPACITY TO KEEP THE BOTTOM OF THE EXCAVATION TRENCH DRY AND FREE FROM WATER AT ALL TIMES UNTIL THE SECTION OF WORK HAS BEEN COMPLETED.
5. THE CONC. BOX CULVERTS SHALL BE SUPPORTED ON NATIVE SOIL OR ENGINEERED FILL HAVING THE FOLLOWING MINIMUM ALLOWABLE BEARING CAPACITY:
   - CROSSING #1: 200KPa
   - CROSSING #2: 100KPa
   - CROSSING #3: 85KPa

   BEARING CAPACITY SHALL BE CONFIRMED IN FIELD BY A GEOTECHNICAL ENGINEER PRIOR TO CONSTRUCTION OF CULVERT.
6. BACKFILL TO BE PLACED SIMULTANEOUSLY ON BOTH SIDES OF THE CULVERT KEEPING THE HEIGHT OF THE BACKFILL APPROXIMATELY THE SAME. AT NO TIME SHALL THE DIFFERENCE IN ELEVATION BE GREATER THAN 500mm.

GENERAL NOTES

1. ALL STANDARDS, MANUALS, AND CODES REFERENCED IN THIS SET OF DRAWINGS REFER TO THE MOST RECENTLY IMPLEMENTED VERSION/EDITION.
2. ORDER OF PRECEDENCE OF STANDARD DRAWINGS IS FIRSTLY CITY OF BARRIE ENGINEERING DESIGN STANDARDS, AND SECONDLY ONTARIO PROVINCIAL STANDARD SPECIFICATIONS (OPSS) AND DRAWINGS (OPSD).
3. ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH OPSS MUNI 401, MUNI 421, 490, 491, 492, 501, 517, 539, 805, 821, 902, 1005 AND 1801.
4. ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH THE OCCUPATIONAL HEALTH AND SAFETY ACT OF ONTARIO.
5. THE CONTRACTOR SHALL EXAMINE ALL DRAWINGS. CHECK ALL DIMENSIONS AND REPORT ANY DISCREPANCIES BEFORE PROCEEDING WITH WORK.
6. CONTRACTOR TO CONFIRM RELATED DIMENSIONS IN THE FIELD BEFORE PROCEEDING WITH THE WORK.
7. ALL ELEVATIONS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
8. ALL FILL USED IN SLOPES, BERMS, AND/OR EMBANKMENTS IS TO BE COMPACTED TO A MINIMUM OF 98% SPMDD

NOTE:
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BENCHMARKS

VERTICAL BENCHMARK: 03120110016 (2nd ORDER)
ELEVATION: 268.852

HORIZONTAL BENCHMARK: 03120110016 (2nd ORDER)
NORTHING: 4911024.443 EASTING: 612156.298

VERTICAL BENCHMARK: 03120110020 (2nd ORDER)
ELEVATION: 261.551

HORIZONTAL BENCHMARK: 03120110020 (2nd ORDER)
NORTHING: 4912264.861 EASTING: 611717.143

NOTES

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3.	ISSUED FOR TENDER	JUNE 3/21

ENGINEER STAMP

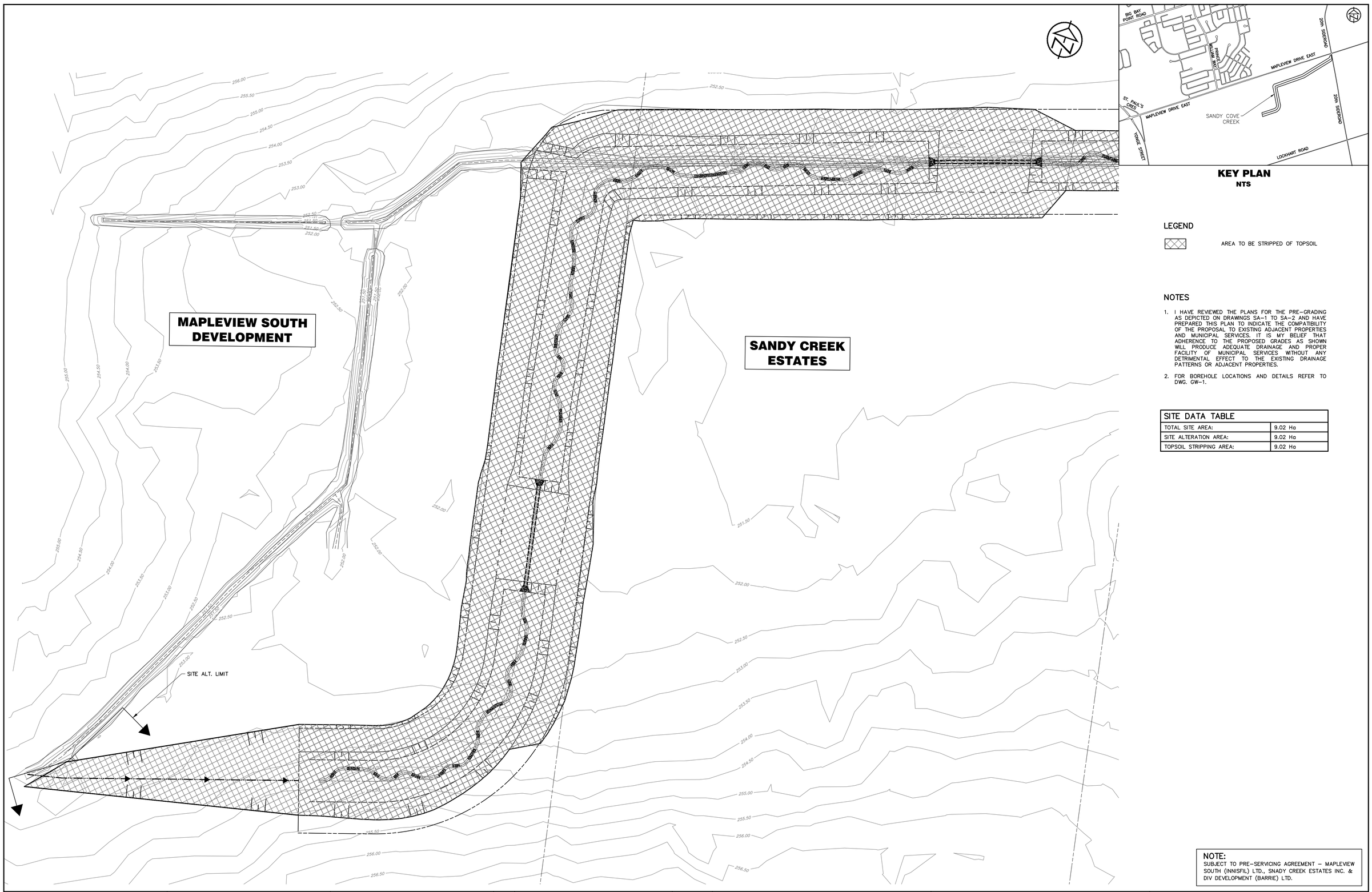
LICENSED PROFESSIONAL ENGINEER
N. A. MILLINGTON
100190121
JUNE 3, 2021
PROVINCE OF ONTARIO

SANDY COVE CREEK LANDOWNERS GROUP
SANDY COVE CREEK REALIGNMENT
CITY OF BARRIE

SITE ALTERATION PLAN DETAILS & NOTES

TATHAM ENGINEERING

DESIGN: NM	FILE: 417427	DWG: SA-3
DRAWN: LCG	DATE: AUG 2019	
CHECK: DRT	SCALE: N.T.S.	



KEY PLAN
NTS

LEGEND

AREA TO BE STRIPPED OF TOPSOIL

NOTES

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2. FOR BOREHOLE LOCATIONS AND DETAILS REFER TO DWG. GW-1.

SITE DATA TABLE	
TOTAL SITE AREA:	9.02 Ha
SITE ALTERATION AREA:	9.02 Ha
TOPSOIL STRIPPING AREA:	9.02 Ha

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ELEVATION: 268.852

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NORTHING: 4911024.443 EASTING: 612156.298

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ELEVATION: 261.551

HORIZONTAL BENCHMARK: 03120110020 (2nd ORDER)
NORTHING: 4912264.861 EASTING: 611717.143

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ENGINEER STAMP

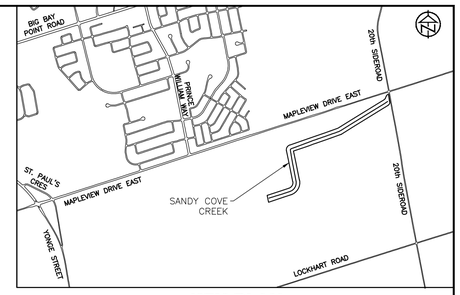
LICENSED PROFESSIONAL ENGINEER
N.A. MILLINGTON
100190121
JUNE 3, 2021
PROVINCE OF ONTARIO

SANDY COVE CREEK LANDOWNERS GROUP
SANDY COVE CREEK REALIGNMENT
CITY OF BARRIE

TOPSOIL STRIPPING PLAN INTERIM CONDITION

TATHAM ENGINEERING

DESIGN: NM	FILE: 417427	DWG: TS-1
DRAWN: LCG	DATE: AUG 2019	
CHECK: DRT	SCALE: 1:1000	



KEY PLAN
NTS

MAPLEVIEW DRIVE EAST

SANDY CREEK ESTATES

DORSAY DEVELOPMENT

SITE ALT. LIMIT

20TH SIDEROAD

LEGEND

AREA TO BE STRIPPED OF TOPSOIL

NOTES

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SITE ALTERATION AREA:	9.02 Ha
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NORTHING: 4911024.443 EASTING: 612156.298

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ELEVATION: 261.551

HORIZONTAL BENCHMARK: 03120110020 (2nd ORDER)
NORTHING: 4912264.861 EASTING: 611717.143

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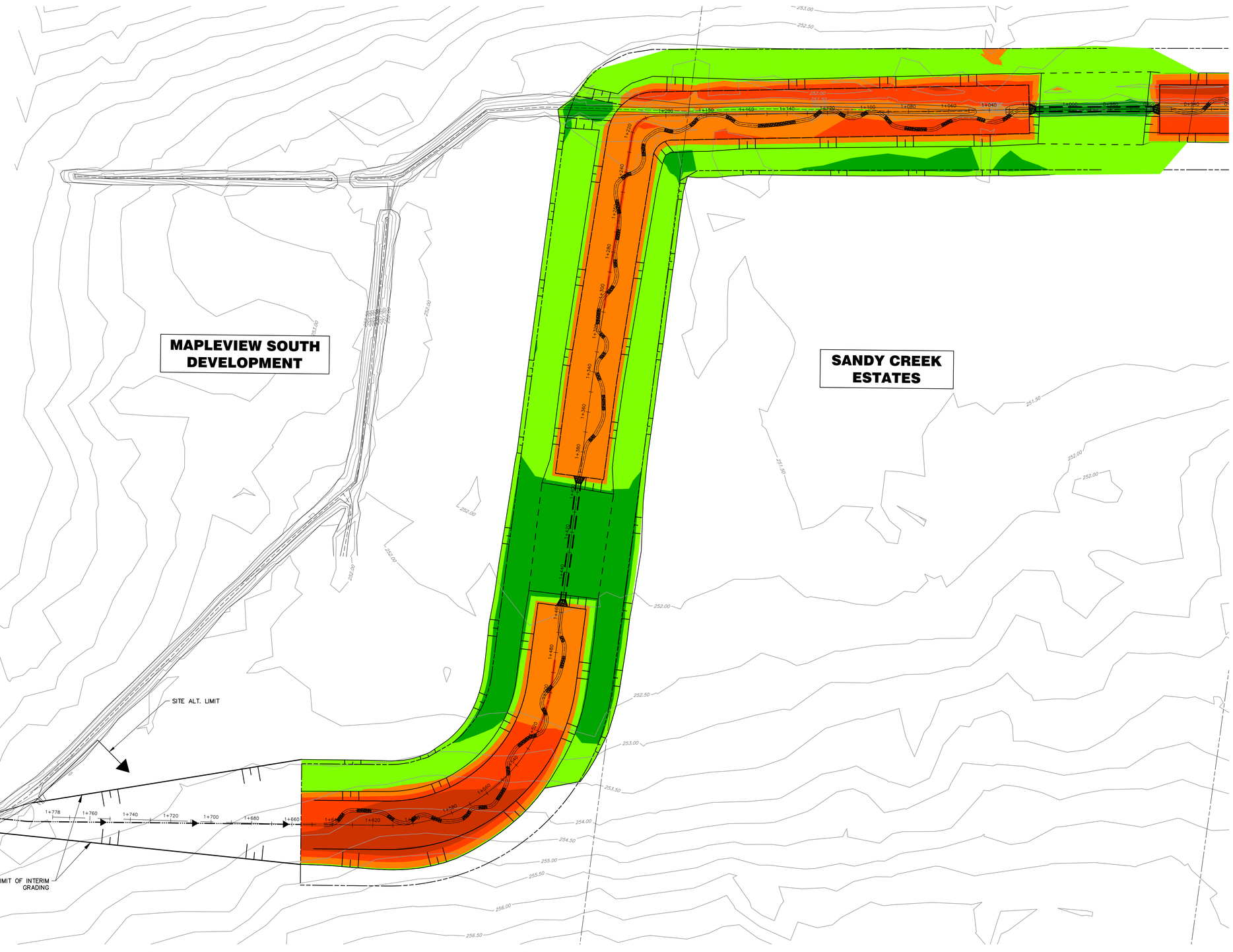
N.A. MILLINGTON
100190121
JUNE 3, 2021
PROVINCE OF ONTARIO

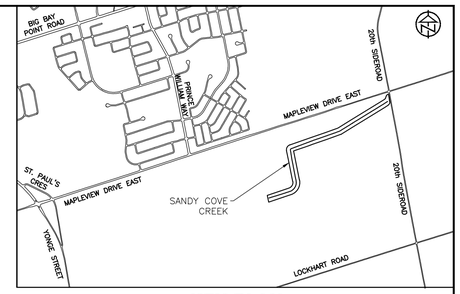
SANDY COVE CREEK LANDOWNERS GROUP
SANDY COVE CREEK REALIGNMENT
CITY OF BARRIE

TOPSOIL STRIPPING PLAN INTERIM CONDITION

TATHAM ENGINEERING

DESIGN: NM	FILE: 417427	DWG: **TS-2**
DRAWN: LCG	DATE: AUG 2019	
CHECK: DRT	SCALE: 1:1000	





KEY PLAN
NTS

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SITE DATA TABLE	
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SITE ALTERATION AREA:	9.02 Ha
EXISTING LAND USE:	AGRICULTURAL
PROPOSED LAND USE:	CREEK CORRIDOR
PREDOMINANT SOIL TYPE:	SAND

Elevations Table				
Number	Minimum Elevation	Maximum Elevation	Area	Color
1	−3.86	−3.00	3236.45	
2	−3.00	−2.00	11847.90	
3	−2.00	−1.00	12931.80	
4	−1.00	0.00	17218.76	
5	0.00	1.00	25677.30	
6	1.00	2.00	9207.59	
7	2.00	3.18	970.89	

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N.A. MILLINGTON
100190121
JUNE 3, 2021
PROVINCE OF ONTARIO

SANDY COVE CREEK LANDOWNERS GROUP
SANDY COVE CREEK REALIGNMENT
CITY OF BARRIE

EARTHWORKS CUT/FILL GRADATION INTERIM CONDITION

TATHAM ENGINEERING

DESIGN: NM	FILE: 417427	DWG:
DRAWN: LCG	DATE: AUG 2019	**EA-1**
CHECK: DRT	SCALE: 1:1000	

NOTES

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SITE ALTERATION AREA:	9.02 Ha
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PREDOMINANT SOIL TYPE:	SAND

Elevations Table				
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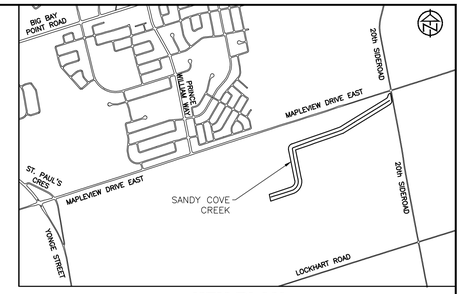
5	0.00	1.00	25677.30	
6	1.00	2.00	9207.59	
7	2.00	3.18	970.89	



KEY PLAN
NTS

MAPLEVIEW DRIVE EAST

SANDY CREEK ESTATES

DORSAY DEVELOPMENT

SITE ALT. LIMIT

20TH SIDEROAD

NOTE:
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ELEVATION: 268.852

HORIZONTAL BENCHMARK: 03120110016 (2nd ORDER)
NORTHING: 4911024.443 EASTING: 612156.298

VERTICAL BENCHMARK: 03120110020 (2nd ORDER)
ELEVATION: 261.551

HORIZONTAL BENCHMARK: 03120110020 (2nd ORDER)
NORTHING: 4912264.861 EASTING: 611717.143

NOTES

TOPOGRAPHIC INFORMATION SHOWN ON THIS PLAN PROVIDED BY LLOYD & PURCELL LTD. COMPLETED JANUARY 2015. RECIEVED OCTOBER 17, 2016.

TOPOGRAPHIC INFORMATION SHOWN ON THIS PLAN PROVIDED BY RUDY MAK SURVEYING LTD. COMPLETED JULy 2012. RECIEVED OCTOBER 25, 2018.

GROUNDWATER ELEVATIONS ARE INFERRED FROM LIMITED SUBSURFACE INFORMATION. FIELD CONDITIONS MAY VERY.

No.	REVISION DESCRIPTION	DATE
1.	2ND SUBMISSION	SEPT 18/19
2.	3RD SUBMISSION	APR 27/21
3.	ISSUED FOR TENDER	JUNE 3/21

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N.A. MILLINGTON
100190121
JUNE 3, 2021
PROVINCE OF ONTARIO

SANDY COVE CREEK LANDOWNERS GROUP
SANDY COVE CREEK REALIGNMENT
CITY OF BARRIE

EARTHWORKS
CUT/FILL GRADATION
INTERIM CONDITION

TATHAM ENGINEERING

DESIGN: NM	FILE: 417427	DWG:
DRAWN: LCG	DATE: AUG 2019	**EA-2**
CHECK: DRT	SCALE: 1:1000	

GeoProcess RESEARCH ASSOCIATES
Knowledge Research Consulting
PO Box 65506
Dundas PO
Dundas, ON
L9H 6Y6
(416) 452-5037
www.geoprocessresearch.com

LEGEND

- Deciduous Tree – 60 mm Cal
- Coniferous Tree – 2000 mm Height
- Shrub – 600 mm Height
- Simcoe County Native Seed Mix
- Wet Meadow Seed Mix
- Rock Pile/Hibernacula
- Brush Pile
- Turtle Nesting Area
- Snag

SURFACE DATA:
DATA SOURCE
DATE

VERTICAL DATUM:
NAD83 (CSRS)

SCALE

1:2000

0 40 80 120

HORIZONTAL

No.	REVISIONS	DATE	INITIAL
01	Response to City and LSRCA comments	03/11/2020	ITR
02	Issued for Approval	05/17/2021	ITR

SANDY COVE CREEK RESTROATION
OVERVIEW

Scale: 1:2000	Drawn By: ITR	Drawing No. 1
Date Issued: 05/17/2021	Checked By: KG	

REACH 1

REACH 2

GeoProcess RESEARCH ASSOCIATES

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LEGEND

- Shrub – 600 mm Height
- Simcoe County Native Seed Mix
- Wet Meadow Seed Mix
- Rock Pile/Hibernacula
- Brush Pile

SURFACE DATA:
DATA SOURCE
DATE

VERTICAL DATUM:
NAD83 (CSRS)

SCALE

1:750

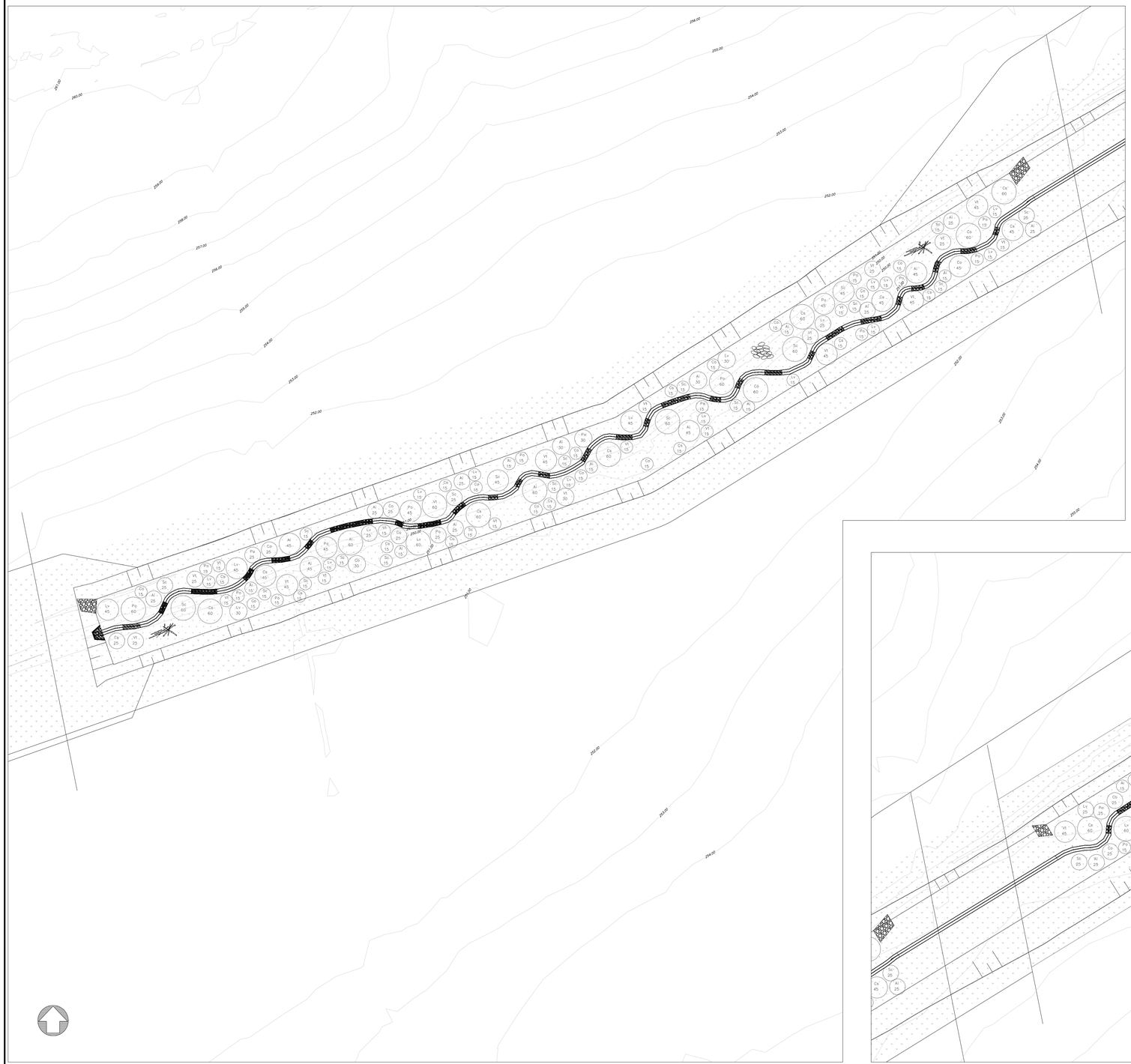
0 25 50

VERTICAL

No.	REVISIONS	DATE	INITIAL
01	Response to City and LSRCA comments	03/11/2020	ITR
02	Issued for Approval	05/17/2021	ITR

SANDY COVE CREEK RESTORATION
PHASE 1: INTERIM CONDITION
REACH 1 AND REACH 2

Scale: 1:750	Drawn By: ITR	Drawing No. 2
Date Issued: 05/17/2021	Checked By: KG	



REACH 3

REACH 4

GeoProcess RESEARCH ASSOCIATES

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L9H 6Y6
(416) 452-5037
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LEGEND

- Shrub – 600 mm Height
- Simcoe County Native Seed Mix
- Wet Meadow Seed Mix
- Rock Pile/Hibernacula
- Brush Pile

SURFACE DATA:
DATA SOURCE
DATE

VERTICAL DATUM:
NAD83 (CSRS)

SCALE

1:750

0 25 50

VERTICAL

No.	REVISIONS	DATE	INITIAL
01	Response to City and LSRCA comments	03/11/2020	ITR
02	Issued for Approval	05/17/2021	ITR

SANDY COVE CREEK RESTORATION
PHASE 1: INTERIM CONDITION
REACH 3 AND REACH 4

Scale: 1:750	Drawn By: ITR	Drawing No. 3
Date Issued: 05/17/2021	Checked By: KG	

TREES		Code	Reach 1	Reach 2	Reach 3	Reach 4
Acer saccharum	Sugar Maple	As	34	35	52	35
Acer rubrum	Red Maple	Ar	18	45	48	23
Carya cordifomis	Bitternut Hickory	Cc	0	18	9	11
Larix laricina	Tamarack	Ll	3	12	7	0
Picea glauca	White Spruce	Pg	3	22	9	15
Pinus strobus	White Pine	Ps	7	4	10	12
Prunus serotina	Black Cherry	Pse	7	3	8	5
Quercus macrocarpa	Bur Oak	Qm	0	24	16	14
Quercus rubra	Red Oak	Qr	12	15	23	13
Tsuga occidentalis	White Cedar	To	23	29	40	18
SHRUBS (FLOODPLAIN)						
Alnus incana	Speckled Alder	Ai	250	560	640	420
Cephalanthus occidentalis	Buttonbush	Co	265	540	450	380
Cornus stolonifera	Red Osier Dogwood	Cs	395	475	595	460
Ilex verticillata	Winterberry	Lv	340	495	485	500
Physocarpus opulifolius	Ninebark	Po	335	590	485	360
Sambucus canadensis	Common Elderberry	Sc	290	635	540	395
Viburnum trilobum	Highbush Cranberry	Vt	260	600	590	475
SHRUBS (FRINGE)						
Cornus stolonifera	Red Osier Dogwood	Cs	247	555	538	460
SHRUBS (UPLAND)						
Cornus alternifolia	Alternate Leaved Dogwood	Ca	90	300	70	215
Diervilla lonicera	Honeysuckle	Dl	75	160	115	260
Prunus virginiana	Chokecherry	Pv	75	180	65	195
Amalanchier laevis	Smooth Juneberry	Sa	45	120	70	50
Sambucus canadensis	Common Elderberry	Sc	55	130	170	70
Viburnum acerifolium	Maple-leaved Viburnum	Va	105	190	250	240
Viburnum lentago	Nannyberry	Vl	70	210	160	140

All deciduous trees are 60 mm caliper.
All coniferous trees are 200 cm height.
All shrubs trees are min. 60 cm height.

Simcoe County Native Seed Mix

12% Black Eyed Susan (Rudbeckia hirta)
20% Canada Wild Rye (Elymus canadensis)
20% Indiangrass (Sorghastrum nutans)
15% Little Bluestem (Schizachyrium scoparium)
2% New England Aster (Aster novae- angliae)
1% Wild Bergamot (Monarda fistulosa)
4% Canada Goldenrod (Solidago canadensis)
5% Common Milkweed (Asclepias syriaca)
20% Sand Dropseed (Sporobolus cryptandrus)
1% Smooth Blue Aster (Aster laevis)

Apply to sideslopes at 25 kg/ha. Apply a nurse crop of annual rye at 12 kg/ha.

Area of sideslope approximately 30845 m2 (30.85 ha)

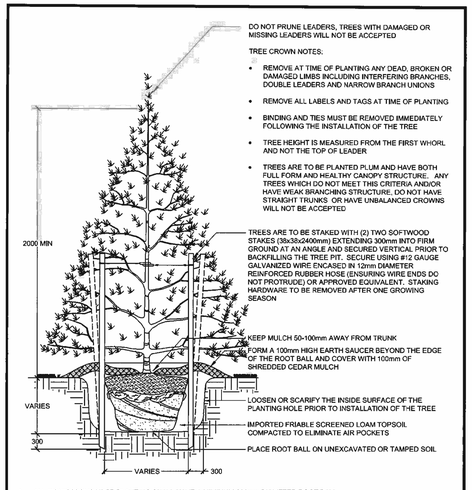
Wet Meadow Mix (OSC Seed Mix 8240)

Deer Tongue (Panicum clandestinum)
Fowl Bluegrass (Poa palustris)
Fox Sedge (Carex vulpinoidea)
Nodding Bur Marigold (Bidens cernua)
Ox Eye Sunflower (Helianthus helianthoides)
Switchgrass (Panicum virgatum)
Virginia Wild Rye (Elymus virginicus)

Apply to floodplain at 25 kg/ha.
Apply a nurse crop of annual rye at 12 ha/kg.

Area of floodplain approximately 15218 m2 (15.22 ha)

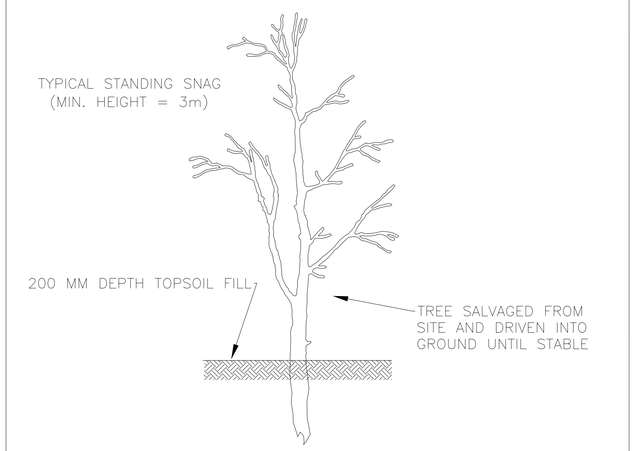
ZONE	A Area	B Waters Edge	C Aquatic Plants	D Quantity of Plants Coverage	E Number of trees provided	F Number of shrubs provided	G Trees * 25m2	H Shrubs * 1m2	Percent Coverage
Submerged	0	0	0		N/A	N/A	N/A		
Aquatic Fringe	0	0	0		N/A	N/A	N/A		
Shoreline Fringe	29402			12805	N/A	12805	N/A	12805	43.5%
Flood Fringe	5842			2600	32	1800	800	1800	44.5%
Upland	44890			20225	650	3975	16250	3975	45.0%



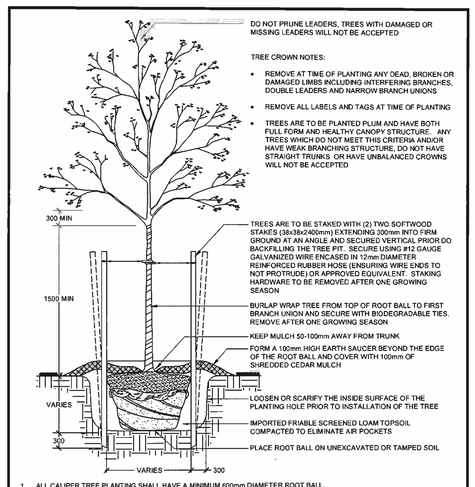
1. ALL CONIFEROUS TREE PLANTING SHALL HAVE A MINIMUM 600mm DIAMETER ROOT BALL.
2. CUT AND REMOVE ALL WIRE, ROPE AND BURLAP FROM THE TOP 150mm OF THE ROOT BALL AT THE TIME OF PLANTING.
3. FOR POORLY DRAINED OR COMPACTED SOILS THE ROOT BALL SHALL BE PLACED SO THAT THE ROOT COLLAR IS A MAXIMUM OF 100mm ABOVE THE FINISHED GRADE. FOR ALL OTHER INSTALLATIONS THE ROOT COLLAR SHALL BE AT OR 50mm ABOVE FINISHED GRADE.
4. ALL TWINE AND BURLAP MUST BE BIODEGRADABLE (UNTREATED).
5. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.

APPROVED DATE June 11/15 DIRECTOR OF ENGINEERING

The City of BARRIE STANDARD DETAIL | CONIFEROUS TREE PLANTING DETAIL | REV No. 4 | DATE: JUNE 2015 | SCALE: N.T.S. | BSD-1312 FORMERLY BSD-30



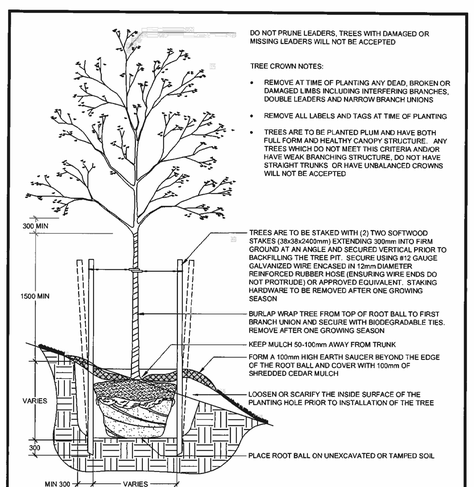
TYPICAL DETAIL: STANDING SNAG



1. ALL CALIPER TREE PLANTING SHALL HAVE A MINIMUM 600mm DIAMETER ROOT BALL.
2. CUT AND REMOVE ALL WIRE, ROPE AND BURLAP FROM THE TOP 150mm OF THE ROOT BALL AT THE TIME OF PLANTING.
3. FOR POORLY DRAINED OR COMPACTED SOILS THE ROOT BALL SHALL BE PLACED SO THAT THE ROOT COLLAR IS A MAXIMUM OF 100mm ABOVE THE FINISHED GRADE. FOR ALL OTHER INSTALLATIONS THE ROOT COLLAR SHALL BE AT OR 50mm ABOVE FINISHED GRADE.
4. ALL TREES WITHIN 3.0m OF A SIDEWALK OR DRIVEWAY MUST ALSO HAVE A COORDINATED INSTALLATION OF AN APPROVED ROOT BARRIER INSTALLED IN ADDITION TO THE TREE FOR ALL STREETSCAPE APPLICATIONS.
5. ALL TWINE AND BURLAP MUST BE BIODEGRADABLE (UNTREATED).
6. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.

APPROVED DATE June 11/15 DIRECTOR OF ENGINEERING

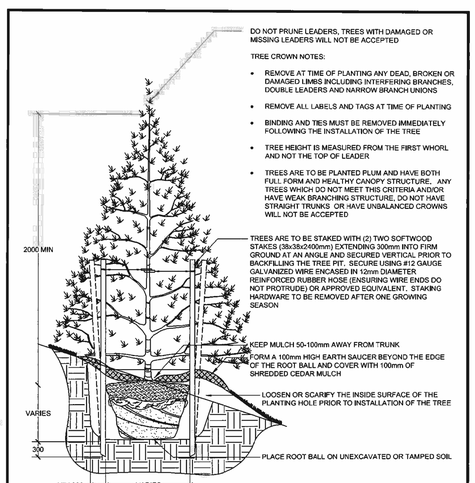
The City of BARRIE STANDARD DETAIL | DECIDUOUS TREE PLANTING DETAIL | REV No. 4 | DATE: JUNE 2015 | SCALE: N.T.S. | BSD-1310 FORMERLY BSD-29



1. ALL CALIPER TREE PLANTING SHALL HAVE A MINIMUM 600mm DIAMETER ROOT BALL.
2. CUT AND REMOVE ALL WIRE, ROPE AND BURLAP FROM THE TOP 150mm OF THE ROOT BALL AT THE TIME OF PLANTING.
3. EXCAVATION TO BE BACKFILLED WITH IMPORTED FRIABLE SCREENED TOPSOIL WHICH IS TO BE FIRMLY COMPACTED TO ELIMINATE AIR POCKETS AND PREVENT SETTLEMENT.
4. EXPOSED SOIL SHALL BE RE-SODDED OR IN A RESTORATION ENVIRONMENT SEEDED WITH A SIMCOE COUNTY NATIVE SEED MIX AND ANNUAL RYE NURSE CROP.
5. ALL TWINE AND BURLAP MUST BE BIODEGRADABLE (UNTREATED).
6. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.

APPROVED DATE June 11/15 DIRECTOR OF ENGINEERING

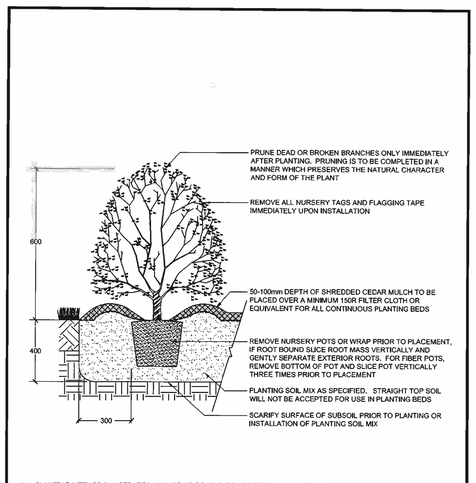
The City of BARRIE STANDARD DETAIL | DECIDUOUS TREE PLANTING ON SLOPE | REV No. 1 | DATE: JUNE 2015 | SCALE: N.T.S. | BSD-1311



1. ALL CONIFEROUS TREE PLANTING SHALL HAVE A MINIMUM 600mm DIAMETER ROOT BALL.
2. CUT AND REMOVE ALL WIRE, ROPE AND BURLAP FROM THE TOP 150mm OF THE ROOT BALL AT THE TIME OF PLANTING.
3. EXCAVATION TO BE BACKFILLED WITH IMPORTED FRIABLE SCREENED TOPSOIL WHICH IS TO BE FIRMLY COMPACTED TO ELIMINATE AIR POCKETS AND PREVENT SETTLEMENT.
4. EXPOSED SOIL SHALL BE RE-SODDED OR IN A RESTORATION ENVIRONMENT SEEDED WITH A SIMCOE COUNTY NATIVE SEED MIX AND ANNUAL RYE NURSE CROP.
5. ALL TWINE AND BURLAP MUST BE BIODEGRADABLE (UNTREATED).
6. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.

APPROVED DATE June 11/15 DIRECTOR OF ENGINEERING

The City of BARRIE STANDARD DETAIL | CONIFEROUS TREE PLANTING ON SLOPE | REV No. 1 | DATE: JUNE 2015 | SCALE: N.T.S. | BSD-1313



1. PLANTING METHOD ILLUSTRATED APPLIES TO CONTAINER / POTTED MATERIAL ONLY.
2. PLANTING DETAIL DOES NOT SPECIFICALLY RELATE TO ANY PARTICULAR SPECIES AND SHALL BE APPLIED TO BOTH DECIDUOUS AND CONIFEROUS POTTED MATERIAL.
3. SET SHRUBS 50mm HIGHER THAN GRADE TO ALLOW FOR SETTLEMENT.
4. ALL SHRUB PLANTING IS TO OCCUR IN CONTINUOUS MULCHED PLANTING BEDS WITH WEED CONTROL #FILTER FABRIC.
5. DO NOT COVER THE BASE OF SHRUB WITH MULCH.
6. ALL SOIL SHALL BE ADEQUATELY COMPACTED TO PREVENT AIR POCKETS AND SETTLEMENT.
7. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.

APPROVED DATE June 11/15 DIRECTOR OF ENGINEERING

The City of BARRIE STANDARD DETAIL | CONTAINER GROWN SHRUB PLANTING DETAIL | REV No. 4 | DATE: JUNE 2015 | SCALE: N.T.S. | BSD-1314 FORMERLY BSD-31

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LEGEND

SURFACE DATA:
DATA SOURCE
DATE

VERTICAL DATUM:
NAD83 (CSRS)

SCALE

No.	REVISIONS	DATE	INITIAL
01	Response to City and LSRCA comments	03/11/2020	ITR
02	Issued for Approval	05/17/2021	ITR

SANDY COVE CREEK RESTORATION
DETAILS

Scale: N.T.S. | Drawn By: ITR | Drawing No. 8
Date Issued: 05/17/2021 | Checked By: KG

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT PLANNING AND DESIGN GUIDE

Version 1.0

2010

CVC
CREDIT VALLEY CONSERVATION

TORONTO AND REGION Conservation
for The Living City

4.4 Soakaways, Infiltration Trenches and Chambers

4.4.1 Overview

Description
On sites suitable for underground stormwater infiltration practices, there are a variety of facility design options to consider, such as soakaways, infiltration trenches and infiltration chambers.

Soakaways are rectangular or circular excavations lined with geotextile fabric and filled with clean granular stone or other void forming material, that receive runoff from a perforated pipe inlet and allow it to infiltrate into the native soil (Figures 4.4.1 and 4.4.3). They typically service individual lots and receive only roof and walkway runoff (City of Toronto, 2002; OMOE, 2003) but can also be designed to receive overflows from rainwater harvesting systems. Soakaways can also be referred to as infiltration galleries, dry wells or soakaway pits.

Infiltration trenches are rectangular trenches lined with geotextile fabric and filled with clean granular stone or other void forming material. Like soakaways, they typically service an individual lot and receive only roof and walkway runoff. This design variation on soakaways is well suited to sites where available space for infiltration is limited to narrow strips of land between buildings or properties, or along road rights-of-way (Figure 4.4.1). They can also be referred to as infiltration galleries or linear soakaways.

Figure 4.4.1 Construction of a soakaway in a residential subdivision and infiltration trenches in parkland settings

Source: Lanark Consultants (left); Cahill Associates (centre); North Dakota State University (right)

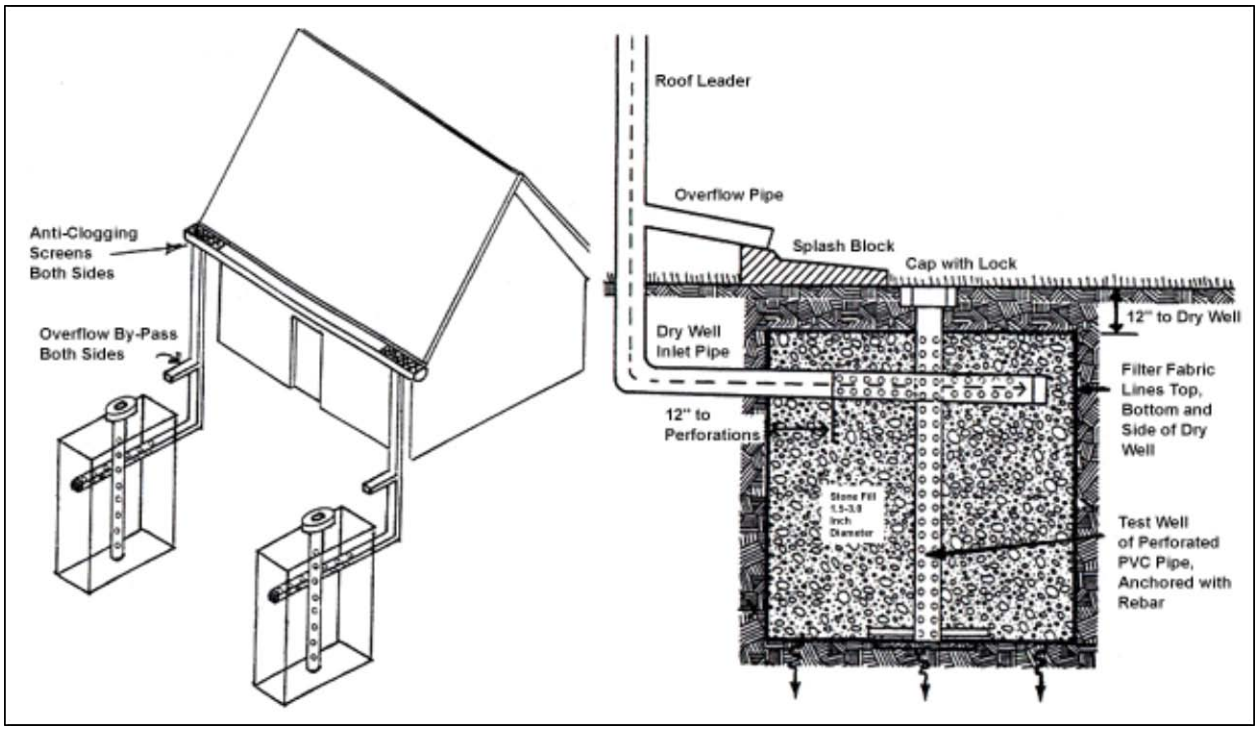
Infiltration chambers are another design variation on soakaways. They include a range of proprietary manufactured modular structures installed underground, typically under parking or landscaped areas that create large void spaces for temporary storage of stormwater runoff and allow it to infiltrate into the underlying native soil (Figure 4.4.2). Structures typically have open bottoms, perforated side walls and optional underlying granular stone reservoirs. They can be installed individually or in series in trench or bed configurations. They can infiltrate roof, walkway, parking lot and road runoff with adequate pretreatment. Due to the large volume of underground void space they create in comparison to a soakaway of the same dimensions, and the modular nature of their

design, they are well suited to sites where available space for other types of BMPs is limited, or where it is desirable for the facility to have little or no surface footprint (*e.g.*, high density development contexts). They can also be referred to as infiltration tanks.

Figure 4.4.2 Infiltration chambers under construction in commercial developments

Source: StormTech (left); Cultech (right)

Figure 4.4.3 Schematic of a dry well soakaway



Common Concerns

There are several common concerns associated with the use of soakaways, infiltration trenches and infiltration chambers:

- *Risk of Groundwater Contamination*: Most pollutants in urban runoff are well retained by infiltration practices and soils and therefore, have a low to moderate potential for groundwater contamination (Pitt *et al.*, 1999). Chloride and sodium

from de-icing salts applied to roads and parking areas during winter are not well attenuated in soil and can easily travel to shallow groundwater. Infiltration of de-icing salt constituents is also known to increase the mobility of certain heavy metals in soil (*e.g.*, lead, copper and cadmium), thereby raising the potential for elevated concentrations in underlying groundwater (Amrhein *et al.*, 1992; Bauske and Goetz, 1993). However, very few studies that have sampled groundwater below infiltration facilities or roadside ditches receiving de-icing salt laden runoff have found concentrations of heavy metals that exceed drinking water standards (*e.g.*, Howard and Beck, 1993; Granato *et al.*, 1995). To minimize risk of groundwater contamination the following management approaches are recommended (Pitt *et al*., 1999; TRCA, 2009b):

  - stormwater infiltration practices should not receive runoff from high traffic areas where large amounts of de-icing salts are applied (*e.g.*, busy highways), nor from pollution hot spots (*e.g.*, source areas where land uses or activities have the potential to generate highly contaminated runoff such as vehicle fuelling, servicing or demolition areas, outdoor storage or handling areas for hazardous materials and some heavy industry sites);
  - prioritize infiltration of runoff from source areas that are comparatively less contaminated such as roofs, low traffic roads and parking areas; and,
  - apply sedimentation pretreatment practices (*e.g.*, oil and grit separators) before infiltration of road or parking area runoff;

- *Risk of Soil Contamination:* Available evidence from monitoring studies indicates that small distributed stormwater infiltration practices do not contaminate underlying soils, even after 10 years of operation (TRCA, 2008).

- *On Private Property:* If soakaways, infiltration trenches or infiltration chambers are installed on private lots, property owners or managers will need to be educated on their routine maintenance needs, understand the long-term maintenance plan, and be subject to a legally binding maintenance agreement. An incentive program such as a storm sewer user fee based on the area of impervious cover on a property that is directly connected to a storm sewer (*i.e.*, does not first drain to a pervious area or LID practice) could be used to encourage property owners or managers to maintain existing practices. Alternatively, infiltration practices could be located in an expanded road right-of-way or “stormwater easement” so that municipal staff can access the facility in the event it fails to function properly.

- *Standing Water and Mosquitoes:* The detention of water in a soakaway, infiltration trench or chamber should be solely underground.

- *Foundations and Seepage:* Soakaways, infiltration trenches and chambers should be set back at least four (4) metres from building foundations. Overflow pipes should discharge to pervious areas that are located at least 2 metres from building foundations and slope away from the building.

- *Winter Operation:* Soakaways, infiltration trenches and chambers will continue to function during winter months if the inlet pipe and top of the facility is located below the local maximum frost penetration depth (MTO, 2005).

Physical Suitability and Constraints

Key constraints for soakaways, infiltration trenches and chambers include:

- *Wellhead Protection:* Facilities receiving road or parking lot runoff should not be located within two (2) year time-of-travel wellhead protection areas.

- *Site Topography:* Facilities cannot be located on natural slopes greater than 15%.

- *Water Table:* The bottom of the facility should be vertically separated by one (1) metre from the seasonally high water table or top of bedrock elevation.

- *Soils:* Soakaways, infiltration trenches and chambers can be constructed over any soil type, but hydrologic soil group A or B soils are best for achieving water balance and channel erosion control objectives. If possible, facilities should be located in portions of the site with the highest native soil infiltration rates. Designers should verify the soil infiltration rate at the proposed location and depth through field measurement of hydraulic conductivity under field saturated conditions using the methods described in Appendix C.

- *Drainage Area:* Soakaways and infiltration trenches typically service individual lots and receive roof and walkway runoff only. Infiltration chambers can treat roof, walkway and low to medium traffic road or parking lot runoff with adequate sedimentation pretreatment. They can be designed with an impervious drainage area to treatment facility area ratio of between 5:1 and 20:1. A maximum ratio of 10:1 is recommended for facilities receiving road or parking lot runoff.

- *Pollution Hot Spot Runoff:* To protect groundwater from possible contamination, source areas where land uses or human activities have the potential to generate highly contaminated runoff (*e.g.*, vehicle fueling, servicing and demolition areas, outdoor storage and handling areas for hazardous materials and some heavy industry sites) should not be treated by soakaways, infiltration trenches or chambers.

- *Setbacks from Buildings*: Facilities should be setback a minimum of four (4) metres from building foundations.

- *Proximity to Underground Utilities:* Local utility design guidance should be consulted to define the horizontal and vertical offsets. Generally, requirements for underground utilities passing near the practice will be no different than for utilities in other pervious areas. However, the designer should consider the need for long term maintenance when locating infiltration facilities near other underground utilities.

Typical Performance

The ability of soakaways, infiltration trenches and infiltration chambers to help meet SWM objectives is summarized in Table 4.4.1.

Table 4.4.1 Ability of soakaways, infiltration trenches and chambers to meet SWM objectives

BMP	Water Balance Benefit	Water Quality Improvement	Stream Channel Erosion Control Benefit
Soakaways, Infiltration Trenches and Chambers	Yes	Yes	Partial - depends on soil infiltration rate

Water Balance

The degree to which the water balance objective is met will depend on the amount of runoff stored and infiltrated by the facility. Limited data are available on the runoff reduction capabilities of soakaways, infiltration trenches and chambers, although they are likely similar to perforated pipe systems (Table 4.4.2).

Table 4.4.2 Volumetric runoff reduction[1] achieved by infiltration trenches and perforated pipe systems

LID Practice	Location	Runoff Reduction[1]	Reference
Infiltration trench with underdrain	Virginia	60%	Schueler (1983)
Grass swale/ Perforated pipe system	Ontario	73%	J.F. Sabourin and Associates (2008a)
Grass swale/ Perforated pipe system	Ontario	86%	J.F. Sabourin and Associates (2008a)
Perforated pipe system	Ontario	95%	SWAMP (2005)
Perforated pipe system	Ontario	89%	SWAMP (2005)
Runoff Reduction Estimate[2]		**85%**	

Notes:

1. Runoff reduction estimates are based on differences in runoff volume between the practice and a conventional impervious surface over the period of monitoring.
2. This estimate is provided only for the purpose of initial screening of LID practices suitable for achieving stormwater management objectives and targets. Performance of individual facilities will vary depending on site specific contexts and facility design parameters and should be estimated as part of the design process and submitted with other documentation for review by the approval authority.

Water Quality – Pollutant Removal Capacity

Performance results from a limited number of field studies indicate that subsurface stormwater infiltration practices are effective BMPs for pollutant removal (TRCA, 2009b). These types of practices provide effective removal for many pollutants as a result of sedimentation, filtering, and soil adsorption. It is also important to note that there is a relationship between the water balance and water quality functions. If an infiltration practice infiltrates and evaporates 100% of the runoff from a site, then there is essentially no pollution leaving the site in surface runoff. Furthermore, treatment of infiltrated runoff continues to occur as it leaves the facility and moves through the native

4.5 Bioretention

4.5.1 Overview

Description

As a stormwater filter and infiltration practice, bioretention temporarily stores, treats and infiltrates runoff. Depending on native soil infiltration rate and physical constraints, the system may be designed without an underdrain for full infiltration, with an underdrain for partial infiltration, or with an impermeable liner and underdrain for filtration only, which can also be referred to as a biofilter. The primary component of a bioretention practice is the filter bed which is a mixture of sand, fines and organic material. Other important elements of bioretention include a mulch ground cover and plants adapted to the conditions of a stormwater practice. Pretreatment, such as a settling forebay, vegetated filter strip, or stone diaphragm, often precedes the bioretention to remove particles that would otherwise clog the filter bed. Bioretention is designed to capture small storm events or the water quality storage requirement. An overflow or bypass is necessary to pass large storm event flows.

Bioretention can be adapted to fit into many different development contexts and provides a convenient area for snow storage and treatment. In a low density development, it might have a soft edge and gentle slopes, while a high density application might have a hard edge with vertical sides. A number of common forms of bioretention design are illustrated in Figure 4.5.1.

Common Concerns

Bioretention is a popular LID practice as it can meet local stormwater requirements while using space that would be landscaped anyway. However, there are some common concerns that can be addressed during design. These include:

- *Risk of Groundwater Contamination*: Most pollutants in urban runoff are well retained by infiltration practices and soils and therefore, have a low to moderate potential for groundwater contamination (Pitt *et al.*, 1999). Chloride and sodium from de-icing salts applied to roads and parking areas during winter are not well attenuated in soil and can easily travel to shallow groundwater. Infiltration of de-icing salt constituents is also known to increase the mobility of certain heavy metals in soil (*e.g.*, lead, copper and cadmium), thereby raising the potential for elevated concentrations in underlying groundwater (Amrhein *et al.*, 1992; Bauske and Goetz, 1993). However, very few studies that have sampled groundwater below infiltration facilities or roadside ditches receiving de-icing salt laden runoff have found concentrations of heavy metals that exceed drinking water standards (*e.g.*, Howard and Beck, 1993; Granato *et al.*, 1995). To minimize risk of groundwater contamination the following management approaches are recommended (Pitt *et al.*, 1999; TRCA, 2009b):
    - stormwater infiltration practices should not receive runoff from high traffic areas where large amounts of de-icing salts are applied (*e.g.*, busy

highways), nor from pollution hot spots (*e.g.*, source areas where land uses or activities have the potential to generate highly contaminated runoff such as vehicle fuelling, servicing or demolition areas, outdoor storage or handling areas for hazardous materials and some heavy industry sites);
- prioritize infiltration of runoff from source areas that are comparatively less contaminated such as roofs, low traffic roads and parking areas; and,
- apply sedimentation pretreatment practices (*e.g.*, oil and grit separators) before infiltration of road or parking area runoff.

- *Risk of Soil Contamination:* Available evidence from monitoring studies indicates that small distributed stormwater infiltration practices do not contaminate underlying soils, even after more than 10 years of operation (TRCA, 2008).

- *Performance in Winter Conditions and Spring Snowmelt*: Performance studies show that bioretention effectively captures and treats runoff during winter months with average daily temperatures in the -5 to 10 ºC range (Traver, 2005; UNHSC, 2005, Roseen *et al.*, 2009). Frost penetration of filter media varied from zero to 17 cm in studies at the University of New Hampshire (Roseen, 2007). Year round monitoring of a bioswale in the Greater Toronto Area showed the facility continued to function during winter, with temperatures in the filter bed remaining above zero at a depth of 50 cm below the surface (TRCA, 2008b). While bioretention frequently accepts runoff containing high chloride concentrations, the dissolved chloride will pass through to the groundwater without treatment. Cold climate adaptation for bioretention designs include extending the filter bed and underdrain pipe below the frost line, oversizing the underdrain to reduce the freezing potential, and selecting salt-tolerant vegetation. Some bioretention design variants, such as stormwater planters and curb extensions, are new to cold climates and have not been monitored in winter conditions. Stormwater planters that are wholly above ground should be given special consideration, as the underdrain and other conveyance structures will be more susceptible to freezing.

- *Vegetation Maintenance*: Vegetation maintenance requirements are similar to those of other landscaped areas. The landscaping design should account for the expected level of maintenance. Formal landscape designs will require more maintenance than naturalized landscaping designs. Bioretention in higher density urban areas will need frequent routine maintenance to remove trash, check for clogging, and maintain vegetation.

- *Standing Water and Mosquitoes:* The maximum allowable surface ponding time is 24 hours after the storm event, which is less than the time required for one mosquito breeding cycle. Maximum ponding depth will be between 150-250 millimetres at the end of a storm, but most water is stored in voids within soil and gravel layers. In high density urban landscapes, it may be desirable to have a shorter ponding time.

Figure 4.5.1 Forms of bioretention

Bioretention Cells can be used in development types with large landscaping areas, parks, parking lot islands, or any areas without tight space constraints. They will have side slopes of 2:1 or shallower. Often, they take inflow as sheet flow, but in some cases, such as parking lots, they may be surrounded by curbs and have concentrated inflow.

Left – York University (Source: TRCA); Right – Riverwood Park, Mississauga, Ontario (Source: CVC)

Rain gardens capture roof, lawn and driveway runoff from low to medium density residential lots in a shallow depression in the front, side, or rear yard of the home depending on the development's drainage pattern. These can be simple gardens constructed by the homeowner as a retrofit, or they can be professionally designed into a residential development and may have an underdrain connected to the main storm drain pipe.

Left and Right - front yard rain gardens that takes runoff from the residential lot and street (Source: City of Maplewood, Minnesota)

Stormwater planters (or foundation planters) are typically used in ultra urban areas adjacent to buildings and in plazas. They differ from traditional landscaping beds by receiving runoff from other surfaces.

(Source: City of Portland, BES)

Extended tree pits (also known as parallel bioretention) are located within the road right of way and take advantage of the landscaped space between the sidewalk and street. They can be designed to take runoff from the sidewalk or street. They are typically designed to be offline, that is when they are full the stormwater will bypass the practice and flow to the downstream street inlet.

Source: left – City of Portland, BES; right – CVC.

Curb extensions are, like extended tree pits, installed in the road right-of-way and can also act as a traffic calming device. In place of an otherwise raised concrete surface, the area is constructed as a depression with vegetation and used for stormwater treatment.

Source: City of Portland, BES

- *On Private Property*: If bioretention practices are installed on private lots, property owners or managers will need to be educated on their routine maintenance needs, understand the long-term maintenance plan, and may be subject to a legally binding maintenance agreement. An incentive program such as a storm sewer user fee based on the area of impervious cover on a property that is directly connected to a storm sewer (*i.e.*, does not first drain to a pervious area or LID practice) could be used to encourage property owners or managers to maintain existing practices. Alternatively, bioretention areas could be located in an expanded road right-of-way or "stormwater easement" so that municipal staff can access the facility in the event it fails to function properly.

- *Foundations and Seepage:* Bioretention facilities should be set back at least 4 metres from building foundations. Stormwater planters located near building foundations will need to have an impermeable liner under the bioretention media or the foundation will need to be waterproofed.

- *Roadway Stability:* Design standards on roadway drainage should be consulted. It may be necessary to provide a barrier to keep water from saturating the road's sub-base.

- *Pedestrian Traffic:* Many bioretention applications are located in areas of high foot traffic. Designers should consider methods to prevent pedestrian traffic through the facility, such as shrub placement, curbing, and protective railings.

Physical Suitability and Constraints

Some of the key constraints and design mitigation strategies for bioretention include:

- *Wellhead Protection:* Facilities receiving road or parking lot runoff should not be located within two (2) year time-of-travel wellhead protection areas.

- *Available Space:* Designers should reserve open areas of about 10 to 20% of the size of the contributing drainage area. These are areas that would be typically set aside for landscaping. More space is required for designs with soft and shallow side slopes than those with hard, vertical edges.

- *Site Topography*: Bioretention is best applied when contributing slopes are between 1 to 5%. Ideally, the proposed treatment area will be located in a natural depression to minimize excavation. The surface of the filter bed should be flat to allow flow to spread out and not concentrate in one area of the practice. However, for linear bioretention practices, such as those along roadways, the longitudinal slope must be considered. A stepped multi-cell design can be used when a flat surface cannot be maintained along the length of a linear bioretention.

- *Available Head:* If an underdrain is used, then 1 to 1.5 metres elevation difference is needed between the inflow point and the downstream storm drain invert. This is generally not a constraint due to the standard depth of storm drains. For bioretention without an underdrain, the design will only require enough elevation difference to move large event flows through the overflow or bypass without generating a backflow or flooding problem.

- *Water Table:* Bioretention should be separated from the seasonally high water table by a minimum of one (1) metre to ensure groundwater does not intersect the filter bed, as this could lead to groundwater contamination or practice failure.

- *Soils:* Bioretention can be located over any soil type, but hydrologic soil group A and B soils are best for achieving water balance benefits. Facilities should be located in portions of the site with the highest native soil infiltration rates. Where infiltration rates are less than 15 mm/hr (hydraulic conductivity less than $1x10^{-6}$ cm/s) an underdrain is required. Native soil infiltration rate at the proposed facility location and depth should be confirmed through measurement of hydraulic

conductivity under field saturated conditions using the methods described in Appendix C.

- *Drainage Area and Runoff Volume:* Bioretention cells work best for smaller drainage areas, as flow distribution over the filter bed is easier to achieve. Typical drainage areas are between 100 m^2 to 0.5 hectares. The maximum recommended drainage area to one bioretention facility is approximately 0.8 hectares (Davis *et al*., 2009). Ideally, bioretention should be used as a source control for small drainage areas and not as an end of pipe control. Typical ratios of impervious drainage area to bioretention cell area range from 5:1 to 15:1.

- *Pollution Hot Spot Runoff:* To protect groundwater from possible contamination, source areas where land uses or human activities have the potential to generate highly contaminated runoff (*e.g.*, vehicle fueling, servicing and demolition areas, outdoor storage and handling areas for hazardous materials and some heavy industry sites) should not be treated by bioretention facilities designed for full or partial infiltration. Facilities designed with an impermeable liner (filtration only facilities) can be used to treat runoff from pollution hot spots.

- *Proximity to Underground Utilities:* Designers should consult local utility design guidance for the horizontal and vertical clearances required between storm drains, ditches, and surface water bodies. It is feasible for on-site utilities to cross linear bioretention; however, this may require design of special protection for the utility. For road right-of-way applications, care should be taken to provide utility-specific horizontal and vertical offsets. However, conflicts with water and sewer laterals (house connections) may be unavoidable. If so, revisit the off-sets with the utility company, and sequence construction to avoid impacts to services.

- *Overhead Wires*: Designers should also check whether maximum future tree canopy height in the bioretention area will not interfere with existing overhead phone and power lines.

- *Setbacks from Buildings:* If an impermeable liner is used, no setback is needed. If not, a four (4) metre setback from buildings should be applied.

Typical Performance

Bioretention is suited to meet both water quality and water balance objectives. It may also be used in a treatment train with traditional detention practices that meet the regional event peak discharge requirements. The ability of bioretention to meet the stormwater management objectives is shown in Table 4.5.1.

Table 4.5.1 Ability of bioretention to meet SWM objectives

BMP	Water Balance Benefit	Water Quality Improvement	Stream Channel Erosion Control Benefits
Bioretention with no underdrain	Yes	Yes – size for water quality storage requirement	Partial – based on available storage volume and infiltration rates
Bioretention with underdrain	Partial – based on available storage volume beneath the underdrain and soil infiltration rate	Yes – size for water quality storage requirement	Partial – based on available storage volume beneath the underdrain and soil infiltration rate
Bioretention with underdrain and impermeable liner	Partial – some volume reduction through evapotranspiration	Yes – size for water quality storage requirement	Partial – some volume reduction through evapotranspiration

Water Balance

Bioretention has been shown to reduce runoff volume through evapotranspiration and infiltration of runoff. The research can be classified into bioretention applications that include underdrains and those that do not (and therefore rely on full infiltration into underlying soils). Aside from the underdrain, many other factors can impact the water balance such as the native soil infiltration rate, rainfall patterns, and sizing criteria. Table 4.5.2 presents the runoff reduction results from various bioretention studies, each with their own set of environmental contexts and design factors influencing the results.

Table 4.5.2 Volumetric runoff reduction[1] achieved by bioretention

LID Practice	Location	% Runoff Reduction[1]	Reference
Bioretention without underdrain	Connecticut	99%	Dietz and Clausen (2005)
	Pennsylvania	80%	Ermilio (2005)
	Pennsylvania	70%	Emerson and Traver (2004)
Bioretention with underdrain	North Carolina	40 to 60%	Smith and Hunt (2007)
	North Carolina	33 to 50%	Hunt and Lord (2006)
	Maryland and North Carolina	20 to 50%	Li *et al.* (2009)
Runoff Reduction Estimate[2]		**85% without underdrain 45% with underdrain**	

Notes:

1. Runoff reduction estimates are based on differences in runoff volume between the practice and a conventional impervious surface over the period of monitoring.
2. This estimate is provided only for the purpose of initial screening of LID practices suitable for achieving stormwater management objectives and targets. Performance of individual facilities will vary depending on site specific contexts and facility design parameters and should be estimated as part of the design process and submitted with other documentation for review by the approval authority.

APPENDIX B: Water Supply Calculations

Background Information
Excerpts from Planning Documents

It was established that no additional storage is required for pressure zones 1, 2S and 3N for the post-2031 conditions. It was determined that if the pressure zones were treated as independent zones, without interaction between them, there would be a deficit of storage in pressure zones 2N and 3S. For this reason, AMEC has recommended the protection of a site for elevated storage in Zone 3S.

5.4 Distribution System Supply (Draft Secondary Plan Land Use – Annexed Area, Intensification Nodes and Corridors)

A modeling scenario was created for all three (3) land use options for the Annexed Area. Proposed servicing and modeling scenarios were based on the existing water distribution system model and the City's Capital works plan. The modeling scenarios were as follows:

1. Maximum Daily Demand for the Annexed Area are based on City of Barrie and MOE design criteria;
2. Maximum Daily Demand plus Fire Flow for the Annexed Area are based on City of Barrie design criteria.

Modeling results for Land Use Options 1, 2 and 3 all indicate that a booster pumping station (BPS) will be required to increase low pressures in Zone 3S to maintain pressure from increased water demands. The BPS could also include in-ground reservoir storage to provide the necessary volumes identified. The proposed BPS is recommended on the south side of Salem Road, east of Veterans Drive. Other options were evaluated including a Zone 3S Elevated Tank (ET) situated at different locations in Zone 3S. Based on cost, water storage flexibility and distribution system criteria requirements the proposed BPS, as noted above, is the preferred choice to meet system pressure requirements for the proposed growth. The proposed reservoir would have an operating level of 302 m to 308 m.

The model also indicates that during the maximum day the SWTP will generate a demand greater than the rated capacity of 60 MLD. This capacity still does not meet the system demands of all three (3) land use options.

Table 5.6. Post-2031 SWTP Capacity Evaluation (City's Criteria)

	Zone 2S	Zone 3S	Total
Option 1	641.06 l/s	453.73 l/s	1,094.79 l/s
			94.59 MLD
Option 2	656.53 l/s	457.84 l/s	1,114. 36 l/s
			96.28 MLD
Option 3	610.45 l/s	437.03 l/s	1,047.48 l/s
			90.50 MLD

The results indicate that the second phase of the SWTP, which has a rated capacity of 120 MLD, would be required for the post-2031 demands. Information related to the upgrade of the SWTP is provided in the Water Supply Master Plan prepared by Genivar.

Pressure reducing valves are required for the Salem Neighbourhood at the Zone 2S and Zone 3S boundary between pipes along the collector roads.

The Hewitt's Neighbourhood requires no booster pumping stations, pressure reducing valves or elevated tanks and the operating pressures and available fire flows fall within the acceptable operating range.

Point	Identification	Master Plan	SIS	Pipe Capacity
		Discharge Flow (L/s)	Discharge Flow (L/s)	(L/s)
E1	SAP09044	5	7.3	59.5
E2	SAP09067	77	20.8	96.0
E3	SAP09006A	66	79.8	156.2
E4A	6940	24	34.5	40.3
E4B	SAP25122	11	n/a	n/a
E4C	SAP25121	1	n/a	n/a
E5	SAH08044	129	157.7	1435.4
E6	SAH09043	2	2.3	229.3
E7	SAH08021	8	1.0	40.8
E8	SAH08063	16	14.6	53.0
E9	SAH08066	14	15.5	37.6

The proposed sanitary flows and areas based on the revised conceptual plan vary (in some cases significantly) from the proposed Master Plan flows, however the proposed flows are less than the capacity of the receiving pipe. The full downstream pipe network should be reviewed with the City to confirm capacity to the discharge point.

In the case of connection point E4A, which includes the sanitary discharge from the Sobey's lands, the downstream pipe capacity may limit development. At detailed design, the pipe discharge should not exceed 85% capacity of the receiving pipe, which may limit the number of units within this parcel. Additional detailed analysis will be required to confirm pipe sizing and the distribution of the proposed units within the development area.

6.4 Water Distribution

6.4.1 External Water Supply

The municipal water supply for the City of Barrie is currently obtained from twelve groundwater wells as well as several surface water sources, with a total combined capacity of 81.3 million liters per day (MLD), with an additional two wells at design stage. The City is divided into five major pressure zones, with the two southern zones (2S and 3S) being serviced by surface water sources, and the remaining three northern zones (1, 2N and 3N) being serviced by groundwater sources.

The Hewitt's SPA lies within pressure zone 2S, which is serviced by a surface water treatment plant (SWTP) located on the shore of Kempenfelt Bay. The ultimate capacity of the plant is 240 MLD, however it is being implemented in phases, with the initial capacity at 60 MLD.

The Master Plan identified that the overall existing water supply for the City of Barrie is sufficient for the projected demand, to the 2031 projected demand, however the Hewitt's SPA lies within southern pressure zone 2S, and it is anticipated that if the five pressure zones remain distinct, then the Phase 1 surface water treatment plant capacity will be exceeded by 2.0 MLD by 2029.

The identified solutions to resolve the projected shortfall in capacity is to implement water efficiency measures and through the optimization of existing unit processes in the surface water treatment plant, including upgrading one of the low-lift pumps, increasing the primary membrane operation temperature and several other minor upgrades.

The Master Plan identified additional external trunk watermain upgrades to meet Maximum Day (potable water) and fire flow demands for the Hewitt's SPA (Section 5.2, Water Storage and Distribution Master Plan). The main upgrades include the following;

- 400 mm dia. trunk main on Big Bay Point Road between 20th Sideroad and Versailles Crescent.
- 600 mm dia. trunk main connecting Mapleview Drive East to Big Bay Point Road west of Royal Jubilee Drive.
- 750 mm dia. trunk main connecting Mapleview Drive East to Big Bay Point Road at Madeline Drive.
- 600 mm dia. trunk main on Mapleview Drive East between Madeline Drive and Royal Jubilee Drive.
- 750 mm dia. trunk main connecting Lockhart Road to Mapleview Drive along Huronia Road.
- 200 mm & 300 mm dia. mains on 20th Sideroad and Lockhart Road.

6.4.2 Internal Water Distribution

The internal water distribution network as proposed within the secondary plan is shown on "Drawing 2". The internal network consists of 200 mm and 300 mm dia. watermain pipes connecting the external network on Lockhart, 20th Sideroad, Mapleview Drive East and Big Bay Point Road.

The network as proposed in the Secondary Plan has been modified to reflect the current conceptual plan developed by the Owner's Group. Please refer to Figure 12 for a revised version of the watermain network. Efforts have been made to maintain the same number of connections and approximate routing configurations that was presented in the Secondary Plan.

6.5 Storm Sewer Network

The storm sewer network is to be designed for the 1 in 5 year storm event without surcharge as per the City of Barrie engineering standards. There are several notable

2 The casing of Well No. 5 does not allow the installation of a well pump up to its PTTW allowance and required pressure. The current operating capacity is limited at 5,184 m^3/d (60 L/s).
3 The output of Well No. 11 is limited to 6,912 m^3/d (80 L/s), since this well presents trace contamination with chlorinated solvent.
4 Total installed operating capacity less that of the largest available unit to represent 'firm' conditions in review.
5 Wells 4A and 19 will be in service by 2041. Refer to the Water Supply Master plan for additional details and analysis of LOS.

The supply distribution results show that there is inadequate supply capacity to service the 2041 growth projection for the surface water treatment plant pressures zones areas. When 100% operating capacity occurs, there is a deficit in boosting supply which may result in adverse affects in the system, such as decreased pressures or unavailable flow to modelled junctions. Floating storage facilities may resolve adverse supply affects, however over long durations the rate of tank filling may not meet the MDD resulting in loss of operational capacity.

Table 6-10 Total Boosting Capacity by Pressure Zone – 2041

	ADD (ML/d)	MDD (ML/d)	Sufficient Floating Storage	Firm[7] Capacity (ML/d)	MDD of Firm Capacity (ML/d)	Stand-by Capacity[6] (ML/d)	ADD of Stand-by Capacity	LOS Criteria Met
Zone 1[1]	13.55	32.25	☑	82.03	**39%**	82.03	**17%**	☑
Zone 2N[2]	13.84	21.25	☑	38.83	**55%**	38.83	**36%**	☑
Zone 3N[3]	2.15	5.68	☑	12.10	**47%**	12.10	**18%**	☑
Zone 2S[4]	23.97	51.69	☑	60	**86%**	42.8	**56%**	☑
Zone 3S[5]	18.41	28.85	☑	64.8	**45%**	64.8	**28%**	☑

1 Includes Well Pump Supply – Storage from Anne Reservoir.
2 Includes Anne BPS, Codrington BPS and Sunnidale BPS.
3 Includes Leacock BPS.
4 Includes SWTP.
5 Includes Harvie Reservoir BPS and Big Bay Point BPS – Salem Reservoir adds projected 20 ML/d capacity.
6 Facilities have Stand-By Power.
7 Firm capacity for zones based on individual capacities of facilities following MECP criteria

The total boosting capacity results for existing conditions by pressure zone shows that there is adequate Firm and Stand-by Capacity for MDD and ADD scenarios respectively. It is to be noted though however that the Zone 2S is approaching firm boosting capacity when accounting for the current SWTP rated capacity before any expansion. This area may experience pressure drops further in high flow scenarios and into 2071 as sustained MDD conditions reduced the available floating storage however the boosting needs are achieved for the growth projection horizon of 2041.

Future Distribution Gaps

A summary of distribution gap observations is shown in Table 6-11 for the 2041 growth projection scenario. Detailed distribution mapping for pressures, head loss and velocity results are included in the appendices for all projection years. For all growth projection scenario each zone was tested for ADD, MDD and MDD+FF conditions based on Level of Service criteria presented in Section 5.

Table 6-11 Distribution Level of Service Criteria Review – 2041

Pressure Zone	Level of Service (LOS) Results					
	Head Loss Gradient		Pressures		Velocities	
Zone 1	Less then 2.5 m/km during ADD	☒	Between 50-90psi during ADD	☑	ADD conditions below 3 m/s	☑
			Above 40psi during MDD	☑	MDD+FF conditions below 5 m/s	☑
			Available flow above 20psi	☒		
Zone 2N	Older pipe areas greater than 2.5m/km during ADD	☒	Between 50-90psi during ADD	☑	Normal conditions below 3 m/s	☑
			Above 40psi during MDD	☒	MDD+FF conditions below 5 m/s	☑
			Available flow above 20psi	☒		
Zone 3N	Older pipe areas greater than 2.5m/km during ADD	☒	Between 50-90psi during ADD	☑	ADD conditions below 3 m/s	☑
			Above 40psi during MDD	☒	MDD+FF conditions below 5 m/s	☑
			Available flow above 20psi	☒		
Zone 2S	Less then 2.5m/km during ADD	☒	Between 50-90psi during ADD	☒	ADD conditions below 3 m/s	☑
			Above 40psi during MDD	☒	MDD+FF conditions below 5 m/s	☒
			Available flow above 20psi	☒		
Zone 3S	Less then 2.5m/km during ADD	☒	Between 50-90psi during ADD	☒	ADD conditions below 3 m/s	☒
			Above 40psi during MDD	☒	MDD+FF conditions below 5 m/s	☒
			Available flow above 20psi	☒		

In summary, there are additional distribution gaps under future conditions as compared to existing conditions, however following the implementation of imminent infrastructure projects by 2021 it was observed that many of the noted LOS concerns are initially resolved. The increase of demand for the growth projection requires the addition of new service distribution piping for 2S and 3S for the Salem and Hewitt Secondary Plan areas as the system generally meets level of service criteria for most pressures zones save and except these locations during ADD and MDD.

There are a few areas within the City during MDD scenarios where lower pressures are noted as borderline compliant with the LOS criteria for Zones 2N and 3N which is consistent with existing conditions observations. In the model simulations this is typically occurring during tank fill/drain cycles when the tanks approach their lower functional limit. In the case of zone 2N and 3N the MDD pressures are beyond borderline only when the pressures are not maintained between pressures zones unless elevated tanks are at functional elevations under initial conditions. With the addition of the Anne St. 2N/3N BPS upgrades the pressures are normalized and within the LOS targets. In the case for 2S and 3S, there is limited water supply to meet the demand over extended period simulation as the supply capacity is exceeded for these zones. Addressing supply demand is discussed and analysed further in the 2017 Water Supply Master Plan Update (WSP).

In terms of MDD+FF the LOS criteria selected for industrial and commercial properties demonstrated during model simulations that all water pressures zones are currently experiencing available fire flow deficiencies into future conditions. This is consistent with the findings under existing conditions, however the observations of the model simulations show limitations to the zones that are nearing their storage capacity. This is generally due to a lack of looping and limited watermain sizing and supply for the cases of 2S and 3S. Imminent infrastructure projects have improved fire flow servicing for all zones for the 2021 scenario as compared to existing conditions while the majority of MDD+FF deficiencies continue to occur at junctions where 50mm service pipe is located. The recommended reinforcement projects from the last master plan update and a selection of additional projects for the Former Barrie area will improve available fire flow for multiple locations in the city. Locations where noted clusters of Fire Flow deficiencies have been observed are shown in the mapping results found in **Appendix F**.

6.2.3 Additional Considerations from Model Development

Water Quality Model Review

The water quality model review using the existing and future model scenario representations was compared to chlorine residuals from field testing. A substance reaction/decay simulation was run throughout the city. Findings from the water quality analysis are shown in **Appendix G**. During the study it was indicated from anecdotal evidence and flushing exercises that adverse water quality was observed in 2N during these activities. The water complaint records and copy of work orders with hydrant locations, flow and residual pressures were provided by the City for review and compared to the modelling results. Overall, the complaints primarily were based on the observation of discoloration of water as opposed to taste and odour or

4.2.1 Problem Statement

Under the City's current supply strategy, the southern zones (2S and 3S) are serviced by surface water and the northern zones (1, 2N and 3N) are serviced by groundwater. Based on the current servicing strategy, the following conclusions can be taken from Figure 4-1 to Figure 4-3:

- Based on the current SWTP operating capacity of 60 ML/d, the water demand of Zones 2S and 3S, including the Salem and Hewitts Secondary Plan Areas, will exceed the firm capacity of the SWTP by 2035. The maximum day demand projections for Zones 2S and 3S exceed the SWTP capacity by approximately 7.3 ML/d in 2041 and by approximately 15.1 ML/d in 2071. Additional water supply is required by 2041 (7.3 ML/d).
- Based on the groundwater firm production of 78 ML/d, the current production will be sufficient to service the growth projections of Zones 1, 2N and 3N until 2071. This estimate of available water supply is conservative since Wells 4A and 19 are currently not in operation.

4.2.2 Sensitivity Analysis

A sensitivity analysis was performed on 2041 projections for the two following scenarios, to better gauge the effects on the water supply system in case the water usage changes.

- High ICI demand scenario: For this scenario, it was considered the ICI properties were developed using MECP design rates (28 m^3/ha.d for institutional and commercial, 35 m^3/ha.d for industrial), with 60% density factor, in addition to the employment demand. This water demand is 38% higher than the expected scenario.
- High average daily per capita scenario: For this scenario, it was considered the average daily per capita for future equivalent population is 225 Lpcd, instead the current average daily per capita. This water demand is 11% higher than the expected scenario.

From Table 4-1, in Barrie the ADD has a potential range from 64,611 to 107,874 m^3/d for a 2041 projection, while the MDD has a potential range from 123,684 m^3 to 199,838 m^3/d for a 2041 projection.

Both alternatives can meet the southern zones 2071 build-out MDD, but only Alternative 6A provides enough supply to meet the one for the northern zones 2071. With Alternative 6B, the demand exceeds the groundwater supply by 2063 in the northern zones. Alternative 6B also requires additional works at an earlier stage than Alternative 6A. Well 14 also presents some contamination with chlorinated solvents and may be taken off line in the future. In conclusion, Alternative 6A is considered to be more favourable than Alternative 6B, and it is the only alternative to be carried forward.

5.1.7 Alternative 7 – Mix Surface Water Supply and Groundwater Supply

Under the City's current water supply strategy and with the incorporation of the Salem and Hewitts Secondary Plan Areas, the Zones 2S and 3S water demand will exceed the SWTP capacity by 2035. However, there is 21.8 MLD excess groundwater capacity available in 2041 based on demand projections for northern zones serviced by groundwater. This alternative involves mixing the surface and groundwater systems over the course of two phases.

Since the groundwater production capacity is significantly higher than water demand projections, mixing groundwater and surface water supplies could be an option to meet maximum day requirements. Implementation of a mixing strategy to meet maximum day demands could defer expansion of the SWTP required to accommodate future growth. This alternative assumes distinct surface water and groundwater zones the majority of the time. Mixing will only be used when the demands in Zone 2S and 3S exceed the current rated capacity of the SWTP. This is expected to occur later in the planning horizon and only for a few days per year in the summer months.

As stated above, the infrastructure upgrades required to create a subzone of Zone 2S or to isolate the entire Zone 2S from the Zone 3S, in order to prevent mixing of surface water and groundwater in more than one zone, would impact the entire distribution system of these zones. Therefore, this alternative considers mixing surface water and groundwater supplies in Zone 2S and 3S. Most of the time, these zones, in their entirety, will be serviced using surface water in accordance with the current water supply strategy. It is estimated that less than 0.5% of the total annual consumption of Zones 2S and 3S will be from groundwater supply by 2041.

In Phase 1, upgrades to the Innisfil BPS will be used to supplement water supply in Zone 2S and 3S, if maximum day demands exceed available surface water supply. Boosting southward was a previous condition of the Innisfil BPS and should supply these zones without further upgrades until 2059. No additional transmission mains are required.

There are several PSVs and PRVs needed between Zones 2S and 3S in order to maintain constant upstream system pressure in Zone 2S while ensuring demands in Zone 3S are met. These will need to be adjusted/replaced to allow for the existing station to boost to the southern zones.

In Phase 2, there are two options to increase the southern zone water supply by 15.1 ML/d to meet the ultimate build-out demand. The first option includes expanding the capacity of the Innisfil BPS by 2059, and the construction of Wells 4A and 19 pump houses and their connections to the distribution system will be required to provide sufficient groundwater supply to the system by 2062. This option is feasible with adjustments to the PSV and PRV during Phase 1, as pressure reduction needs to be removed. This option is also contingent on the use of existing transmission mains (400mm size) from Zone 1 to Innisfil BPS. The 300mm transmission main to Big Bay BPS (2.8km long in total) should be upsized to 400mm to provide redundancy.

The second option includes diverting Wells 17/18, the rehabilitation of a portion of the dedicated Ferndale Drive transmission main (1.6km of 600mm diameter) from these wells to Harvie Reservoir, and the construction of Wells 4A and 19 pump houses and their connection to the distribution system as well by 2059.

The first option would require the least amount of capital investment (unless additional dedicated transmission mains from Zone 1 Wells are to be considered), but it would promote the highest amount of mixing. On the other hand, the second option would provide the most redundancy and operational flexibility, while controlling most of the groundwater mixing to Zone 3S. Considering the Phase 2 should occur beyond 2041, it is recommended to re-assess the water needs and evaluate the best option in the future.

Figure 5-9 illustrates the water supply capacity plotted against the water demand projections with the integration of both systems.

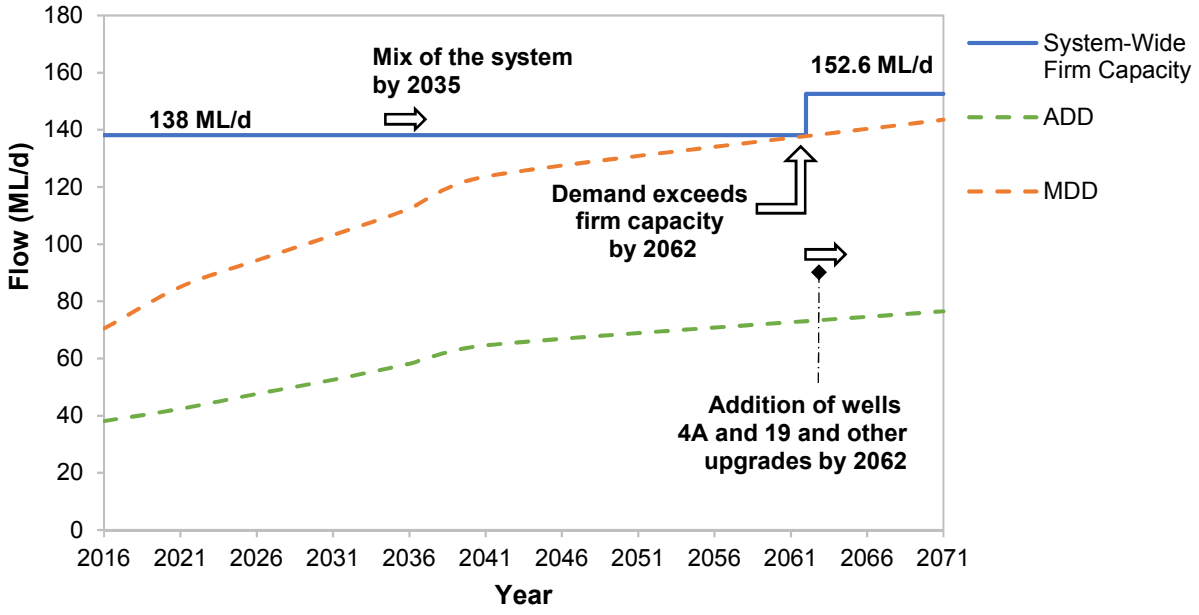


Figure 5-9 City of Barrie 2018 System-Wide Water Demand Projections compared to System-Wide Firm Production Capacity with the implementation of Alternative 7

The groundwater and surface water supplies are sufficient to service maximum day demands to the year 2058 if this strategy is implemented.

When considering mixing surface water and groundwater supplies, it is important to consider the following:

- Ensure compatibility of disinfection methods. It is not anticipated that this will be an issue since all the groundwater wells and the Barrie SWTP utilize chlorine gas for disinfection.
- With the expansion of the distribution network and the increase of the water age, the chlorine decay in the distribution network may also be a concern.
- Using groundwater to supplement surface water supplies may therefore result in temporary discolouration in the surface water zones. However, aesthetics may not be a primary concern since blending will only occur in short duration to meet maximum day demands.
- There may be concerns from ICI customers that could be negatively affected to changes in water quality in their process. This would have to be reviewed in more detail and potentially those ICI customers contacted in advance of these changes taking place.
- Jar testing is highly recommended to ensure the compatibility of the two water sources based on parameters such as turbidity, temperature, alkalinity, hardness and pH.

Other municipalities have effectively implemented surface water and groundwater mixing, including York Region and the Region of Waterloo. The water supply of Town of Aurora in York Region is composed of approximately 75% of surface water and 25% groundwater. In the Town of Aurora, the surface water and groundwater supplies are currently mixed at a water storage tank from which point blended water is supplied in the distribution system and the percentage of mixing can be controlled, smoothing the water quality variation. However, this is not a possible solution for the City, since the contribution of groundwater supply for Zones 2S and 3S would be minimal.

From a technical perspective, there are few obvious drawbacks to this alternative and it has potential to solve the problem. Therefore, it was carried forward for further evaluation.

5.2 Short-Listed Alternatives

Based on an initial assessment of whether each alternative could adequately address/solve the problem, three alternatives were short-listed for further evaluation:

- **Alternative 4.** Surface Water Treatment Plant Expansion
- **Alternative 6A.** Divert Wells 17/18 to Zones 2S and 3S
- **Alternative 7.** Mix Surface Water Supply and Groundwater Supply

It is important to note that in the life cycle costs analysis, the common works between the alternatives are not included in this analysis, including the works related to water storage, BPS, and water distribution.

A 20-year planning period from 2021 to 2041 was used and the following assumptions were applied to calculate the life cycle costs:

5.2.3 Alternative 7 – Mix Surface Water Supply and Groundwater Supply

DESCRIPTION OF INFRASTRUCTURE UPGRADES

To implement the mixing surface water system and groundwater system in Zones 2S and 3S, the key proposed upgrades for this alternative are the following:

- Construction of Wells 4A and 19 pump houses and their connection to the distribution system between 2059 and 2062, to supplement the water supply for the northern zones.

Construction lead time of the wells pump houses is within the range of 1.5 to 2 years including design and installation.

A Schedule “B” Class EA will be required for each of these wells. Although the Wells 4A and 19 are part of the current PTTW, the total taking of the PTTW will need to be increased to 161.6 MLD. An amendment of the DWWP and the MDWL will also be required.

In addition, an assessment of the groundwater systems to evaluate the need to upgrade the wells treatment in order to meet the new manganese regulation is recommended. Once the wells requiring additional treatment are identified, upgrades will be required once the new regulation come into force. The required timeline and actual effort for the upgrades is unknow. For the purpose of this study, it was considered the upgrades will be required between 2025 and 2031.

Considering the blending, it is recommended to perform a feasibility study with mitigation plan for the blending of surface water and groundwater systems to better understand the compatibility of the two water sources, as well as a communication plan to inform the residential and ICI customers in Zone 2S and 3S about the potential changes in water quality due to the blending of surface water and groundwater systems.

An optimization study for the SWTP to identify opportunities to increase capacity within the current equipment is recommended. The implementation of small capital works recommended by this study could postpone other investments and increase the plant operational flexibility. For the purpose of this study, it was considered the implementation of these small upgrades will be performed between 2025 and 2031. Depending on the recommendations of the SWTP optimization study, an amendment to the PTTW, the DWWP and the MDWL may be required.

It is recommended to evaluate the best option to implement Phase 2 of Alternative 7 closer to 2041, in order to ensure the expansion of Innisfil BPS and the distribution improvements could be completed before 2059.

LIFE CYCLE COSTS

The life cycle cost analysis was estimated on NPV. Table 5-6 and Table 5-7 present the Capital Costs and NPV related to Alternative 7. The detailed estimation of costs is presented in **Appendix D**. The capital cost analysis assumed that mixing would occur by 2031, four years before the water is needed. A Class D estimate of the capital costs is shown in Table 5-6.

6 Master Plan Implementation and Phasing

6.1 Implementation: Projects and Phasing

The **Alternative 7. Mix Surface Water Supply and Groundwater Supply** has sufficient water supply capacity to service the City beyond 2071 and has been selected as the preferred solution for the City's water supply system. However, it is also recommended to rehabilitate the damaged portion of Ferndale Drive transmission main, in order to allow Wells 17/18 to be diverted to the Zones 2S and 3S. This would increase the water supply system security, redundancy, and operational flexibility.

In meeting the service requirements of the City of Barrie based on projected water flows to 2041 and 2071, the recommended implementation plan is outlined in Table 6-1 below.

Table 6-1 Proposed Implementation Plan

STAGE	RECOMMENDED STEPS
Stage 1 (2019-2024)	– Keep the quarterly monitoring of sodium levels for Wells 3A, 9, 11, 12, 13, 14, and extend this frequently monitoring for the SWTP; – Keep the monthly monitoring of PCE and TCE levels for Wells 11, 12, 14 and 15; – Extend the monitoring of dissolved and particulate manganese at the raw water and treated water for all wells and SWTP, and along the distribution system, as well as other pertinent parameters, in order to identify systems that would require manganese removal and collect data for design purposes; – Initiate an assessment of the groundwater system; – Initiate an optimization study for the SWTP optimization study to identify opportunities to increase capacity and postpone blending; – Initiate a feasibility study with mitigation plan for the blending of surface water and groundwater systems to understand the compatibility of the two water sources, chlorine decay in the network, and discolouration potential; – Initiate a communication plan to inform the residential and ICI customers in Zone 2S and 3S about the potential changes in water quality due to the blending of surface water and groundwater systems.

STAGE	RECOMMENDED STEPS
Stage 2 (2025-2031)	– Upgrade the wells that required manganese removal to meet new regulation. – Rehabilitate the damaged portion of the Ferndale Drive transmission main (1.6km of 600mm diameter) from Wells 17/18 to Harvie Reservoir. – Implementation of small capital works recommended by the SWTP optimization study. – Amend the PTTW, the DWWP and the MDWL to regarding the SWTP small capital works if required.
Stage 3 (2032-2041)	N/A
Stage 4 (2042 and beyond)	– Evaluate best option to implement Phase 2 of Alternative 7. Mix Surface Water Supply and Groundwater Supply (through Innisfil BPS or Well17/18). – Initiate Schedule "B" Class EA for the construction of Wells 4A and 19 pump houses and their connection to the distribution system; – Design and construction of Wells 4A and 19 pump houses and their connection to the distribution system; – Amend the PTTW, the DWWP and the MDWL to include Wells 4A and 19; – Initiate Schedule "B" Class EA for the Innisfil BPS upgrades if required; – Design and construction of the Innisfil BPS upgrades if required.

6.2 Summary of costs

A Class D estimate of the capital costs is shown in Table 6-2.

Table 6-2 Capital Costs for Implementation Plan

COMPONENT	PRELIMINARY COSTS (CAD)[1]
SWTP Optimization Study, Groundwater System Assessment, Blending Feasibility Study and Communication Plan	$ 500,000
City Project Management for Studies (5%)	$ 25,000

Water Demand Calculations

Population Calculations

Project Title: Dorsay Barrie
Project Number: 5170
Last Edited: 2024-04-26

Municipality City of Barrie

Design Parameters

Low Density	Single detached, duplexes, semi-detached dwellings	3.25	ppu	City of Barrie's Drinking Water Infrastructure Design Standard (2024)
Medium Density	Triplexes/fourplexes, cluster/block townhouses, street townhouses, walk-up apartments	2.57	ppu	City of Barrie's Drinking Water Infrastructure Design Standard (2024)
High Density	Apartment dwellings	1.67	ppu	City of Barrie's Drinking Water Infrastructure Design Standard (2024)
Parkland Density		10	ppha	City of Toronto's Design Criteria for Sewers and Watermains (January 2021)
School Density		86	ppha	City of Toronto's Design Criteria for Sewers and Watermains (January 2021)

Equivalent Population Calculation

Lands North of Reach 3

Land Use	Land Use Category	Density Classification	Density (ppu)	Density (ppha)		Total Units	Land Area (ha)	Population
Single Detached	Residential	Low Density	3.25	-		354	-	1151
Townhouses	Residential	Medium Density	2.57	-		266	-	684
Parkland*	-	-	-	10		-	0.5	5
					Total	**596**		**1840**

Lands South of Reach 3

Land Use	Land Use Category	Density Classification	Density (ppu)	Density (ppha)		Total Units	Land Area (ha)	Population
Single Detached	Residential	Low Density	3.25	-		405	-	1317
Townhouses	Residential	Medium Density	2.57	-		224	-	576
Parkland*	-	-	-	10		-	2.43	25
School*	Institutional	-	-	86		-	2.29	197
					Total	**629**		**2115**

All Dorsay Lands

Land Use	Land Use Category	Density Classification	Density (ppu)	Density (ppha)		Total Units	Land Area (ha)	Population
Single/Semi Detached	Residential	Low Density	3.25	-		759	-	2467
Townhouses	Residential	Medium Density	2.57	-		490	-	1260
Parkland*	-	-	-	10		-	2.93	30
School*	Institutional	-	-	86		-	2.29	197
					Total	**1249**		**3954**

Land use information retrieved from Conceptual Development Plan (Dorsay Property) by MGP (March 18, 2024)
*Parkland and school population density based on City of Toronto's Design Criteria for Sewers and Watermains (January 2021) as City of Barrie's design guidelines do not provide equivalent population density

Water Supply Calculations

Project Title: Dorsay Barrie
Project Number: 5170
Last Edited: 2024-04-26

Municipality City of Barrie

Water Supply Parameters

Water Demand

Residential	225	L/cap./d	City of Barrie's Water Transmission and Distribution Policies and Design Standard (June 2022)
Commercial	28	m^3/ha./d	City of Barrie's Water Transmission and Distribution Policies and Design Standard (June 2022)
Institutional	28	m^3/ha./d	City of Barrie's Water Transmission and Distribution Policies and Design Standard (June 2022)
Industrial	35	m^3/ha./d	City of Barrie's Water Transmission and Distribution Policies and Design Standard (June 2022)

Peaking Factors

Lands North of Reach 3

Max Day Factor	2.50	-	City of Barrie's Water Transmission and Distribution Policies and Design Standard (June 2022)
Peak Hour Factor	3.75	-	City of Barrie's Water Transmission and Distribution Policies and Design Standard (June 2022)

Lands South of Reach 3

Max Day Factor	2.25	-	City of Barrie's Water Transmission and Distribution Policies and Design Standard (June 2022)
Peak Hour Factor	3.38	-	City of Barrie's Water Transmission and Distribution Policies and Design Standard (June 2022)

All Dorsay Lands

Max Day Factor	2.00	-	City of Barrie's Water Transmission and Distribution Policies and Design Standard (June 2022)
Peak Hour Factor	3.00	-	City of Barrie's Water Transmission and Distribution Policies and Design Standard (June 2022)

Design Water Demand Calculation

Lands North of Reach 3

Land Use	Population	Land Area (ha)	Flow (L/s)		
			Average Day Demand	*Max Day Demand*	*Peak Hour Demand*
Residential*	1840		4.79	11.98	17.97
Total			**4.79**	**11.98**	**17.97**

Lands South of Reach 3

Land Use	Population	Land Area (ha)	Flow (L/s)		
			Average Day Demand	*Max Day Demand*	*Peak Hour Demand*
Residential*	1918		4.99	11.24	16.88
Institutional	197	2.29	0.74	1.67	2.51
Total			**5.74**	**12.91**	**19.39**

All Dorsay Lands

Land Use	Population	Land Area (ha)	Flow (L/s)		
			Average Day Demand	*Max Day Demand*	*Peak Hour Demand*
Residential*	3757		9.78	19.57	29.35
Institutional	197	2.29	0.74	1.48	2.23
Total	**3954**		**10.53**	**21.05**	**31.58**

*Parkland equivalent population included in residential land use population

Barrie

Water Main

Brent Harlow
The City of Barrie

View Full Details

Download

Details

Dataset
Feature Layer

May 16, 2022
Info Updated

May 16, 2022
Data Updated

June 18, 2018
Published Date

Records: 5,971
View data table

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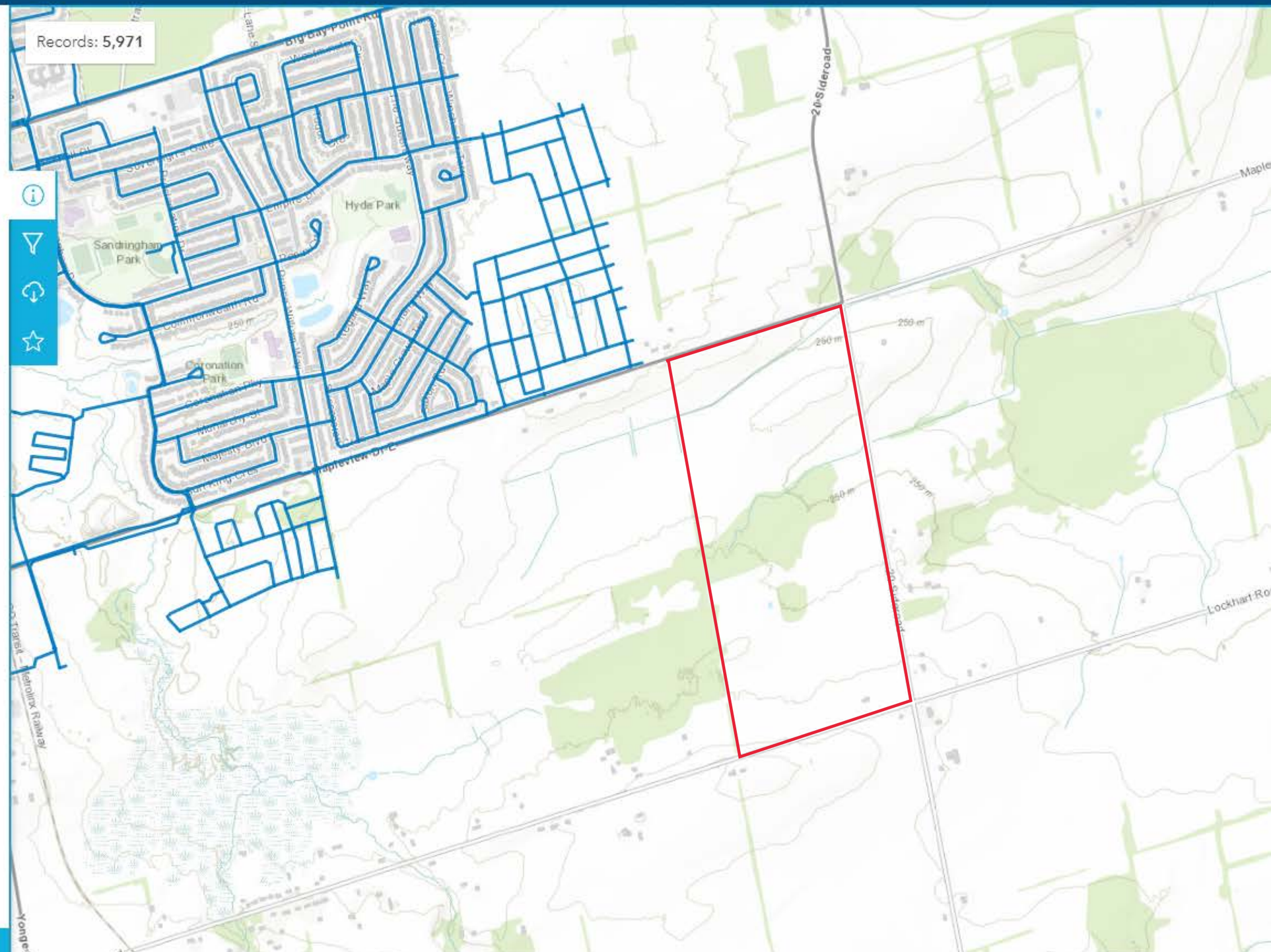
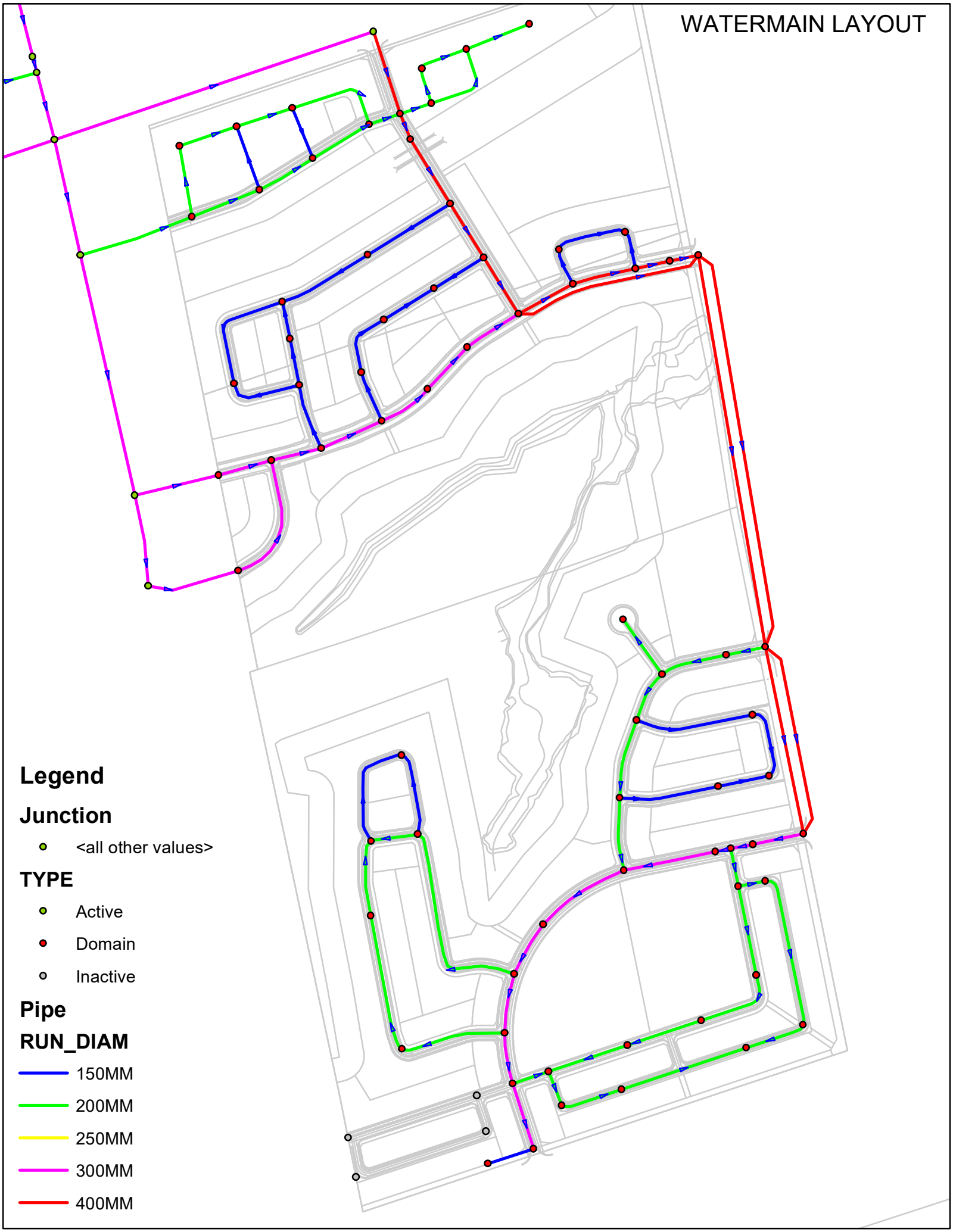


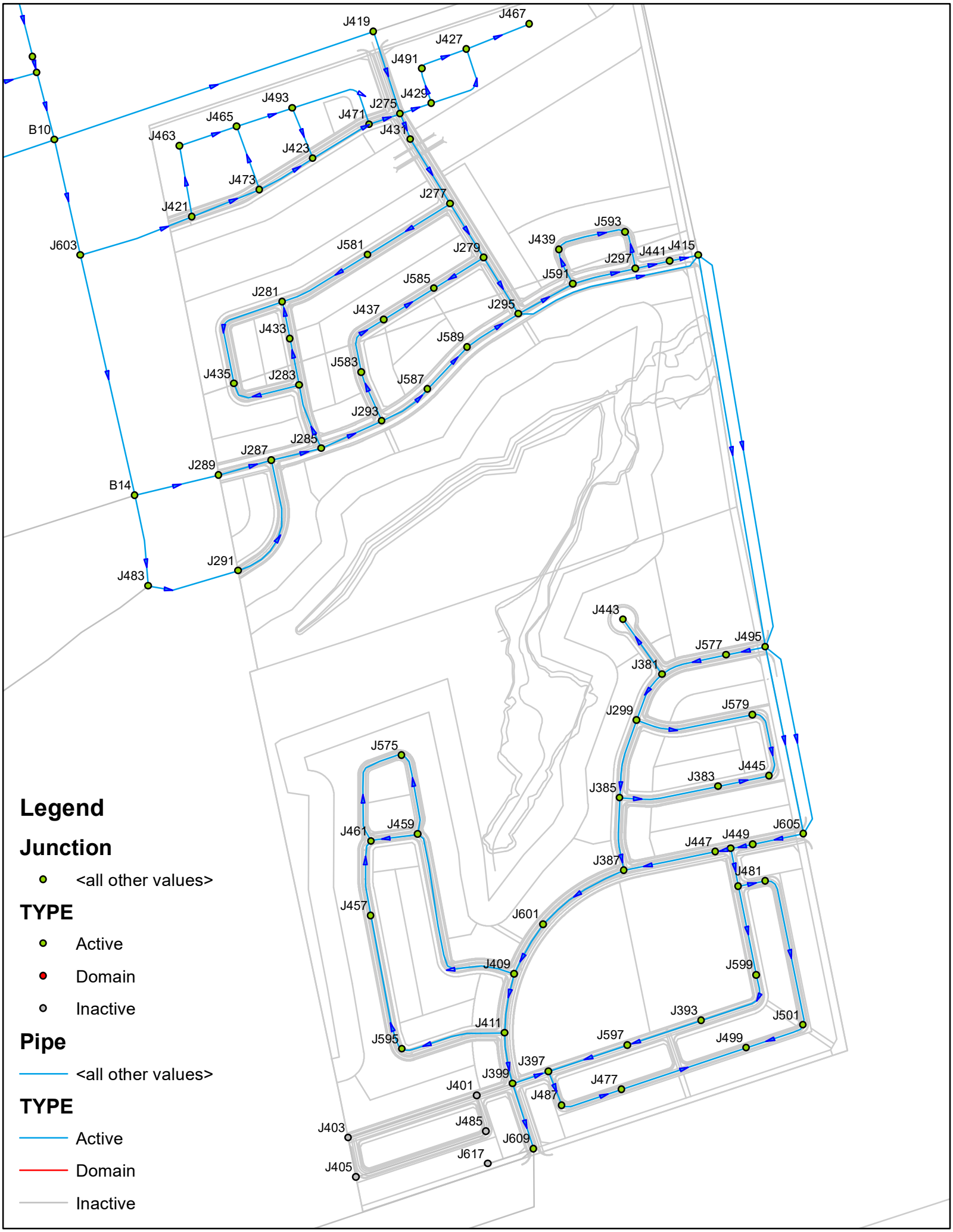
Hydraulic Model Results

Hydraulic Model Results

Model Layout

WATERMAIN LAYOUT





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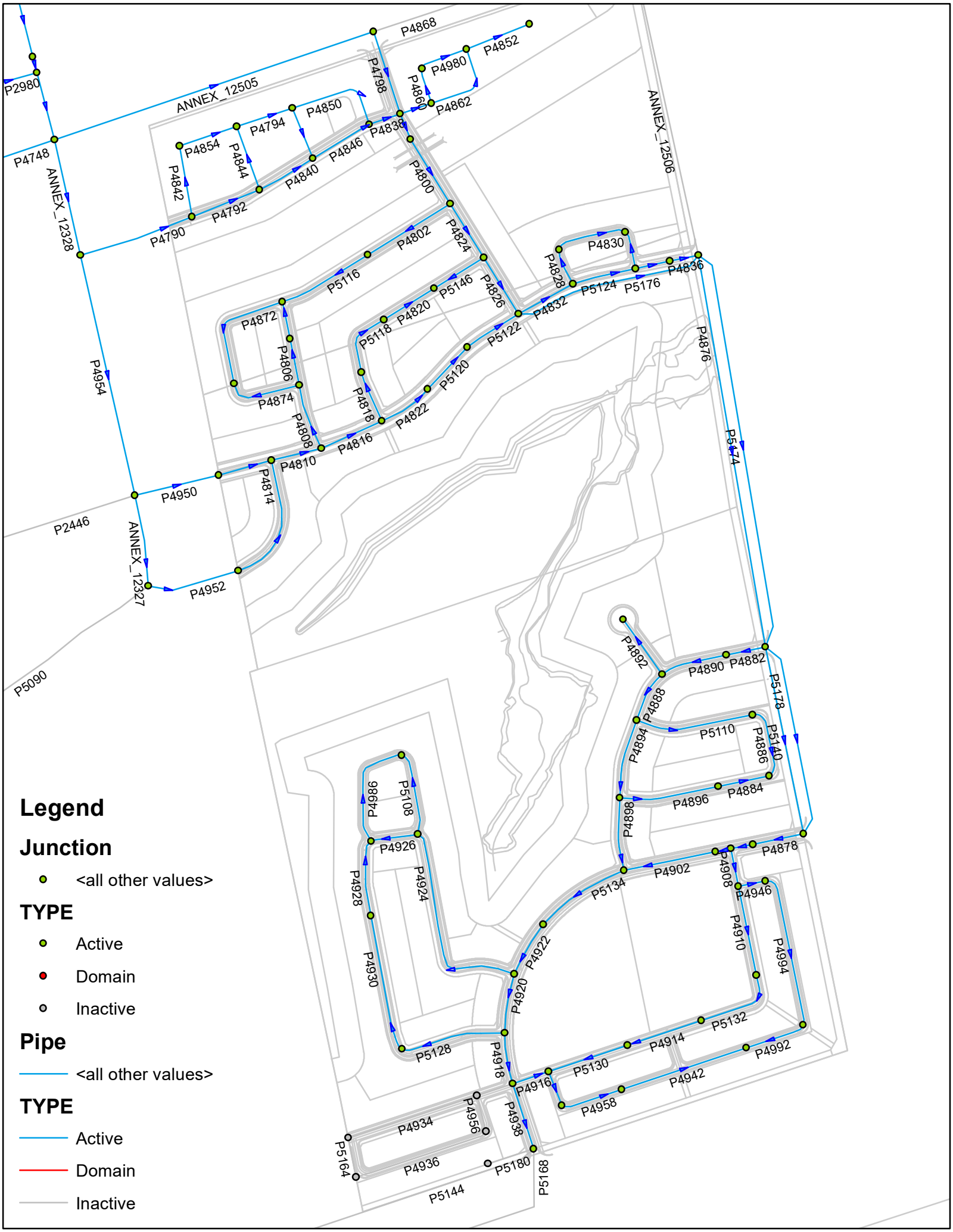

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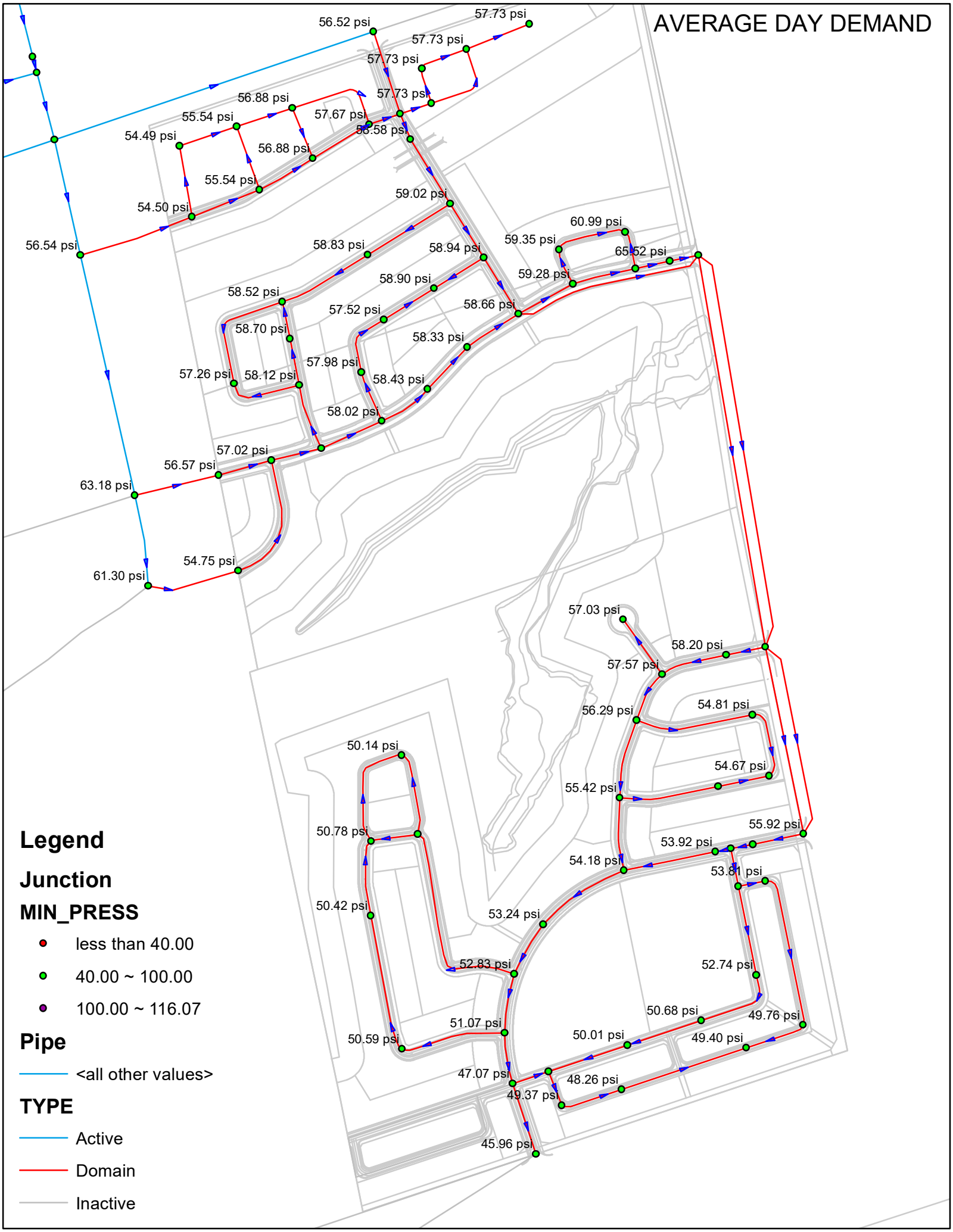
Hydraulic Model Results
Average Day Demand Scenario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57.73 psi
57.73 psi
57.73 psi
56.88 psi
55.54 psi
57.67 psi
54.49 psi
56.88 psi
55.54 psi
54.50 psi
56.54 psi
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ADD - Junction Demand

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62	☐	J501	0.44	19:50	0.03	07:20	0.22	0.40
63	☐	J575	0.24	19:50	0.02	07:20	0.12	0.22
64	☐	J577	0.21	19:50	0.02	07:20	0.11	0.20
65	☐	J579	0.38	19:50	0.03	07:20	0.19	0.36
66	☐	J595	0.41	19:50	0.03	07:20	0.20	0.38
67	☐	J597	0.36	19:50	0.03	07:20	0.18	0.34
68	☐	J599	0.21	19:50	0.02	07:20	0.11	0.20
69	☐	J601	0.32	19:50	0.02	07:20	0.16	0.29
70	☐	J605	0.00	00:00	0.00	00:00	0.00	0.00
71	☐	J609	0.10	19:50	0.01	07:20	0.05	0.09

ADD - Junction Pressure

		ID	Max.Value (psi)	Max.Time (hrs.)	Min.Value (psi)	Min.Time (hrs.)	Average (psi)	Difference (psi)
1	☐	J275	77.42	145:10	58.02	44:40	73.07	19.40
2	☐	J277	78.71	145:10	59.31	44:40	74.36	19.40
3	☐	J279	78.64	145:10	59.24	44:40	74.29	19.40
4	☐	J281	78.21	145:10	58.81	44:40	73.86	19.41
5	☐	J283	77.81	145:10	58.41	44:40	73.46	19.40
6	☐	J285	77.10	145:10	57.71	44:40	72.76	19.40
7	☐	J287	76.71	145:10	57.31	44:40	72.36	19.39
8	☐	J289	76.25	145:10	56.86	44:40	71.90	19.39
9	☐	J291	74.43	145:10	55.04	44:40	70.08	19.39
10	☐	J293	77.71	145:10	58.32	44:40	73.37	19.40
11	☐	J295	78.35	145:10	58.95	44:40	74.00	19.40
12	☐	J297	82.56	145:10	63.16	44:40	78.21	19.41
13	☐	J421	74.17	145:10	54.79	44:40	69.83	19.39
14	☐	J423	76.56	145:10	57.17	44:40	72.22	19.39
15	☐	J427	77.42	145:10	58.02	44:40	73.07	19.40
16	☐	J429	77.42	145:10	58.02	44:40	73.07	19.40
17	☐	J431	78.27	145:10	58.87	44:40	73.92	19.40
18	☐	J433	78.40	145:10	58.99	44:40	74.05	19.40
19	☐	J435	76.96	145:10	57.56	44:40	72.61	19.41
20	☐	J437	77.22	145:10	57.81	44:40	72.87	19.40
21	☐	J439	79.05	145:10	59.64	44:40	74.70	19.41
22	☐	J441	85.22	145:10	65.81	44:40	80.87	19.41
23	☐	J463	74.17	145:10	54.78	44:40	69.83	19.39
24	☐	J465	75.23	145:10	55.83	44:40	70.88	19.39
25	☐	J467	77.42	145:10	58.02	44:40	73.07	19.40
26	☐	J471	77.36	145:10	57.96	44:40	73.01	19.39
27	☐	J473	75.23	145:10	55.84	44:40	70.88	19.39
28	☐	J491	77.42	145:10	58.02	44:40	73.07	19.40
29	☐	J493	76.56	145:10	57.17	44:40	72.22	19.39
30	☐	J581	78.52	145:10	59.12	44:40	74.17	19.40
31	☐	J583	77.67	145:10	58.27	44:40	73.32	19.40
32	☐	J585	78.60	145:10	59.19	44:40	74.25	19.40
33	☐	J587	78.13	145:10	58.73	44:40	73.78	19.40
34	☐	J589	78.03	145:10	58.62	44:40	73.68	19.40
35	☐	J591	78.98	145:10	59.57	44:40	74.63	19.41
36	☐	J593	80.69	145:10	61.28	44:40	76.33	19.41
37	☐	J299	76.01	145:10	56.58	44:40	71.65	19.42
38	☐	J381	77.29	145:10	57.87	44:40	72.93	19.42
39	☐	J383	74.84	145:10	55.41	44:40	70.48	19.43
40	☐	J385	75.14	145:10	55.72	44:40	70.78	19.43
41	☐	J387	73.90	145:10	54.48	44:40	69.55	19.43
42	☐	J389	73.78	145:10	54.35	44:40	69.42	19.42
43	☐	J393	70.41	145:10	50.97	44:40	66.05	19.43
44	☐	J395	73.75	145:10	54.32	44:40	69.39	19.43
45	☐	J397	68.81	145:10	49.38	44:40	64.45	19.43
46	☐	J399	66.80	145:10	47.36	44:40	62.44	19.43
47	☐	J409	72.55	145:10	53.12	44:40	68.19	19.43
48	☐	J411	70.79	145:10	51.36	44:40	66.43	19.43
49	☐	J415	85.80	145:10	66.40	44:40	81.45	19.41
50	☐	J443	76.75	145:10	57.32	44:40	72.39	19.42

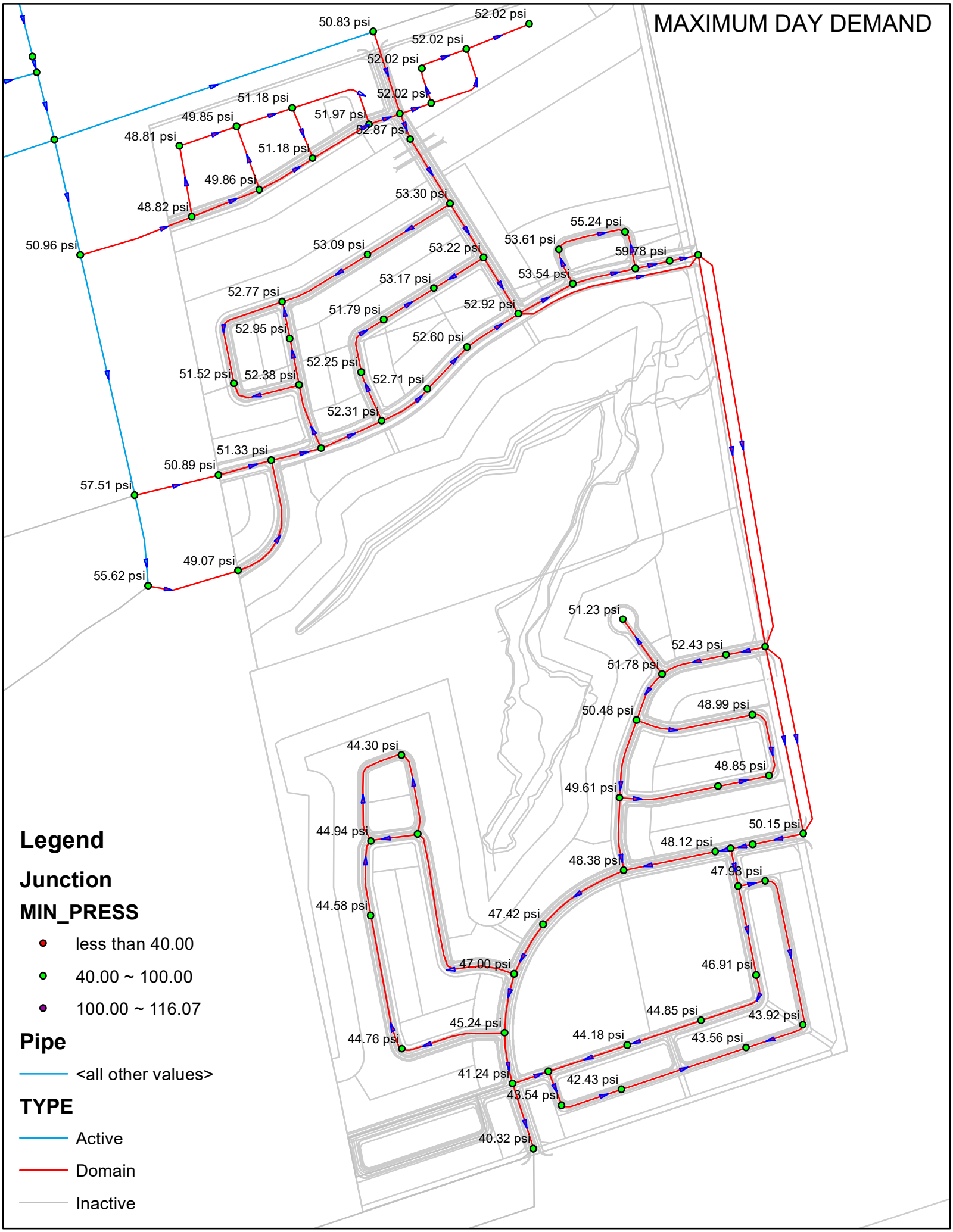
		ID	Max.Value (psi)	Max.Time (hrs.)	Min.Value (psi)	Min.Time (hrs.)	Average (psi)	Difference (psi)
51	☐	J445	74.39	145:10	54.96	44:40	70.03	19.43
52	☐	J447	73.63	145:10	54.21	44:40	69.28	19.42
53	☐	J449	74.37	145:10	54.95	44:40	70.02	19.42
54	☐	J457	70.15	145:10	50.72	44:40	65.79	19.43
55	☐	J459	71.49	145:10	52.05	44:40	67.13	19.43
56	☐	J461	70.51	145:10	51.07	44:40	66.15	19.43
57	☐	J477	67.99	145:10	48.56	44:40	63.63	19.43
58	☐	J481	73.53	145:10	54.10	44:40	69.17	19.43
59	☐	J487	69.10	145:10	49.67	44:40	64.74	19.43
60	☐	J495	78.57	145:10	59.16	44:40	74.21	19.41
61	☐	J499	69.13	145:10	49.69	44:40	64.77	19.43
62	☐	J501	69.48	145:10	50.05	44:40	65.12	19.43
63	☐	J575	69.87	145:10	50.43	44:40	65.51	19.43
64	☐	J577	77.91	145:10	58.50	44:40	73.56	19.42
65	☐	J579	74.53	145:10	55.10	44:40	70.17	19.43
66	☐	J595	70.32	145:10	50.89	44:40	65.96	19.43
67	☐	J597	69.74	145:10	50.31	44:40	65.38	19.43
68	☐	J599	72.47	145:10	53.04	44:40	68.11	19.43
69	☐	J601	72.97	145:10	53.54	44:40	68.61	19.43
70	☐	J605	75.62	145:10	56.21	44:40	71.27	19.41
71	☐	J609	65.87	145:10	46.44	44:40	61.51	19.43

ADD - Pipe

		ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/k-m)	Status
1	☐	P4790	J603	J421	141.27	200.00	110.00	0.93	0.03	0.00	0.01	Open
2	☐	P4792	J473	J421	86.72	200.00	110.00	-0.47	0.02	0.00	0.00	Open
3	☐	P4794	J493	J465	70.08	200.00	110.00	-0.28	0.01	0.00	0.00	Open
4	☐	P4796	J275	J431	33.15	400.00	120.00	2.71	0.02	0.00	0.00	Open
5	☐	P4798	J419	J275	103.34	400.00	120.00	2.57	0.02	0.00	0.00	Open
6	☐	P4800	J431	J277	90.25	400.00	120.00	2.71	0.02	0.00	0.00	Open
7	☐	P4802	J277	J581	115.93	150.00	100.00	0.18	0.01	0.00	0.00	Open
8	☐	P4804	J281	J433	45.12	150.00	100.00	-0.05	0.00	0.00	0.00	Open
9	☐	P4806	J433	J283	56.75	150.00	100.00	-0.12	0.01	0.00	0.00	Open
10	☐	P4808	J283	J285	80.68	150.00	100.00	-0.31	0.02	0.00	0.01	Open
11	☐	P4810	J285	J287	61.06	300.00	120.00	-1.79	0.03	0.00	0.00	Open
12	☐	P4812	J287	J289	65.51	300.00	120.00	-1.15	0.02	0.00	0.00	Open
13	☐	P4814	J287	J291	158.87	300.00	120.00	-0.72	0.01	0.00	0.00	Open
14	☐	P4816	J285	J293	79.70	300.00	120.00	1.40	0.02	0.00	0.00	Open
15	☐	P4818	J293	J583	63.67	150.00	100.00	0.18	0.01	0.00	0.00	Open
16	☐	P4820	J437	J585	70.63	150.00	100.00	0.04	0.00	0.00	0.00	Open
17	☐	P4822	J293	J587	67.64	300.00	120.00	1.16	0.02	0.00	0.00	Open
18	☐	P4824	J277	J279	76.00	400.00	120.00	2.42	0.02	0.00	0.00	Open
19	☐	P4826	J279	J295	79.00	400.00	120.00	2.28	0.02	0.00	0.00	Open
20	☐	P4828	J591	J439	44.89	150.00	100.00	0.13	0.01	0.00	0.00	Open
21	☐	P4830	J439	J593	85.09	150.00	100.00	0.02	0.00	0.00	0.00	Open
22	☐	P4832	J295	J591	74.44	400.00	120.00	1.69	0.01	0.00	0.00	Open
23	☐	P4834	J297	J441	42.15	400.00	120.00	1.42	0.01	0.00	0.00	Open
24	☐	P4838	J471	J275	39.26	200.00	110.00	0.42	0.01	0.00	0.00	Open
25	☐	P4840	J473	J423	74.28	200.00	110.00	0.33	0.01	0.00	0.00	Open
26	☐	P4842	J421	J463	86.20	200.00	110.00	0.40	0.01	0.00	0.00	Open
27	☐	P4844	J473	J465	80.21	150.00	100.00	0.07	0.00	0.00	0.00	Open
28	☐	P4846	J423	J471	78.46	200.00	110.00	0.28	0.01	0.00	0.00	Open
29	☐	P4850	J471	J493	123.02	200.00	110.00	-0.22	0.01	0.00	0.00	Open
30	☐	P4852	J427	J467	81.09	200.00	110.00	0.07	0.00	0.00	0.00	Open
31	☐	P4854	J465	J463	72.49	200.00	110.00	-0.32	0.01	0.00	0.00	Open
32	☐	P4858	J275	J429	39.25	200.00	110.00	0.28	0.01	0.00	0.00	Open
33	☐	P4860	J429	J491	43.46	200.00	110.00	0.13	0.00	0.00	0.00	Open
34	☐	P4862	J429	J427	102.89	200.00	110.00	0.09	0.00	0.00	0.00	Open
35	☐	P4872	J281	J435	147.62	150.00	100.00	0.03	0.00	0.00	0.00	Open
36	☐	P4874	J435	J283	89.38	150.00	100.00	-0.11	0.01	0.00	0.00	Open
37	☐	P4950	B14	J289	102.99	300.00	120.00	1.18	0.02	0.00	0.00	Open
38	☐	P4952	J291	J483	111.35	300.00	120.00	-0.78	0.01	0.00	0.00	Open
39	☐	P4980	J491	J427	59.32	200.00	110.00	0.06	0.00	0.00	0.00	Open
40	☐	P4982	J493	J423	64.95	150.00	100.00	0.03	0.00	0.00	0.00	Open
41	☐	P5116	J581	J281	116.78	150.00	100.00	0.06	0.00	0.00	0.00	Open
42	☐	P5118	J583	J437	80.89	150.00	100.00	0.11	0.01	0.00	0.00	Open
43	☐	P5120	J587	J589	69.13	300.00	120.00	1.08	0.02	0.00	0.00	Open
44	☐	P5122	J589	J295	72.72	300.00	120.00	1.01	0.01	0.00	0.00	Open
45	☐	P5124	J591	J297	76.84	400.00	120.00	1.49	0.01	0.00	0.00	Open
46	☐	P5126	J593	J297	46.19	150.00	100.00	-0.04	0.00	0.00	0.00	Open
47	☐	P5146	J585	J279	69.94	150.00	100.00	-0.07	0.00	0.00	0.00	Open
48	☐	P4836	J441	J415	34.81	400.00	120.00	1.38	0.01	0.00	0.00	Open
49	☐	P4876	J415	J495	475.03	400.00	120.00	1.46	0.01	0.00	0.00	Open
50	☐	P4878	J605	J449	61.81	300.00	120.00	2.24	0.03	0.00	0.01	Open
51	☐	P4880	J449	J389	26.88	300.00	120.00	2.19	0.03	0.00	0.01	Open
52	☐	P4882	J495	J577	48.14	200.00	110.00	0.66	0.02	0.00	0.01	Open
53	☐	P4884	J383	J445	62.05	150.00	100.00	0.03	0.00	0.00	0.00	Open
54	☐	P4886	J445	J579	86.97	150.00	100.00	-0.02	0.00	0.00	0.00	Open
55	☐	P4888	J299	J381	63.52	200.00	110.00	-0.43	0.01	0.00	0.00	Open

		ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/k-m)	Status
56	☐	P4890	J381	J577	80.38	200.00	110.00	-0.61	0.02	0.00	0.01	Open
57	☐	P4892	J443	J381	80.56	200.00	110.00	-0.10	0.00	0.00	0.00	Open
58	☐	P4894	J299	J385	96.19	200.00	110.00	0.22	0.01	0.00	0.00	Open
59	☐	P4896	J383	J385	119.21	150.00	100.00	-0.11	0.01	0.00	0.00	Open
60	☐	P4898	J385	J387	87.13	200.00	110.00	0.03	0.00	0.00	0.00	Open
61	☐	P4900	J389	J447	18.65	300.00	120.00	1.17	0.02	0.00	0.00	Open
62	☐	P4902	J447	J387	111.90	300.00	120.00	1.13	0.02	0.00	0.00	Open
63	☐	P4908	J389	J395	46.00	200.00	110.00	1.00	0.03	0.00	0.01	Open
64	☐	P4910	J395	J599	108.13	200.00	110.00	0.22	0.01	0.00	0.00	Open
65	☐	P4914	J393	J597	92.88	200.00	110.00	0.11	0.00	0.00	0.00	Open
66	☐	P4916	J397	J399	45.21	200.00	110.00	-0.31	0.01	0.00	0.00	Open
67	☐	P4918	J399	J411	61.62	300.00	120.00	-0.40	0.01	0.00	0.00	Open
68	☐	P4920	J411	J409	71.82	300.00	120.00	-0.73	0.01	0.00	0.00	Open
69	☐	P4922	J409	J601	69.00	300.00	120.00	-1.05	0.01	0.00	0.00	Open
70	☐	P4924	J459	J409	245.92	200.00	110.00	-0.28	0.01	0.00	0.00	Open
71	☐	P4926	J461	J459	56.70	200.00	110.00	-0.09	0.00	0.00	0.00	Open
72	☐	P4928	J461	J457	91.85	200.00	110.00	-0.04	0.00	0.00	0.00	Open
73	☐	P4930	J457	J595	165.18	200.00	110.00	-0.18	0.01	0.00	0.00	Open
74	☐	P4938	J609	J399	81.51	300.00	120.00	-0.03	0.00	0.00	0.00	Open
75	☐	P4940	J397	J487	43.57	200.00	110.00	0.24	0.01	0.00	0.00	Open
76	☐	P4942	J477	J499	157.44	200.00	110.00	0.01	0.00	0.00	0.00	Open
77	☐	P4946	J395	J481	33.00	200.00	110.00	0.32	0.01	0.00	0.00	Open
78	☐	P4958	J477	J487	75.06	200.00	110.00	-0.14	0.00	0.00	0.00	Open
79	☐	P4986	J575	J461	136.64	150.00	100.00	-0.02	0.00	0.00	0.00	Open
80	☐	P4992	J501	J499	74.12	200.00	110.00	0.10	0.00	0.00	0.00	Open
81	☐	P4994	J481	J501	184.93	200.00	110.00	0.22	0.01	0.00	0.00	Open
82	☐	P5108	J575	J459	99.81	150.00	100.00	-0.04	0.00	0.00	0.00	Open
83	☐	P5110	J579	J299	141.81	150.00	100.00	-0.13	0.01	0.00	0.00	Open
84	☐	P5128	J595	J411	125.56	200.00	110.00	-0.29	0.01	0.00	0.00	Open
85	☐	P5130	J597	J397	99.57	200.00	110.00	0.01	0.00	0.00	0.00	Open
86	☐	P5132	J599	J393	102.31	200.00	110.00	0.16	0.01	0.00	0.00	Open
87	☐	P5134	J387	J601	117.17	300.00	120.00	1.13	0.02	0.00	0.00	Open
88	☐	P5140	J495	J605	228.13	400.00	120.00	1.13	0.01	0.00	0.00	Open
89	☐	P5174	J415	J495	484.22	400.00	120.00	1.45	0.01	0.00	0.00	Open
90	☐	P5176	J295	J415	231.62	400.00	120.00	1.52	0.01	0.00	0.00	Open
91	☐	P5178	J495	J605	238.91	400.00	120.00	1.11	0.01	0.00	0.00	Open

Hydraulic Model Results
Maximum Day Demand Scenario


MAXIMUM DAY DEMAND
50.83 psi
52.02 psi
52.02 psi
52.02 psi
52.02 psi
51.18 psi
49.85 psi
51.97 psi
52.87 psi
48.81 psi
51.18 psi
49.86 psi
48.82 psi
53.30 psi
50.96 psi
55.24 psi
53.61 psi
59.78 psi
53.09 psi
53.22 psi
53.54 psi
53.17 psi
52.77 psi
51.79 psi
52.92 psi
52.95 psi
52.60 psi
52.25 psi
51.52 psi
52.38 psi
52.71 psi
52.31 psi
51.33 psi
50.89 psi
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51.23 psi
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49.61 psi
44.94 psi
50.15 psi
48.12 psi
48.38 psi
47.98 psi
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47.42 psi
47.00 psi
46.91 psi
44.85 psi
43.92 psi
45.24 psi
44.18 psi
44.76 psi
43.56 psi
41.24 psi
42.43 psi
43.54 psi
40.32 psi
Legend
Junction
MIN_PRESS
less than 40.00
40.00 ~ 100.00
100.00 ~ 116.07
Pipe
<all other values>
TYPE
Active
Domain
Inactive

MDD - Junction Demand

		ID	Max.Value (L/s)	Max.Time (hrs.)	Min.Value (L/s)	Min.Time (hrs.)	Average (L/s)	Difference (L/s)
1	☐	J275	0.00	00:00	0.00	00:00	0.00	0.00
2	☐	J277	0.98	19:50	0.07	07:20	0.48	0.90
3	☐	J279	0.73	19:50	0.05	07:20	0.36	0.68
4	☐	J281	0.79	19:50	0.06	07:20	0.39	0.73
5	☐	J283	0.73	19:50	0.05	07:20	0.36	0.68
6	☐	J285	0.67	19:50	0.05	07:20	0.33	0.62
7	☐	J287	0.73	19:50	0.05	07:20	0.36	0.68
8	☐	J289	0.30	19:50	0.02	07:20	0.15	0.28
9	☐	J291	0.61	19:50	0.04	07:20	0.30	0.56
10	☐	J293	0.61	19:50	0.04	07:20	0.30	0.56
11	☐	J295	0.67	19:50	0.05	07:20	0.33	0.62
12	☐	J297	0.37	19:50	0.03	07:20	0.18	0.34
13	☐	J421	0.56	19:50	0.04	07:20	0.28	0.52
14	☐	J423	0.75	19:50	0.06	07:20	0.37	0.70
15	☐	J427	0.75	19:50	0.06	07:20	0.37	0.70
16	☐	J429	0.56	19:50	0.04	07:20	0.28	0.52
17	☐	J431	0.00	00:00	0.00	00:00	0.00	0.00
18	☐	J433	0.64	19:50	0.05	07:20	0.32	0.59
19	☐	J435	1.34	19:50	0.10	07:20	0.66	1.24
20	☐	J437	0.67	19:50	0.05	07:20	0.33	0.62
21	☐	J439	0.98	19:50	0.07	07:20	0.48	0.90
22	☐	J441	0.30	19:50	0.02	07:20	0.15	0.28
23	☐	J463	0.69	19:50	0.05	07:20	0.34	0.64
24	☐	J465	1.07	19:50	0.08	07:20	0.53	0.99
25	☐	J467	0.63	19:50	0.05	07:20	0.31	0.58
26	☐	J471	0.75	19:50	0.06	07:20	0.37	0.70
27	☐	J473	0.66	19:50	0.05	07:20	0.33	0.61
28	☐	J491	0.69	19:50	0.05	07:20	0.34	0.64
29	☐	J493	0.28	19:50	0.02	07:20	0.14	0.26
30	☐	J581	1.10	19:50	0.08	07:20	0.54	1.02
31	☐	J583	0.67	19:50	0.05	07:20	0.33	0.62
32	☐	J585	0.98	19:50	0.07	07:20	0.48	0.90
33	☐	J587	0.67	19:50	0.05	07:20	0.33	0.62
34	☐	J589	0.67	19:50	0.05	07:20	0.33	0.62
35	☐	J591	0.67	19:50	0.05	07:20	0.33	0.62
36	☐	J593	0.55	19:50	0.04	07:20	0.27	0.51
37	☐	J299	0.72	19:50	0.05	07:20	0.36	0.67
38	☐	J381	0.62	19:50	0.05	07:20	0.31	0.58
39	☐	J383	0.67	19:50	0.05	07:20	0.33	0.62
40	☐	J385	0.67	19:50	0.05	07:20	0.33	0.62
41	☐	J387	0.24	19:50	0.02	07:20	0.12	0.22
42	☐	J389	0.19	19:50	0.01	07:20	0.10	0.18
43	☐	J393	0.43	19:50	0.03	07:20	0.21	0.40
44	☐	J395	3.86	20:20	0.28	07:30	1.91	3.58
45	☐	J397	0.74	19:50	0.05	07:20	0.37	0.69
46	☐	J399	0.41	19:50	0.03	07:20	0.20	0.38
47	☐	J409	0.34	19:50	0.02	07:20	0.17	0.31
48	☐	J411	0.38	19:50	0.03	07:20	0.19	0.36
49	☐	J415	0.00	00:00	0.00	00:00	0.00	0.00
50	☐	J443	0.82	19:50	0.06	07:20	0.41	0.76

		ID	Max.Value (L/s)	Max.Time (hrs.)	Min.Value (L/s)	Min.Time (hrs.)	Average (L/s)	Difference (L/s)
51	☐	J445	0.43	19:50	0.03	07:20	0.21	0.40
52	☐	J447	0.34	19:50	0.02	07:20	0.17	0.31
53	☐	J449	0.38	19:50	0.03	07:20	0.19	0.36
54	☐	J457	1.11	19:50	0.08	07:20	0.55	1.02
55	☐	J459	1.25	19:50	0.09	07:20	0.62	1.16
56	☐	J461	0.91	19:50	0.07	07:20	0.45	0.85
57	☐	J477	1.04	19:50	0.08	07:20	0.52	0.97
58	☐	J481	0.80	19:50	0.06	07:20	0.40	0.74
59	☐	J487	0.80	19:50	0.06	07:20	0.40	0.74
60	☐	J495	0.00	00:00	0.00	00:00	0.00	0.00
61	☐	J499	0.98	19:50	0.07	07:20	0.49	0.91
62	☐	J501	0.98	19:50	0.07	07:20	0.49	0.91
63	☐	J575	0.53	19:50	0.04	07:20	0.26	0.49
64	☐	J577	0.48	19:50	0.04	07:20	0.24	0.45
65	☐	J579	0.87	19:50	0.06	07:20	0.43	0.80
66	☐	J595	0.91	19:50	0.07	07:20	0.45	0.85
67	☐	J597	0.82	19:50	0.06	07:20	0.41	0.76
68	☐	J599	0.48	19:50	0.04	07:20	0.24	0.45
69	☐	J601	0.72	19:50	0.05	07:20	0.35	0.66
70	☐	J605	0.00	00:00	0.00	00:00	0.00	0.00
71	☐	J609	0.20	19:50	0.02	07:20	0.10	0.19

MDD - Junction Pressure

		ID	Max.Value (psi)	Max.Time (hrs.)	Min.Value (psi)	Min.Time (hrs.)	Average (psi)	Difference (psi)
1	☐	J275	78.61	144:40	52.02	21:10	71.70	26.59
2	☐	J277	79.91	144:40	53.30	21:10	72.99	26.61
3	☐	J279	79.84	144:40	53.22	21:10	72.91	26.62
4	☐	J281	79.41	144:40	52.77	21:10	72.48	26.64
5	☐	J283	79.01	144:40	52.38	21:10	72.08	26.63
6	☐	J285	78.30	144:40	51.71	21:10	71.39	26.59
7	☐	J287	77.90	144:40	51.33	21:10	70.99	26.57
8	☐	J289	77.45	144:40	50.89	21:10	70.54	26.56
9	☐	J291	75.63	144:40	49.07	21:10	68.72	26.56
10	☐	J293	78.91	144:40	52.31	21:10	71.99	26.60
11	☐	J295	79.55	144:40	52.92	21:10	72.62	26.63
12	☐	J297	83.76	144:40	57.12	21:10	76.83	26.64
13	☐	J421	75.38	144:40	48.82	21:10	68.47	26.55
14	☐	J423	77.76	144:40	51.18	21:10	70.85	26.58
15	☐	J427	78.61	144:40	52.02	21:10	71.70	26.60
16	☐	J429	78.61	144:40	52.02	21:10	71.70	26.59
17	☐	J431	79.47	144:40	52.87	21:10	72.55	26.60
18	☐	J433	79.59	144:40	52.95	21:10	72.66	26.64
19	☐	J435	78.16	144:40	51.52	21:10	71.23	26.64
20	☐	J437	78.41	144:40	51.79	21:10	71.49	26.62
21	☐	J439	80.25	144:40	53.61	21:10	73.32	26.64
22	☐	J441	86.42	144:40	59.78	21:10	79.49	26.64
23	☐	J463	75.37	144:40	48.81	21:10	68.47	26.57
24	☐	J465	76.43	144:40	49.85	21:10	69.52	26.57
25	☐	J467	78.61	144:40	52.02	21:10	71.70	26.60
26	☐	J471	78.56	144:40	51.97	21:10	71.64	26.58
27	☐	J473	76.43	144:40	49.86	21:10	69.52	26.57
28	☐	J491	78.61	144:40	52.02	21:10	71.70	26.60
29	☐	J493	77.76	144:40	51.18	21:10	70.85	26.58
30	☐	J581	79.72	144:40	53.09	21:10	72.79	26.63
31	☐	J583	78.87	144:40	52.25	21:10	71.95	26.62
32	☐	J585	79.79	144:40	53.17	21:10	72.87	26.62
33	☐	J587	79.32	144:40	52.71	21:10	72.40	26.61
34	☐	J589	79.22	144:40	52.60	21:10	72.30	26.62
35	☐	J591	80.18	144:40	53.54	21:10	73.25	26.63
36	☐	J593	81.88	144:40	55.24	21:10	74.95	26.64
37	☐	J299	77.20	144:40	50.48	21:10	70.25	26.72
38	☐	J381	78.48	144:40	51.78	21:10	71.53	26.70
39	☐	J383	76.03	144:40	49.31	21:10	69.08	26.73
40	☐	J385	76.33	144:40	49.61	21:10	69.38	26.72
41	☐	J387	75.10	144:40	48.38	21:10	68.14	26.72
42	☐	J389	74.97	144:40	48.26	21:10	68.02	26.70
43	☐	J393	71.60	144:40	44.85	21:10	64.63	26.75
44	☐	J395	74.94	144:40	48.20	21:10	67.98	26.74
45	☐	J397	70.00	144:40	43.26	21:10	63.04	26.75
46	☐	J399	67.99	144:40	41.24	21:10	61.02	26.75
47	☐	J409	73.74	144:40	47.00	21:10	66.78	26.74
48	☐	J411	71.98	144:40	45.24	21:10	65.02	26.74
49	☐	J415	87.00	144:40	60.36	21:10	80.07	26.64
50	☐	J443	77.94	144:40	51.23	21:10	70.99	26.71

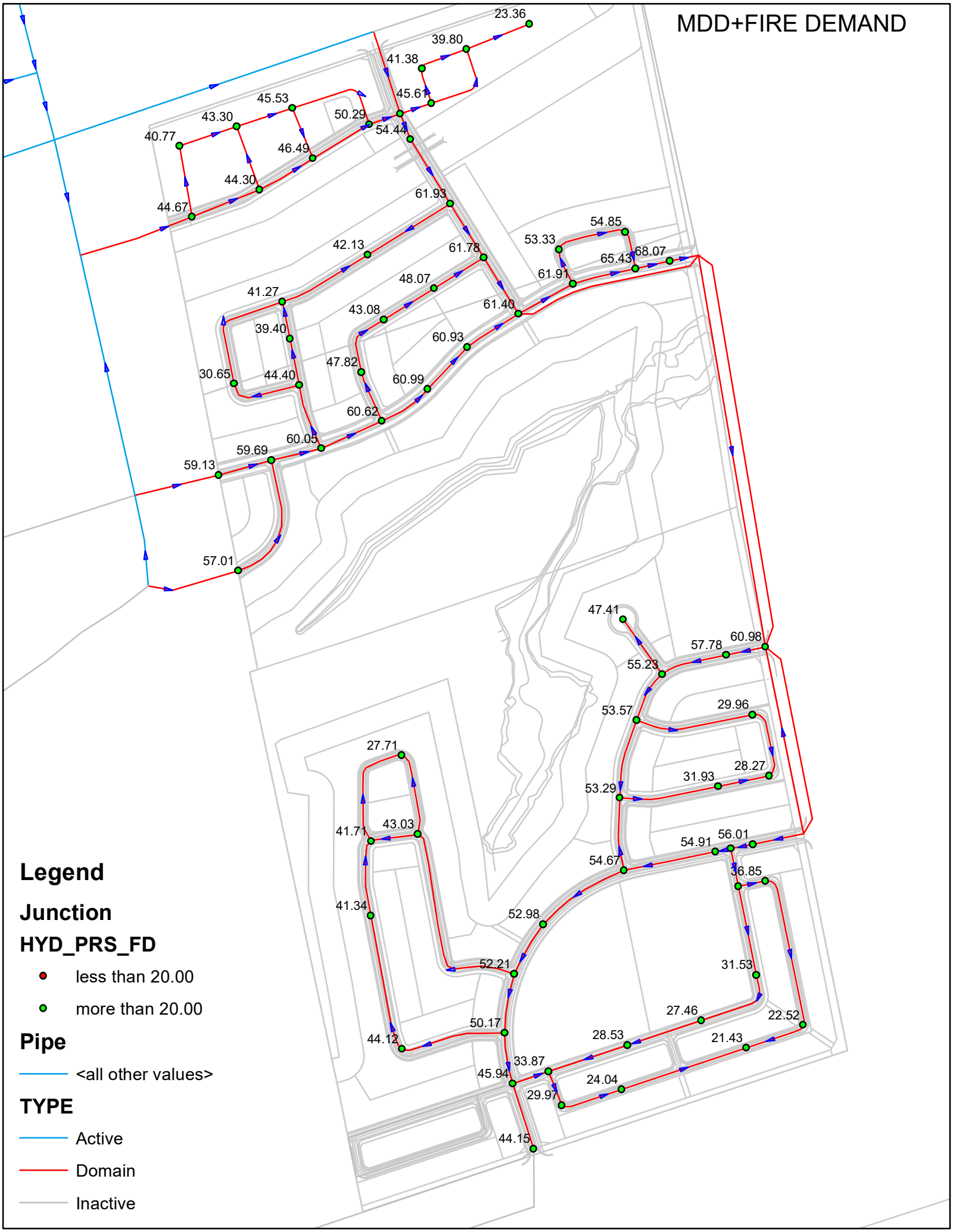
		ID	Max.Value (psi)	Max.Time (hrs.)	Min.Value (psi)	Min.Time (hrs.)	Average (psi)	Difference (psi)
51	☐	J445	75.58	144:40	48.85	21:10	68.62	26.73
52	☐	J447	74.83	144:40	48.12	21:10	67.88	26.71
53	☐	J449	75.57	144:40	48.87	21:10	68.62	26.69
54	☐	J457	71.34	144:40	44.58	21:10	64.37	26.76
55	☐	J459	72.68	144:40	45.92	21:10	65.71	26.76
56	☐	J461	71.70	144:40	44.94	21:10	64.73	26.76
57	☐	J477	69.18	144:40	42.43	21:10	62.21	26.75
58	☐	J481	74.72	144:40	47.98	21:10	67.76	26.74
59	☐	J487	70.29	144:40	43.54	21:10	63.32	26.75
60	☐	J495	79.76	144:40	53.10	21:10	72.82	26.66
61	☐	J499	70.32	144:40	43.56	21:10	63.35	26.75
62	☐	J501	70.67	144:40	43.92	21:10	63.71	26.75
63	☐	J575	71.06	144:40	44.30	21:10	64.09	26.76
64	☐	J577	79.11	144:40	52.43	21:10	72.16	26.68
65	☐	J579	75.72	144:40	48.99	21:10	68.76	26.73
66	☐	J595	71.51	144:40	44.76	21:10	64.55	26.75
67	☐	J597	70.93	144:40	44.18	21:10	63.96	26.75
68	☐	J599	73.66	144:40	46.91	21:10	66.70	26.75
69	☐	J601	74.16	144:40	47.42	21:10	67.20	26.73
70	☐	J605	76.82	144:40	50.15	21:10	69.88	26.67
71	☐	J609	67.06	144:40	40.32	21:10	60.10	26.75

MDD - Pipe

		ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/k-m)	Status
1		P4790	J603	J421	141.27	200.00	110.00	2.22	0.07	0.01	0.05	Open
2		P4792	J473	J421	86.72	200.00	110.00	-1.12	0.04	0.00	0.02	Open
3		P4794	J493	J465	70.08	200.00	110.00	-0.64	0.02	0.00	0.01	Open
4		P4796	J275	J431	33.15	400.00	120.00	6.30	0.05	0.00	0.01	Open
5		P4798	J419	J275	103.34	400.00	120.00	6.08	0.05	0.00	0.01	Open
6		P4800	J431	J277	90.25	400.00	120.00	6.30	0.05	0.00	0.01	Open
7		P4802	J277	J581	115.93	150.00	100.00	0.47	0.03	0.00	0.01	Open
8		P4804	J281	J433	45.12	150.00	100.00	-0.12	0.01	0.00	0.00	Open
9		P4806	J433	J283	56.75	150.00	100.00	-0.30	0.02	0.00	0.01	Open
10		P4808	J283	J285	80.68	150.00	100.00	-0.77	0.04	0.00	0.04	Open
11		P4810	J285	J287	61.06	300.00	120.00	-4.20	0.06	0.00	0.02	Open
12		P4812	J287	J289	65.51	300.00	120.00	-2.72	0.04	0.00	0.01	Open
13		P4814	J287	J291	158.87	300.00	120.00	-1.69	0.02	0.00	0.00	Open
14		P4816	J285	J293	79.70	300.00	120.00	3.25	0.05	0.00	0.01	Open
15		P4818	J293	J583	63.67	150.00	100.00	0.43	0.02	0.00	0.01	Open
16		P4820	J437	J585	70.63	150.00	100.00	0.07	0.00	0.00	0.00	Open
17		P4822	J293	J587	67.64	300.00	120.00	2.65	0.04	0.00	0.01	Open
18		P4824	J277	J279	76.00	400.00	120.00	5.57	0.04	0.00	0.01	Open
19		P4826	J279	J295	79.00	400.00	120.00	5.18	0.04	0.00	0.01	Open
20		P4828	J591	J439	44.89	150.00	100.00	0.30	0.02	0.00	0.01	Open
21		P4830	J439	J593	85.09	150.00	100.00	0.04	0.00	0.00	0.00	Open
22		P4832	J295	J591	74.44	400.00	120.00	3.86	0.03	0.00	0.00	Open
23		P4834	J297	J441	42.15	400.00	120.00	3.17	0.03	0.00	0.00	Open
24		P4838	J471	J275	39.26	200.00	110.00	0.93	0.03	0.00	0.01	Open
25		P4840	J473	J423	74.28	200.00	110.00	0.77	0.02	0.00	0.01	Open
26		P4842	J421	J463	86.20	200.00	110.00	0.94	0.03	0.00	0.01	Open
27		P4844	J473	J465	80.21	150.00	100.00	0.17	0.01	0.00	0.00	Open
28		P4846	J423	J471	78.46	200.00	110.00	0.63	0.02	0.00	0.01	Open
29		P4850	J471	J493	123.02	200.00	110.00	-0.51	0.02	0.00	0.00	Open
30		P4852	J427	J467	81.09	200.00	110.00	0.17	0.01	0.00	0.00	Open
31		P4854	J465	J463	72.49	200.00	110.00	-0.76	0.02	0.00	0.01	Open
32		P4858	J275	J429	39.25	200.00	110.00	0.71	0.02	0.00	0.01	Open
33		P4860	J429	J491	43.46	200.00	110.00	0.32	0.01	0.00	0.00	Open
34		P4862	J429	J427	102.89	200.00	110.00	0.23	0.01	0.00	0.00	Open
35		P4872	J281	J435	147.62	150.00	100.00	0.08	0.00	0.00	0.00	Open
36		P4874	J435	J283	89.38	150.00	100.00	-0.28	0.02	0.00	0.01	Open
37		P4950	B14	J289	102.99	300.00	120.00	2.80	0.04	0.00	0.01	Open
38		P4952	J291	J483	111.35	300.00	120.00	-1.85	0.03	0.00	0.00	Open
39		P4980	J491	J427	59.32	200.00	110.00	0.14	0.00	0.00	0.00	Open
40		P4982	J493	J423	64.95	150.00	100.00	0.06	0.00	0.00	0.00	Open
41		P5116	J581	J281	116.78	150.00	100.00	0.17	0.01	0.00	0.00	Open
42		P5118	J583	J437	80.89	150.00	100.00	0.25	0.01	0.00	0.00	Open
43		P5120	J587	J589	69.13	300.00	120.00	2.47	0.03	0.00	0.01	Open
44		P5122	J589	J295	72.72	300.00	120.00	2.29	0.03	0.00	0.01	Open
45		P5124	J591	J297	76.84	400.00	120.00	3.37	0.03	0.00	0.00	Open
46		P5126	J593	J297	46.19	150.00	100.00	-0.11	0.01	0.00	0.00	Open
47		P5146	J585	J279	69.94	150.00	100.00	-0.19	0.01	0.00	0.00	Open
48		P4836	J441	J415	34.81	400.00	120.00	3.08	0.02	0.00	0.00	Open
49		P4876	J415	J495	475.03	400.00	120.00	3.27	0.03	0.00	0.00	Open
50		P4878	J605	J449	61.81	300.00	120.00	5.02	0.07	0.00	0.03	Open
51		P4880	J449	J389	26.88	300.00	120.00	4.92	0.07	0.00	0.03	Open
52		P4882	J495	J577	48.14	200.00	110.00	1.49	0.05	0.00	0.03	Open
53		P4884	J383	J445	62.05	150.00	100.00	0.06	0.00	0.00	0.00	Open
54		P4886	J445	J579	86.97	150.00	100.00	-0.05	0.00	0.00	0.00	Open
55		P4888	J299	J381	63.52	200.00	110.00	-0.97	0.03	0.00	0.01	Open

		ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/k-m)	Status
56	☐	P4890	J381	J577	80.38	200.00	110.00	-1.36	0.04	0.00	0.02	Open
57	☐	P4892	J443	J381	80.56	200.00	110.00	-0.22	0.01	0.00	0.00	Open
58	☐	P4894	J299	J385	96.19	200.00	110.00	0.49	0.02	0.00	0.00	Open
59	☐	P4896	J383	J385	119.21	150.00	100.00	-0.24	0.01	0.00	0.00	Open
60	☐	P4898	J385	J387	87.13	200.00	110.00	0.07	0.00	0.00	0.00	Open
61	☐	P4900	J389	J447	18.65	300.00	120.00	2.63	0.04	0.00	0.01	Open
62	☐	P4902	J447	J387	111.90	300.00	120.00	2.54	0.04	0.00	0.01	Open
63	☐	P4908	J389	J395	46.00	200.00	110.00	2.24	0.07	0.00	0.06	Open
64	☐	P4910	J395	J599	108.13	200.00	110.00	0.48	0.02	0.00	0.00	Open
65	☐	P4914	J393	J597	92.88	200.00	110.00	0.24	0.01	0.00	0.00	Open
66	☐	P4916	J397	J399	45.21	200.00	110.00	-0.71	0.02	0.00	0.01	Open
67	☐	P4918	J399	J411	61.62	300.00	120.00	-0.88	0.01	0.00	0.00	Open
68	☐	P4920	J411	J409	71.82	300.00	120.00	-1.62	0.02	0.00	0.00	Open
69	☐	P4922	J409	J601	69.00	300.00	120.00	-2.34	0.03	0.00	0.01	Open
70	☐	P4924	J459	J409	245.92	200.00	110.00	-0.63	0.02	0.00	0.01	Open
71	☐	P4926	J461	J459	56.70	200.00	110.00	-0.20	0.01	0.00	0.00	Open
72	☐	P4928	J461	J457	91.85	200.00	110.00	-0.10	0.00	0.00	0.00	Open
73	☐	P4930	J457	J595	165.18	200.00	110.00	-0.40	0.01	0.00	0.00	Open
74	☐	P4938	J609	J399	81.51	300.00	120.00	-0.06	0.00	0.00	0.00	Open
75	☐	P4940	J397	J487	43.57	200.00	110.00	0.53	0.02	0.00	0.00	Open
76	☐	P4942	J477	J499	157.44	200.00	110.00	0.04	0.00	0.00	0.00	Open
77	☐	P4946	J395	J481	33.00	200.00	110.00	0.71	0.02	0.00	0.01	Open
78	☐	P4958	J477	J487	75.06	200.00	110.00	-0.32	0.01	0.00	0.00	Open
79	☐	P4986	J575	J461	136.64	150.00	100.00	-0.05	0.00	0.00	0.00	Open
80	☐	P4992	J501	J499	74.12	200.00	110.00	0.23	0.01	0.00	0.00	Open
81	☐	P4994	J481	J501	184.93	200.00	110.00	0.49	0.02	0.00	0.00	Open
82	☐	P5108	J575	J459	99.81	150.00	100.00	-0.09	0.01	0.00	0.00	Open
83	☐	P5110	J579	J299	141.81	150.00	100.00	-0.29	0.02	0.00	0.01	Open
84	☐	P5128	J595	J411	125.56	200.00	110.00	-0.64	0.02	0.00	0.01	Open
85	☐	P5130	J597	J397	99.57	200.00	110.00	0.02	0.00	0.00	0.00	Open
86	☐	P5132	J599	J393	102.31	200.00	110.00	0.35	0.01	0.00	0.00	Open
87	☐	P5134	J387	J601	117.17	300.00	120.00	2.54	0.04	0.00	0.01	Open
88	☐	P5140	J495	J605	228.13	400.00	120.00	2.54	0.02	0.00	0.00	Open
89	☐	P5174	J415	J495	484.22	400.00	120.00	3.24	0.03	0.00	0.00	Open
90	☐	P5176	J295	J415	231.62	400.00	120.00	3.43	0.03	0.00	0.00	Open
91	☐	P5178	J495	J605	238.91	400.00	120.00	2.48	0.02	0.00	0.00	Open

Hydraulic Model Results
Fire Flow Scenario


MDD+FIRE DEMAND
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44.67
61.93
54.85
53.33
42.13
61.78
68.07
65.43
61.91
48.07
41.27
61.40
43.08
39.40
60.93
47.82
30.65
44.40
60.99
60.62
60.05
59.69
59.13
57.01
47.41
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55.23
29.96
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27.71
28.27
31.93
53.29
41.71
43.03
56.01
54.91
54.67
36.85
41.34
52.98
52.21
31.53
27.46
22.52
50.17
28.53
21.43
44.12
33.87
45.94
24.04
29.97
44.15
Legend
Junction
HYD_PRS_FD
less than 20.00
more than 20.00
Pipe
<all other values>
TYPE
Active
Domain
Inactive

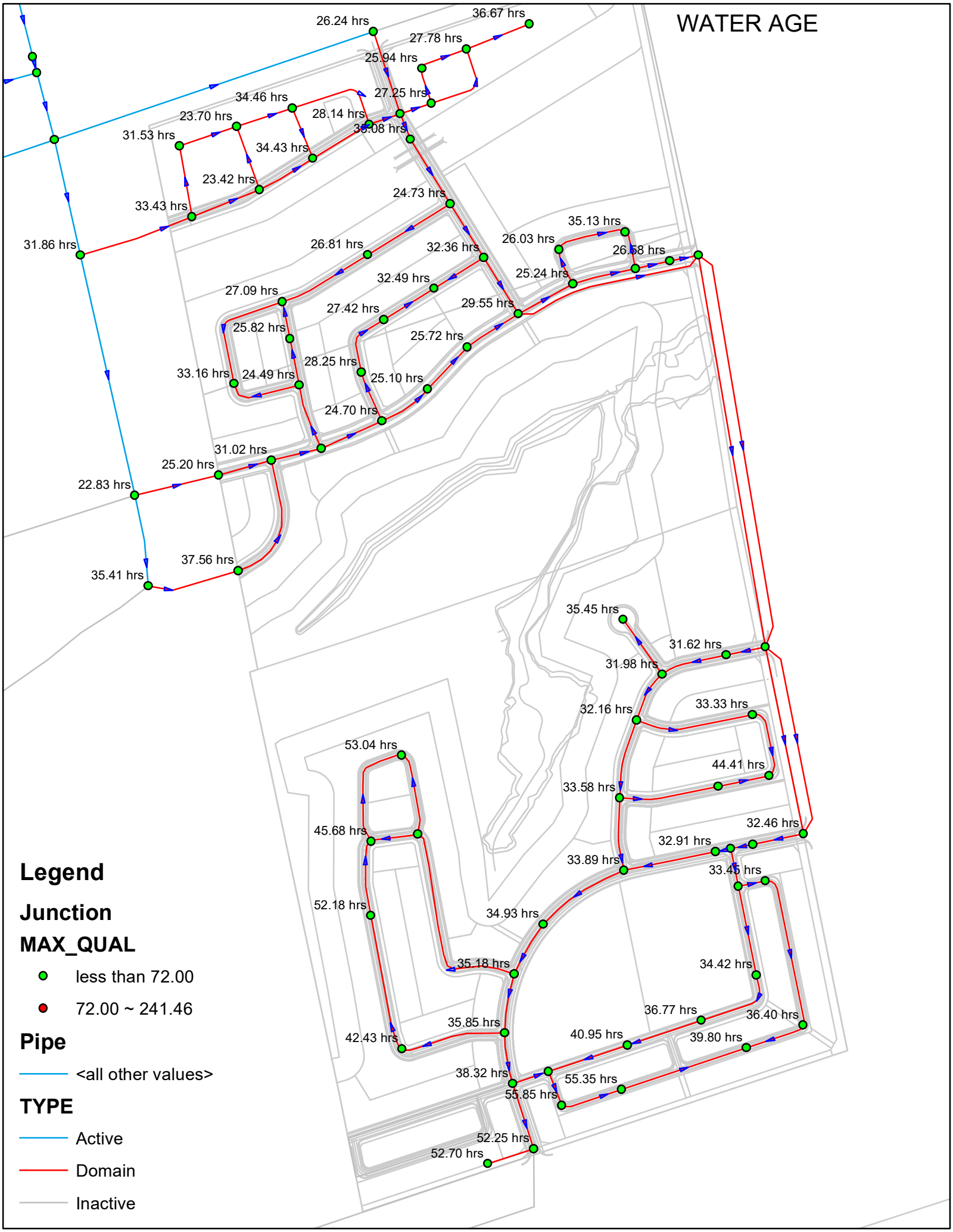
MDD+FIRE TABLE

		ID	Static Demand (L/s)	Static Pressure (psi)	Static Head (m)	Fire-Flow Demand (L/s)	Residual Pressure (psi)	Hydrant Available Flow (L/s)	Hydrant Pressure at Available Flow (psi)	Critical Pipe ID at Available Flow	Critical Pipe Velocity at Available Flow (m/s)	Junctions with Pressure Violation
1	☐	J445	0.21	65.11	304.26	100.00	28.27	112.38	20.00	P4884	3.38	0
2	☐	J575	0.26	60.58	304.26	100.00	27.71	113.04	20.00	P5108	3.47	0
3	☐	J579	0.42	65.26	304.26	100.00	29.96	115.58	20.00	P5110	3.83	0
4	☐	J435	0.66	67.71	304.28	100.00	30.65	116.04	20.00	P4874	3.74	0
5	☐	J383	0.33	65.57	304.26	100.00	31.93	119.17	20.00	P4896	4.18	0
6	☐	J283	0.36	68.57	304.28	100.00	44.40	133.01	29.12	P4808	5.01	0
7	☐	J583	0.33	68.43	304.29	100.00	47.82	133.43	34.65	P4818	5.00	0
8	☐	J433	0.31	69.15	304.28	100.00	39.40	133.45	20.00	P4806	3.85	0
9	☐	J585	0.48	69.35	304.29	100.00	48.07	136.26	33.21	P5146	5.00	0
10	☐	J439	0.48	69.80	304.28	100.00	53.33	137.78	41.59	P4828	5.00	0
11	☐	J593	0.27	71.44	304.28	100.00	54.85	138.85	42.55	P5126	5.00	0
12	☐	J281	0.39	68.96	304.28	100.00	41.27	138.91	20.00	P5116	3.27	0
13	☐	J581	0.54	69.28	304.28	100.00	42.13	141.07	20.00	P4802	4.78	0
14	☐	J437	0.33	67.97	304.29	100.00	43.08	145.78	20.00	P4820	4.16	0
15	☐	J457	0.54	60.87	304.26	100.00	41.34	154.79	20.00	P4930	2.65	0
16	☐	J461	0.45	61.22	304.26	100.00	41.71	155.59	20.00	P4928	2.28	0
17	☐	J429	0.28	68.18	304.29	155.00	45.61	156.44	45.32	P4858	5.01	0
18	☐	J443	0.40	67.48	304.27	100.00	47.41	157.07	23.98	P4892	5.00	0
19	☐	J467	0.31	68.18	304.29	155.00	23.36	157.07	22.45	P4852	5.00	0
20	☐	J499	0.48	59.85	304.26	155.00	21.43	158.79	20.00	P4942	2.54	0
21	☐	J459	0.61	62.20	304.26	100.00	43.03	159.56	20.00	P4924	2.93	0
22	☐	J501	0.48	60.20	304.26	155.00	22.52	161.41	20.00	P4994	2.91	0
23	☐	J477	0.51	58.71	304.26	155.00	24.04	165.83	20.00	P4958	3.43	0
24	☐	J595	0.45	61.04	304.26	100.00	44.12	169.38	20.00	P5128	3.71	0
25	☐	J393	0.21	61.13	304.26	155.00	27.46	174.41	20.00	P4914	2.79	0
26	☐	J597	0.40	60.46	304.26	155.00	28.53	178.44	20.00	P5130	3.49	0
27	☐	J487	0.39	59.82	304.26	155.00	29.97	184.06	20.00	P4940	4.35	0
28	☐	J599	0.24	63.19	304.26	155.00	31.53	186.10	20.00	P4910	3.74	0
29	☐	J609	0.00	56.59	304.26	100.00	44.15	192.51	20.00	P4938	2.72	0
30	☐	J481	0.39	64.26	304.26	155.00	36.85	198.65	22.69	P4946	5.00	0
31	☐	J397	0.36	59.53	304.26	155.00	33.87	200.77	20.00	P4916	3.80	0
32	☐	J399	0.35	57.52	304.26	100.00	45.94	205.57	20.00	P4918	2.05	0
33	☐	J427	0.37	68.18	304.29	155.00	39.80	211.14	20.00	P4862	3.37	0
34	☐	J577	0.24	68.65	304.27	100.00	57.78	211.70	31.49	P4882	5.01	0
35	☐	J299	0.35	66.74	304.27	100.00	53.57	213.57	20.00	P4888	3.36	0
36	☐	J385	0.33	65.87	304.26	100.00	53.29	217.87	20.00	P4898	4.27	0
37	☐	J491	0.34	68.18	304.29	155.00	41.38	218.49	20.00	P4860	4.67	0
38	☐	J381	0.31	68.02	304.27	100.00	55.23	220.93	20.00	P4890	4.15	0
39	☐	J411	0.19	61.51	304.26	100.00	50.17	221.19	20.00	P4920	2.10	0
40	☐	J395	1.89	64.47	304.26	200.00	28.40	222.20	21.99	P4908	5.00	0
41	☐	J463	0.34	64.95	304.30	155.00	40.77	223.07	20.00	P4842	3.72	0
42	☐	J471	0.37	68.13	304.29	155.00	50.29	228.82	34.17	P4838	5.00	0
43	☐	J409	0.16	63.28	304.26	100.00	52.21	230.43	20.00	P4922	2.49	0
44	☐	J465	0.52	66.00	304.30	155.00	43.30	235.21	20.00	P4794	3.35	0
45	☐	J601	0.35	63.69	304.26	100.00	52.98	237.14	20.00	P5134	2.67	0
46	☐	J473	0.32	66.00	304.30	155.00	44.30	241.54	20.00	P4840	3.26	0
47	☐	J493	0.14	67.33	304.30	155.00	45.53	244.71	20.00	P4850	3.22	0
48	☐	J421	0.28	64.95	304.30	155.00	44.67	248.43	20.00	P4790	3.87	0
49	☐	J423	0.37	67.33	304.30	155.00	46.49	251.91	20.00	P4846	3.72	0
50	☐	J387	0.12	64.63	304.26	100.00	54.67	252.11	20.00	P4902	2.44	0
51	☐	J447	0.16	64.37	304.27	100.00	54.91	260.41	20.00	P4900	3.03	0
52	☐	J389	0.09	64.51	304.27	100.00	55.18	263.37	20.00	P4880	3.33	0
53	☐	J449	0.19	65.11	304.27	100.00	56.01	269.99	20.00	P4878	3.49	0
54	☐	J291	0.30	65.21	304.30	100.00	57.01	286.38	20.00	P4814	2.18	0
55	☐	J289	0.15	67.03	304.30	100.00	59.13	301.45	20.00	P4812	2.28	0
56	☐	J495	0.00	69.31	304.28	100.00	60.98	302.14	20.00	P4876	1.26	0
57	☐	J287	0.36	67.48	304.30	100.00	59.69	306.95	20.00	P4810	2.02	0

MDD+FIRE TABLE

		ID	Static Demand (L/s)	Static Pressure (psi)	Static Head (m)	Fire-Flow Demand (L/s)	Residual Pressure (psi)	Hydrant Available Flow (L/s)	Hydrant Pressure at Available Flow (psi)	Critical Pipe ID at Available Flow	Critical Pipe Velocity at Available Flow (m/s)	Junctions with Pressure Violation
58	☐	J285	0.33	67.87	304.29	100.00	60.05	308.09	20.00	P4810	2.18	0
59	☐	J293	0.30	68.48	304.29	100.00	60.62	309.60	20.00	P4816	2.18	0
60	☐	J587	0.33	68.89	304.29	100.00	60.99	310.56	20.00	P5120	2.23	0
61	☐	J589	0.33	68.78	304.29	100.00	60.93	311.75	20.00	P5122	2.55	0
62	☐	J591	0.33	69.73	304.28	100.00	61.91	317.16	20.00	P4832	1.83	0
63	☐	J295	0.33	69.11	304.28	100.00	61.40	318.24	20.00	P4826	1.82	0
64	☐	J279	0.36	69.40	304.29	100.00	61.78	321.84	20.00	P4824	1.81	0
65	☐	J275	0.00	68.18	304.29	155.00	53.66	322.42	20.00	P4838	1.81	0
66	☐	J277	0.48	69.47	304.29	100.00	61.93	324.51	20.00	P4800	1.78	0
67	☐	J431	0.00	69.03	304.29	155.00	54.44	324.80	20.00	P4796	1.83	0
68	☐	J297	0.18	73.32	304.28	100.00	65.43	328.66	20.00	P5124	1.55	0
69	☐	J441	0.15	75.97	304.28	100.00	68.07	337.67	20.00	P4834	1.51	0

Hydraulic Model Results
Water Quality Analysis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23.70 hrs
28.14 hrs
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34.43 hrs
23.42 hrs
33.43 hrs
24.73 hrs
31.86 hrs
35.13 hrs
26.03 hrs
26.58 hrs
26.81 hrs
32.36 hrs
25.24 hrs
32.49 hrs
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29.55 hrs
27.42 hrs
25.82 hrs
25.72 hrs
28.25 hrs
33.16 hrs
24.49 hrs
25.10 hrs
24.70 hrs
31.02 hrs
25.20 hrs
22.83 hrs
37.56 hrs
35.41 hrs
35.45 hrs
31.62 hrs
31.98 hrs
32.16 hrs
33.33 hrs
53.04 hrs
44.41 hrs
33.58 hrs
45.68 hrs
32.46 hrs
32.91 hrs
33.89 hrs
33.45 hrs
52.18 hrs
34.93 hrs
35.18 hrs
34.42 hrs
36.77 hrs
36.40 hrs
35.85 hrs
42.43 hrs
40.95 hrs
39.80 hrs
38.32 hrs
55.35 hrs
55.85 hrs
52.25 hrs
52.70 hrs
Legend
Junction
MAX_QUAL
less than 72.00
72.00 ~ 241.46
Pipe
<all other values>
TYPE
Active
Domain
Inactive

Water Age - Junction

		ID	Max.Value (hrs)	Max.Time (hrs.)	Min.Value (hrs)	Min.Time (hrs.)	Average (hrs)	Difference (hrs)
1	☐	J275	34.97	210:10	0.00	00:00	15.27	34.97
2	☐	J277	24.73	152:30	0.00	00:00	15.96	24.73
3	☐	J279	32.36	211:10	0.00	00:00	16.45	32.36
4	☐	J281	27.09	158:40	0.00	00:00	21.71	27.09
5	☐	J283	24.49	179:30	0.00	00:00	17.78	24.49
6	☐	J285	23.48	178:50	0.00	00:00	17.21	23.48
7	☐	J287	31.02	211:00	0.00	00:00	16.92	31.02
8	☐	J289	25.20	152:10	0.00	00:00	15.32	25.20
9	☐	J291	37.56	211:50	0.00	00:00	16.98	37.56
10	☐	J293	24.70	153:50	0.00	00:00	17.68	24.70
11	☐	J295	29.55	211:30	0.00	00:00	17.65	29.55
12	☐	J297	25.48	155:20	0.00	00:00	18.98	25.48
13	☐	J421	33.43	209:10	0.00	00:00	13.80	33.43
14	☐	J423	34.43	210:40	0.00	00:00	15.85	34.43
15	☐	J427	27.78	214:20	0.00	00:00	21.06	27.78
16	☐	J429	27.25	210:40	0.00	00:00	15.88	27.25
17	☐	J431	35.08	210:20	0.00	00:00	15.49	35.08
18	☐	J433	25.82	155:00	0.00	00:00	18.76	25.82
19	☐	J435	33.16	212:40	0.00	00:00	21.69	33.16
20	☐	J437	27.42	182:10	0.00	00:00	19.84	27.42
21	☐	J439	26.03	155:20	0.00	00:00	18.97	26.03
22	☐	J441	26.58	156:00	0.00	00:00	19.37	26.58
23	☐	J463	31.53	210:00	0.00	00:00	14.68	31.53
24	☐	J465	23.70	178:10	0.00	00:00	15.81	23.70
25	☐	J467	36.67	220:50	0.00	00:00	26.28	36.67
26	☐	J471	28.14	211:30	0.00	00:00	17.65	28.14
27	☐	J473	23.42	209:50	0.00	00:00	14.51	23.42
28	☐	J491	25.94	153:50	0.00	00:00	17.28	25.94
29	☐	J493	34.46	211:30	0.00	00:00	16.75	34.46
30	☐	J581	26.81	220:10	0.00	00:00	18.29	26.81
31	☐	J583	28.25	212:00	0.00	00:00	18.41	28.25
32	☐	J585	32.49	217:10	0.00	00:00	20.94	32.49
33	☐	J587	25.10	180:00	0.00	00:00	18.14	25.10
34	☐	J589	25.72	155:00	0.00	00:00	18.64	25.72
35	☐	J591	25.24	180:10	0.00	00:00	18.25	25.24
36	☐	J593	35.13	217:50	0.00	00:00	23.03	35.13
37	☐	J299	32.16	163:10	0.00	00:00	25.16	32.16
38	☐	J381	31.98	162:50	0.00	00:00	24.67	31.98
39	☐	J383	45.60	176:20	0.00	00:00	30.94	45.60
40	☐	J385	33.58	164:20	0.00	00:00	26.56	33.58
41	☐	J387	33.89	192:50	0.00	00:00	28.00	33.89
42	☐	J389	32.98	164:40	0.00	00:00	27.04	32.98
43	☐	J393	36.77	225:40	0.00	00:00	30.50	36.77
44	☐	J395	32.78	212:50	0.00	00:00	27.20	32.78
45	☐	J397	45.87	193:10	0.00	00:00	32.13	45.87
46	☐	J399	38.32	121:10	0.00	00:00	31.01	38.32
47	☐	J409	35.18	193:30	0.00	00:00	29.18	35.18
48	☐	J411	35.85	167:20	0.00	00:00	29.86	35.85
49	☐	J415	29.89	213:00	0.00	00:00	19.70	29.89
50	☐	J443	35.45	176:00	0.00	00:00	28.86	35.45

		ID	Max.Value (hrs)	Max.Time (hrs.)	Min.Value (hrs)	Min.Time (hrs.)	Average (hrs)	Difference (hrs)
51	☐	J445	44.41	205:20	0.00	00:00	33.46	44.41
52	☐	J447	32.91	164:40	0.00	00:00	27.16	32.91
53	☐	J449	32.65	164:30	0.00	00:00	26.95	32.65
54	☐	J457	52.18	128:10	0.00	00:00	36.89	52.18
55	☐	J459	38.67	170:20	0.00	00:00	32.41	38.67
56	☐	J461	45.68	233:40	0.00	00:00	36.97	45.68
57	☐	J477	55.35	193:30	0.00	00:00	34.41	55.35
58	☐	J481	33.45	165:00	0.00	00:00	27.55	33.45
59	☐	J487	55.85	194:00	0.00	00:00	33.01	55.85
60	☐	J495	31.18	162:10	0.00	00:00	23.98	31.18
61	☐	J499	39.80	228:20	0.00	00:00	32.65	39.80
62	☐	J501	36.40	168:00	0.00	00:00	30.16	36.40
63	☐	J575	53.04	233:40	0.00	00:00	40.83	53.04
64	☐	J577	31.62	162:20	0.00	00:00	24.22	31.62
65	☐	J579	33.33	212:50	0.00	00:00	27.46	33.33
66	☐	J595	42.43	151:10	0.00	00:00	32.77	42.43
67	☐	J597	40.95	229:30	0.00	00:00	32.51	40.95
68	☐	J599	34.42	166:00	0.00	00:00	28.72	34.42
69	☐	J601	34.93	193:20	0.00	00:00	28.72	34.93
70	☐	J605	32.46	212:30	0.00	00:00	26.74	32.46
71	☐	J609	52.25	217:00	0.00	00:00	37.32	52.25
72	☐	J617	52.70	217:00	0.00	00:00	37.55	52.70

Water Age - Pipe

		ID	Max.Value (hrs)	Max.Time (hrs.)	Min.Value (hrs)	Min.Time (hrs.)	Average (hrs)	Difference (hrs)
1	☐	P4790	18.77	208:40	0.00	00:00	13.48	18.77
2	☐	P4792	18.84	209:20	0.00	00:00	14.14	18.84
3	☐	P4794	20.63	180:40	0.00	00:00	16.27	20.63
4	☐	P4796	24.05	210:10	0.00	00:00	15.37	24.05
5	☐	P4798	19.58	209:40	0.00	00:00	14.47	19.58
6	☐	P4800	20.92	210:30	0.00	00:00	15.73	20.92
7	☐	P4802	21.11	220:00	0.00	00:00	17.13	21.11
8	☐	P4804	23.52	159:10	0.00	00:00	19.60	23.52
9	☐	P4806	22.46	182:00	0.00	00:00	18.27	22.46
10	☐	P4808	21.96	181:10	0.00	00:00	17.49	21.96
11	☐	P4810	23.03	211:10	0.00	00:00	17.06	23.03
12	☐	P4812	21.42	210:40	0.00	00:00	15.56	21.42
13	☐	P4814	21.85	183:20	0.00	00:00	17.84	21.85
14	☐	P4816	22.15	211:20	0.00	00:00	17.44	22.15
15	☐	P4818	22.48	181:40	0.00	00:00	18.04	22.48
16	☐	P4820	25.85	161:00	0.00	00:00	21.44	25.85
17	☐	P4822	22.54	157:40	0.00	00:00	17.91	22.54
18	☐	P4824	21.66	210:50	0.00	00:00	16.19	21.66
19	☐	P4826	21.83	153:20	0.00	00:00	16.70	21.83
20	☐	P4828	23.17	182:30	0.00	00:00	18.61	23.17
21	☐	P4830	26.52	162:00	0.00	00:00	21.87	26.52
22	☐	P4832	22.47	181:40	0.00	00:00	17.95	22.47
23	☐	P4834	24.13	183:10	0.00	00:00	19.17	24.13
24	☐	P4838	22.97	156:20	0.00	00:00	17.80	22.97
25	☐	P4840	19.46	179:20	0.00	00:00	14.98	19.46
26	☐	P4842	18.68	178:30	0.00	00:00	14.21	18.68
27	☐	P4844	19.14	181:10	0.00	00:00	15.81	19.14
28	☐	P4846	20.60	180:40	0.00	00:00	16.37	20.60
29	☐	P4850	21.52	183:00	0.00	00:00	17.67	21.52
30	☐	P4852	26.72	224:40	0.00	00:00	23.66	26.72
31	☐	P4854	19.62	179:30	0.00	00:00	15.12	19.62
32	☐	P4858	20.64	210:20	0.00	00:00	15.58	20.64
33	☐	P4860	20.41	180:50	0.00	00:00	16.57	20.41
34	☐	P4862	21.20	182:50	0.00	00:00	18.21	21.20
35	☐	P4872	34.89	226:50	0.00	00:00	28.27	34.89
36	☐	P4874	22.39	158:00	0.00	00:00	18.62	22.39
37	☐	P4950	19.54	179:20	0.00	00:00	14.94	19.54
38	☐	P4952	20.61	181:10	0.00	00:00	16.38	20.61
39	☐	P4980	22.55	185:00	0.00	00:00	19.57	22.55
40	☐	P4982	22.91	185:00	0.00	00:00	19.18	22.91
41	☐	P5116	25.59	224:00	0.00	00:00	20.71	25.59
42	☐	P5118	23.15	158:40	0.00	00:00	19.12	23.15
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45	☐	P5124	23.17	182:30	0.00	00:00	18.60	23.17
46	☐	P5126	27.49	218:10	0.00	00:00	21.07	27.49
47	☐	P5146	23.85	218:30	0.00	00:00	18.50	23.85
48	☐	P4836	24.90	156:10	0.00	00:00	19.53	24.90
49	☐	P4876	26.04	161:30	0.00	00:00	21.80	26.04
50	☐	P4878	32.73	164:30	0.00	00:00	26.84	32.73

		ID	Max.Value (hrs)	Max.Time (hrs.)	Min.Value (hrs)	Min.Time (hrs.)	Average (hrs)	Difference (hrs)
51	☐	P4880	32.58	212:40	0.00	00:00	26.99	32.58
52	☐	P4882	30.91	162:10	0.00	00:00	24.09	30.91
53	☐	P4884	40.37	177:00	0.00	00:00	32.42	40.37
54	☐	P4886	35.01	169:00	0.00	00:00	30.43	35.01
55	☐	P4888	30.96	163:00	0.00	00:00	24.91	30.96
56	☐	P4890	30.60	162:30	0.00	00:00	24.44	30.60
57	☐	P4892	30.57	219:00	0.00	00:00	26.77	30.57
58	☐	P4894	30.65	163:20	0.00	00:00	25.83	30.65
59	☐	P4896	37.64	220:00	0.00	00:00	29.12	37.64
60	☐	P4898	35.37	169:00	0.00	00:00	29.64	35.37
61	☐	P4900	33.06	164:40	0.00	00:00	27.09	33.06
62	☐	P4902	32.29	165:00	0.00	00:00	27.53	32.29
63	☐	P4908	33.02	164:40	0.00	00:00	27.11	33.02
64	☐	P4910	32.74	193:00	0.00	00:00	27.96	32.74
65	☐	P4914	36.64	193:00	0.00	00:00	31.53	36.64
66	☐	P4916	45.89	193:10	0.00	00:00	31.72	45.89
67	☐	P4918	35.76	169:00	0.00	00:00	30.35	35.76
68	☐	P4920	34.57	169:10	0.00	00:00	29.50	34.57
69	☐	P4922	34.39	193:20	0.00	00:00	28.94	34.39
70	☐	P4924	35.48	169:10	0.00	00:00	30.76	35.48
71	☐	P4926	38.32	200:00	0.00	00:00	33.55	38.32
72	☐	P4928	49.31	180:20	0.00	00:00	39.66	49.31
73	☐	P4930	45.63	224:00	0.00	00:00	35.20	45.63
74	☐	P4938	45.50	217:00	0.00	00:00	35.68	45.50
75	☐	P4940	55.94	194:10	0.00	00:00	32.74	55.94
76	☐	P4942	50.79	217:00	0.00	00:00	37.95	50.79
77	☐	P4946	32.91	164:50	0.00	00:00	27.37	32.91
78	☐	P4958	55.20	217:50	0.00	00:00	33.82	55.20
79	☐	P4986	54.96	228:10	0.00	00:00	44.96	54.96
80	☐	P4992	36.25	169:00	0.00	00:00	31.10	36.25
81	☐	P4994	33.54	193:00	0.00	00:00	28.85	33.54
82	☐	P5108	40.27	176:30	0.00	00:00	34.95	40.27
83	☐	P5110	30.70	163:30	0.00	00:00	26.29	30.70
84	☐	P5128	40.06	220:00	0.00	00:00	31.55	40.06
85	☐	P5130	48.69	193:00	0.00	00:00	36.54	48.69
86	☐	P5132	34.80	169:00	0.00	00:00	29.63	34.80
87	☐	P5134	34.06	193:10	0.00	00:00	28.35	34.06
88	☐	P5140	29.86	234:50	0.00	00:00	25.29	29.86
89	☐	P5174	26.13	162:00	0.00	00:00	21.87	26.13
90	☐	P5176	22.43	183:30	0.00	00:00	18.68	22.43
91	☐	P5178	29.93	234:50	0.00	00:00	25.39	29.93
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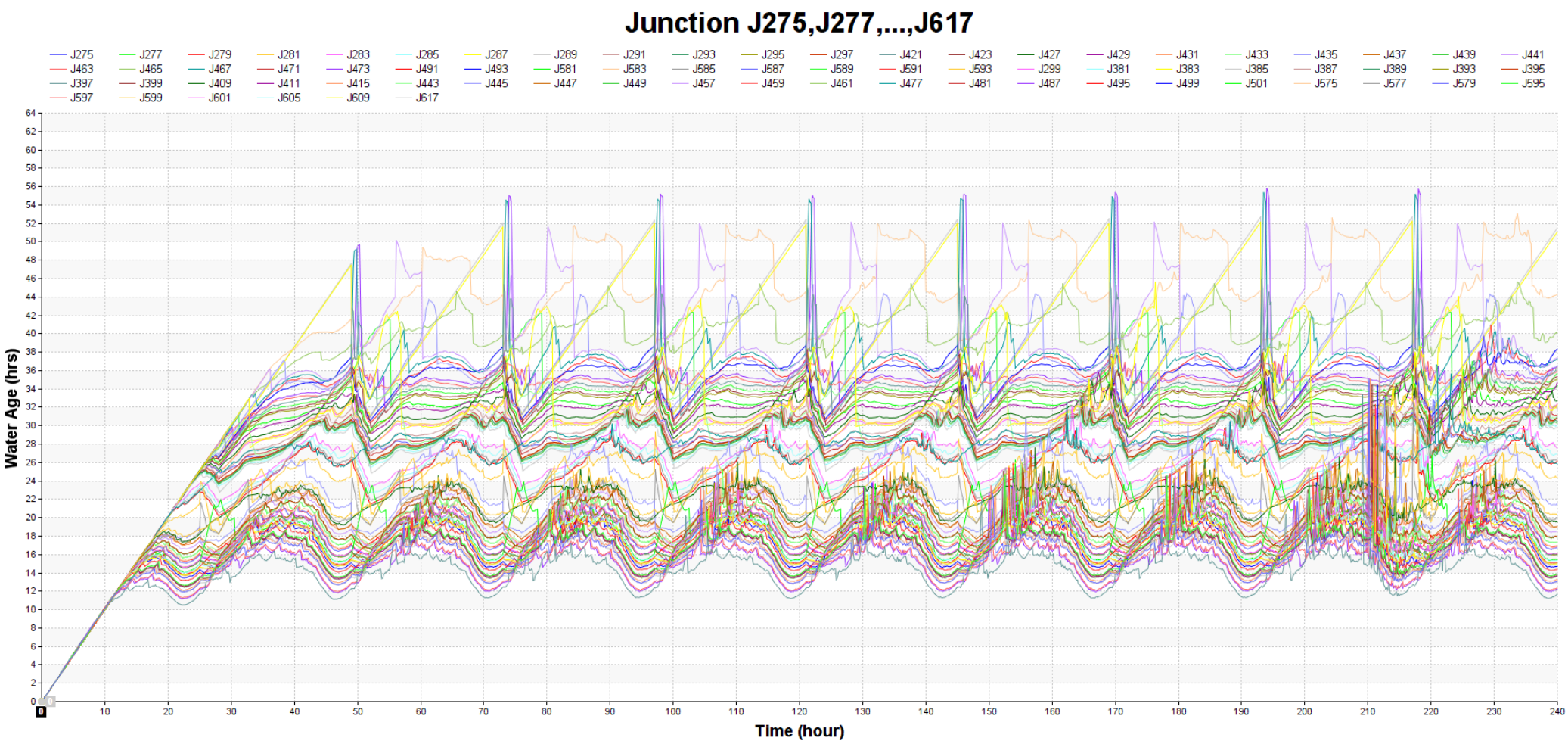
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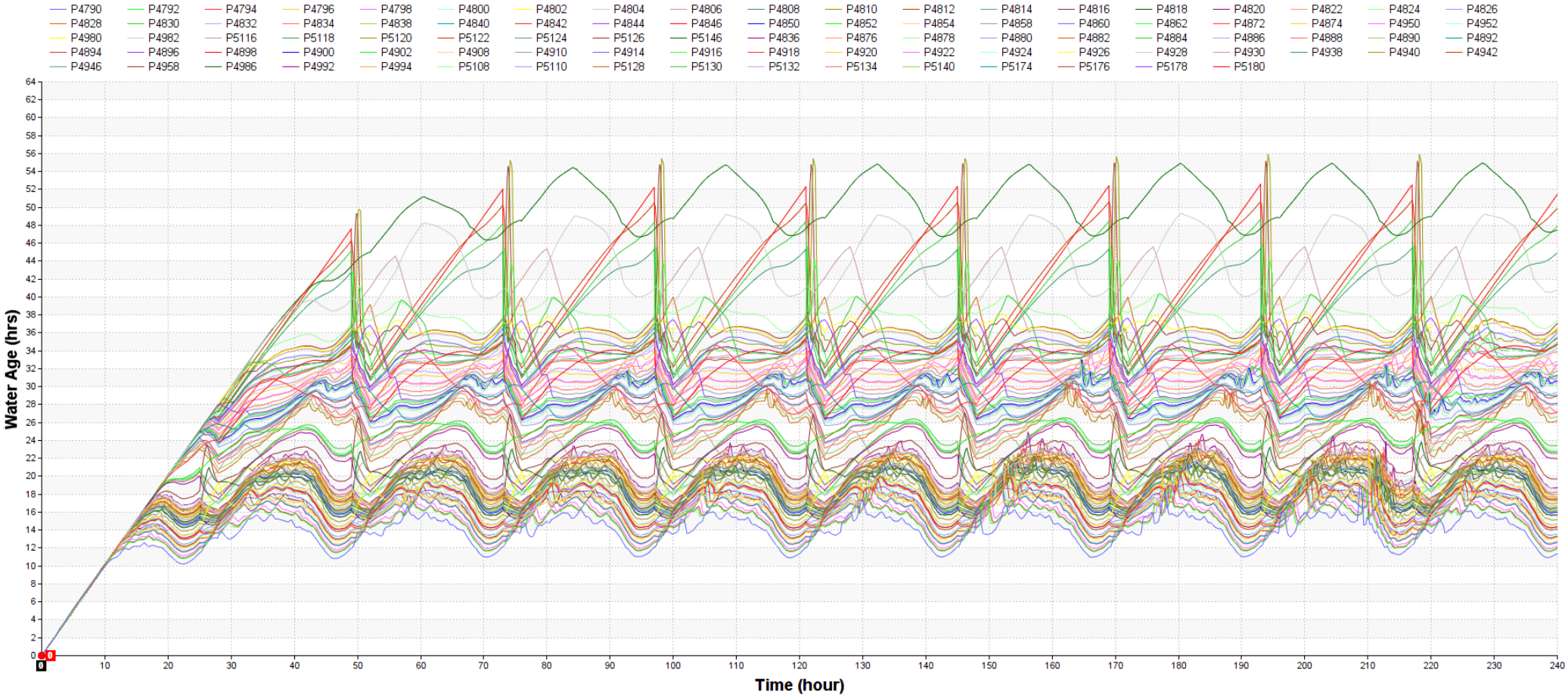
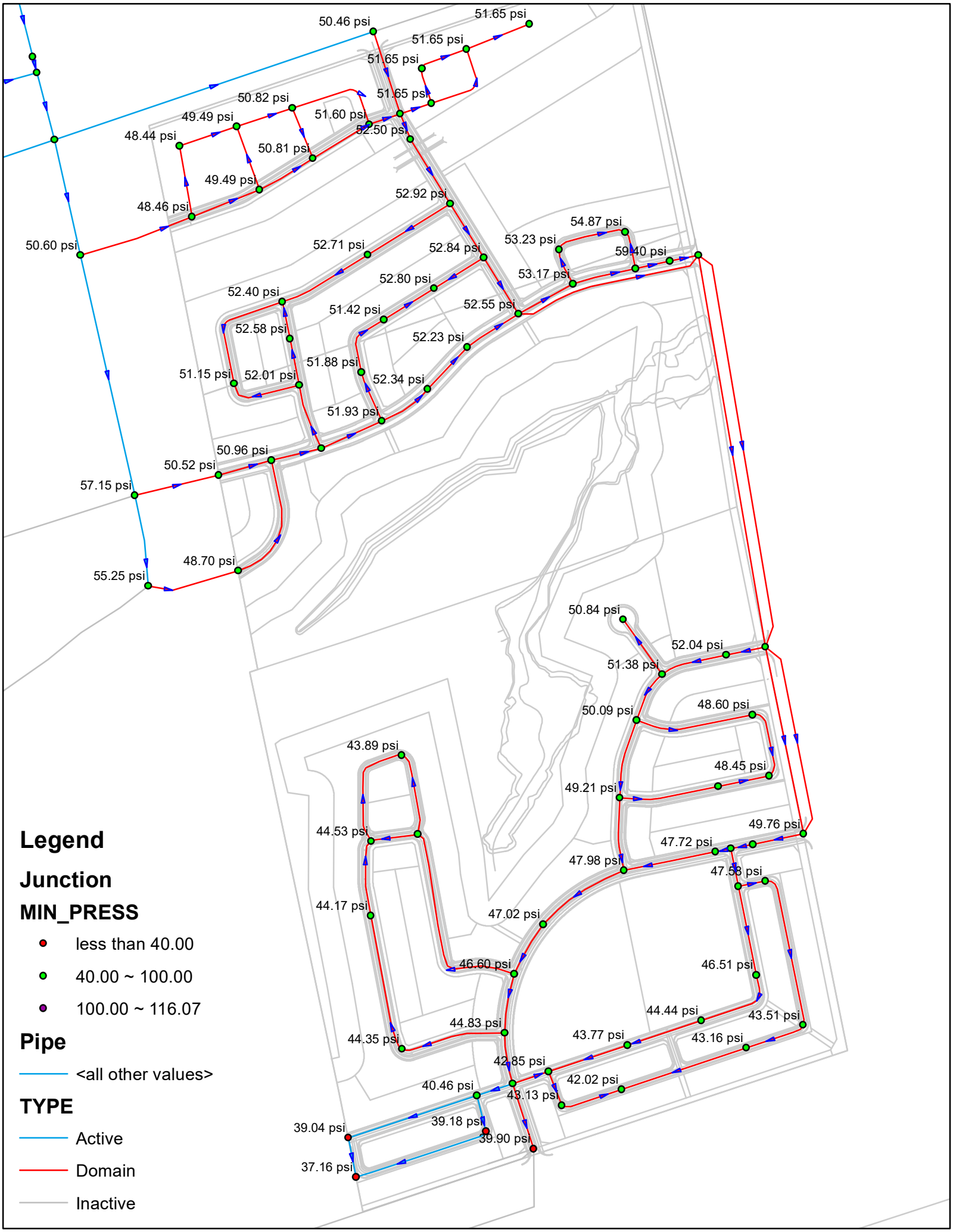
J463 J465 J467 J471 J473 J491 J493 J581 J583 J585 J587 J589 J591 J593 J299 J381 J383 J385 J387 J389 J393 J395
J397 J399 J409 J411 J415 J443 J445 J447 J449 J457 J459 J461 J477 J481 J487 J495 J499 J501 J575 J577 J579 J595
J597 J599 J601 J605 J609 J617
Water Age (hrs)
Time (hour)

Pipe P4790,P4792,...,P5180



Hydraulic Model Results
MDD Scenario – All Dorsay Lands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42.85 psi
42.02 psi
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37.16 psi
Legend
Junction
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40.00 ~ 100.00
100.00 ~ 116.07
Pipe
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TYPE
Active
Domain
Inactive

APPENDIX C: Sanitary Servicing Calculations

Sanitary Flow Calculation

Project Title: Dorsay Barrie
Project Number: 5170
Last Edited: 2024-04-29

Municipality City of Barrie

Infiltration Rate:		0.1	L/s/ha
Generation Rate:	Residential	225	L/capita/day
	Institutional	28	m^3/day/ha

Estimated Site Discharge

Land Use	Units / Area	Population*	Average Demand (L/s)	Harmon's Peaking Factor	Peak Demand (L/s)	Infiltration (L/s)	Total Peak Flow (L/s)
Low Density Residential	759 units	2467	6.42				
Medium Density Residential	490 units	1260	3.28				
Institutional (school)	2.29 ha	197	0.74				
Park***	2.93 ha	30	0.08				
TOTAL	54.15 ha	3954	10.53	3.34	35.13	5.42	**40.55**

APPENDIX D: Stormwater Management Calculations

Dorsay Subdivision

Project: 2022-5170

Runoff Coefficient/Imperviousness

Catchment 201

Description	Area (ha)	Runoff C	TIMP	AC	A*TIMP	XIMP	A*XIMP
SWM Block	2.92	0.55	0.50	1.61	1.46	0.50	1.46
Single Detached/Semi-Detached	9.01	0.67	0.67	6.04	6.05	0.50	4.54
Townhomes	0.72	0.75	0.79	0.54	0.57	0.59	0.42
ROW	4.45	0.73	0.75	3.25	3.34	0.75	3.34
Medium Density Block	2.42	0.75	0.79	1.82	1.90	0.59	1.43
Parkettes	0.50	0.35	0.21	0.18	0.11	0.21	0.11
Walkways	0.04	0.90	1.00	0.04	0.04	1.00	0.04
TOTAL	20.06	**0.67**	**0.67**	13.46	13.46	**0.56**	11.33

Catchment 202

Description	Area (ha)	Runoff C	TIMP	AC	A*TIMP	XIMP	A*XIMP
SWM Block	2.63	0.55	0.50	1.45	1.32	0.50	1.32
Single Detached/Semi-Detached	11.44	0.67	0.67	7.66	7.68	0.50	5.76
Townhomes	3.62	0.75	0.79	2.72	2.84	0.59	2.13
ROW	6.56	0.73	0.75	4.79	4.92	0.75	4.92
Park	2.43	0.35	0.21	0.85	0.52	0.21	0.52
School	2.29	0.75	0.79	1.72	1.80	0.59	1.35
Walkways	0.09	0.9	1.00	0.08	0.09	1.00	0.09
TOTAL	29.06	**0.66**	**0.66**	19.26	19.17	**0.55**	16.09

Catchment 203

Description	Area (ha)	Runoff C	TIMP	AC	A*TIMP	XIMP	A*XIMP
Future Development	2.00	**0.75**	**0.79**			**0.59**	

Uncontrolled Area

Description	Area (ha)	Runoff C	TIMP	AC	A*TIMP	XIMP	A*XIMP
Single Detached/Semi-Detached	0.79	0.67	0.67	0.53	0.53	0.50	0.39
ROW	0.34	0.73	0.75	0.25	0.26	0.75	0.26
TOTAL	1.13	**0.69**	**0.70**	0.77	0.78	**0.58**	0.65

External Areas

Description	Area (ha)	Runoff C	TIMP	AC	A*TIMP	XIMP	A*XIMP
EXT-1	15.53	**0.66**	**0.65**			**0.49**	
EXT-2	3.80	**0.76**	**0.80**			**0.60**	

Allowable Release Rates

Dorsay Subdivision

2022-5170

Reach 2 Allowable Release Rates

Pre-Development Area	16.00	ha
	15.53	ha
	31.53	**ha**

Storm	Unitary Rate	Allowable
2y	0.002	0.063
5y	0.008	0.252
10y	0.015	0.473
25y	0.024	0.757
50y	0.032	1.009
100y	0.040	1.261

Post-Dev Area to SWMP 201	35.59	ha
Post-Dev Area 203	2.00	ha

Catchment Allowable Release Rates

Storm	Allowable	SWMP 201	Catchment 203
2y	0.063	0.060	0.003
5y	0.252	0.239	0.013
10y	0.473	0.448	0.025
25y	0.757	0.716	0.041
50y	1.009	0.955	0.054
100y	1.261	1.194	0.067

Reach 4 Allowable Release Rates

Pre-Development Area	29.06	ha
	3.80	ha
	32.86	**ha**

Storm	Unitary Rate	Allowable*
2y	0.002	0.066
5y	0.008	0.263
10y	0.015	0.493
25y	0.024	0.789
50y	0.032	1.052
100y	0.040	1.314

**allowable from SWM Pond 202*

Erosion Control

Dorsay Subdivision

Method 1 (Based on SIS Unitary Rates)

Catchment	Reach	Area (ha)	IMP	Discharge Unit Rate ($m^3/s/ha$) *	Storage Unit Rate (m^3/Imp. ha) *	Release Rate (m^3/s)	Storage (m^3)
201	SAN2	35.59	66%	0.0010	310	0.036	7282
202	SAN3	32.86	68%	0.0011	320	0.036	7150
203	SAN2	2.00	79%	0.0010	310	0.002	490

** As per Table 4.4.15 of the SWMMP (2013) and prescribed in the SIS (2016)*

Method 2 (Based on 25mm Storm)

Catchment 201			Catchment 202			Catchment 203		
NHYD	18		NHYD	23		NHYD	37	
Area	35.59	ha	Area	32.86	ha	Area	2.00	ha
RV	15.56	mm	RV	16.03	mm	RV	17.54	mm
Drawdown	48	hrs	Drawdown	48	hrs	Drawdown	48	hrs
Req Storage	5539	m^3	Req Storage	5266	m^3	Req Storage	351	m^3
Avg Flow	0.032	m^3/s	Avg Flow	0.030	m^3/s	Avg Flow	0.002	m^3/s
Peak Flow	0.048	m^3/s	Peak Flow	0.046	m^3/s	Peak Flow	0.003	m^3/s

Summary Table

Catchment	SIS		25mm Storm	
	Release Rate (m^3/s)	Storage (m^3)	Release Rate (m^3/s)	Storage (m^3)
201	0.036	7282	0.048	5539
202	0.036	7150	0.046	5266
203	0.002	490	0.003	351

5170 - Dorsay (Catchment 201)
Quality Control Storage
Water Quality Control Requirements

Table 3.2: Water Quality Storage Requirements based on Receiving Waters

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level			
		35%	55%	70%	85%
Enhanced 80% Long-Term TSS Removal	Infiltration	25	30	35	40
	Wetlands	80	105	120	140
	Hydrid Wet Pond/Wetland	110	150	175	195
	Wet Pond	140	190	225	250
	N/A	N/A	N/A	N/A	N/A

* For wet ponds, all of the storage, except for 40 m^3/ha represents the permanent pool volume. The 40 m^3/ha represents extended detention storage.

Source: 2003 SWM Planning & Design Manual

SWM Storage

Input:

Weighted Imperviousness =	66%	
Area =	35.59	ha
Level of Protection =	1	
SWMP Type =	Wet Pond	

Calculation:

Total Storage Volume =	216	m^3/ha	→	7,676	m^3
Permanent Pool Volume =	**176**	m^3/ha	→	**6,252**	**m^3**
Active Storage Volume =	40	m^3/ha	→	1,424	m^3

5170 - Dorsay (Catchment 202)
Quality Control Storage
Water Quality Control Requirements

Table 3.2: Water Quality Storage Requirements based on Receiving Waters

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level			
		35%	55%	70%	85%
Enhanced 80% Long-Term TSS Removal	Infiltration	25	30	35	40
	Wetlands	80	105	120	140
	Hydrid Wet Pond/Wetland	110	150	175	195
	Wet Pond	140	190	225	250
	N/A	N/A	N/A	N/A	N/A

* For wet ponds, all of the storage, except for 40 m^3/ha represents the permanent pool volume. The 40 m^3/ha represents extended detention storage.
Source: 2003 SWM Planning & Design Manual

SWM Storage

Input:

Weighted Imperviousness =	68%	
Area =	32.86	ha
Level of Protection =	1	
SWMP Type =	Wet Pond	

Calculation:

Total Storage Volume =	220	m^3/ha	→	7,240	m^3
Permanent Pool Volume =	**180**	m^3/ha	→	**5,926**	**m^3**
Active Storage Volume =	40	m^3/ha	→	1,314	m^3

FILTER BED SIZING

Project: 5170 Schaeffers Consulting Engineers

Catchment 201

Filter Surface Area Calculation Based on Equation 4.12 of MOE Manual		
A = (1000 x V x d) / (k x (h + d) x t)		
Volume of Water to be Filtered (V), (Extended Detention Volume) =	**5872**	(m^3)
Depth of Filter (d) =	**0.80**	(m)
Permeability Coefficient (k) =	**45**	mm/hr
Head of Water (h) =	0.30	(m)
Maximum Flow into Filter Media (Erosion Flow) =	0.036	(m^3/s)
Minimum Drawdown Time (t) =	**45**	(hour)
Filtration Bed Area (A) =	**2095**	(m^2)
Filtration Bed Area Provided (A) =	**2300**	(m^2)
Actual Head of Water (h) =	**0.30**	(m)
Expected Drawdown Time based on provided filtration bed area (t) =	**45**	(hours)

Site 25mm Requirement		
Area	35.59	ha
IMP	66	%
VCTL	25	mm
Volume	**5872**	m^3

Catchment 202

Filter Surface Area Calculation Based on Equation 4.12 of MOE Manual		
A = (1000 x V x d) / (k x (h + d) x t)		
Volume of Water to be Filtered (V), (Extended Detention Volume) =	**5586**	(m^3)
Depth of Filter (d) =	**0.80**	(m)
Permeability Coefficient (k) =	**45**	mm/hr
Head of Water (h) =	0.30	(m)
Maximum Flow into Filter Media (Erosion Flow) =	0.036	(m^3/s)
Minimum Drawdown Time (t) =	**43**	(hour)
Filtration Bed Area (A) =	**2095**	(m^2)
Filtration Bed Area Provided (A) =	**2095**	(m^2)
Actual Head of Water (h) =	**0.30**	(m)
Expected Drawdown Time based on provided filtration bed area (t) =	**43**	(hours)

Site 25mm Requirement		
Area	32.86	ha
IMP	68	%
VCTL	25	mm
Volume	**5586**	m^3

Sediment Drying Area (SWMP 201)

Project No. 5170

Tributary Area to the pond	35.59	ha
Imperviousness	66	%
Annual sediment loading (As per MOE manual)	2.6	m3/ha
Annual sediment loading	91.1	m3
10-year sediment volume	911.1	m3
Depth of the sediment	1.0	m
Side slope	10	: 1
Sediment Drying Area Required	**0.161**	**ha**
Sediment Drying Area Provided	**0.165**	**ha**

Catchment Imperviousnes (%)	*Annual Loading (m^3/ha)*
55	1.9
66	2.6
70	2.8

Table 6.3: Annual Sediment Loadings

Catchment Imperviousness	Annual Loading (kg/ha)	Wet Density (kg/m^3)	Annual Loading (m^3/ha)
35%	770	1,230	0.6
55%	2,300	1,230	1.9
70%	3,495	1,230	2.8
85%	4,680	1,230	3.8

Sediment Drying Area (SWMP 202)

Project No. 5170

Tributary Area to the pond	32.86	ha
Imperviousness	68	%
Annual sediment loading (As per MOE manual)	2.7	m3/ha
Annual sediment loading	88.1	m3
10-year sediment volume	880.6	m3
Depth of the sediment	1.0	m
Side slope	10	: 1
Sediment Drying Area Required	**0.157**	**ha**
Sediment Drying Area Provided	**0.200**	**ha**

Catchment Imperviousnes (%)	*Annual Loading (m^3/ha)*
55	1.9
68	2.7
70	2.8

Table 6.3: Annual Sediment Loadings

Catchment Imperviousness	Annual Loading (kg/ha)	Wet Density (kg/m^3)	Annual Loading (m^3/ha)
35%	770	1,230	0.6
55%	2,300	1,230	1.9
70%	3,495	1,230	2.8
85%	4,680	1,230	3.8

TABLE 1: WATER BUDGET - PRE DEVELOPMENT - AREA TO REACH 2
WATER BALANCE/WATER BUDGET ASSESSMENT

Catchment Designation	Catchment 201	Part of Catchment 203	
	Agricultural Area	Agricultural Area	Total
Area (m^2)	149520	20000	169520
Pervious Area (m^2)	149520	20000	169520
Impervious Area (m^2)	0	0	0
Infiltration Factors			
Topography Infiltration Factor ()	0.1	0.1	
Soil Infiltration Factor ()	0.2	0.2	
Land Cover Infiltration Factor	0.1	0.1	
MOE Infiltration Factor	0.4	0.4	
Inputs (per unit area)			
Precipitation (mm/year	933	933	933
Total Inputs (mm/year)	933	933	933
Outputs (per unit area)			
Precipitation Surplus (mm/year)	340	340	340
Net Surplus (mm/year)	340	340	340
Downspout Disconnection Retention*	0	0	0
Evapotranpiration (mm/year)	593	593	593
Roof Evapotranspiration (mm/year)**	0	0	0
Rooftop Runoff Lawn Evaporation (mm/year)	0	0	0
Total Evapotranspiration (mm/yr)	**593**	**593**	**593**
Infiltration (mm/year)	136	136	136
Rooftop Infiltration (mm/year)**	0	0	0
Total Infiltration (mm/year)	**136**	**136**	**136**
Runoff Pervious Area (mm/year)	204	204	204
Runoff Impervious Area (mm/year)	0	0	0
Total Runoff (mm/year)	**204**	**204**	**204**
Total Outputs (mm/year)	**933**	**933**	933
Difference (Inputs - Outputs)	0	0	0
Input Volumes			
Precipitation (m^3/year)	139502	18660	158162
Total Inputs (m^3/year)	**139502**	**18660**	**158162**
Outputs (Volumes)			
Precipitation Surplus (m^3/year)	50837	6800	57637
Net Surplus (m^3/year)	50837	6800	57637
Downspout Disconnection Retention* (m^3/year)	0	0	0
Evapotranpiration (m^3/year)	88665	11860	100525
Roof Evapotranspiration (m^3/year)	0	0	0
Rooftop Runoff Lawn Evaporation (m^3/year)	0	0	0
Total Evapotranspiration (m^3/year)	**88665**	**11860**	**100525**
Infiltration (m^3/year)	20335	2720	23055
Rooftop Infiltration (m^3/year)	0	0	0
Total Infiltration (m^3/year)	**20335**	**2720**	**23055**
Runoff Pervious Area (m^3/year)	30502	4080	34582
Runoff Impervious Area (m^3/year)	0	0	0
Total Runoff (m^3/year)	**30502**	**4080**	**34582**
Total Outputs (m^3/year)	**139502**	**18660**	**158162**
Difference (Inputs - Outputs)	0	0	0

TABLE 4: WATER BUDGET - POST DEVELOPMENT - AREA TO REACH 2

WATER BALANCE/WATER BUDGET ASSESSMENT	149520		24200		20000		
Catchment Designation	**Catchment 201**		**Block 58**		**Block 59 - Part of Catchment 203**		
	Pervious Area	Impervious Area	Pervious Area	Impervious Area	Pervious Area	Impervious Area	Total
Area (m^2)	44260	81060	5082	19118	4200	15800	169520
Pervious Area (m^2)	44260	0	5082	0	4200	0	53542
Impervious Area (m^2)	0	81060	0	19118	0	15800	115978
Infiltration Factors							
Topography Infiltration Factor (Rolling Land)	0.1	N/A	0.1	N/A	0.1	N/A	
Soil Infiltration Factor (Soil Type D)	0.2	N/A	0.4	N/A	0.4	N/A	
Land Cover Infiltration Factor	0.1	N/A	0.1	N/A	0.1	N/A	
MOE Infiltration Factor	0.4	N/A	0.6	N/A	0.6	N/A	
Inputs (per unit area)							
Precipitation (mm/year	933	933	933	933	933	933	933
Total Inputs (mm/year)	933	933	933	933	933	933	933
Outputs (per unit area)							
Precipitation Surplus (mm/year)	340	840	340	840	340	840	682
Net Surplus (mm/year)	340	840	340	840	340	840	682
Downspout Disconnection Retention*	0	0	0	0	0	0	0
Evapotranpiration (mm/year)	593	93	593	93	593	93	251
Roof Evapotranspiration (mm/year)**	0	0	0	0	0	0	0
Rooftop Runoff Lawn Evaporation (mm/year)	0	0	0	0	0	0	0
Total Evapotranspiration (mm/yr)	**593**	**93**	**593**	**93**	**593**	**93**	**251**
Infiltration (mm/year)	136	0	204	0	204	0	47
Rooftop Infiltration (mm/year)**	0	0	0	0	0	0	0
Total Infiltration (mm/year)	**136**	**0**	**204**	**0**	**204**	**0**	**47**
Runoff Pervious Area (mm/year)	204	0	136	0	136	0	61
Runoff Impervious Area (mm/year)	0	840	0	840	0	840	574
Total Runoff (mm/year)	**204**	**840**	**136**	**840**	**136**	**840**	**635**
Total Outputs (mm/year)	**933**	**933**	**933**	**933**	**933**	**933**	**933**
Difference (Inputs - Outputs)	0	0	0	0	0	0	0
Input Volumes							
Precipitation (m^3/year)	41294	75629	4742	17837	3919	14741	158162
Total Inputs (m^3/year)	**41294**	**75629**	**4742**	**17837**	**3919**	**14741**	158162
Outputs (Volumes)							
Precipitation Surplus (m^3/year)	15048	68066	1728	16053	1428	13267	115591
Net Surplus (m^3/year)	15048	68066	1728	16053	1428	13267	115591
Downspout Disconnection Retention* (m^3/year)	0	0	0	0	0	0	0
Evapotranpiration (m^3/year)	26246	7563	3014	1784	2491	1474	42571
Roof Evapotranspiration (m^3/year)	0	0	0	0	0	0	0
Rooftop Runoff Lawn Evaporation (m^3/year)	0	0	0	0	0	0	0
Total Evapotranspiration (m^3/year)	**26246**	**7563**	**3014**	**1784**	**2491**	**1474**	**42571**
Infiltration (m^3/year)	6019	0	1037	0	857	0	7913
Rooftop Infiltration (m^3/year)	0	0	0	0	0	0	0
Total Infiltration (m^3/year)	**6019**	**0**	**1037**	**0**	**857**	**0**	**7913**
Runoff Pervious Area (m^3/year)	9029	0	691	0	571	0	10291
Runoff Impervious Area (m^3/year)	0	68066	0	16053	0	13267	97387
Total Runoff (m^3/year)	**9029**	**68066**	**691**	**16053**	**571**	**13267**	**107678**
Total Outputs (m^3/year)	**41294**	**75629**	**4742**	**17837**	**3919**	**14741**	**158162**
Difference (Inputs - Outputs)	0	0	0	0	0	0	**0**

Water Balance Mitigation Calculations - Area to Reach 2

Pre Development Infiltration =	**23,055 m^3/y**
Post Development Infiltration =	**7,913 m^3/y**
Post to Pre Deficit =	**15,142 m^3/y**

Overall Required mitigation

16.95 ha x Annual Precipitation Depth = 15,142 m^3/year

Required Annual Precpitation Depth to meet deficit = 89 mm/yr

Based on this analysis, it is concluded that precipitation events of depth less than or equal to *0.74 mm* 125.44 m^3/event

will produce an annual amount of precipitation equal to 89 mm/yr

# Townhouses lots	40	lots
# single detached lots	151	lots
Avg roof area	180	sqm
Total detached roof area	27180	sqm
Half of roof area	13590	sqm
Assuming front grass area for 1 Single Detached lot =	21	sqm
Total grass area for all lots =	3171	sqm

Rain Garden - Sizing for 1 Townhouse lot - Half roof and backyard

0.010 ha x Annual Precipitation Depth = 28 m^3/year

Required Annual Precpitation Depth to meet deficit 274 mm/yr

Based on this analysis, it is concluded that precipitation events of depth less than or equal to *2.70 mm* 0.27 m^3/event

will produce an annual amount of precipitation equal t 274 mm/yr

Total Volume Infiltrated = 1108 m3/year --> Rain garden proposed for all Townhouse lot

Rain Garden - Sizing for 1 Single Detached lot - Half roof and front grass area

0.012 ha x Annual Precipitation Depth = 26 m^3/year

Required Annual Precpitation Depth to meet deficit 227 mm/yr

Based on this analysis, it is concluded that precipitation events of depth less than or equal to *2.15 mm* 0.25 m^3/event

will produce an annual amount of precipitation equal t 227 mm/yr

Total Volume Infiltrated = 3956 m3/year --> Rain garden proposed for all Detached Houses lot

Rain Garden Sizing - Single Detached Lot

Required Infiltration System Footprint Area

Infiltration Volume	0.25	m^3
Number of Gardens	1	
Inillftration Volume per Garden	0.25	m^3
drawdown time	48	hours
infiltration rate	15	mm/h
Safety Factor	2.5	
Design Infiltration Rate	6	mm/h
Required Footprint Area	2.16	m^2

MOE Eqn 4.3

Proposed Infiltration Details

Length=	1.50	m
Width=	1.50	m
Total Trench Volume Provided per unit=	0.27	m^3
Minimum Required Storage Depth =	0.30	m
Drawdown time=	20.00	hours
Total Volume retained by Raingardens=	0.27	m^3

(1.5m x 1.5m x 0.3 m)

Therefore the proposed system has the required footprint area to drain within 48 hours and will provid
retention volume that exceeds the required volume for mitigati

* Soils with Satutrated Hydraulic Conductivity = 1(10) cm/s correlates to an infiltration rate of 15mm/h
Low Impact Development Design Manual (TRCA and CVC, 201(

Bioswale - Half of ROW Area + Lot Drainage to Fron

1.82 ha x Annual Precipitation Depth = 1,450 m^3/year

Required Annual Precpitation Depth to meet deficit 80 mm/yr

Based on this analysis, it is concluded that precipitation events of depth less than or equal to *0.65 mm* 11.85 m^2/event

will produce an annual amount of precipitation equal t 80 mm/yr

LID in Block 58

1.91 ha x Annual Precipitation Depth = 4,920 m^3/year

Required Annual Precpitation Depth to meet deficit 257 mm/yr

Based on this analysis, it is concluded that precipitation events of depth less than or equal to *2.50 mm* 47.80 m^3/event

will produce an annual amount of precipitation equal t 257 mm/yr

LID in Block 59

1.58 ha x Annual Precipitation Depth = 4,060 m^3/year

Required Annual Precpitation Depth to meet deficit 257 mm/yr

Based on this analysis, it is concluded that precipitation events of depth less than or equal to *2.50 mm* 39.50 m^3/event

will produce an annual amount of precipitation equal t 257 mm/yr

Bioswale

Required Infiltration System Footprint Area

Infiltration Volume	11.85	m^3
Number of Gardens	1	
Inillftration Volume per Garden	11.85	m^3
drawdown time	48	hours
infiltration rate	15	mm/h
Safety Factor	2.5	
Design Infiltration Rate	6	mm/h
Required Footprint Area	102.84	m^2

MOE Eqn 4.3

Proposed Infiltration Details

Length=	99	m
Width=	1.00	m
Total Trench Volume Provided per unit=	11.93	m^3
Minimum Required Storage Depth =	0.30	m
Drawdown time=	20.00	hours
Total Volume retained=	11.93	m^3

(99.4264m x 1m x 0.3 m

Therefore the proposed system has the required footprint area to drain within 48 hours and will provid
retention volume that exceeds the required volume for mitigati

* Soils with Satutrated Hydraulic Conductivity = 1(10) cm/s correlates to an infiltration rate of 15mm/h
Low Impact Development Design Manual (TRCA and CVC, 201(

Remaining Deficit **-352** **m3/year**

TABLE 3: WATER BUDGET - PRE DEVELOPMENT - AREA TO REACH 3
WATER BALANCE/WATER BUDGET ASSESSMENT

	Catchment 202	Part of Catchment 201 below GW line	
Catchment Designation	Agricultural Area	Agricultural Area	Total
Area (m^2)	290600	62366	352966
Pervious Area (m^2)	290600	62366	352966
Impervious Area (m^2)	0	0	0
Infiltration Factors			
Topography Infiltration Factor ()	0.1	0.1	
Soil Infiltration Factor ()	0.2	0.4	
Land Cover Infiltration Factor	0.1	0.1	
MOE Infiltration Factor	0.6	0.4	
Inputs (per unit area)			
Precipitation (mm/year	933	933	933
Total Inputs (mm/year)	933	933	933
Outputs (per unit area)			
Precipitation Surplus (mm/year)	340	340	340
Net Surplus (mm/year)	340	340	340
Downspout Disconnection Retention*	0	0	0
Evapotranpiration (mm/year)	593	593	593
Roof Evapotranspiration (mm/year)**	0	0	0
Rooftop Runoff Lawn Evaporation (mm/year)	0	0	0
Total Evapotranspiration (mm/yr)	**593**	**593**	593
Infiltration (mm/year)	204	136	192
Rooftop Infiltration (mm/year)**	0	0	0
Total Infiltration (mm/year)	**204**	**136**	192
Runoff Pervious Area (mm/year)	136	204	148
Runoff Impervious Area (mm/year)	0	0	0
Total Runoff (mm/year)	**136**	**204**	148
Total Outputs (mm/year)	**933**	**933**	933
Difference (Inputs - Outputs)	0	0	0
Input Volumes			
Precipitation (m^3/year)	271130	58187	329317
Total Inputs (m^3/year)	**271130**	**58187**	**329317**
Outputs (Volumes)			
Precipitation Surplus (m^3/year)	98804	21204	120008
Net Surplus (m^3/year)	98804	21204	120008
Downspout Disconnection Retention* (m^3/year)	0	0	0
Evapotranpiration (m^3/year)	172326	36983	209309
Roof Evapotranspiration (m^3/year)	0	0	0
Rooftop Runoff Lawn Evaporation (m^3/year)	0	0	0
Total Evapotranspiration (m^3/year)	**172326**	**36983**	**209309**
Infiltration (m^3/year)	59282	8482	67764
Rooftop Infiltration (m^3/year)	0	0	0
Total Infiltration (m^3/year)	**59282**	**8482**	**67764**
Runoff Pervious Area (m^3/year)	39522	12723	52244
Runoff Impervious Area (m^3/year)	0	0	0
Total Runoff (m^3/year)	**39522**	**12723**	**52244**
Total Outputs (m^3/year)	**271130**	**58187**	**329317**
Difference (Inputs - Outputs)	0	0	0

TABLE 4: WATER BUDGET - POST DEVELOPMENT - AREA TO REACH 3

WATER BALANCE/WATER BUDGET ASSESSMENT

Catchment Designation	Part of Catchment 201 below GW line		Catchment 202		xxxxxxxx		
	Pervious Area	Impervious Area	Pervious Area	Impervious Area	Pervious Area	Impervious Area	Total
Area (m^2)	20581	41785	98804	191796			352966
Pervious Area (m^2)	20581	0	98804	0			119385
Impervious Area (m^2)	0	41785	0	191796			233581
Infiltration Factors							
Topography Infiltration Factor (Rolling Land)	0.1	N/A	0.1	N/A	0.1	N/A	
Soil Infiltration Factor (Soil Type D)	0.2	N/A	0.4	N/A	0.4	N/A	
Land Cover Infiltration Factor	0.1	N/A	0.1	N/A	0.1	N/A	
MOE Infiltration Factor	0.4	N/A	0.6	N/A	0.6	N/A	
Inputs (per unit area)							
Precipitation (mm/year	933	933	933	933	933	933	933
Total Inputs (mm/year)	933	933	933	933	933	933	933
Outputs (per unit area)							
Precipitation Surplus (mm/year)	340	840	340	840	340	840	671
Net Surplus (mm/year)	340	840	340	840	340	840	671
Downspout Disconnection Retention*	0	0	0	0	0	0	0
Evapotranpiration (mm/year)	593	93	593	93	593	93	262
Roof Evapotranspiration (mm/year)**	0	0	0	0	0	0	0
Rooftop Runoff Lawn Evaporation (mm/year)	0	0	0	0	0	0	0
Total Evapotranspiration (mm/yr)	**593**	**93**	**593**	**93**	**593**	**93**	**262**
Infiltration (mm/year)	136	0	204	0	204	0	65
Rooftop Infiltration (mm/year)**	0	0	0	0	0	0	0
Total Infiltration (mm/year)	**136**	**0**	**204**	**0**	**204**	**0**	**65**
Runoff Pervious Area (mm/year)	204	0	136	0	136	0	50
Runoff Impervious Area (mm/year)	0	840	0	840	0	840	556
Total Runoff (mm/year)	**204**	**840**	**136**	**840**	**136**	**840**	**606**
Total Outputs (mm/year)	**933**	**933**	**933**	**933**	**933**	**933**	**933**
Difference (Inputs - Outputs)	0	0	0	0	0	0	0
Input Volumes							
Precipitation (m^3/year)	19202	38986	92184	178946	0	0	328742
Total Inputs (m^3/year)	**19202**	**38986**	**92184**	**178946**	**0**	**0**	328742
Outputs (Volumes)							
Precipitation Surplus (m^3/year)	6997	35087	33593	161051	0	0	236313
Net Surplus (m^3/year)	6997	35087	33593	161051	0	0	236313
Downspout Disconnection Retention* (m^3/year)	0	0	0	0	0	0	0
Evapotranpiration (m^3/year)	12204	3899	58591	17895	0	0	92429
Roof Evapotranspiration (m^3/year)	0	0	0	0	0	0	0
Rooftop Runoff Lawn Evaporation (m^3/year)	0	0	0	0	0	0	0
Total Evapotranspiration (m^3/year)	**12204**	**3899**	**58591**	**17895**	**0**	**0**	**92429**
Infiltration (m^3/year)	2799	0	20156	0	0	0	22927
Rooftop Infiltration (m^3/year)	0	0	0	0	0	0	0
Total Infiltration (m^3/year)	**2799**	**0**	**20156**	**0**	**0**	**0**	**22927**
Runoff Pervious Area (m^3/year)	4198	0	13437	0	0	0	17594
Runoff Impervious Area (m^3/year)	0	35087	0	161051	0	0	195791
Total Runoff (m^3/year)	**4198**	**35087**	**13437**	**161051**	**0**	**0**	**213385**
Total Outputs (m^3/year)	**19202**	**38986**	**92184**	**178946**	**0**	**0**	**328742**
Difference (Inputs - Outputs)	0	0	0	0	0	0	**0**

Water Balance Mitigation Calculations - Area to Reach 3

Pre Development Infiltration =	**67764 m^3/y**
Post Development Infiltration =	**23927 m^3/y**
Post to Pre Deficit =	**44837 m^3/y**

Overall Required mitigation

35.30 ha x Annual Precipitation Depth = 44,837 m^3/year

Required Annual Precipitation Depth to meet deficit = 127 mm/yr

Based on this analysis, it is concluded that precipitation events of depth less than or equal to *1.11 mm* will produce an annual amount of precipitation equal to 127 mm/yr — 391.79 m^3/event

4.2mm retention in School Block

1.809 ha x Annual Precipitation Depth = 7,040 m^3/year

Required Annual Precipitation Depth to meet deficit = 389 mm/yr

Based on this analysis, it is concluded that precipitation events of depth less than or equal to *4.20 mm* will produce an annual amount of precipitation equal to 389 mm/yr — 75.98 m^3/event

# Townhouses lots	144	lots
Avg roof area	120	sqm
Total roof area	17280	sqm
Half of roof area	8640	sqm
# single detached lots	290	lots
Avg roof area	180	sqm
Total roof area	52200	sqm
Half of roof area	26100	sqm
Assuming front grass area for 1 Townhouse lot =	12	sqm
Total grass area for all lots =	1728	sqm
Assuming front grass area for 1 Single Detached lot	21	sqm
Total grass area for all lots =	6090	sqm

Rain Garden - Sizing for 1 Single Detached lot - Half roof and front grass are

0.013 ha x Annual Precipitation Depth = 28 m^3/year

Required Annual Precipitation Depth to meet deficit = 213 mm/yr

Based on this analysis, it is concluded that precipitation events of depth less than or equal to *2.00 mm* will produce an annual amount of precipitation equal to 213 mm/yr — 0.27 m^3/event

Total Volume Infiltrated = 8149 m3/year —> Rain garden proposed for all Detached Houses lots

Rain Garden - Sizing for 1 Townhouse lot - Half roof and front grass are

0.006 ha x Annual Precipitation Depth = 13 m^3/year

Required Annual Precipitation Depth to meet deficit = 213 mm/yr

Based on this analysis, it is concluded that precipitation events of depth less than or equal to *2.00 mm* will produce an annual amount of precipitation equal to 213 mm/yr — 0.27 m^3/event

Total Volume Infiltrated = 1829 m3/year —> Rain garden proposed for all Townhouse lots

Rain Garden Sizing

Required Infiltration System Footprint Area

Infiltration Volume	0.27	m^3	
Number of Gardens	1		
Initfiltration Volume per Garden	0.27	m^3	
drawdown time	48	hours	
infiltration rate	15	mm/h	
Safety Factor	2.5		
Design Infiltration Rate	6	mm/h	MOE Eqn 4.3
Required Footprint Area	2.34	m^2	

Proposed Infiltration Detail

Length=	1.50	m	
Width=	1.50	m	**(1.5m x 1.5m x 0.3 m)**
Total Trench Volume Provided per unit=	0.27	m^3	
Minimum Required Storage Depth =	0.30	m	
Drawdown time=	20.00	hours	
Total Volume retained by Raingardens=	0.27	m^3	

Therefore the proposed system has the required footprint area to drain within 48 hours and will provide retention volume that exceeds the required volume for mitigatio

* Soils with Saturated Hydraulic Conductivity = 1(10^{-6}) cm/s correlates to an infiltration rate of 15mm/h Low Impact Development Design Manual (TRCA and CVC, 2010

Bioswale - Half of ROW + Lot Drainage to Fron

4.85 ha x Annual Precipitation Depth = 4,700 m^3/year

Required Annual Precipitation Depth to meet deficit = 97 mm/yr

Based on this analysis, it is concluded that precipitation events of depth less than or equal to *0.82 mm* will produce an annual amount of precipitation equal to 97 mm/yr — 39.66 m^3/event

ROW Bioswale

Required Infiltration System Footprint Area

Infiltration Volume	39.66	m^3	
drawdown time	48	hours	
infiltration rate	15	mm/h	
Safety Factor	2.5		
Design Infiltration Rate	6	mm/h	MOE Eqn 4.3
Required Footprint Area	344.31	m^2	

Proposed Infiltration Detail

Length=	332	m	
Width=	1.00	m	**(331.6335m x 1m x 0.3 m)**
Total Trench Volume Provided per unit=	39.80	m^3	
Minimum Required Storage Depth =	0.30	m	
Drawdown time=	20.00	hours	
Total Volume retained=	39.80	m^3	

Therefore the proposed system has the required footprint area to drain within 48 hours and will provide retention volume that exceeds the required volume for mitigatio

* Soils with Saturated Hydraulic Conductivity = 1(10^{-6}) cm/s correlates to an infiltration rate of 15mm/h Low Impact Development Design Manual (TRCA and CVC, 2010

Greenstorm Tank - Minor Flow from sewer

6.22 ha x Annual Precipitation Depth = 6,350 m^3/year

Required Annual Precipitation Depth to meet deficit = 102 mm/yr

Based on this analysis, it is concluded that precipitation events of depth less than or equal to *0.87 mm* will produce an annual amount of precipitation equal to 102 mm/yr — 53.90 m^3/event

ROW Greenstorm Tanks

Required Infiltration System Footprint Area

Infiltration Volume	53.90	m^3	
drawdown time	48	hours	
infiltration rate	15	mm/h	
Safety Factor	2.5		
Design Infiltration Rate	6	mm/h	MOE Eqn 4.3
Required Footprint Area	187.15	m^2	

Proposed Infiltration Details

Length=	117	m	
Width=	1.60	m	**(117m x 1.6m x 0.288 m)**
Total Trench Volume Provided per unit=	53.91	m^3	
Minimum Required Storage Depth =	0.29	m	
Drawdown time=	48.00	hours	
Total Volume retained=	53.91	m^3	

Therefore the proposed system has the required footprint area to drain within 48 hours and will provide a retention volume that exceeds the required volume for mitigation

* Soils with Saturated Hydraulic Conductivity = 1(10^{-6}) cm/s correlates to an infiltration rate of 15mm/h Low Impact Development Design Manual (TRCA and CVC, 2010

Swale along Buffer (Potential Measure) - Single Detached Half Roof & Backyard

2.62 ha x Annual Precipitation Depth = 16,840 m^3/year

Required Annual Precipitation Depth to meet deficit = 643 mm/yr

Based on this analysis, it is concluded that precipitation events of depth less than or equal to *9.19 mm* will produce an annual amount of precipitation equal to 643 mm/yr — 240.56 m^3/event

Swale along Buffer (potential measure)

Required Infiltration System Footprint Area

Infiltration Volume	240.56	m^3	
drawdown time	48	hours	
infiltration rate	15	mm/h	
Safety Factor	2.5		
Design Infiltration Rate	6	mm/h	MOE Eqn 4.3
Required Footprint Area	835.28	m^2	

Proposed Infiltration Details

Length=	1672	m	
Bottom Width=	0.30	m	**(1672m x 0.3m x 0.3 m)**
Top Width =	2.10	m	
Total Trench Volume Provided per unit=	240.77	m^3	
Minimum Required Storage Depth =	0.30	m	
Drawdown time=	20.00	hours	
Total Volume retained=	240.77	m^3	

Therefore the proposed system has the required footprint area to drain within 48 hours and will provide a retention volume that exceeds the required volume for mitigation

* Soils with Saturated Hydraulic Conductivity = 1(10^{-6}) cm/s correlates to an infiltration rate of 15mm/h Low Impact Development Design Manual (TRCA and CVC, 2010

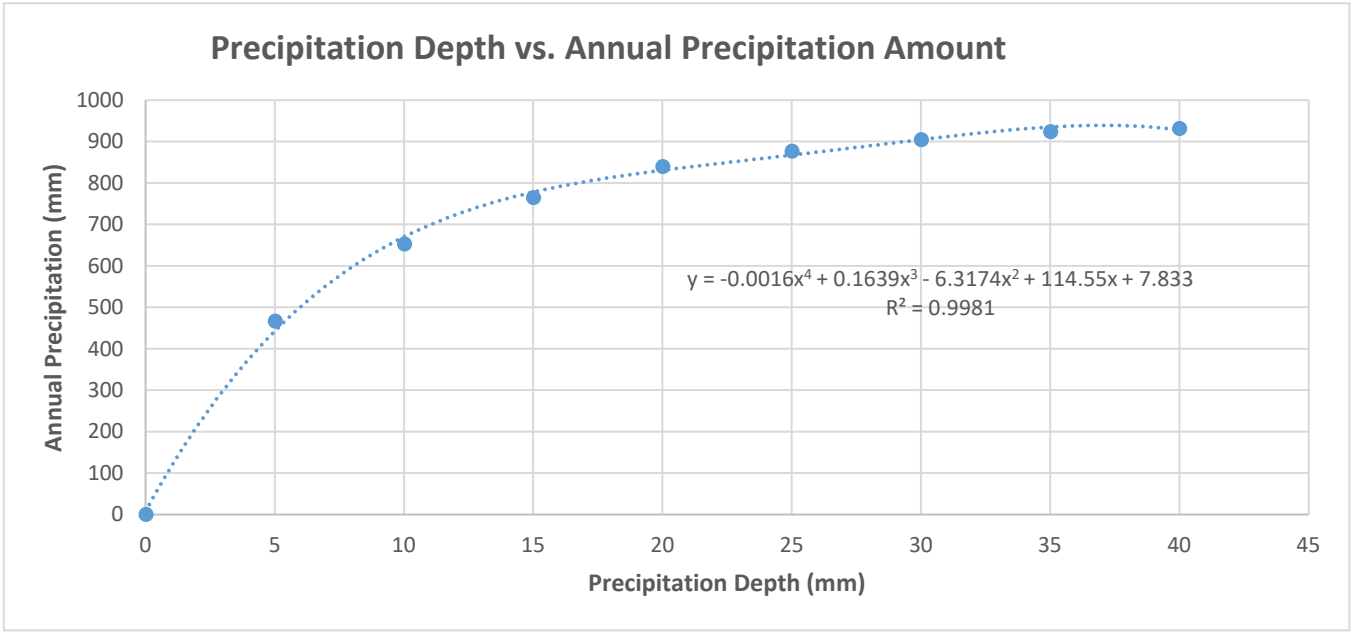
Remaining Deficit **-71** **m3/year**

Precipitation Depth vs. Annual Precipitation Depth

Precipitation .	933	mm

0	0
5	**467**
10	**653**
15	**765**
20	**840**
25	**877**
30	**905**
35	**924**
40	**932**

rainfall depth $y = -0.0016x^4 + 0.1639x^3 - 6.3174x^2 + 114.55x + 7.833$



Ontario

MINISTRY OF THE ENVIRONMENT

Database Version: V 2.0 Release Update
Update Date: 30-Mar-12

Project DEVELOPMENT Summary

DEVELOPMENT: 5170 - Dorsay
Subwatershed: Innisfil Creeks

Total Pre-Development Area (ha):	**52.25**	Total Pre-Development Phosphorus Load (kg/yr):	**9.93**

Pre-Development Land Use	Area (ha)	P coeff. (kg/ha)	P Load (kg/yr)
Cropland	52.25	0.19	9.93

DEVELOPMENT: 5170 - Dorsay
Subwatershed: Innisfil Creeks

POST-DEVELOPMENT LOAD

Post-Development Land Use	Area (ha)	P coeff. (kg/ha)	Best Management Practice applied with P Removal Efficiency		P Load (kg/yr)
High Intensity - Residential	2.62	1.32	Vegetated Filter Strips/Stream Buffers	65%	1.21
			Buffer Swales (65%)		
High Intensity - Residential	1.13	1.32	Hydrodynamic devices	**71%**	0.43
			Bioswales (65%) + JellyFish (40%)		
NOTE: BMP efficiency has been adjusted from the reference provided value by 71% (from 0% to 71%)					
High Intensity - Residential	5.69	1.32	Other	92%	0.60
			Wet Pond (63%)+ Sorbtive Media (79%)		
High Intensity - Residential	27.92	1.32	Wet Detention Ponds	**92%**	2.95
			Wet Pond (63%) + Sorbtive Media (79%)		
NOTE: BMP efficiency has been adjusted from the reference provided value by 29% (from 63% to 92%)					
High Intensity - Residential	6.67	1.32	Bioretention Systems	**97%**	0.26
			Bioswales (65%) + Wet Pond (63%) + Sorbtive Media (79%)		
NOTE: BMP efficiency has been adjusted from the reference provided value by 97% (from 0% to 97%)					
High Intensity - Residential	6.22	1.32	Underground Storage	**97%**	0.25
			Infiltration Tanks (60%) + Wet Pond (63%) + Sorbtive Media (79%)		
NOTE: BMP efficiency has been adjusted from the reference provided value by 72% (from 25% to 97%)					
High Intensity - Residential	2	1.32	Treatment Train Approach	40%	1.58
			JellyFish (40%)		

Post-Development Area Altered: **52.25**

Total Pre-Development Area: **52.25**

Unaffected Area: **0**

	P Load (kg/yr)
Pre-Development:	**9.93**
Post-Development:	**68.97**
Change (Pre - Post):	**-59.04**
595% Net Increase in Load	
Post-Development (with BMPs):	**7.29**
Change (Pre - Post):	**2.64**
27% Net Reduction in Load	

DEVELOPMENT: 5170 - Dorsay
Subwatershed: Innisfil Creeks

CONSTRUCTION PHASE LOAD

SUMMARY WITH IMPLEMENTATION OF BMPs	**P Load (kg/yr)**
Pre-Development:	**9.93**
Construction Phase Amortized Over 8 Years :	to be determined
Post-Development:	**7.29**
Post-Development + Amortized Construction:	**to be determined**
Pre-Development Load - Post-Development Load:	**2.64**
Conclusion:	**27% Reduction in Load**
Pre-Development Load - (Post-Development + Amortized Construction Load):	**to be determined**
Conclusion:	**to be determined**

Based on a comparison of Pre-Development and Post-Development loads, and in consideration of Construction Phase loads, the Ministry would encourage the Municipality to:

STANDARD OFFLINE
Jellyfish Filter Sizing Report

Project Information

Date	Thursday, March 02, 2023
Project Name	Mapleview Dr. E and 20th Sideroad
Project Number	5170
Location	Barrie

Jellyfish Filter Design Overview

This report provides information for the sizing and specification of the Jellyfish Filter. When designed properly in accordance to the guidelines detailed in the Jellyfish Filter Technical Manual, the Jellyfish Filter will exceed the performance and longevity of conventional horizontal bed and granular media filters.
Please see ***www.ImbriumSystems.com*** *for more information.*

Jellyfish Filter System Recommendation

The Jellyfish Filter model JF10-11-3 is recommended to meet the water quality objective by treating a flow of 63.1 L/s, which meets or exceeds 90% of the average annual rainfall runoff volume based on 36 years of BARRIE WPCC rainfall data for this site. This model has a sediment capacity of 711 kg, which meets or exceeds the estimated average annual sediment load.

Jellyfish Model	Number of High-Flo Cartridges	Number of Draindown Cartridges	Manhole Diameter (m)	Treatment Flow Rate (L/s)	Sediment Capacity (kg)
JF10-11-3	11	3	3.0	63.1	711

The Jellyfish Filter System

The patented Jellyfish Filter is an engineered stormwater quality treatment technology featuring unique membrane filtration in a compact stand-alone treatment system that removes a high level and wide variety of stormwater pollutants. Exceptional pollutant removal is achieved at high treatment flow rates with minimal head loss and low maintenance costs. Each lightweight Jellyfish Filter cartridge contains an extraordinarily large amount of membrane surface area, resulting in superior flow capacity and pollutant removal capacity.

Maintenance

Regular scheduled inspections and maintenance is necessary to assure proper functioning of the Jellyfish Filter. The maintenance interval is designed to be a minimum of 12 months, but this will vary depending on site loading conditions and upstream pretreatment measures. Quarterly inspections and inspections after all storms beyond the 5-year event are recommended until enough historical performance data has been logged to comfortably initiate an alternative inspection interval.

Please see ***www.ImbriumSystems.com*** *for more information.*

Thank you for the opportunity to present this information to you and your client.

Performance

Jellyfish efficiently captures a high level of Stormwater pollutants, including:

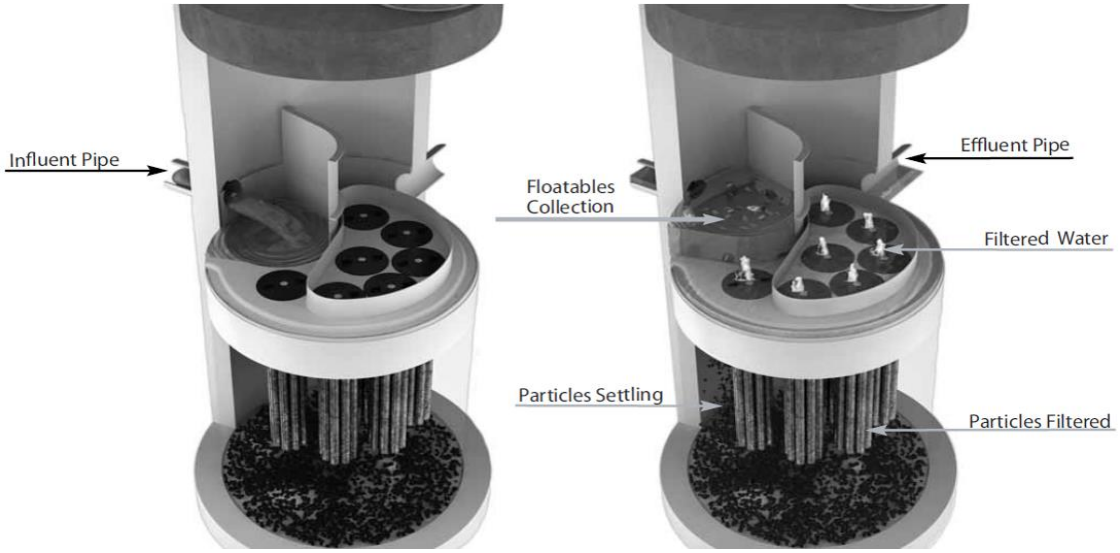
- ☑ 89% of the total suspended solids (TSS) load, including particles less than 5 microns
- ☑ 77% TP removal & 51% TN removal
- ☑ 90% Total Copper, 81% Total Lead, 70% Total Zinc
- ☑ Particulate-bound pollutants such as nutrients, toxic metals, hydrocarbons and bacteria
- ☑ Free oil, Floatable trash and debris

Field Proven Peformance

The Jellyfish filter has been field-tested on an urban site with 25 TARP qualifying rain events and field monitored according to the TARP field test protocol, demonstrating:

- A median TSS removal efficiency of 89%, and a median SSC removal of 99%;
- The ability to capture fine particles as indicated by an effluent d50 median of 3 microns for all monitotred storm events, and a median effluent turbidity of 5 NTUs;
- A median Total Phosphorus removal of 77%, and a median Total Nitrogen removal of 51%.

Jellyfish Filter Treatment Functions



Pre-treatment and Membrane Filtration

Jellyfish® Filter

Project Information

Date:	Thursday, March 02, 2023
Project Name:	Mapleview Dr. E and 20th Sideroad
Project Number:	5170
Location:	Barrie

Designer Information

Company:	Schaeffers Consulting Engineers
Contact:	Ming Gao
Phone #:	

Notes

Rainfall

Name:	BARRIE WPCC
State:	ON
ID:	557
Record:	1968 to 2003
Co-ords:	44°23'N, 79°41'W

Drainage Area

Total Area:	3.47 ha
Imperviousness:	70%

Upstream Detention

Peak Release Rate:	n/a
Pretreatment Credit:	n/a

Design System Requirements

Flow Loading	90% of the Average Annual Runoff based on 36 years of BARRIE WPCC rainfall data:	**61.6 L/s**
Sediment Loading	Treating 90% of the average annual runoff volume, 7067 m³, with a suspended sediment concentration of 60 mg/L.	**424 kg**

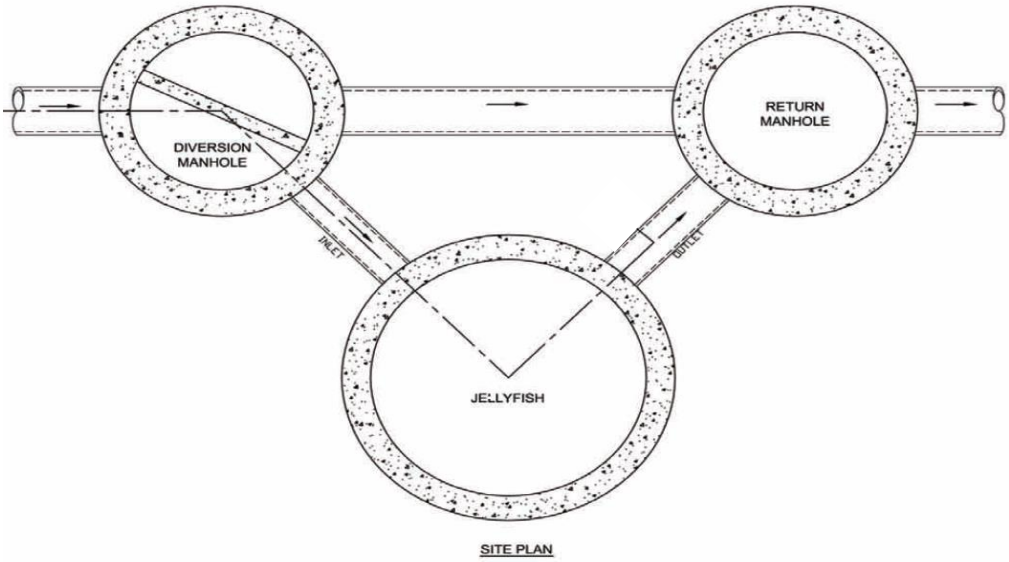
Recommendation

The Jellyfish Filter model JF10-11-3 is recommended to meet the water quality objective by treating a flow of 63.1 L/s, which meets or exceeds 90% of the average annual rainfall runoff volume based on 36 years of BARRIE WPCC rainfall data for this site. This model has a sediment capacity of 711 kg, which meets or exceeds the estimated average annual sediment load.

Jellyfish Model	Number of High-Flo Cartridges	Number of Draindown Cartridges	Manhole Diameter (m)	Wet Vol Below Deck (L)	Sump Storage (m³)	Oil Capacity (L)	Treatment Flow Rate (L/s)	Sediment Capacity (kg)
JF4-1-1	1	1	1.2	2313	0.34	379	7.6	85
JF4-2-1	2	1	1.2	2313	0.34	379	12.6	142
JF6-3-1	3	1	1.8	5205	0.79	848	17.7	199
JF6-4-1	4	1	1.8	5205	0.79	848	22.7	256
JF6-5-1	5	1	1.8	5205	0.79	848	27.8	313
JF6-6-1	6	1	1.8	5205	0.79	848	28.6	370
JF8-6-2	6	2	2.4	9252	1.42	1469	35.3	398
JF8-7-2	7	2	2.4	9252	1.42	1469	40.4	455
JF8-8-2	8	2	2.4	9252	1.42	1469	45.4	512
JF8-9-2	9	2	2.4	9252	1.42	1469	50.5	569
JF8-10-2	10	2	2.4	9252	1.42	1469	50.5	626
JF10-11-3	**11**	**3**	**3.0**	**14456**	**2.21**	**2302**	**63.1**	**711**
JF10-12-3	12	3	3.0	14456	2.21	2302	68.2	768
JF10-12-4	12	4	3.0	14456	2.21	2302	70.7	796
JF10-13-4	13	4	3.0	14456	2.21	2302	75.7	853
JF10-14-4	14	4	3.0	14456	2.21	2302	78.9	910
JF10-15-4	15	4	3.0	14456	2.21	2302	78.9	967
JF10-16-4	16	4	3.0	14456	2.21	2302	78.9	1024
JF10-17-4	17	4	3.0	14456	2.21	2302	78.9	1081
JF10-18-4	18	4	3.0	14456	2.21	2302	78.9	1138
JF10-19-4	19	4	3.0	14456	2.21	2302	78.9	1195
JF12-20-5	20	5	3.6	20820	3.2	2771	113.6	1280
JF12-21-5	21	5	3.6	20820	3.2	2771	113.7	1337
JF12-22-5	22	5	3.6	20820	3.2	2771	113.7	1394
JF12-23-5	23	5	3.6	20820	3.2	2771	113.7	1451
JF12-24-5	24	5	3.6	20820	3.2	2771	113.7	1508
JF12-25-5	25	5	3.6	20820	3.2	2771	113.7	1565
JF12-26-5	26	5	3.6	20820	3.2	2771	113.7	1622
JF12-27-5	27	5	3.6	20820	3.2	2771	113.7	1679

Jellyfish Filter Design Notes

- Typically the Jellyfish Filter is designed in an offline configuration, as all stormwater filter systems will perform for a longer duration between required maintenance services when designed and applied in off-line configurations. Depending on the design parameters, an optional internal bypass may be incorporated into the Jellyfish Filter, however note the inspection and maintenance frequency should be expected to increase above that of an off-line system. Speak to your local representative for more information.



Jellyfish Filter Typical Layout

- Typically, 18 inches (457 mm) of driving head is designed into the system, calculated as the difference in elevation between the top of the diversion structure weir and the invert of the Jellyfish Filter outlet pipe. Alternative driving head values can be designed as 12 to 24 inches (305 to 610mm) depending on specific site requirements, requiring additional sizing and design assistance.
- Typically, the Jellyfish Filter is designed with the inlet pipe configured 6 inches (150 mm) above the outlet invert elevation. However, depending on site parameters this can vary to an optional configuration of the inlet pipe entering the unit below the outlet invert elevation.
- The Jellyfish Filter can accommodate multiple inlet pipes within certain restrictions.
- While the optional inlet below deck configuration offers 0 to 360 degree flexibility between the inlet and outlet pipe, typical systems conform to the following:

Model Diameter (m)	Minimum Angle Inlet / Outlet Pipes	Minimum Inlet Pipe Diameter (mm)	Minimum Outlet Pipe Diameter (mm)
1.2	62º	150	200
1.8	59º	200	250
2.4	52º	250	300
3.0	**48º**	**300**	**450**
3.6	40º	300	450

- The Jellyfish Filter can be built at all depths of cover generally associated with conventional stormwater conveyance systems. For sites that require minimal depth of cover for the stormwater infrastructure, the Jellyfish Filter can be applied in a shallow application using a hatch cover. The general minimum depth of cover is 36 inches (915 mm) from top of the underslab to outlet invert.
- If driving head caclulations account for water elevation during submerged conditions the Jellyfish Filter will function effectively under submerged condtions.
- Jellyfish Filter systems may incorporate grated inlets depending on system configuration.
- For sites with water quality treatment flow rates or mass loadings that exceed the design flow rate of the largest standard Jellyfish Filter manhole models, systems can be designed that hydraulically connect multiple Jellyfish Filters in series or alternatively Jellyfish Vault units can be designed.

STANDARD SPECIFICATION
STORMWATER QUALITY – MEMBRANE FILTRATION TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

Specifies requirements for construction and performance of an underground stormwater quality membrane filtration treatment device that removes pollutants from stormwater runoff through the unit operations of sedimentation, floatation, and membrane filtration.

1.2 REFERENCE STANDARDS

ASTM C 891: Specification for Installation of Underground Precast Concrete Utility Structures
ASTM C 478: Specification for Precast Reinforced Concrete Manhole Sections
ASTM C 443: Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
ASTM D 4101: Specification for Copolymer steps construction

CAN/CSA-A257.4-M92
Joints for Circular Concrete Sewer and Culvert Pipe, Manhole Sections and Fittings Using Rubber Gaskets

CAN/CSA-A257.4-M92
Precast Reinforced Circular Concrete Manhole Sections, Catch Basins and Fittings

Canadian Highway Bridge Design Code

1.3 SHOP DRAWINGS

Shop drawings for the structure and performance are to be submitted with each order to the contractor. Contractor shall forward shop drawing submittal to the consulting engineer for approval. Shop drawings are to detail the structure's precast concrete and call out or note the fiberglass (FRP) internals/components.

1.4 PRODUCT SUBSTITUTIONS

No product substitutions shall be accepted unless submitted 10 days prior to project bid date, or as directed by the engineer of record. Submissions for substitutions require review and approval by the Engineer of Record, for hydraulic performance, impact to project designs, equivalent treatment performance, and any required project plan and report (hydrology/hydraulic, water quality, stormwater pollution) modifications that would be required by the approving jurisdictions/agencies. Contractor to coordinate with the Engineer of Record any applicable modifications to the project estimates of cost, bonding amount determinations, plan check fees for changes to approved documents, and/or any other regulatory requirements resulting from the product substitution.

1.5 HANDLING AND STORAGE

Prevent damage to materials during storage and handling.

PART 2 – PRODUCTS

2.1 GENERAL

2.1.1 The device shall be a cylindrical or rectangular, all concrete structure (including risers), constructed from precast concrete riser and slab components or monolithic precast structure(s), installed to conform to ASTM C 891 and to any required state highway, municipal or local specifications; whichever is more stringent. The device shall be watertight.

2.1.2 Cartridge Deck The cylindrical concrete device shall include a fiberglass deck. The rectangular concrete device shall include a coated aluminum deck. In either instance, the insert shall be bolted and sealed watertight inside the precast concrete chamber. The deck shall serve as: (a) a horizontal divider between the lower treatment zone and the upper treated effluent zone; (b) a deck for attachment of filter cartridges such that the membrane filter elements of each cartridge extend into the lower treatment zone; (c) a platform for maintenance workers to service the filter cartridges (maximum manned weight = 450 pounds (204 kg)); (d) a conduit for conveyance of treated water to the effluent pipe.

2.1.3 Membrane Filter Cartridges Filter cartridges shall be comprised of reusable cylindrical membrane filter elements connected to a perforated head plate. The number of membrane filter elements per cartridge shall be a minimum of eleven 2.75-inch (70-mm) diameter elements. The length of each filter element shall be a minimum 15 inches (381 mm). Each cartridge shall be fitted into the cartridge deck by insertion into a cartridge receptacle that is permanently mounted into the cartridge deck. Each cartridge shall be secured by a cartridge lid that is threaded onto the receptacle, or similar mechanism to secure the cartridge into the deck. The maximum treatment flow rate of a filter cartridge shall be controlled by an orifice in the cartridge lid, or on the individual cartridge itself, and based on a design flux rate (surface loading rate) determined by the maximum treatment flow rate per unit of filtration membrane surface area. The maximum design flux rate shall be 0.21 gpm/ft² (0.142 lps/m²).

Each membrane filter cartridge shall allow for manual installation and removal. Each filter cartridge shall have filtration membrane surface area and dry installation weight as follows (if length of filter cartridge is between those listed below, the surface area and weight shall be proportionate to the next length shorter and next length longer as shown below):

Filter Cartridge Length (in / mm)	Minimum Filtration Membrane Surface Area (ft2 / m2)	Maximum Filter Cartridge Dry Weight (lbs / kg)
15	106 / 9.8	10.5 / 4.8
27	190 / 17.7	15.0 / 6.8
40	282 / 26.2	20.5 / 9.3
54	381 / 35.4	25.5 / 11.6

2.1.4 Backwashing Cartridges The filter device shall have a weir extending above the cartridge deck, or other mechanism, that encloses the high flow rate filter cartridges when placed in their respective cartridge receptacles within the cartridge deck. The weir, or other mechanism, shall collect a pool of filtered water during inflow events that backwashes the high flow rate cartridges when the inflow

event subsides. All filter cartridges and membranes shall be reusable and allow for the use of filtration membrane rinsing procedures to restore flow capacity and sediment capacity; extending cartridge service life.

2.1.5 Maintenance Access to Captured Pollutants The filter device shall contain an opening(s) that provides maintenance access for removal of accumulated floatable pollutants and sediment, removal of and replacement of filter cartridges, cleaning of the sump, and rinsing of the deck. Access shall have a minimum clear vertical clear space over all of the filter cartridges. Filter cartridges shall be able to be lifted straight vertically out of the receptacles and deck for the entire length of the cartridge.

2.1.6 Bend Structure The device shall be able to be used as a bend structure with minimum angles between inlet and outlet pipes of 90-degrees or less in the stormwater conveyance system.

2.1.7 Double-Wall Containment of Hydrocarbons The cylindrical precast concrete device shall provide double-wall containment for hydrocarbon spill capture by a combined means of an inner wall of fiberglass, to a minimum depth of 12 inches (305 mm) below the cartridge deck, and the precast vessel wall.

2.1.8 Baffle The filter device shall provide a baffle that extends from the underside of the cartridge deck to a minimum length equal to the length of the membrane filter elements. The baffle shall serve to protect the membrane filter elements from contamination by floatables and coarse sediment. The baffle shall be flexible and continuous in cylindrical configurations, and shall be a straight concrete or aluminum wall in rectangular configurations.

2.1.9 Sump The device shall include a minimum 24 inches (610 mm) of sump below the bottom of the cartridges for sediment accumulation, unless otherwise specified by the design engineer. Depths less than 24 inches may have an impact on the total performance and/or longevity between cartridge maintenance/replacement of the device.

2.2 PRECAST CONCRETE SECTIONS

All precast concrete components shall be manufactured to a minimum live load of HS-20 truck loading or greater based on local regulatory specifications, unless otherwise modified or specified by the design engineer, and shall be watertight.

2.3 JOINTS All precast concrete manhole configuration joints shall use nitrile rubber gaskets and shall meet the requirements of ASTM C443, Specification C1619, Class D or engineer approved equal to ensure oil resistance. Mastic sealants or butyl tape are not an acceptable alternative.

2.4 GASKETS Only profile neoprene or nitrile rubber gaskets in accordance to CSA A257.3-M92 will be accepted. Mastic sealants, butyl tape or Conseal CS-101 are not acceptable gasket materials.

2.5 FRAME AND COVER Frame and covers must be manufactured from cast-iron or other composite material tested to withstand H-20 or greater design loads, and as approved by the

local regulatory body. Frames and covers must be embossed with the name of the device manufacturer or the device brand name.

2.6 DOORS AND HATCHES If provided shall meet designated loading requirements or at a minimum for incidental vehicular traffic.

2.7 CONCRETE All concrete components shall be manufactured according to local specifications and shall meet the requirements of ASTM C 478.

2.8 FIBERGLASS The fiberglass portion of the filter device shall be constructed in accordance with the following standard: ASTM D-4097: Contact Molded Glass Fiber Reinforced Chemical Resistant Tanks.

2.9 STEPS Steps shall be constructed according to ASTM D4101 of copolymer polypropylene, and be driven into preformed or pre-drilled holes after the concrete has cured, installed to conform to applicable sections of state, provincial and municipal building codes, highway, municipal or local specifications for the construction of such devices.

2.10 INSPECTION All precast concrete sections shall be inspected to ensure that dimensions, appearance and quality of the product meet local municipal specifications and ASTM C 478.

PART 3 – PERFORMANCE

3.1 GENERAL

3.1.1 Verification – The stormwater quality filter must be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV).

3.1.2 Function - The stormwater quality filter treatment device shall function to remove pollutants by the following unit treatment processes; sedimentation, floatation, and membrane filtration.

3.1.3 Pollutants - The stormwater quality filter treatment device shall remove oil, debris, trash, coarse and fine particulates, particulate-bound pollutants, metals and nutrients from stormwater during runoff events.

3.1.4 Bypass - The stormwater quality filter treatment device shall typically utilize an external bypass to divert excessive flows. Internal bypass systems shall be equipped with a floatables baffle, and must avoid passage through the sump and/or cartridge filtration zone.

3.1.5 Treatment Flux Rate (Surface Loading Rate) – The stormwater quality filter treatment device shall treat 100% of the required water quality treatment flow based on a maximum design treatment flux rate (surface loading rate) across the membrane filter cartridges of 0.21 gpm/ft² (0.142 lps/m²).

3.2 FIELD TEST PERFORMANCE

At a minimum, the stormwater quality filter device shall have been field tested and verified with a minimum 25 TARP qualifying storm events and field monitoring shall have been conducted according to the TARP 2009 NJDEP TARP field test protocol, and have received NJCAT verification.

3.2.1 Suspended Solids Removal - The stormwater quality filter treatment device shall have demonstrated a minimum median TSS removal efficiency of 85% and a minimum median SSC removal efficiency of 95%.

3.2.2 Runoff Volume – The stormwater quality filter treatment device shall be engineered, designed, and sized to treat a minimum of 90 percent of the annual runoff volume determined from use of a minimum 15-year rainfall data set.

3.2.3 Fine Particle Removal - The stormwater quality filter treatment device shall have demonstrated the ability to capture fine particles as indicated by a minimum median removal efficiency of 75% for the particle fraction less than 25 microns, an effluent d_{50} of 15 microns or lower for all monitored storm events.

3.2.4 Turbidity Reduction - The stormwater quality filter treatment device shall have demonstrated the ability to reduce the turbidity from influent from a range of 5 to 171 NTU to an effluent turbidity of 15 NTU or lower.

3.2.5 Nutrient (Total Phosphorus & Total Nitrogen) Removal - The stormwater quality filter treatment device shall have demonstrated a minimum median Total Phosphorus removal of 55%, and a minimum median Total Nitrogen removal of 50%.

3.2.6 Metals (Total Zinc & Total Copper) Removal - The stormwater quality filter treatment device shall have demonstrated a minimum median Total Zinc removal of 55%, and a minimum median Total Copper removal of 85%.

3.3 INSPECTION and MAINTENANCE

The stormwater quality filter device shall have the following features:

3.3.1 Durability of membranes are subject to good handling practices during inspection and maintenance (removal, rinsing, and reinsertion) events, and site specific conditions that may have heavier or lighter loading onto the cartridges, and pollutant variability that may impact the membrane structural integrity. Membrane maintenance and replacement shall be in accordance with manufacturer's recommendations.

3.3.2 Inspection which includes trash and floatables collection, sediment depth determination, and visible determination of backwash pool depth shall be easily conducted from grade (outside the structure).

3.3.3 Manual rinsing of the reusable filter cartridges shall promote restoration of the flow capacity and sediment capacity of the filter cartridges, extending cartridge service life.

3.3.4 The filter device shall have a minimum 12 inches (305 mm) of sediment storage depth, and a minimum of 12 inches between the top of the sediment storage and bottom of the filter cartridge tentacles, unless otherwise specified by the design engineer. Variances may have an impact on the total performance and/or longevity between cartridge maintenance/replacement of the device.

3.3.5 Sediment removal from the filter treatment device shall be able to be conducted using a standard maintenance truck and vacuum apparatus, and a minimum one point of entry to the sump that is unobstructed by filter cartridges.

3.3.6 Maintenance access shall have a minimum clear height that provides suitable vertical clear space over all of the filter cartridges. Filter cartridges shall be able to be lifted straight vertically out of the receptacles and deck for the entire length of the cartridge.

3.3.7 Filter cartridges shall be able to be maintained without the requirement of additional lifting equipment.

PART 4 – EXECUTION

4.1 INSTALLATION

4.1.1 PRECAST DEVICE CONSTRUCTION SEQUENCE

The installation of a watertight precast concrete device should conform to ASTM C 891 and to any state highway, municipal or local specifications for the construction of manholes, whichever is more stringent. Selected sections of a general specification that are applicable are summarized below.

4.1.1.1 The watertight precast concrete device is installed in sections in the following sequence:

- aggregate base
- base slab
- treatment chamber and cartridge deck riser section(s)
- bypass section
- connect inlet and outlet pipes
- concrete riser section(s) and/or transition slab (if required)
- maintenance riser section(s) (if required)
- frame and access cover

4.1.2 The precast base should be placed level at the specified grade. The entire base should be in contact with the underlying compacted granular material. Subsequent sections, complete with joint seals, should be installed in accordance with the precast concrete manufacturer's recommendations.

4.1.3 Adjustment of the stormwater quality treatment device can be performed by lifting the upper sections free of the excavated area, re-leveling the base, and re-installing the sections. Damaged sections and gaskets should be repaired or replaced as necessary to restore original condition and watertight seals. Once the stormwater quality treatment device has been constructed, any/all lift holes must be plugged watertight with mortar or non-shrink grout.

4.1.4 Inlet and Outlet Pipes Inlet and outlet pipes should be securely set into the device using approved pipe seals (flexible boot connections, where applicable) so that the structure is watertight, and such that any pipe intrusion into the device does not impact the device functionality.

4.1.5 Frame and Cover Installation Adjustment units (e.g. grade rings) should be installed to set the frame and cover at the required elevation. The adjustment units should be laid in a full bed of mortar with successive units being joined using sealant recommended by the manufacturer. Frames for the cover should be set in a full bed of mortar at the elevation specified.

4.2 MAINTENANCE ACCESS WALL
In some instances the Maintenance Access Wall, if provided, shall require an extension attachment and sealing to the precast wall and cartridge deck at the job site, rather than at the precast facility. In this instance, installation of these components shall be performed according to instructions provided by the manufacturer.

4.3 FILTER CARTRIDGE INSTALLATION Filter cartridges shall be installed in the cartridge deck only after the construction site is fully stabilized and in accordance with the manufacturer's guidelines and recommendations. Contractor to contact the manufacturer to schedule cartridge delivery and review procedures/requirements to be completed to the device prior to installation of the cartridges and activation of the system.

PART 5 – QUALITY ASSURANCE

5.1 FILTER CARTRIDGE INSTALLATION Manufacturer shall coordinate delivery of filter cartridges and other internal components with contractor. Filter cartridges shall be delivered and installed complete after site is stabilized and unit is ready to accept cartridges. Unit is ready to accept cartridges after is has been cleaned out and any standing water, debris, and other materials have been removed. Contractor shall take appropriate action to protect the filter cartridge receptacles and filter cartridges from damage during construction, and in accordance with the manufacturer's recommendations and guidance. For systems with cartridges installed prior to full site stabilization and prior to system activation, the contractor can plug inlet and outlet pipes to prevent stormwater and other influent from entering the device. Plugs must be removed during the activation process.

5.2 INSPECTION AND MAINTENANCE

5.2.1 The manufacturer shall provide an Owner's Manual upon request.

5.2.2 After construction and installation, and during operation, the device shall be inspected and cleaned as necessary based on the manufacturer's recommended inspection and maintenance guidelines and the local regulatory agency/body.

5.3 REPLACEMENT FILTER CARTRIDGES When replacement membrane filter elements and/or other parts are required, only membrane filter elements and parts approved by the manufacturer for use with the stormwater quality filter device shall be installed.

END OF SECTION

DRAWING NOT TO BE USED FOR CONSTRUCTION

GENERAL NOTES:

1□ ALL DIMENSIONS INDICATED ARE IN MILLIMETERS □INC□ES□□NLESS OT□ER□ ISE SPECI□IED□
□□ □ELLY□IS□ STR□CT□RE INLET AND O□TLET PIPE SI□E AND ORIENTATION S□O□ N □OR IN□ORMATIONAL P□RPOSES ONLY□
□□ □NLESS OT□ER□ ISE NOTED□□YPASS IN□RASTR□CT□RE□S□C□ AS ALL □PSTREAM DIVERSION STR□CT□RES□CONNECTING STR□CT□RES□OR PIPE COND□ITS CONNECTING TO COMPLETE T□E □ELLY□IS□ SYSTEM S□ALL □E PROVIDED AND ADDRESSED SEPARATELY□
□□ DRA□ ING □OR IN□ORMATION P□RPOSES ONLY□RE□ER TO ENGINEER'S SITE□TILITY PLAN □OR STR□CT□RE ORIENTATION□
5□ NO PROD□CT S□□STIT□TIONS S□ALL □E ACCEPTED □NLESS S□□MITTED 10 DAYS PRIOR TO PRO□ECT □ID DATE□OR AS DIRECTED □Y T□E ENGINEER OR RECORD□

JELLYFISH STRUCTURE & DESIGN NOTES:

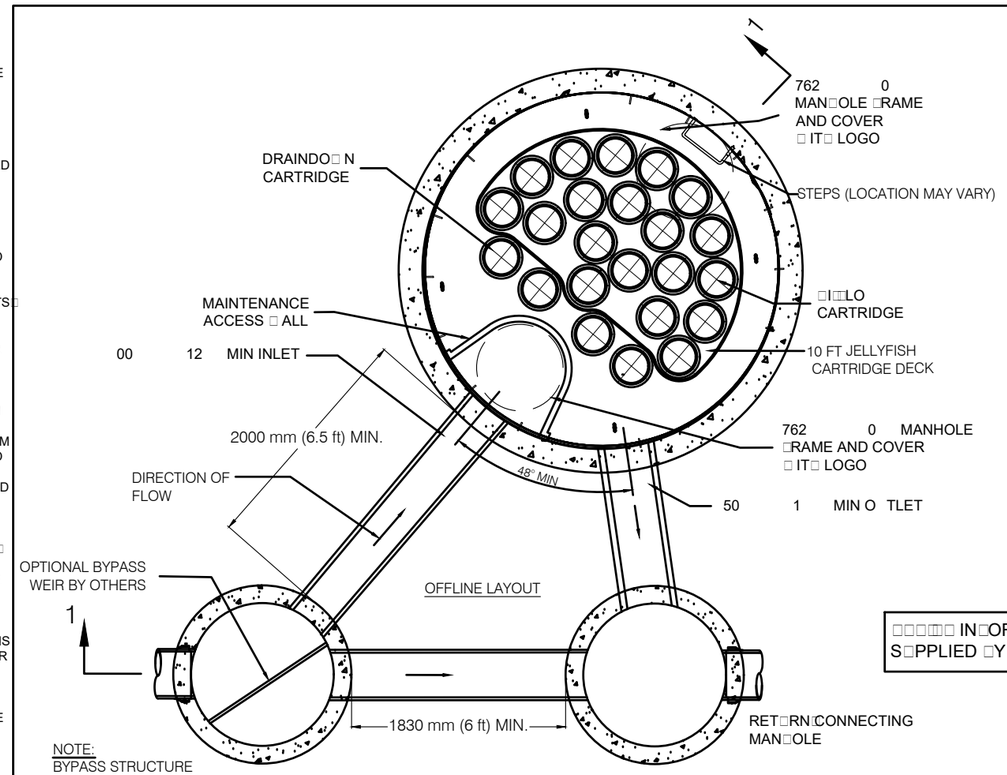
1□ 762 MM 0" MAINTENANCE ACCESS WALL TO BE SED OR CLEANO□T AND ACCESS □ELO□ CARTRIDGE DECK□
□□ CASTINGS OR DOORS O□ T□E □ELLY□IS□ MAN□OLE STR□CT□RE TO E□TEND TO DESIGN □INIS□ GRADE□DEPT□S IN E□CESS O□ □□5 M □1□□MAY RE□□IRE T□E DESIGN AND INSTALLATION O□ INTERMEDIATE SA□ETY GRATES OR OT□ER STR□CT□RAL ELEMENTS□
□□ CASTINGS AND GRADE RINGS□OR DOORS AND DOOR RISERS□OR □OT□□S□ALL □E GRO□TED □OR □ ATERTIG□TNESS□ STR□CT□RE S□ALL MEET AAS□TO □S□0□ASS□MING EART□ COVER O□ 0□□□□AND GRO□ND□ ATER ELEVATION AT□OR □ELO□ □T□E O□TLET PIPE INVERT ELEVATION□ ENGINEER O□ RECORD TO CON□IRM ACT□AL GRO□ND□ ATER ELEVATION□ CASTINGS S□ALL MEET AAS□TO M□0□LOAD RATING AND □E CAST □ IT□ T□E IM□RI□M LOGO□
□□ ALL STR□CT□RAL SECTIONS AND PARTS TO MEET OR E□CEED ASTM C□7□□ASTM C□□□□AND ASTM D□0□7 CORRESPONDING TO AAS□TO SPECI□ICATIONS□AND ANY OT□ER SITE OR LOCAL STANDARDS□
5□ CONCRETE RISER SECTIONS □ROM □OTTOM TO TOP □ ILL □E ADDED AS RE□□IRED INCL□DING TRANSITION PIECES TO SMALLER DIAMETER RISERS □OR S□R□ACE ACCESSES □ □ERE □ ARRANTED □Y SERVICING DEPT□□
□□ I□ MINIM□M DEPT□ □ROM TOP O□ CARTRIDGE DECK TO □OTTOM O□ STR□CT□RAL TOP SLA□ CANNOT □E AC□IEVED D□E TO PIPING INVERT ELEVATIONS OR OT□ER SITE CONSTRAINTS□ALTERNATIVE □ATC□ CON□IG□RATIONS MAY □E AVAILA□LE□ □ATC□ DOORS S□O□LD □E SI□ED TO PROVIDE □□LL ACCESS A□OVE T□E CARTRIDGES TO ACCOMMODATE MAINTENANCE□
7□ STEPS TO □E APPRO□IMATELY □□0 MM □ □APART AND DIMENSIONS M□ST MEET LOCAL STANDARDS□STEPS M□ST □E INSTALLED A□TER CARTRIDGE DECK IS IN PLACE□
□□ CON□IG□RATION O□ INLET AND O□TLET PIPE CAN VARY TO MEET SITE'S NEEDS□
□□ IT IS T□E RESPONSI□ILITY O□ OT□ERS TO PROPERLY PROTECT T□E TREATMENT DEVICE□AND KEEP T□E DEVICE O□□LINE D□RING CONSTR CTION ILTER CARTRID ES SHALL NOT BE INSTALLED □NTIL T□E PRO□ECT SITE IS CLEAN AND □REE O□ DE□RIS□□Y OT□ERS□T□E PRO□ECT SITE INCL□DES ANY S□R□ACE T□AT CONTRI□□TES STORM DRAINAGE TO T□E TREATMENT DEVICE□ CARTRIDGES S□ALL □E □□RNIS□ED NE□ □AT T□E TIME O□ □INAL ACCEPTANCE□
10□T□IS DRA□ ING M□ST □E VIE□ ED IN CON□□NCTION □ IT□ T□E STANDARD □ELLY□IS□ SPECI□ICATION□AND STORM□ ATER □□ALITY □ILTER TREATMENT □ELLY□IS□ DOC□MENTS□

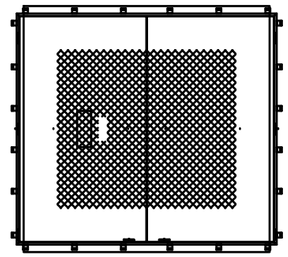
INSTALLATION NOTES

A□ ANY S□□□ASE□□ACK□ILL DEPT□□AND□OR ANTI□LOTATION PROVISIONS ARE SITE□SPECI□IC DESIGN CONSIDERATIONS AND S□ALL □E SPECI□IED □Y ENGINEER O□ RECORD□
□□ CONTRACTOR TO PROVIDE E□□IPMENT □ IT□ S□□□ICIENT LI□TING AND REAC□ CAPACITY TO LI□T AND SET T□E STR□CT□RE □LI□TING CL□TC□ES PROVIDED□
C□ CONTRACTOR □ ILL INSTALL AND LEVEL T□E STR□CT□RE□SEALING T□E □OINTS□LINE ENTRY AND E□IT POINTS □NON□S□RINK GRO□T □ IT□ APPROVED □ ATERSTOP OR □LE□I□LE □OOT□
D□ CONTRACTOR TO TAKE APPROPRIATE MEAS□RES TO PROTECT CARTRIDGES □ROM CONSTR□CTION□RELATED EROSION R□NO□□□
E□ CARTRIDGE INSTALLATION□□Y IM□RI□M□S□ALL OCC□R ONLY A□TER SITE □AS □EEN STA□ILI□ED AND T□E □ELLY□IS□ □NIT IS CLEAN AND □REE O□ DE□RIS□ CONTACT IM□RI□M TO COORDINATE CARTRIDGE INSTALLATION □ IT□ SITE STA□ILI□ATION□

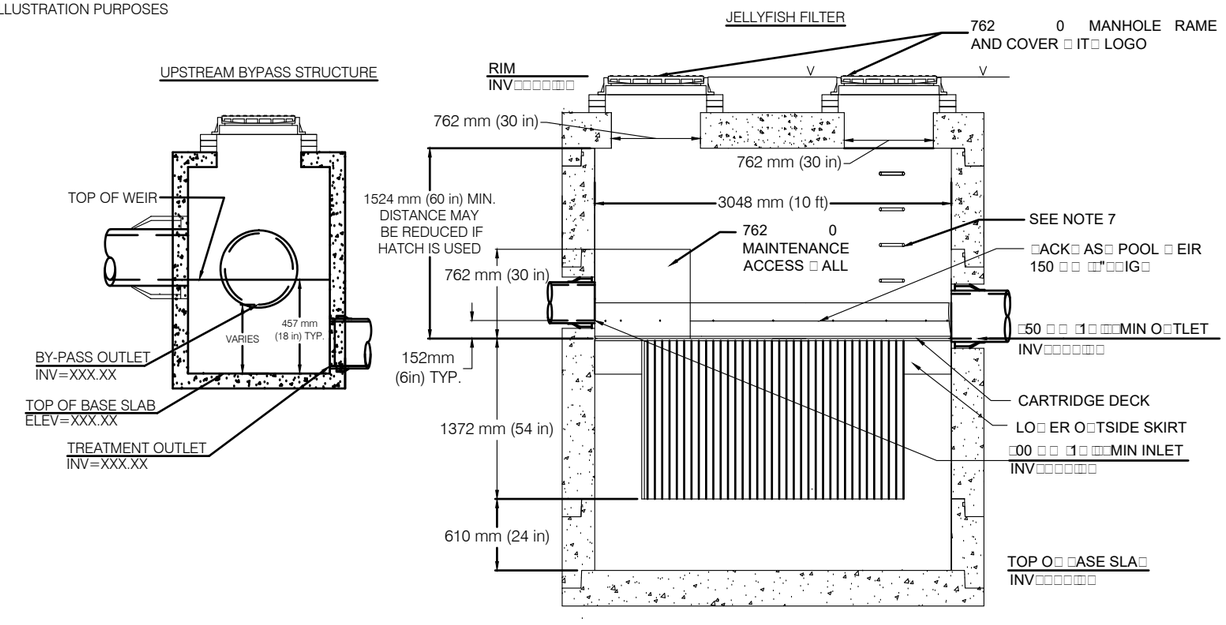
STANDARD O□□LINE □ELLY□IS□ RECOMMENDED PIPE DIAMETERS			
MODEL DIAMETER □□ □	MINIM□M ANGLE INLET□O□TLET PIPES	MINIM□M INLET PIPE DIAMETER □□ □ □	MINIM□M O□TLET PIPE DIAMETER □□ □ □
1□□	□□	150	□00
1□□	5□	□00	□50
□□□	5□	□50	□00
□□0	□□	□00	□50
□□□	□0	□00	□50
CONTACT IM□RI□M SYSTEMS □OR ALTERNATE PIPE DIAMETERS			

□OR SITE SPECI□IC DRA□ INGS PLEASE CONTACT YO□R LOCAL □ELLY□IS□ □ILTER REPRESENTATIVE□SITE SPECI□IC DRA□ INGS ARE □ASED ON T□E □EST AVAILA□LE IN□ORMATION AT T□E TIME□SOME □IELD REVISIONS TO T□E SYSTEM LOCATION OR CONNECTION PIPING MAY □E NECESSARY □ASED ON AVAILA□LE SPACE OR SITE CON□IG□RATION REVISIONS□ELEVATIONS S□O□LD □E MAINTAINED E□CEPT □ □ERE NOTED ON □YPASS STR□CT□RE□





□□□□□□ IN□ORMATION TO □E S□PPLIED □Y ENGINEER O□ RECORD



CROSS SECTION 1□1

□ELLY□IS□ DESIGN NOTES

1□ □ELLY□IS□ TREATMENT CAPACITY IS A □□NCTION O□ T□E CARTRIDGE SELECTION AND T□E N□M□ER O□ CARTRIDGES□ T□E STANDARD MAN□OLE STYLE IS S□□O□ N□ 0 120" MANHOLE ELLY ISH PEAK TREATMENT CAPACITY IS 10 5 L C S TREATMENT LOW RATE IS BASED ON 57 MM □1" □O □EAD PRESS□RE□

CARTRIDGE SELECTION		5□"	□0"	□7"	15"	
CARTRIDGE DEPT□		7□"	7□"	□"	51"	
O□TLET INVERT TO STR□CT□RE □ASE SLA□		50 □□□55	□□□ □1 □□	□55 □1□7	1□1 □0.71	
□LO□ RATE □IG□□LO □DRAINDO□ N □L □□□□r □r□□		57 □□□	□□ □□1	1□ □□		
SEDIMENT CAPACITY □IG□□LO □DRAINDO□ N				1□ □□		
MA□□CARTS □IG□□LO DRAINDO□ N		11□5	□□□	5□□	□□	
MA□□SEDIMENT CAPACITY □□□□		10□□	7□□□	5□□	□□1	
MA□□TREATMENT □L□□□						

MARK	DATE	REVISION DESCRIPTION	□Y
1	0□01□015	NOTES	□S□
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SITE SPECIFIC DATA REQUIREMENTS

□ELLY□IS□ MODEL	□
STR□CT□RE ID	□
□ ATER □□ALITY □LO□ RATE □L□□□	□
PEAK □LO□ RATE □L□□□	□
RET□RN PERIOD O□ PEAK □LO□ □r□□	□
□ O□ CARTRIDGES RE□□IRED □□ □DD□	□
CARTRIDGE SI□E □□□□□□	□

PIPE DATA□	I□E□	MAT□L	DIA	SLOPE □	□GL
INLET □1	□	□	□	□	□
INLET □□	□	□	□	□	□
O□TLET	□	□	□	□	□
□PER ENGINEER O□ RECORD					

Jellyfish
JF10 STANDARD
Scale = 1:50
www.imbriumsystems.com
imbrium
70-7 R□□ R□□d S□□□□50□□□□□□□□r MD □107□
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T□ SHIPPED □F MAY □E PROTECTED □ □ □NE OR MORE □ T□ □
100 □□□ □□□□□□□□□

JELLYFISH® FILTER - SPECIFICATIONS

GENERAL

A□□ ORK INCL□DED□ SPECI□IES RE□□IREMENTS □OR CONSTR□CTION AND PER□ORMANCE O□ AN □NDERGRO□ND STORM□ ATER □□ALITY□MEM□RANE □ILTRATION□AND TREATMENT DEVICE T□AT REMOVES POLL□TANTS □ROM STORM□ ATER R□NO□□ T□RO□G□ T□E □NIT OPERATIONS O□ SEDIMENTATION□□LOATATION□AND MEM□RANE □ILTRATION□

□□RE□ERENCE STANDARDS□

ASTM C □□1□ SPECI□ICATION □OR INSTALLATION O□ □NDERGRO□ND PRECAST CONCRETE □TILITY STR□CT□RES
ASTM C □7□□ SPECI□ICATION □OR PRECAST REIN□ORCED CONCRETE MAN□OLE SECTIONS
ASTM C □□0□ SPECI□ICATION □OR □OINTS □OR CONCRETE MAN□OLES □SING PRE□ORMED □LE□□LE □OINT SEALANTS
ASTM D □101□ SPECI□ICATION □OR COPOLYMER STEPS CONSTR□CTION

C□S□OP DRA□ INGS□ S□OP DRA□ INGS □OR T□E STR□CT□RE AND PER□ORMANCE ARE TO □E S□□MITTED □ IT□ EAC□ ORDER TO T□E CONTRACTOR□CONTRACTOR S□ALL □OR□ ARD S□OP DRA□ ING S□□MITTAL TO T□E CONS□LTING ENGINEER □OR APPROVAL□ S□OP DRA□ INGS ARE TO DETAIL T□E STR□CT□RE PRECAST CONCRETE AND CALL O□T OR NOTE T□E □□ERGLASS □RP□ INTERNALS□COMPONENTS□

D□PROD□CT S□□STIT□TIONS□ NO PROD□CT S□□STIT□TIONS S□ALL □E ACCEPTED □NLESS S□□MITTED 10 DAYS PRIOR TO PRO□ECT □ID DATE□OR AS DIRECTED □Y T□E ENGINEER O□ RECORD□ S□□MISSIONS □OR S□□STIT□TIONS RE□□IRE REVIE□ AND APPROVAL □Y T□E ENGINEER O□ RECORD□ □OR □YDRA□LIC PER□ORMANCE□ IMPACT TO PRO□ECT DESIGNS□ E□□IVALENT TREATMENT PER□ORMANCE□ AND ANY RE□□IRED PRO□ECT PLAN AND REPORT □YDROLOGY□YDRA□LIC□ □ ATER □□ALITY□ STORM□ ATER POLL□TION□ MODI□ICATIONS T□AT □O□LD □E RE□□IRED □Y T□E APPROVING □□RISDICTIONS□AGENCIES□ CONTRACTOR TO COORDINATE □ IT□ T□E ENGINEER O□ RECORD ANY APPLIC□LE MODI□ICATIONS TO T□E PRO□ECT ESTIMATES O□ COST□□ONDING AMO□NT DETERMINATIONS□PLAN C□ECK □EES □OR C□ANGES TO APPROVED DOC□MENTS□AND□OR ANY OT□ER REG□LATORY RE□□IREMENTS RES□LTING □ROM T□E PROD□CT S□□STIT□TION□

E□□ANDLING AND STORAGE□PREVENT DAMAGE TO MATERIALS D□RING STORAGE AND □ANDLING□

PRODUCTS

A□T□E DEVICE S□ALL □E A CYLINDRICAL OR RECTANG□LAR□ALL CONCRETE STR□CT□RE □INCL□DING RISERS□CONSTR□CTED □ROM PRECAST CONCRETE RISER AND SLA□ COMPONENTS OR MONOLIT□IC PRECAST STR□CT□RE□S□INSTALLED TO CON□ORM TO ASTM C □□1 AND TO ANY RE□□IRED STATE □IG□□ AY□M□NICIPAL OR LOCAL SPECI□ICATIONS□□ □IC□EVER IS MORE STRINGENT□ T□E DEVICE S□ALL □E □ ATERTIG□T□

□□T□E CYLINDRICAL CONCRETE DEVICE S□ALL INCL□DE A □□ERGLASS CARTRIDGE DECK INSERT□T□E RECTANG□LAR CONCRETE DEVICE S□ALL INCL□DE A COATED AL□MIN□M INSERT□ IN EIT□ER INSTANCE□ T□E INSERT S□ALL □E □OLTED AND SEALED □ ATERTIG□T INSIDE T□E PRECAST CONCRETE C□AM□ER□ T□E INSERT S□ALL SERVE AS□A□A □ORI□ONTAL DIVIDER □ET□EEN T□E LO□ ER TREATMENT □ONE AND T□E □PPER TREATED E□□L□ENT □ONE□□□A DECK □OR ATTAC□MENT O□ □ILTER CARTRIDGES S□C□T□AT T□E MEM□RANE □ILTER ELEMENTS O□ EAC□ CARTRIDGE E□TEND INTO T□E LO□ ER TREATMENT □ONE□C□A PLAT□ORM □OR MAINTENANCE □ ORKERS TO SERVICE T□E □ILTER CARTRIDGES □MA□IM□M MANNED □ EIG□T □ □50 PO□NDS□□D□A COND□IT □OR CONVEYANCE O□TREATED □ ATER TO T□E E□□L□ENT PIPE□

C□MEM□RANE □ILTER CARTRIDGES S□ALL □E COMPRISED O□ RE□SA□LE CYLINDRICAL MEM□RANE □ILTER ELEMENTS CONNECTED TO A PER□ORATED □EAD PLATE□T□E N□M□ER O□ MEM□RANE □ILTER ELEMENTS PER CARTRIDGE S□ALL □E A MINIM□M O□ ELEVEN □75□INC□ □70□MM□OR GREATER DIAMETER ELEMENTS□T□E LENGT□ O□ EAC□ □ILTER ELEMENT S□ALL □E A MINIM□M 15 INC□ES □□□1 MM□□ EAC□ CARTRIDGE S□ALL □E □TTED INTO T□E CARTRIDGE DECK □Y INSERTION INTO A CARTRIDGE RECEPTACLE T□AT IS PERMANENTLY MO□NTED INTO T□E CARTRIDGE DECK□ EAC□ CARTRIDGE S□ALL □E SEC□RED □Y A CARTRIDGE LID T□AT IS T□READED ONTO T□E RECEPTACLE□ OR SIMILAR MEC□ANISM TO SEC□RE T□E CARTRIDGE INTO T□E DECK□ T□E MA□IM□M TREATMENT □LO□ RATE O□ A □ILTER CARTRIDGE S□ALL □E CONTROLLED □Y AN ORI□ICE IN T□E CARTRIDGE LID□OR ON T□E INDIVID□AL CARTRIDGE ITSEL□□AND □ASED ON A DESIGN □L□□ RATE □S□R□ACE LOADING RATE□DETERMINED □Y T□E MA□IM□M TREATMENT □LO□ RATE PER □NIT O□ □ILTRATION MEM□RANE S□R□ACE AREA□T□E MA□IM□M □L□□ RATE S□ALL □E 0□1 GPM□T□ □0□1□□ LPS□M□□□ EAC□ MEM□RANE □ILTER CARTRIDGE S□ALL ALLO□ □OR MAN□AL INSTALLATION AND REMOVAL□

D□ALL □ILTER CARTRIDGES AND MEM□RANES S□ALL □E RE□SA□LE AND ALLO□ □OR T□E □SE O□ □ILTRATION MEM□RANE RINSING PROCED□RES TO RESTORE □LO□ CAPACITY AND SEDIMENT CAPACITY□E□TENDING CARTRIDGE SERVICE LI□E□

E□ACCESS S□ALL □AVE A MINIM□M CLEAR □EIG□T O□ 60 OVER ALL O□ T□E □ILTER CARTRIDGES□OR □E ACCESSI□LE □Y A □ATC□ OR OT□ER MEC□ANISM T□AT PROVIDES MINIM□M 60 VERTICAL CLEAR SPACE OVER ALL O□ T□E □ILTER CARTRIDGES□ □ILTER CARTRIDGES S□ALL □E A□LE TO □E LI□TED STRAIG□T VERTICALLY O□T O□ T□E RECEPTACLES AND DECK □OR T□E ENTIRE LENGT□ O□ T□E CARTRIDGE□

□□ T□E DEVICE S□ALL INCL□DE A MINIM□M □□ INC□ES □10 MM□O□ S□MP □ELO□ T□E □OTTOM O□ T□E CARTRIDGES □OR SEDIMENT ACC□M□LATION□□NLESS OT□ER□ ISE SPECI□IED □Y T□E DESIGN ENGINEER□ DEPT□S LESS T□AN 2 MAY □AVE AN IMPACT ON T□E TOTAL PER□ORMANCE AND□OR LONGEVITY □ET□ EEN CARTRIDGE MAINTENANCE□REPLACEMENT O□ T□E DEVICE□

G□ALL PRECAST CONCRETE COMPONENTS S□ALL □E MAN□□ACT□RED TO A MINIM□M LIVE LOAD O□ □S□0 TR□CK LOADING OR GREATER □ASED ON LOCAL REG□LATORY SPECI□ICATIONS□□NLESS OT□ER□ ISE MODI□IED OR SPECI□IED □Y T□E DESIGN ENGINEER□ AND S□ALL □E □ ATERTIG□T□

□□GASKETS AND□OR SEALANTS TO PROVIDE □ ATER TIG□T SEAL □ET□ EEN CONCRETE □OINTS□ □OINTS S□ALL □E SEALED □ IT□ PRE□ORMED □OINT SEALING COMPO□ND CON□ORMING TO ASTM C □□0□

I□ □RAME AND COVERS M□ST □E MAN□□ACT□RED □ROM CAST□IRON OR OT□ER COMPOSITE MATERIAL TESTED TO □ IT□STAND □□0 OR GREATER DESIGN LOADS□AND AS APPROVED □Y T□E LOCAL REG□LATORY □ODY□ □RAMES AND COVERS M□ST □E EM□OSSED □ IT□ T□E NAME O□ T□E DEVICE MAN□□ACT□RER OR T□E DEVICE □RAND NAME□

□□ DOOR AND □ATC□ES□ I□ PROVIDED S□ALL MEET DESIGNATED LOADING RE□□IREMENTS OR AT A MINIM□M □OR INCIDENTAL VE□IC□LAR TRA□□IC□

K□ALL CONCRETE COMPONENTS S□ALL □E MAN□□ACT□RED ACCORDING TO LOCAL SPECI□ICATIONS AND S□ALL MEET T□E RE□□IREMENTS O□ ASTM C □7□□

L□ T□E □□ERGLASS PORTION O□ T□E □ILTER DEVICE S□ALL □E CONSTR□CTED IN ACCORDANCE □ IT□ T□E □OLLO□ ING STANDARD□ ASTM D□□0□7□ CONTACT MOLDED GLASS □□ER REIN□ORCED C□EMICAL RESISTANT TANKS□

M□STEPS S□ALL □E CONSTR□CTED ACCORDING TO ASTM D□101 O□ COPOLYMER POLYPROPYLENE□AND □E DRIVEN INTO PRE□ORMED OR PRE□DRILLED □OLES A□TER T□E CONCRETE □AS C□RED□ INSTALLED TO CON□ORM TO APPLICA□LE SECTIONS O□ STATE□ PROVINCIAL AND M□NICIPAL □□ILDING CODES□□IG□□ AY□M□NICIPAL OR LOCAL SPECI□ICATIONS □OR T□E CONSTR□CTION O□ S□C□ DEVICES□

N□ALL PRECAST CONCRETE SECTIONS S□ALL □E INSPECTED TO ENS□RE T□AT DIMENSIONS□APPEARANCE AND □□ALITY O□ T□E PROD□CT MEET LOCAL M□NICIPAL SPECI□ICATIONS AND ASTM C □7□□

PERFORMANCE

A□T□E STORM□ ATER □□ALITY □ILTER TREATMENT DEVICE S□ALL □□NCTION TO REMOVE POLL□TANTS □Y T□E □OLLO□ ING □NIT TREATMENT PROCESSES□SEDIMENTATION□□LOATATION□AND MEM□RANE □ILTRATION□

□□T□E STORM□ ATER □□ALITY □ILTER TREATMENT DEVICE S□ALL REMOVE OIL□DE□RIS□TRAS□□COARSE AND □INE PARTIC□LATES□ PARTIC□LATE□□O□ND POLL□TANTS□METALS AND N□TRIENTS □ROM STORM□ ATER D□RING R□NO□□ EVENTS□

C□T□E STORM□ ATER □□ALITY □ILTER TREATMENT DEVICE S□ALL TYPICALLY □TILI□E AN E□TERNAL □YPASS TO DIVERT E□CESSIVE □LO□S□ INTERNAL □YPASS SYSTEMS S□ALL □E E□□IPPED □IT□ A □LOATA□LES □A□□LE□AND M□ST PASS □ ATER OVER T□E CARTRIDGE DECK□AND AVOID PASSAGE T□RO□G□ T□E S□MP AND□OR CARTRIDGE □ILTRATION □ONE□

D□T□E STORM□ ATER □□ALITY □ILTER TREATMENT DEVICE S□ALL TREAT 100□ O□ T□E RE□□IRED □ ATER □□ALITY TREATMENT □LO□ □ASED ON A MA□IM□M TREATMENT □L□□ RATE □S□R□ACE LOADING RATE□ACROSS T□E MEM□RANE □ILTER CARTRIDGES NOT TO E□CEED 0□□1 GPM□□T□ □0□1□□ LPS□M□□□

E□AT A MINIM□M□T□E STORM□ ATER □□ALITY □ILTER DEVICE S□ALL □AVE □EEN □IELD TESTED AND VERI□IED □ IT□ A MINIM□M □5 □□ALI□YING STORM EVENTS AND □IELD MONITORING COND□CTED ACCORDING TO T□E TARP TIER II OR TAPE □IELD TEST PROTOCOL□ AND □AVE RECEIVED N□CAT VERI□ICATION□

□□T□E STORM□ ATER □□ALITY □ILTER TREATMENT DEVICE S□ALL □AVE DEMONSTRATED A MINIM□M MEDIAN TSS REMOVAL E□□ICIENCY O□ □5□ AND A MINIM□M MEDIAN SSC REMOVAL E□□ICIENCY O□ □5□ □

G□T□E STORM□ ATER □□ALITY □ILTER TREATMENT DEVICE S□ALL □AVE DEMONSTRATED T□E A□ILITY TO CAPT□RE □INE PARTICLES AS INDICATED □Y A MINIM□M MEDIAN REMOVAL E□□ICIENCY O□ 75□ □OR T□E PARTICLE □RACTION LESS T□AN □5 MICRONS□AN E□□L□ENT D50 O□ 15 MICRONS OR LO□ ER □OR ALL MONITORED STORM EVENTS□AND AN E□□L□ENT T□R□IDITY O□ 15 NT□S OR LO□ ER□

□□T□E STORM□ ATER □□ALITY □ILTER TREATMENT DEVICE S□ALL □AVE DEMONSTRATED A MINIM□M MEDIAN TOTAL P□OSP□OR□S REMOVAL O□ 55□ □AND A MINIM□M MEDIAN TOTAL NITROGEN REMOVAL O□ 50□ □

I□ T□E STORM□ ATER □□ALITY □ILTER TREATMENT DEVICE S□ALL □AVE DEMONSTRATED A MINIM□M MEDIAN TOTAL □INC REMOVAL O□ 50□ □AND A MINIM□M MEDIAN TOTAL COPPER REMOVAL O□ 75□ □

INSPECTION AND MAINTENANCE

A□D□RA□ILITY O□ MEM□RANES ARE S□□□ECT TO GOOD □ANDLING PRACTICES D□RING INSPECTION AND MAINTENANCE □REMOVAL□ RINSING□AND REINSERTION□EVENTS□AND SITE SPECI□IC CONDITIONS T□AT MAY □AVE □EAVIER OR LIG□TER LOADING ONTO T□E CARTRIDGES□AND POLL□TANT VARIA□ILITY T□AT MAY IMPACT T□E MEM□RANE STR□CT□RAL INTEGRITY□ MEM□RANE MAINTENANCE AND REPLACEMENT S□ALL □E IN ACCORDANCE □ IT□ MAN□□ACT□RER'S RECOMMENDATIONS□

□□INSPECTION □ □IC□ INCL□DES TRAS□ AND □LOATA□LES COLLECTION□ SEDIMENT DEPT□ DETERMINATION□ AND VISI□LE DETERMINATION O□ □ACK□ AS□ POOL DEPT□ S□ALL □E EASILY COND□CTED □ROM GRADE □O□TSIDE T□E STR□CT□RE□□

C□MAN□AL RINSING O□ T□E RE□SA□LE □ILTER CARTRIDGES S□ALL PROMOTE RESTORATION O□ T□E □LO□ CAPACITY AND SEDIMENT CAPACITY O□ T□E □ILTER CARTRIDGES□E□TENDING CARTRIDGE SERVICE LI□E□

D□SEDIMENT REMOVAL □ROM T□E □ILTER TREATMENT DEVICE S□ALL □E A□LE TO □E COND□CTED □SING A STANDARD MAINTENANCE TR□CK AND VAC□□M APPARAT□S□AND A MINIM□M ONE POINT O□ ENTRY TO T□E S□MP T□AT IS □NO□STR□CTED □Y □ILTER CARTRIDGES□

E□MAINTENANCE ACCESS S□ALL □AVE A MINIM□M CLEAR □EIG□T O□ 60 OVER ALL O□ T□E □ILTER CARTRIDGES□OR □E ACCESSI□LE □Y A □ATC□ OR OT□ER MEC□ANISM T□AT PROVIDES MINIM□M 60 VERTICAL CLEAR SPACE OVER ALL O□ T□E □ILTER CARTRIDGES□ □ILTER CARTRIDGES S□ALL □E A□LE TO □E LI□TED STRAIG□T VERTICALLY O□T O□ T□E RECEPTACLES AND DECK □OR T□E ENTIRE LENGT□ O□ T□E CARTRIDGE□

□□ □ILTER CARTRIDGES S□ALL □E A□LE TO □E MAINTAINED □ IT□O□T T□E □SE O□ ADDITIONAL LI□TING E□□IPMENT□

EXECUTION

A□T□E INSTALLATION O□ A □ ATERTIG□T PRECAST CONCRETE DEVICE S□O□LD CON□ORM TO ASTM C □□1 AND TO ANY STATE □IG□□ AY□ M□NICIPAL OR LOCAL SPECI□ICATIONS □OR T□E CONSTR□CTION O□ MAN□OLES□□ □IC□EVER IS MORE STRINGENT□ SELECTED SECTIONS O□ A GENERAL SPECI□ICATION T□AT ARE APPLICA□LE ARE S□MMARI□ED □ELO□ □

□□T□E □ ATERTIG□T PRECAST CONCRETE DEVICE IS INSTALLED IN SECTIONS IN T□E □OLLO□ ING SE□□ENCE□

- AGGREGATE □ASE
- □ASE SLA□
- TREATMENT C□AM□ER AND CARTRIDGE DECK RISER SECTION□S□
- □YPASS SECTION
- CONNECT INLET AND O□TLET PIPES
- CONCRETE RISER SECTION□S□AND□OR TRANSITION SLA□ □□ RE□□IRED□
- MAINTENANCE RISER SECTION□S□□□ RE□□IRED□
- □RAME AND ACCESS COVER

C□INLET AND O□TLET PIPES S□O□LD □E SEC□RELY SET INTO T□E DEVICE □SING APPROVED PIPE SEALS □LE□□LE □OOT CONNECTIONS□□ □ERE APPLICA□LE□SO T□AT T□E STR□CT□RE IS □ ATERTIG□T□AND S□C□ T□AT ANY PIPE INTR□SION INTO T□E DEVICE DOES NOT IMPACT T□E DEVICE □□NCTIONALITY□

D□AD□□STMENT □NITS □E□G□GRADE RINGS□S□O□LD □E INSTALLED TO SET T□E □RAME AND COVER AT T□E RE□□IRED ELEVATION□T□E AD□□STMENT □NITS S□O□LD □E LAID IN A □□LL □ED O□ MORTAR □ IT□ S□CCESSIVE □NITS □EING □OINED □SING SEALANT RECOMMENDED □Y T□E MAN□□ACT□RER□□RAMES □OR T□E COVER S□O□LD □E SET IN A □□LL □ED O□ MORTAR AT T□E ELEVATION SPECI□IED□

E□IN SOME INSTANCES T□E MAINTENANCE ACCESS □ ALL□□ PROVIDED□S□ALL RE□□IRE AN E□TENSION ATTAC□MENT AND SEALING TO T□E PRECAST □ ALL AND CARTRIDGE DECK AT T□E □O□ SITE□RAT□ER T□AN AT T□E PRECAST □ACILITY□ IN T□IS INSTANCE□ INSTALLATION O□ T□ESE COMPONENTS S□ALL □E PER□ORMED ACCORDING TO INSTR□CTIONS PROVIDED □Y T□E MAN□□ACT□RER□

□□ □ILTER CARTRIDGES S□ALL □E INSTALLED IN T□E CARTRIDGE DECK A□TER T□E CONSTR□CTION SITE IS □□LLY STA□ILI□ED AND IN ACCORDANCE □ IT□ T□E MAN□□ACT□RERS G□IDELINES AND RECOMMENDATIONS□CONTRACTOR TO CONTACT T□E MAN□□ACT□RER TO SC□ED□LE CARTRIDGE DELIVERY AND REVIE□ PROCED□RES□RE□□IREMENTS TO □E COMPLETED TO T□E DEVICE PRIOR TO INSTALLATION O□ T□E CARTRIDGES AND ACTIVATION O□ T□E SYSTEM□

G□MAN□□ACT□RER S□ALL COORDINATE DELIVERY O□ □ILTER CARTRIDGES AND OT□ER INTERNAL COMPONENTS □ IT□ CONTRACTOR□ □ILTER CARTRIDGES S□ALL □E DELIVERED AND INSTALLED COMPLETE A□TER SITE IS STA□ILI□ED AND □NIT IS READY TO ACCEPT CARTRIDGES□ □NIT IS READY TO ACCEPT CARTRIDGES A□TER IS □AS □EEN CLEANED O□T AND ANY STANDING □ ATER□DE□RIS□AND OT□ER MATERIALS □AVE □EEN REMOVED□ CONTRACTOR S□ALL TAKE APPROPRIATE ACTION TO PROTECT T□E □ILTER CARTRIDGE RECEPTACLES AND □ILTER CARTRIDGES □ROM DAMAGE D□RING CONSTR□CTION□AND IN ACCORDANCE □ IT□ T□E MAN□□ACT□RER'S RECOMMENDATIONS AND G□IDANCE□ □OR SYSTEMS □ IT□ CARTRIDGES INSTALLED PRIOR TO □□LL SITE STA□ILI□ATION AND PRIOR TO SYSTEM ACTIVATION□T□E CONTRACTOR CAN PL□G INLET AND O□TLET PIPES TO PREVENT STORM□ ATER AND OT□ER IN□L□ENT □ROM ENTERING T□E DEVICE□PL□GS M□ST □E REMOVED D□RING T□E ACTIVATION PROCESS□

□□T□E MAN□□ACT□RER S□ALL PROVIDE AN O□NER'S MAN□AL □PON RE□□EST□

I□ A□TER CONSTR□CTION AND INSTALLATION□ AND D□RING OPERATION□ T□E DEVICE S□ALL □E INSPECTED AND CLEANED AS NECESSARY □ASED ON T□E MAN□□ACT□RER'S RECOMMENDED INSPECTION AND MAINTENANCE G□IDELINES AND T□E LOCAL REG□LATORY AGENCY□ODY□

□□ □ □EN REPLACEMENT MEM□RANE □ILTER ELEMENTS AND□OR OT□ER PARTS ARE RE□□IRED□ONLY MEM□RANE □ILTER ELEMENTS AND PARTS APPROVED □Y T□E MAN□□ACT□RER □OR □SE □ IT□ T□E STORM□ ATER □□ALITY □ILTER DEVICE S□ALL □E INSTALLED□

END OF SECTION

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MARK	DATE	REVISION DESCRIPTION
0	10□01□□01□	INITIAL RELEASE

JELLYFISH FILTER SPECIFICATIONS

Jellyfish

JF10 STANDARD

Scale = 1:50

info@imbriumsystems.com
www.imbriumsystems.com

imbrium
70□7 Rid□□R□□d S□□□50□□□

STANDARD PERFORMANCE SPECIFICATION
STORMWATER QUALITY – MEMBRANE FILTRATION TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground stormwater quality membrane filtration treatment device that removes pollutants from stormwater runoff through the unit operations of sedimentation, floatation, and membrane filtration.

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental Management – Environmental Technology Verification (ETV)

1.3 SUBMITTALS

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

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

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

PART 2 – PRODUCTS

2.1 GENERAL

2.1.1 Maintenance Access to Captured Pollutants The filter device shall contain an opening(s) that provides maintenance access for removal of accumulated floatable pollutants and sediment, removal of and replacement of filter cartridges, cleaning of the sump, and rinsing of the internal components. Access shall have a minimum clear vertical clear space over all of the filter cartridges. Filter cartridges shall be able to be lifted straight vertically out of their installed placement for the entire length of the cartridge.

2.1.2 Pollutant Storage: The Filter device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants.

PART 3 – PERFORMANCE

3.1 GENERAL

3.1.1 Verification – The stormwater quality filter treatment device shall have been field tested in accordance with either TARP Tier II Protocol (TARP, 2003) and New Jersey Tier II Stormwater Test Requirements – Amendments to TARP Tier II Protocol (NJDEP, 2009) or Washington State Technology Assessment Protocol – Ecology (TAPE), 2011 or later version. The field test shall have been verified in accordance with ISO 14034:2016 Environmental Management – Environmental Technology Verification (ETV). See Section 3.2 of this specification for field test performance requirements.

3.2 FIELD TEST PERFORMANCE

The field test (as specified in section 3.1.1)shall have monitored a minimum of twenty (20) TARP or TAPE qualifying storm events, and report at **minimum** the following results:

3.2.1 Suspended Solids Removal - The stormwater quality filter treatment device shall have ISO 14034 ETV verified load based median TSS removal efficiency of at least 85% and load based median SSC removal efficiency of at least 98%.

3.2.2 Runoff Volume – The stormwater quality filter treatment device shall be engineered, designed, and sized to treat a minimum of 90 percent of the annual runoff volume determined from use of a minimum 15-year rainfall data set.

3.2.3 Fine Particle Removal - The stormwater quality filter treatment device shall have demonstrated the ability to capture fine particles as indicated by a minimum median removal efficiency of 75% for the particle fraction less than 25 microns, and an effluent d_{50} of 15 microns or lower for all monitored storm events.

3.2.4 Turbidity Reduction - The stormwater quality filter treatment device shall have demonstrated the ability to reduce turbidity such that effluent turbidity is 15 NTU or lower.

3.2.5 Nutrients & Metals – The stormwater quality filter treatment device shall have ISO 14034 ETV Verified minimum load based removal efficiencies for the following:

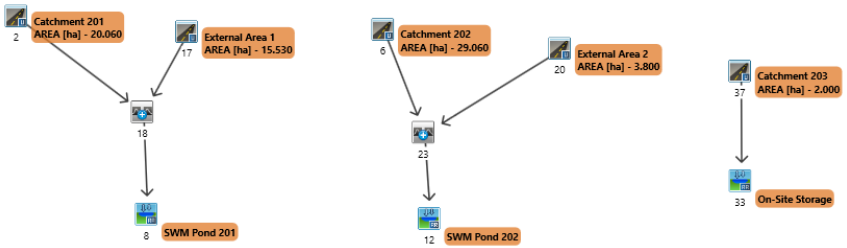
3.2.5.1 Total Phosphorus (TP) Removal - Median TP removal efficiency of at least 49%.

3.2.5.2 Total Nitrogen (TN) Removal - Median TN removal efficiency of at least 39%.

3.2.5.3 Total Zinc (Zn) Removal - Median Zn removal efficiency of at least 69%.

3.2.5.4 Total Copper (Cu) Removal - Median Cu removal efficiency of at least 91%.

END OF SECTION



SCHAEFFERS
CONSULTING ENGINEERS

Visual OTTHYMO™ Schematic

POST- DEVELOPMENT
25mm

Job #: 5170	**Date: April 2024**

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

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


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DATE: 04-30-2024                          TIME: 04:24:51

USER:


COMMENTS: _____________________________________________________________

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  ***********************************************
  ** SIMULATION : 00. 25mm event                **
  ***********************************************


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|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              075cfdec-f540-4fbb-b714-f2c68f0cf08c\af8d9203
| Ptotal= 25.02 mm |    Comments: 25mmchi
--------------------
                TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                 hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
                0.00     2.17 |  1.00     6.20 |  2.00     5.62 |  3.00     2.95
                0.17     2.38 |  1.17    12.18 |  2.17     4.80 |  3.17     2.76
                0.33     2.66 |  1.33    41.67 |  2.33     4.21 |  3.33     2.62
                0.50     3.03 |  1.50    15.28 |  2.50     3.78 |  3.50     2.47
                0.67     3.58 |  1.67     9.22 |  2.67     3.45 |  3.67     2.35
                0.83     4.47 |  1.83     6.88 |  2.83     3.18 |  3.83     2.23

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--------------------
| CALIB            |
| STANDHYD (  0006)|   Area    (ha)=  29.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  66.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      19.18         9.88
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     440.15        40.00
     Mannings n           =      0.013        0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.17	1.083	6.20	2.083	5.62	3.08	2.95
0.167	2.17	1.167	6.20	2.167	5.62	3.17	2.95
0.250	2.38	1.250	12.18	2.250	4.80	3.25	2.76
0.333	2.38	1.333	12.18	2.333	4.80	3.33	2.76
0.417	2.66	1.417	41.67	2.417	4.21	3.42	2.62
0.500	2.66	1.500	41.67	2.500	4.21	3.50	2.62
0.583	3.03	1.583	15.28	2.583	3.78	3.58	2.47
0.667	3.03	1.667	15.28	2.667	3.78	3.67	2.47
0.750	3.58	1.750	9.22	2.750	3.45	3.75	2.35
0.833	3.58	1.833	9.22	2.833	3.45	3.83	2.35
0.917	4.47	1.917	6.88	2.917	3.18	3.92	2.23
1.000	4.47	2.000	6.88	3.000	3.18	4.00	2.23

```
     Max.Eff.Inten.(mm/hr)=      41.67         7.67
               over (min)        10.00        30.00
     Storage Coeff.  (min)=       8.82 (ii)   28.54 (ii)
     Unit Hyd. Tpeak (min)=      10.00        30.00
     Unit Hyd. peak  (cms)=       0.12         0.04
                                                        *TOTALS*
     PEAK FLOW       (cms)=       1.27         0.10        1.300 (iii)
     TIME TO PEAK    (hrs)=       1.58         2.08         1.58
     RUNOFF VOLUME    (mm)=      24.02         5.74        15.80
     TOTAL RAINFALL   (mm)=      25.02        25.02        25.02
     RUNOFF COEFFICIENT   =       0.96         0.23         0.63


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0020)|   Area    (ha)=   3.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  60.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.04         0.76
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     159.16        40.00
     Mannings n           =      0.013        0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.17	1.083	6.20	2.083	5.62	3.08	2.95
0.167	2.17	1.167	6.20	2.167	5.62	3.17	2.95
0.250	2.38	1.250	12.18	2.250	4.80	3.25	2.76
0.333	2.38	1.333	12.18	2.333	4.80	3.33	2.76
0.417	2.66	1.417	41.67	2.417	4.21	3.42	2.62
0.500	2.66	1.500	41.67	2.500	4.21	3.50	2.62
0.583	3.03	1.583	15.28	2.583	3.78	3.58	2.47
0.667	3.03	1.667	15.28	2.667	3.78	3.67	2.47
0.750	3.58	1.750	9.22	2.750	3.45	3.75	2.35
0.833	3.58	1.833	9.22	2.833	3.45	3.83	2.35
0.917	4.47	1.917	6.88	2.917	3.18	3.92	2.23
1.000	4.47	2.000	6.88	3.000	3.18	4.00	2.23

```
     Max.Eff.Inten.(mm/hr)=      41.67        19.99
               over (min)         5.00        20.00
     Storage Coeff.  (min)=       4.79 (ii)   18.23 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=       0.22         0.06
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.24         0.02        0.249 (iii)
     TIME TO PEAK    (hrs)=       1.50         1.75         1.50
     RUNOFF VOLUME    (mm)=      24.02         8.39        17.77
     TOTAL RAINFALL   (mm)=      25.02        25.02        25.02
     RUNOFF COEFFICIENT   =       0.96         0.34         0.71

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    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  (  0023)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0020):      3.80    0.249     1.50    17.77
     + ID2= 2 (  0006):     29.06    1.300     1.58    15.80
       ================================================
       ID = 3 (  0023):     32.86    1.461     1.58    16.03

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0012)|     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    |   0.4930     1.5666
                         0.0360     0.7150    |   0.7890     1.8478
```

	0.0660	1.0737	1.0520	2.0613
	0.2630	1.3645	1.3140	2.2797

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW :	ID= 2 (0023)	32.860	1.461	1.58	16.03
OUTFLOW:	ID= 1 (0012)	32.860	0.025	4.58	15.21

PEAK FLOW REDUCTION [Qout/Qin](%)= 1.72
TIME SHIFT OF PEAK FLOW (min)=180.00
MAXIMUM STORAGE USED (ha.m.)= 0.4997

CALIB	
STANDHYD (0017)	Area (ha)= 15.53
ID= 1 DT= 5.0 min	Total Imp(%)= 65.00 Dir. Conn.(%)= 49.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	10.09	5.44
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	321.77	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.17	1.083	6.20	2.083	5.62	3.08	2.95
0.167	2.17	1.167	6.20	2.167	5.62	3.17	2.95
0.250	2.38	1.250	12.18	2.250	4.80	3.25	2.76
0.333	2.38	1.333	12.18	2.333	4.80	3.33	2.76
0.417	2.66	1.417	41.67	2.417	4.21	3.42	2.62
0.500	2.66	1.500	41.67	2.500	4.21	3.50	2.62
0.583	3.03	1.583	15.28	2.583	3.78	3.58	2.47
0.667	3.03	1.667	15.28	2.667	3.78	3.67	2.47
0.750	3.58	1.750	9.22	2.750	3.45	3.75	2.35
0.833	3.58	1.833	9.22	2.833	3.45	3.83	2.35
0.917	4.47	1.917	6.88	2.917	3.18	3.92	2.23
1.000	4.47	2.000	6.88	3.000	3.18	4.00	2.23

				TOTALS
Max.Eff.Inten.(mm/hr)=		41.67	9.51	
over (min)		5.00	30.00	
Storage Coeff. (min)=		7.31 (ii)	25.40 (ii)	
Unit Hyd. Tpeak (min)=		5.00	30.00	
Unit Hyd. peak (cms)=		0.17	0.04	
PEAK FLOW	(cms)=	0.71	0.07	0.726 (iii)
TIME TO PEAK	(hrs)=	1.50	2.00	1.50
RUNOFF VOLUME	(mm)=	24.02	6.33	15.00
TOTAL RAINFALL	(mm)=	25.02	25.02	25.02
RUNOFF COEFFICIENT	=	0.96	0.25	0.60

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0002)	Area (ha)= 20.06
ID= 1 DT= 5.0 min	Total Imp(%)= 67.00 Dir. Conn.(%)= 56.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	13.44	6.62
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	365.70	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.17	1.083	6.20	2.083	5.62	3.08	2.95
0.167	2.17	1.167	6.20	2.167	5.62	3.17	2.95
0.250	2.38	1.250	12.18	2.250	4.80	3.25	2.76
0.333	2.38	1.333	12.18	2.333	4.80	3.33	2.76
0.417	2.66	1.417	41.67	2.417	4.21	3.42	2.62
0.500	2.66	1.500	41.67	2.500	4.21	3.50	2.62
0.583	3.03	1.583	15.28	2.583	3.78	3.58	2.47
0.667	3.03	1.667	15.28	2.667	3.78	3.67	2.47
0.750	3.58	1.750	9.22	2.750	3.45	3.75	2.35
0.833	3.58	1.833	9.22	2.833	3.45	3.83	2.35
0.917	4.47	1.917	6.88	2.917	3.18	3.92	2.23
1.000	4.47	2.000	6.88	3.000	3.18	4.00	2.23

				TOTALS
Max.Eff.Inten.(mm/hr)=		41.67	7.80	
over (min)		10.00	30.00	
Storage Coeff. (min)=		7.89 (ii)	27.48 (ii)	
Unit Hyd. Tpeak (min)=		10.00	30.00	
Unit Hyd. peak (cms)=		0.13	0.04	
PEAK FLOW	(cms)=	0.92	0.07	0.942 (iii)
TIME TO PEAK	(hrs)=	1.58	2.08	1.58
RUNOFF VOLUME	(mm)=	24.02	5.79	16.00
TOTAL RAINFALL	(mm)=	25.02	25.02	25.02
RUNOFF COEFFICIENT	=	0.96	0.23	0.64

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0018)					
1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 1 (0017):	15.53	0.726	1.50	15.00
	+ ID2= 2 (0002):	20.06	0.942	1.58	16.00

```
       ==================================================
       ID = 3 (  0018):    35.59   1.617     1.50    15.56

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0008)|     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   |   0.4480     1.7011
                           0.0360     0.7282   |   0.7160     2.0238
                           0.0600     1.1698   |   0.9550     2.2595
                           0.2380     1.4871   |   1.1940     2.5034

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0018)     35.590     1.617      1.50      15.56
   OUTFLOW: ID= 1 (  0008)     35.590     0.026      4.58      14.73

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.61
                  TIME SHIFT OF PEAK FLOW         (min)=185.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.5259

------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0037)|   Area    (ha)=   2.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  59.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.58         0.42
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     115.47        40.00
     Mannings n           =      0.013        0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    2.17 | 1.083    6.20 | 2.083    5.62 |  3.08    2.95
              0.167    2.17 | 1.167    6.20 | 2.167    5.62 |  3.17    2.95
              0.250    2.38 | 1.250   12.18 | 2.250    4.80 |  3.25    2.76
              0.333    2.38 | 1.333   12.18 | 2.333    4.80 |  3.33    2.76
              0.417    2.66 | 1.417   41.67 | 2.417    4.21 |  3.42    2.62
              0.500    2.66 | 1.500   41.67 | 2.500    4.21 |  3.50    2.62
              0.583    3.03 | 1.583   15.28 | 2.583    3.78 |  3.58    2.47
              0.667    3.03 | 1.667   15.28 | 2.667    3.78 |  3.67    2.47
              0.750    3.58 | 1.750    9.22 | 2.750    3.45 |  3.75    2.35
              0.833    3.58 | 1.833    9.22 | 2.833    3.45 |  3.83    2.35
              0.917    4.47 | 1.917    6.88 | 2.917    3.18 |  3.92    2.23
              1.000    4.47 | 2.000    6.88 | 3.000    3.18 |  4.00    2.23

     Max.Eff.Inten.(mm/hr)=      41.67        19.04
                 over (min)       5.00        20.00
     Storage Coeff.  (min)=       3.95 (ii)   17.65 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=       0.24         0.06

                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.13         0.01          0.133 (iii)
     TIME TO PEAK    (hrs)=       1.50         1.75           1.50
     RUNOFF VOLUME    (mm)=      24.02         8.23          17.54
     TOTAL RAINFALL   (mm)=      25.02        25.02          25.02
     RUNOFF COEFFICIENT   =       0.96         0.33           0.70

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

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  77.0    Ia = Dep. Storage  (Above)
       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
            THAN THE STORAGE COEFFICIENT.
      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0033)|     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   |   0.0250     0.1054
                           0.0020     0.0490   |   0.0410     0.1239
                           0.0030     0.0750   |   0.0540     0.1381
                           0.0130     0.0932   |   0.0670     0.1527

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0037)     2.000     0.133      1.50      17.54
   OUTFLOW: ID= 1 (  0033)     2.000     0.001      4.42      14.42

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.03
                  TIME SHIFT OF PEAK FLOW         (min)=175.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0337

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 FINISH
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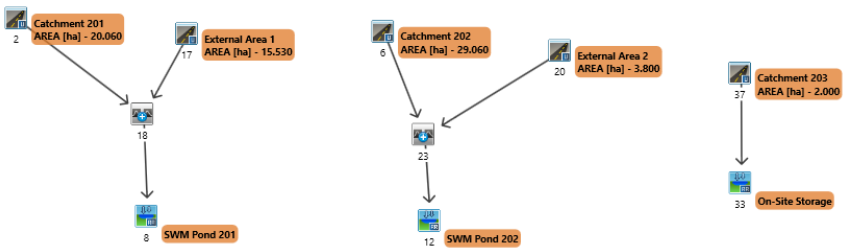

SCHAEFFERS
CONSULTING ENGINEERS

Visual OTTHYMO™ Schematic

POST- DEVELOPMENT
2-100yr, 6HR SCS

Job #: 5170	**Date: April 2024**

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

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


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  Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
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DATE: 05-01-2024                          TIME: 02:51:11

USER:


COMMENTS: ____________________________________________________________

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  ************************************************
  ** SIMULATION : 13. 2-Year-6-Hour-SCS-Type-II **
  ************************************************


--------------------
|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              1c68ae73-c69b-4a60-ad0c-90425c95e5fe\3038ab57
| Ptotal= 42.30 mm |    Comments: 2-Year-6-Hour-SCS-Type-II
--------------------
                TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                 hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
                0.00     0.00 |  1.75     4.23 |  3.50     9.31 |  5.25     1.69
                0.25     1.69 |  2.00     4.23 |  3.75     4.23 |  5.50     1.69
                0.50     1.69 |  2.25     5.08 |  4.00     4.23 |  5.75     1.69
                0.75     2.54 |  2.50     5.08 |  4.25     3.38 |  6.00     1.69
                1.00     2.54 |  2.75    25.38 |  4.50     3.38 |
                1.25     2.54 |  3.00    65.99 |  4.75     2.54 |
                1.50     2.54 |  3.25     9.31 |  5.00     2.54 |

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--------------------
| CALIB            |
| STANDHYD (  0006)|   Area    (ha)=  29.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  66.00   Dir. Conn.(%)=  55.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     19.18         9.88
     Dep. Storage     (mm)=      1.00         5.00
     Average Slope     (%)=      1.00         2.00
     Length            (m)=    440.15        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	1.667	2.54	3.250	65.99	4.83	2.54
0.167	0.00	1.750	2.54	3.333	9.31	4.92	2.54
0.250	0.00	1.833	4.23	3.417	9.31	5.00	2.54
0.333	1.69	1.917	4.23	3.500	9.31	5.08	2.54
0.417	1.69	2.000	4.23	3.583	9.31	5.17	2.54
0.500	1.69	2.083	4.23	3.667	9.31	5.25	2.54
0.583	1.69	2.167	4.23	3.750	9.31	5.33	1.69
0.667	1.69	2.250	4.23	3.833	4.23	5.42	1.69
0.750	1.69	2.333	5.08	3.917	4.23	5.50	1.69
0.833	2.54	2.417	5.08	4.000	4.23	5.58	1.69
0.917	2.54	2.500	5.08	4.083	4.23	5.67	1.69
1.000	2.54	2.583	5.08	4.167	4.23	5.75	1.69
1.083	2.54	2.667	5.08	4.250	4.23	5.83	1.69
1.167	2.54	2.750	5.08	4.333	3.38	5.92	1.69
1.250	2.54	2.833	25.38	4.417	3.38	6.00	1.69
1.333	2.54	2.917	25.38	4.500	3.38	6.08	1.69
1.417	2.54	3.000	25.38	4.583	3.38	6.17	1.69
1.500	2.54	3.083	65.99	4.667	3.38	6.25	1.69
1.583	2.54	3.167	65.99	4.750	3.38		

```
     Max.Eff.Inten.(mm/hr)=      65.99        37.29
               over (min)        5.00        20.00
     Storage Coeff.  (min)=      7.34 (ii)   17.81 (ii)
     Unit Hyd. Tpeak (min)=      5.00        20.00
     Unit Hyd. peak  (cms)=      0.17         0.06
                                                    *TOTALS*
     PEAK FLOW       (cms)=      2.68         0.54      3.029 (iii)
     TIME TO PEAK    (hrs)=      3.25         3.42       3.25
     RUNOFF VOLUME    (mm)=     41.30        15.48      29.68
     TOTAL RAINFALL   (mm)=     42.30        42.30      42.30
     RUNOFF COEFFICIENT   =      0.98         0.37       0.70


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0020)|   Area    (ha)=   3.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  60.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      3.04         0.76
     Dep. Storage     (mm)=      1.00         5.00
     Average Slope     (%)=      1.00         2.00
     Length            (m)=    159.16        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	1.667	2.54	3.250	65.99	4.83	2.54
0.167	0.00	1.750	2.54	3.333	9.31	4.92	2.54
0.250	0.00	1.833	4.23	3.417	9.31	5.00	2.54
0.333	1.69	1.917	4.23	3.500	9.31	5.08	2.54
0.417	1.69	2.000	4.23	3.583	9.31	5.17	2.54
0.500	1.69	2.083	4.23	3.667	9.31	5.25	2.54
0.583	1.69	2.167	4.23	3.750	9.31	5.33	1.69
0.667	1.69	2.250	4.23	3.833	4.23	5.42	1.69
0.750	1.69	2.333	5.08	3.917	4.23	5.50	1.69
0.833	2.54	2.417	5.08	4.000	4.23	5.58	1.69
0.917	2.54	2.500	5.08	4.083	4.23	5.67	1.69
1.000	2.54	2.583	5.08	4.167	4.23	5.75	1.69
1.083	2.54	2.667	5.08	4.250	4.23	5.83	1.69
1.167	2.54	2.750	5.08	4.333	3.38	5.92	1.69
1.250	2.54	2.833	25.38	4.417	3.38	6.00	1.69
1.333	2.54	2.917	25.38	4.500	3.38	6.08	1.69
1.417	2.54	3.000	25.38	4.583	3.38	6.17	1.69
1.500	2.54	3.083	65.99	4.667	3.38	6.25	1.69
1.583	2.54	3.167	65.99	4.750	3.38		

```
     Max.Eff.Inten.(mm/hr)=      65.99        80.20
               over (min)        5.00        15.00
     Storage Coeff.  (min)=      3.99 (ii)   11.70 (ii)
     Unit Hyd. Tpeak (min)=      5.00        15.00
     Unit Hyd. peak  (cms)=      0.24         0.09
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.41         0.11       0.503 (iii)
     TIME TO PEAK    (hrs)=      3.25         3.33       3.25
     RUNOFF VOLUME    (mm)=     41.30        20.38      32.93
     TOTAL RAINFALL   (mm)=     42.30        42.30      42.30
     RUNOFF COEFFICIENT   =      0.98         0.48       0.78

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    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  (  0023)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
```

	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0020):	3.80	0.503	3.25	32.93
+ ID2= 2 (0006):	29.06	3.029	3.25	29.68
ID = 3 (0023):	32.86	3.532	3.25	30.06

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0012) / 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	0.4930	1.5666
	0.0360	0.7150	0.7890	1.8478
	0.0660	1.0737	1.0520	2.0613
	0.2630	1.3645	1.3140	2.2797

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0023)	32.860	3.532	3.25	30.06
OUTFLOW: ID= 1 (0012)	32.860	0.054	6.42	28.53

PEAK FLOW REDUCTION [Qout/Qin](%)= 1.52
TIME SHIFT OF PEAK FLOW (min)=190.00
MAXIMUM STORAGE USED (ha.m.)= 0.9267

CALIB
STANDHYD (0017) | Area (ha)= 15.53
ID= 1 DT= 5.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 49.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	10.09	5.44
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	321.77	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	1.667	2.54	3.250	65.99	4.83	2.54
0.167	0.00	1.750	2.54	3.333	9.31	4.92	2.54
0.250	0.00	1.833	4.23	3.417	9.31	5.00	2.54
0.333	1.69	1.917	4.23	3.500	9.31	5.08	2.54
0.417	1.69	2.000	4.23	3.583	9.31	5.17	2.54
0.500	1.69	2.083	4.23	3.667	9.31	5.25	2.54
0.583	1.69	2.167	4.23	3.750	9.31	5.33	1.69
0.667	1.69	2.250	4.23	3.833	4.23	5.42	1.69
0.750	1.69	2.333	5.08	3.917	4.23	5.50	1.69
0.833	2.54	2.417	5.08	4.000	4.23	5.58	1.69
0.917	2.54	2.500	5.08	4.083	4.23	5.67	1.69
1.000	2.54	2.583	5.08	4.167	4.23	5.75	1.69
1.083	2.54	2.667	5.08	4.250	4.23	5.83	1.69
1.167	2.54	2.750	5.08	4.333	3.38	5.92	1.69
1.250	2.54	2.833	25.38	4.417	3.38	6.00	1.69
1.333	2.54	2.917	25.38	4.500	3.38	6.08	1.69
1.417	2.54	3.000	25.38	4.583	3.38	6.17	1.69
1.500	2.54	3.083	65.99	4.667	3.38	6.25	1.69
1.583	2.54	3.167	65.99	4.750	3.38		

				TOTALS
Max.Eff.Inten.(mm/hr)=	65.99	48.31		
over (min)	5.00	20.00		
Storage Coeff. (min)=	6.08 (ii)	15.52 (ii)		
Unit Hyd. Tpeak (min)=	5.00	20.00		
Unit Hyd. peak (cms)=	0.19	0.07		
PEAK FLOW (cms)=	1.32	0.37		1.567 (iii)
TIME TO PEAK (hrs)=	3.25	3.42		3.25
RUNOFF VOLUME (mm)=	41.30	16.61		28.71
TOTAL RAINFALL (mm)=	42.30	42.30		42.30
RUNOFF COEFFICIENT =	0.98	0.39		0.68

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0002) | Area (ha)= 20.06
ID= 1 DT= 5.0 min | Total Imp(%)= 67.00 Dir. Conn.(%)= 56.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	13.44	6.62
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	365.70	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	1.667	2.54	3.250	65.99	4.83	2.54
0.167	0.00	1.750	2.54	3.333	9.31	4.92	2.54
0.250	0.00	1.833	4.23	3.417	9.31	5.00	2.54
0.333	1.69	1.917	4.23	3.500	9.31	5.08	2.54
0.417	1.69	2.000	4.23	3.583	9.31	5.17	2.54
0.500	1.69	2.083	4.23	3.667	9.31	5.25	2.54
0.583	1.69	2.167	4.23	3.750	9.31	5.33	1.69
0.667	1.69	2.250	4.23	3.833	4.23	5.42	1.69
0.750	1.69	2.333	5.08	3.917	4.23	5.50	1.69
0.833	2.54	2.417	5.08	4.000	4.23	5.58	1.69
0.917	2.54	2.500	5.08	4.083	4.23	5.67	1.69
1.000	2.54	2.583	5.08	4.167	4.23	5.75	1.69
1.083	2.54	2.667	5.08	4.250	4.23	5.83	1.69
1.167	2.54	2.750	5.08	4.333	3.38	5.92	1.69
1.250	2.54	2.833	25.38	4.417	3.38	6.00	1.69
1.333	2.54	2.917	25.38	4.500	3.38	6.08	1.69
1.417	2.54	3.000	25.38	4.583	3.38	6.17	1.69
1.500	2.54	3.083	65.99	4.667	3.38	6.25	1.69

```
              1.583    2.54 | 3.167   65.99 | 4.750    3.38 |

     Max.Eff.Inten.(mm/hr)=      65.99        37.78
               over (min)         5.00        20.00
     Storage Coeff.  (min)=      6.57 (ii)   16.98 (ii)
     Unit Hyd. Tpeak (min)=      5.00        20.00
     Unit Hyd. peak  (cms)=      0.18         0.06
                                                      *TOTALS*
     PEAK FLOW       (cms)=      1.92         0.37        2.167 (iii)
     TIME TO PEAK    (hrs)=      3.25         3.42         3.25
     RUNOFF VOLUME    (mm)=     41.30        15.57        29.98
     TOTAL RAINFALL   (mm)=     42.30        42.30        42.30
     RUNOFF COEFFICIENT   =      0.98         0.37         0.71


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    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  (  0018)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0017):    15.53   1.567     3.25    28.71
     + ID2= 2 (  0002):    20.06   2.167     3.25    29.98
       ================================================
       ID = 3 (  0018):    35.59   3.734     3.25    29.42

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0008)|     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   |  0.4480      1.7011
                         0.0360     0.7282   |  0.7160      2.0238
                         0.0600     1.1698   |  0.9550      2.2595
                         0.2380     1.4871   |  1.1940      2.5034

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0018)    35.590     3.734     3.25      29.42
   OUTFLOW: ID= 1 (  0008)    35.590     0.050     6.50      27.82

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.34
                  TIME SHIFT OF PEAK FLOW          (min)=195.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.9878

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--------------------
| CALIB            |
| STANDHYD (  0037)|   Area     (ha)=   2.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  59.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.58         0.42
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     115.47        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 | 1.667    2.54 | 3.250   65.99 |  4.83    2.54
         0.167    0.00 | 1.750    2.54 | 3.333    9.31 |  4.92    2.54
         0.250    0.00 | 1.833    4.23 | 3.417    9.31 |  5.00    2.54
         0.333    1.69 | 1.917    4.23 | 3.500    9.31 |  5.08    2.54
         0.417    1.69 | 2.000    4.23 | 3.583    9.31 |  5.17    2.54
         0.500    1.69 | 2.083    4.23 | 3.667    9.31 |  5.25    2.54
         0.583    1.69 | 2.167    4.23 | 3.750    9.31 |  5.33    1.69
         0.667    1.69 | 2.250    4.23 | 3.833    4.23 |  5.42    1.69
         0.750    1.69 | 2.333    5.08 | 3.917    4.23 |  5.50    1.69
         0.833    2.54 | 2.417    5.08 | 4.000    4.23 |  5.58    1.69
         0.917    2.54 | 2.500    5.08 | 4.083    4.23 |  5.67    1.69
         1.000    2.54 | 2.583    5.08 | 4.167    4.23 |  5.75    1.69
         1.083    2.54 | 2.667    5.08 | 4.250    4.23 |  5.83    1.69
         1.167    2.54 | 2.750    5.08 | 4.333    3.38 |  5.92    1.69
         1.250    2.54 | 2.833   25.38 | 4.417    3.38 |  6.00    1.69
         1.333    2.54 | 2.917   25.38 | 4.500    3.38 |  6.08    1.69
         1.417    2.54 | 3.000   25.38 | 4.583    3.38 |  6.17    1.69
         1.500    2.54 | 3.083   65.99 | 4.667    3.38 |  6.25    1.69
         1.583    2.54 | 3.167   65.99 | 4.750    3.38 |

     Max.Eff.Inten.(mm/hr)=      65.99        77.28
               over (min)         5.00        15.00
     Storage Coeff.  (min)=      3.29 (ii)   11.11 (ii)
     Unit Hyd. Tpeak (min)=      5.00        15.00
     Unit Hyd. peak  (cms)=      0.27         0.09
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.21         0.06         0.264 (iii)
     TIME TO PEAK    (hrs)=      3.25         3.33          3.25
     RUNOFF VOLUME    (mm)=     41.30        20.09         32.60
     TOTAL RAINFALL   (mm)=     42.30        42.30         42.30
     RUNOFF COEFFICIENT   =      0.98         0.47          0.77

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| RESERVOIR(  0033)|     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   |  0.0250      0.1054
                         0.0020     0.0490   |  0.0410      0.1239
                         0.0030     0.0750   |  0.0540      0.1381
                         0.0130     0.0932   |  0.0670      0.1527
```

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                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0037)     2.000     0.264      3.25      32.60
   OUTFLOW: ID= 1 (  0033)     2.000     0.003      6.42      29.48

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.95
                  TIME SHIFT OF PEAK FLOW         (min)=190.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0623

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\710d6a03-7748-4766-b630-326c09959705\scen
  Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
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DATE: 05-01-2024                          TIME: 02:51:11

USER:



COMMENTS: _____________________________________________________________


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  ***********************************************
  ** SIMULATION : 14. 5-Year-6-Hour-SCS-Type-II **
  ***********************************************


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```

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|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              1c68ae73-c69b-4a60-ad0c-90425c95e5fe\d811bc74
| Ptotal= 59.50 mm |    Comments: 5-Year-6-Hour-SCS-Type-II
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	1.75	5.95	3.50	13.09	5.25	2.38
0.25	2.38	2.00	5.95	3.75	5.95	5.50	2.38
0.50	2.38	2.25	7.14	4.00	5.95	5.75	2.38
0.75	3.57	2.50	7.14	4.25	4.76	6.00	2.38
1.00	3.57	2.75	35.70	4.50	4.76		
1.25	3.57	3.00	92.82	4.75	3.57		
1.50	3.57	3.25	13.09	5.00	3.57		

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--------------------
| CALIB            |
| STANDHYD (  0006)|   Area     (ha)=  29.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  66.00   Dir. Conn.(%)=  55.00
--------------------
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	1.667	3.57	3.250	92.82	4.83	3.57
0.167	0.00	1.750	3.57	3.333	13.09	4.92	3.57
0.250	0.00	1.833	5.95	3.417	13.09	5.00	3.57
0.333	2.38	1.917	5.95	3.500	13.09	5.08	3.57
0.417	2.38	2.000	5.95	3.583	13.09	5.17	3.57
0.500	2.38	2.083	5.95	3.667	13.09	5.25	3.57
0.583	2.38	2.167	5.95	3.750	13.09	5.33	2.38
0.667	2.38	2.250	5.95	3.833	5.95	5.42	2.38
0.750	2.38	2.333	7.14	3.917	5.95	5.50	2.38
0.833	3.57	2.417	7.14	4.000	5.95	5.58	2.38
0.917	3.57	2.500	7.14	4.083	5.95	5.67	2.38
1.000	3.57	2.583	7.14	4.167	5.95	5.75	2.38
1.083	3.57	2.667	7.14	4.250	5.95	5.83	2.38
1.167	3.57	2.750	7.14	4.333	4.76	5.92	2.38
1.250	3.57	2.833	35.70	4.417	4.76	6.00	2.38
1.333	3.57	2.917	35.70	4.500	4.76	6.08	2.38
1.417	3.57	3.000	35.70	4.583	4.76	6.17	2.38
1.500	3.57	3.083	92.82	4.667	4.76	6.25	2.38
1.583	3.57	3.167	92.82	4.750	4.76		

Max.Eff.Inten.	(mm/hr)=	92.82	71.78	
	over (min)	5.00	15.00	
Storage Coeff.	(min)=	6.40 (ii)	14.46 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	15.00	
Unit Hyd. peak	(cms)=	0.18	0.08	
				TOTALS

PEAK FLOW	(cms)=	3.87	1.11	4.806 (iii)
TIME TO PEAK	(hrs)=	3.25	3.33	3.25
RUNOFF VOLUME	(mm)=	58.50	27.47	44.53
TOTAL RAINFALL	(mm)=	59.50	59.50	59.50
RUNOFF COEFFICIENT	=	0.98	0.46	0.75

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0020)	Area (ha)= 3.80		
ID= 1 DT= 5.0 min	Total Imp(%)= 80.00	Dir. Conn.(%)= 60.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	1.667	3.57	3.250	92.82	4.83	3.57
0.167	0.00	1.750	3.57	3.333	13.09	4.92	3.57
0.250	0.00	1.833	5.95	3.417	13.09	5.00	3.57
0.333	2.38	1.917	5.95	3.500	13.09	5.08	3.57
0.417	2.38	2.000	5.95	3.583	13.09	5.17	3.57
0.500	2.38	2.083	5.95	3.667	13.09	5.25	3.57
0.583	2.38	2.167	5.95	3.750	13.09	5.33	2.38
0.667	2.38	2.250	5.95	3.833	5.95	5.42	2.38
0.750	2.38	2.333	7.14	3.917	5.95	5.50	2.38
0.833	3.57	2.417	7.14	4.000	5.95	5.58	2.38
0.917	3.57	2.500	7.14	4.083	5.95	5.67	2.38
1.000	3.57	2.583	7.14	4.167	5.95	5.75	2.38
1.083	3.57	2.667	7.14	4.250	5.95	5.83	2.38
1.167	3.57	2.750	7.14	4.333	4.76	5.92	2.38
1.250	3.57	2.833	35.70	4.417	4.76	6.00	2.38
1.333	3.57	2.917	35.70	4.500	4.76	6.08	2.38
1.417	3.57	3.000	35.70	4.583	4.76	6.17	2.38
1.500	3.57	3.083	92.82	4.667	4.76	6.25	2.38
1.583	3.57	3.167	92.82	4.750	4.76		

Max.Eff.Inten.(mm/hr)=		92.82	132.21	
over (min)		5.00	10.00	
Storage Coeff. (min)=		3.48 (ii)	8.16 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.26	0.13	
				TOTALS
PEAK FLOW	(cms)=	0.58	0.22	0.798 (iii)
TIME TO PEAK	(hrs)=	3.25	3.25	3.25
RUNOFF VOLUME	(mm)=	58.50	34.22	48.79
TOTAL RAINFALL	(mm)=	59.50	59.50	59.50
RUNOFF COEFFICIENT	=	0.98	0.58	0.82

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0023)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0020):	3.80	0.798	3.25	48.79
+ ID2= 2 (0006):	29.06	4.806	3.25	44.53
ID = 3 (0023):	32.86	5.605	3.25	45.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0012)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.4930	1.5666
	0.0360	0.7150	0.7890	1.8478
	0.0660	1.0737	1.0520	2.0613
	0.2630	1.3645	1.3140	2.2797

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0023)	32.860	5.605	3.25	45.03
OUTFLOW: ID= 1 (0012)	32.860	0.210	5.58	43.16

PEAK FLOW REDUCTION [Qout/Qin](%)= 3.75
TIME SHIFT OF PEAK FLOW (min)=140.00
MAXIMUM STORAGE USED (ha.m.)= 1.2863

CALIB			
STANDHYD (0017)	Area (ha)= 15.53		
ID= 1 DT= 5.0 min	Total Imp(%)= 65.00	Dir. Conn.(%)= 49.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	10.09	5.44
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	321.77	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	1.667	3.57	3.250	92.82	4.83	3.57
0.167	0.00	1.750	3.57	3.333	13.09	4.92	3.57
0.250	0.00	1.833	5.95	3.417	13.09	5.00	3.57
0.333	2.38	1.917	5.95	3.500	13.09	5.08	3.57
0.417	2.38	2.000	5.95	3.583	13.09	5.17	3.57
0.500	2.38	2.083	5.95	3.667	13.09	5.25	3.57
0.583	2.38	2.167	5.95	3.750	13.09	5.33	2.38
0.667	2.38	2.250	5.95	3.833	5.95	5.42	2.38
0.750	2.38	2.333	7.14	3.917	5.95	5.50	2.38
0.833	3.57	2.417	7.14	4.000	5.95	5.58	2.38
0.917	3.57	2.500	7.14	4.083	5.95	5.67	2.38
1.000	3.57	2.583	7.14	4.167	5.95	5.75	2.38
1.083	3.57	2.667	7.14	4.250	5.95	5.83	2.38
1.167	3.57	2.750	7.14	4.333	4.76	5.92	2.38
1.250	3.57	2.833	35.70	4.417	4.76	6.00	2.38
1.333	3.57	2.917	35.70	4.500	4.76	6.08	2.38
1.417	3.57	3.000	35.70	4.583	4.76	6.17	2.38
1.500	3.57	3.083	92.82	4.667	4.76	6.25	2.38
1.583	3.57	3.167	92.82	4.750	4.76		

Max.Eff.Inten.(mm/hr)=	92.82	83.26		
over (min)	5.00	15.00		
Storage Coeff. (min)=	5.31 (ii)	12.90 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	0.21	0.08		
			TOTALS	
PEAK FLOW (cms)=	1.89	0.75	2.534 (iii)	
TIME TO PEAK (hrs)=	3.25	3.33	3.25	
RUNOFF VOLUME (mm)=	58.50	29.07	43.49	
TOTAL RAINFALL (mm)=	59.50	59.50	59.50	
RUNOFF COEFFICIENT =	0.98	0.49	0.73	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0002)	Area (ha)= 20.06		
ID= 1 DT= 5.0 min	Total Imp(%)= 67.00	Dir. Conn.(%)= 56.00	
	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	13.44	6.62	
Dep. Storage (mm)=	1.00	5.00	
Average Slope (%)=	1.00	2.00	
Length (m)=	365.70	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	1.667	3.57	3.250	92.82	4.83	3.57
0.167	0.00	1.750	3.57	3.333	13.09	4.92	3.57
0.250	0.00	1.833	5.95	3.417	13.09	5.00	3.57
0.333	2.38	1.917	5.95	3.500	13.09	5.08	3.57
0.417	2.38	2.000	5.95	3.583	13.09	5.17	3.57
0.500	2.38	2.083	5.95	3.667	13.09	5.25	3.57
0.583	2.38	2.167	5.95	3.750	13.09	5.33	2.38
0.667	2.38	2.250	5.95	3.833	5.95	5.42	2.38
0.750	2.38	2.333	7.14	3.917	5.95	5.50	2.38
0.833	3.57	2.417	7.14	4.000	5.95	5.58	2.38
0.917	3.57	2.500	7.14	4.083	5.95	5.67	2.38
1.000	3.57	2.583	7.14	4.167	5.95	5.75	2.38
1.083	3.57	2.667	7.14	4.250	5.95	5.83	2.38
1.167	3.57	2.750	7.14	4.333	4.76	5.92	2.38
1.250	3.57	2.833	35.70	4.417	4.76	6.00	2.38
1.333	3.57	2.917	35.70	4.500	4.76	6.08	2.38
1.417	3.57	3.000	35.70	4.583	4.76	6.17	2.38
1.500	3.57	3.083	92.82	4.667	4.76	6.25	2.38
1.583	3.57	3.167	92.82	4.750	4.76		

Max.Eff.Inten.(mm/hr)=	92.82	72.61		
over (min)	5.00	15.00		
Storage Coeff. (min)=	5.73 (ii)	13.75 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	0.20	0.08		
			TOTALS	
PEAK FLOW (cms)=	2.76	0.77	3.417 (iii)	
TIME TO PEAK (hrs)=	3.25	3.33	3.25	
RUNOFF VOLUME (mm)=	58.50	27.59	44.90	
TOTAL RAINFALL (mm)=	59.50	59.50	59.50	
RUNOFF COEFFICIENT =	0.98	0.46	0.75	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0018)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0017):	15.53	2.534	3.25	43.49
+ ID2= 2 (0002):	20.06	3.417	3.25	44.90
ID = 3 (0018):	35.59	5.951	3.25	44.28

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0008)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.4480	1.7011
	0.0360	0.7282	0.7160	2.0238
	0.0600	1.1698	0.9550	2.2595
	0.2380	1.4871	1.1940	2.5034

	AREA	QPEAK	TPEAK	R.V.

```
                              (ha)      (cms)      (hrs)       (mm)
   INFLOW : ID= 2 (  0018)     35.590      5.951      3.25      44.28
   OUTFLOW: ID= 1 (  0008)     35.590      0.190      6.25      42.20

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  3.20
                  TIME SHIFT OF PEAK FLOW          (min)=180.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.4027

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0037)|   Area    (ha)=   2.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  59.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.58         0.42
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     115.47        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 | 1.667    3.57 | 3.250   92.82 |  4.83    3.57
              0.167    0.00 | 1.750    3.57 | 3.333   13.09 |  4.92    3.57
              0.250    0.00 | 1.833    5.95 | 3.417   13.09 |  5.00    3.57
              0.333    2.38 | 1.917    5.95 | 3.500   13.09 |  5.08    3.57
              0.417    2.38 | 2.000    5.95 | 3.583   13.09 |  5.17    3.57
              0.500    2.38 | 2.083    5.95 | 3.667   13.09 |  5.25    3.57
              0.583    2.38 | 2.167    5.95 | 3.750   13.09 |  5.33    2.38
              0.667    2.38 | 2.250    5.95 | 3.833    5.95 |  5.42    2.38
              0.750    2.38 | 2.333    7.14 | 3.917    5.95 |  5.50    2.38
              0.833    3.57 | 2.417    7.14 | 4.000    5.95 |  5.58    2.38
              0.917    3.57 | 2.500    7.14 | 4.083    5.95 |  5.67    2.38
              1.000    3.57 | 2.583    7.14 | 4.167    5.95 |  5.75    2.38
              1.083    3.57 | 2.667    7.14 | 4.250    5.95 |  5.83    2.38
              1.167    3.57 | 2.750    7.14 | 4.333    4.76 |  5.92    2.38
              1.250    3.57 | 2.833   35.70 | 4.417    4.76 |  6.00    2.38
              1.333    3.57 | 2.917   35.70 | 4.500    4.76 |  6.08    2.38
              1.417    3.57 | 3.000   35.70 | 4.583    4.76 |  6.17    2.38
              1.500    3.57 | 3.083   92.82 | 4.667    4.76 |  6.25    2.38
              1.583    3.57 | 3.167   92.82 | 4.750    4.76 |

     Max.Eff.Inten.(mm/hr)=      92.82       127.81
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      2.87 (ii)    7.68 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.28         0.13
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.30         0.12          0.420 (iii)
     TIME TO PEAK    (hrs)=      3.25         3.25           3.25
     RUNOFF VOLUME    (mm)=     58.50        33.84          48.39
     TOTAL RAINFALL   (mm)=     59.50        59.50          59.50
     RUNOFF COEFFICIENT   =      0.98         0.57           0.81

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| RESERVOIR(  0033)|     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   |  0.0250      0.1054
                          0.0020     0.0490   |  0.0410      0.1239
                          0.0030     0.0750   |  0.0540      0.1381
                          0.0130     0.0932   |  0.0670      0.1527

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0037)     2.000     0.420      3.25      48.39
   OUTFLOW: ID= 1 (  0033)     2.000     0.010      6.25      44.47

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  2.41
                  TIME SHIFT OF PEAK FLOW          (min)=180.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0880

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

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


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86e9-d1c81bbaf91e\11138768-5c0b-4b07-8293-a2cf1c1735a8\scen
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DATE: 05-01-2024                          TIME: 02:51:11

USER:
```

COMMENTS: _____

```
  ***********************************************
  ** SIMULATION : 15. 10-Year-6-Hour-SCS-Type-I **
  ***********************************************
```

READ STORM	Filename: C:\Users\mmsingh\AppData\Local\Temp\1c68ae73-c69b-4a60-ad0c-90425c95e5fe\9434984f
Ptotal= 70.80 mm	Comments: 10-Year-6-Hour-SCS-Type-II

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	1.75	7.08	3.50	15.58	5.25	2.83
0.25	2.83	2.00	7.08	3.75	7.08	5.50	2.83
0.50	2.83	2.25	8.50	4.00	7.08	5.75	2.83
0.75	4.25	2.50	8.50	4.25	5.66	6.00	2.83
1.00	4.25	2.75	42.48	4.50	5.66		
1.25	4.25	3.00	110.45	4.75	4.25		
1.50	4.25	3.25	15.58	5.00	4.25		

CALIB			
STANDHYD (0006)	Area (ha)= 29.06		
ID= 1 DT= 5.0 min	Total Imp(%)= 66.00	Dir. Conn.(%)= 55.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	1.667	4.25	3.250	110.45	4.83	4.25
0.167	0.00	1.750	4.25	3.333	15.58	4.92	4.25
0.250	0.00	1.833	7.08	3.417	15.58	5.00	4.25
0.333	2.83	1.917	7.08	3.500	15.58	5.08	4.25
0.417	2.83	2.000	7.08	3.583	15.58	5.17	4.25
0.500	2.83	2.083	7.08	3.667	15.58	5.25	4.25
0.583	2.83	2.167	7.08	3.750	15.58	5.33	2.83
0.667	2.83	2.250	7.08	3.833	7.08	5.42	2.83
0.750	2.83	2.333	8.50	3.917	7.08	5.50	2.83
0.833	4.25	2.417	8.50	4.000	7.08	5.58	2.83
0.917	4.25	2.500	8.50	4.083	7.08	5.67	2.83
1.000	4.25	2.583	8.50	4.167	7.08	5.75	2.83
1.083	4.25	2.667	8.50	4.250	7.08	5.83	2.83
1.167	4.25	2.750	8.50	4.333	5.66	5.92	2.83
1.250	4.25	2.833	42.48	4.417	5.66	6.00	2.83
1.333	4.25	2.917	42.48	4.500	5.66	6.08	2.83
1.417	4.25	3.000	42.48	4.583	5.66	6.17	2.83
1.500	4.25	3.083	110.45	4.667	5.66	6.25	2.83
1.583	4.25	3.167	110.45	4.750	5.66		

				TOTALS
Max.Eff.Inten.(mm/hr)=	110.45	93.60		
over (min)	5.00	15.00		
Storage Coeff. (min)=	5.97 (ii)	13.22 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	0.19	0.08		
PEAK FLOW (cms)=	4.65	1.53		5.966 (iii)
TIME TO PEAK (hrs)=	3.25	3.33		3.25
RUNOFF VOLUME (mm)=	69.80	36.12		54.65
TOTAL RAINFALL (mm)=	70.80	70.80		70.80
RUNOFF COEFFICIENT =	0.99	0.51		0.77

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0020)	Area (ha)= 3.80		
ID= 1 DT= 5.0 min	Total Imp(%)= 80.00	Dir. Conn.(%)= 60.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	1.667	4.25	3.250	110.45	4.83	4.25
0.167	0.00	1.750	4.25	3.333	15.58	4.92	4.25
0.250	0.00	1.833	7.08	3.417	15.58	5.00	4.25
0.333	2.83	1.917	7.08	3.500	15.58	5.08	4.25
0.417	2.83	2.000	7.08	3.583	15.58	5.17	4.25
0.500	2.83	2.083	7.08	3.667	15.58	5.25	4.25
0.583	2.83	2.167	7.08	3.750	15.58	5.33	2.83
0.667	2.83	2.250	7.08	3.833	7.08	5.42	2.83
0.750	2.83	2.333	8.50	3.917	7.08	5.50	2.83
0.833	4.25	2.417	8.50	4.000	7.08	5.58	2.83
0.917	4.25	2.500	8.50	4.083	7.08	5.67	2.83
1.000	4.25	2.583	8.50	4.167	7.08	5.75	2.83
1.083	4.25	2.667	8.50	4.250	7.08	5.83	2.83
1.167	4.25	2.750	8.50	4.333	5.66	5.92	2.83
1.250	4.25	2.833	42.48	4.417	5.66	6.00	2.83
1.333	4.25	2.917	42.48	4.500	5.66	6.08	2.83
1.417	4.25	3.000	42.48	4.583	5.66	6.17	2.83
1.500	4.25	3.083	110.45	4.667	5.66	6.25	2.83

```
                1.583    4.25 | 3.167  110.45 | 4.750    5.66 |

     Max.Eff.Inten.(mm/hr)=     110.45       167.79
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       3.24 (ii)    7.62 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.27         0.13
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.70         0.28          0.978 (iii)
     TIME TO PEAK    (hrs)=       3.25         3.25           3.25
     RUNOFF VOLUME    (mm)=      69.80        43.91          59.44
     TOTAL RAINFALL   (mm)=      70.80        70.80          70.80
     RUNOFF COEFFICIENT   =       0.99         0.62           0.84

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  77.0    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  (  0023)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0020):     3.80   0.978     3.25    59.44
      + ID2= 2 (  0006):    29.06   5.966     3.25    54.65
        ================================================
        ID = 3 (  0023):    32.86   6.944     3.25    55.20

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0012)|     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   |   0.4930     1.5666
                          0.0360     0.7150   |   0.7890     1.8478
                          0.0660     1.0737   |   1.0520     2.0613
                          0.2630     1.3645   |   1.3140     2.2797

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0023)     32.860     6.944      3.25      55.20
   OUTFLOW: ID= 1 (  0012)     32.860     0.394      4.92      53.28

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  5.67
                  TIME SHIFT OF PEAK FLOW         (min)=100.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.4796

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--------------------
| CALIB            |
| STANDHYD (  0017)|   Area    (ha)=  15.53
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  49.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.09         5.44
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     321.77        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 | 1.667    4.25 | 3.250  110.45 |  4.83    4.25
             0.167    0.00 | 1.750    4.25 | 3.333   15.58 |  4.92    4.25
             0.250    0.00 | 1.833    7.08 | 3.417   15.58 |  5.00    4.25
             0.333    2.83 | 1.917    7.08 | 3.500   15.58 |  5.08    4.25
             0.417    2.83 | 2.000    7.08 | 3.583   15.58 |  5.17    4.25
             0.500    2.83 | 2.083    7.08 | 3.667   15.58 |  5.25    4.25
             0.583    2.83 | 2.167    7.08 | 3.750   15.58 |  5.33    2.83
             0.667    2.83 | 2.250    7.08 | 3.833    7.08 |  5.42    2.83
             0.750    2.83 | 2.333    8.50 | 3.917    7.08 |  5.50    2.83
             0.833    4.25 | 2.417    8.50 | 4.000    7.08 |  5.58    2.83
             0.917    4.25 | 2.500    8.50 | 4.083    7.08 |  5.67    2.83
             1.000    4.25 | 2.583    8.50 | 4.167    7.08 |  5.75    2.83
             1.083    4.25 | 2.667    8.50 | 4.250    7.08 |  5.83    2.83
             1.167    4.25 | 2.750    8.50 | 4.333    5.66 |  5.92    2.83
             1.250    4.25 | 2.833   42.48 | 4.417    5.66 |  6.00    2.83
             1.333    4.25 | 2.917   42.48 | 4.500    5.66 |  6.08    2.83
             1.417    4.25 | 3.000   42.48 | 4.583    5.66 |  6.17    2.83
             1.500    4.25 | 3.083  110.45 | 4.667    5.66 |  6.25    2.83
             1.583    4.25 | 3.167  110.45 | 4.750    5.66 |

     Max.Eff.Inten.(mm/hr)=     110.45       107.84
               over (min)         5.00        15.00
     Storage Coeff.  (min)=       4.95 (ii)   11.80 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.22         0.09
                                                        *TOTALS*
     PEAK FLOW       (cms)=       2.26         1.03          3.157 (iii)
     TIME TO PEAK    (hrs)=       3.25         3.33           3.25
     RUNOFF VOLUME    (mm)=      69.80        38.00          53.58
     TOTAL RAINFALL   (mm)=      70.80        70.80          70.80
     RUNOFF COEFFICIENT   =       0.99         0.54           0.76

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0002)|   Area    (ha)=  20.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  56.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      13.44         6.62
     Dep. Storage     (mm)=       1.00         5.00
```

Average Slope	(%)=	1.00	2.00
Length	(m)=	365.70	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	1.667	4.25	3.250	110.45	4.83	4.25
0.167	0.00	1.750	4.25	3.333	15.58	4.92	4.25
0.250	0.00	1.833	7.08	3.417	15.58	5.00	4.25
0.333	2.83	1.917	7.08	3.500	15.58	5.08	4.25
0.417	2.83	2.000	7.08	3.583	15.58	5.17	4.25
0.500	2.83	2.083	7.08	3.667	15.58	5.25	4.25
0.583	2.83	2.167	7.08	3.750	15.58	5.33	2.83
0.667	2.83	2.250	7.08	3.833	7.08	5.42	2.83
0.750	2.83	2.333	8.50	3.917	7.08	5.50	2.83
0.833	4.25	2.417	8.50	4.000	7.08	5.58	2.83
0.917	4.25	2.500	8.50	4.083	7.08	5.67	2.83
1.000	4.25	2.583	8.50	4.167	7.08	5.75	2.83
1.083	4.25	2.667	8.50	4.250	7.08	5.83	2.83
1.167	4.25	2.750	8.50	4.333	5.66	5.92	2.83
1.250	4.25	2.833	42.48	4.417	5.66	6.00	2.83
1.333	4.25	2.917	42.48	4.500	5.66	6.08	2.83
1.417	4.25	3.000	42.48	4.583	5.66	6.17	2.83
1.500	4.25	3.083	110.45	4.667	5.66	6.25	2.83
1.583	4.25	3.167	110.45	4.750	5.66		

Max.Eff.Inten.(mm/hr)=		110.45	94.64	
over (min)		5.00	15.00	
Storage Coeff. (min)=		5.35 (ii)	12.56 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.21	0.08	
				TOTALS
PEAK FLOW	(cms)=	3.31	1.06	4.231 (iii)
TIME TO PEAK	(hrs)=	3.25	3.33	3.25
RUNOFF VOLUME	(mm)=	69.80	36.27	55.05
TOTAL RAINFALL	(mm)=	70.80	70.80	70.80
RUNOFF COEFFICIENT	=	0.99	0.51	0.78

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0018)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0017):		15.53	3.157	3.25	53.58
+ ID2= 2 (0002):		20.06	4.231	3.25	55.05
ID = 3 (0018):		35.59	7.388	3.25	54.41

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0008) / IN= 2---> OUT= 1 / DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
OVERFLOW IS OFF	0.0000	0.0000	0.4480	1.7011
	0.0360	0.7282	0.7160	2.0238
	0.0600	1.1698	0.9550	2.2595
	0.2380	1.4871	1.1940	2.5034

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0018)		35.590	7.388	3.25	54.41
OUTFLOW: ID= 1 (0008)		35.590	0.366	5.25	52.25

PEAK FLOW REDUCTION [Qout/Qin](%)= 4.95
TIME SHIFT OF PEAK FLOW (min)=120.00
MAXIMUM STORAGE USED (ha.m.)= 1.6175

CALIB / STANDHYD (0037) / ID= 1 DT= 5.0 min	Area (ha)= 2.00	Total Imp(%)= 79.00	Dir. Conn.(%)= 59.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.58	0.42
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	115.47	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	1.667	4.25	3.250	110.45	4.83	4.25
0.167	0.00	1.750	4.25	3.333	15.58	4.92	4.25
0.250	0.00	1.833	7.08	3.417	15.58	5.00	4.25
0.333	2.83	1.917	7.08	3.500	15.58	5.08	4.25
0.417	2.83	2.000	7.08	3.583	15.58	5.17	4.25
0.500	2.83	2.083	7.08	3.667	15.58	5.25	4.25
0.583	2.83	2.167	7.08	3.750	15.58	5.33	2.83
0.667	2.83	2.250	7.08	3.833	7.08	5.42	2.83
0.750	2.83	2.333	8.50	3.917	7.08	5.50	2.83
0.833	4.25	2.417	8.50	4.000	7.08	5.58	2.83
0.917	4.25	2.500	8.50	4.083	7.08	5.67	2.83
1.000	4.25	2.583	8.50	4.167	7.08	5.75	2.83
1.083	4.25	2.667	8.50	4.250	7.08	5.83	2.83
1.167	4.25	2.750	8.50	4.333	5.66	5.92	2.83
1.250	4.25	2.833	42.48	4.417	5.66	6.00	2.83
1.333	4.25	2.917	42.48	4.500	5.66	6.08	2.83
1.417	4.25	3.000	42.48	4.583	5.66	6.17	2.83
1.500	4.25	3.083	110.45	4.667	5.66	6.25	2.83
1.583	4.25	3.167	110.45	4.750	5.66		

Max.Eff.Inten.(mm/hr)=	110.45	162.44	
over (min)	5.00	10.00	

```
     Storage Coeff.  (min)=       2.68 (ii)    7.16 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.29         0.14
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.36         0.15          0.515 (iii)
     TIME TO PEAK    (hrs)=       3.25         3.25           3.25
     RUNOFF VOLUME    (mm)=      69.80        43.48          59.01
     TOTAL RAINFALL   (mm)=      70.80        70.80          70.80
     RUNOFF COEFFICIENT   =       0.99         0.61           0.83

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0033)|     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   |   0.0250     0.1054
                          0.0020     0.0490   |   0.0410     0.1239
                          0.0030     0.0750   |   0.0540     0.1381
                          0.0130     0.0932   |   0.0670     0.1527

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0037)     2.000     0.515      3.25      59.01
   OUTFLOW: ID= 1 (  0033)     2.000     0.020      5.25      54.96

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  3.91
                  TIME SHIFT OF PEAK FLOW         (min)=120.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1005

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

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


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  Output  filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
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DATE: 05-01-2024                          TIME: 02:51:11

USER:


COMMENTS: _____________________________________________________

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  ********************************************
  ** SIMULATION : 16. 25-Year-6-Hour-SCS-Type-I **
  ********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              1c68ae73-c69b-4a60-ad0c-90425c95e5fe\edbfb811
| Ptotal= 85.20 mm |    Comments: 25-Year-6-Hour-SCS-Type-II
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.00 |  1.75    8.52 |  3.50   18.74 |  5.25    3.41
                0.25    3.41 |  2.00    8.52 |  3.75    8.52 |  5.50    3.41
                0.50    3.41 |  2.25   10.22 |  4.00    8.52 |  5.75    3.41
                0.75    5.11 |  2.50   10.22 |  4.25    6.82 |  6.00    3.41
                1.00    5.11 |  2.75   51.12 |  4.50    6.82 |
                1.25    5.11 |  3.00  132.91 |  4.75    5.11 |
                1.50    5.11 |  3.25   18.74 |  5.00    5.11 |

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--------------------
| CALIB            |
| STANDHYD (  0006)|   Area     (ha)=  29.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  66.00   Dir. Conn.(%)=  55.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      19.18          9.88
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     440.15         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 | 1.667    5.11 | 3.250  132.91 |  4.83    5.11
               0.167    0.00 | 1.750    5.11 | 3.333   18.75 |  4.92    5.11
               0.250    0.00 | 1.833    8.52 | 3.417   18.74 |  5.00    5.11
```

0.333	3.41	1.917	8.52	3.500	18.74	5.08	5.11
0.417	3.41	2.000	8.52	3.583	18.74	5.17	5.11
0.500	3.41	2.083	8.52	3.667	18.74	5.25	5.11
0.583	3.41	2.167	8.52	3.750	18.74	5.33	3.41
0.667	3.41	2.250	8.52	3.833	8.52	5.42	3.41
0.750	3.41	2.333	10.22	3.917	8.52	5.50	3.41
0.833	5.11	2.417	10.22	4.000	8.52	5.58	3.41
0.917	5.11	2.500	10.22	4.083	8.52	5.67	3.41
1.000	5.11	2.583	10.22	4.167	8.52	5.75	3.41
1.083	5.11	2.667	10.22	4.250	8.52	5.83	3.41
1.167	5.11	2.750	10.22	4.333	6.82	5.92	3.41
1.250	5.11	2.833	51.12	4.417	6.82	6.00	3.41
1.333	5.11	2.917	51.12	4.500	6.82	6.08	3.41
1.417	5.11	3.000	51.12	4.583	6.82	6.17	3.41
1.500	5.11	3.083	132.91	4.667	6.82	6.25	3.41
1.583	5.11	3.167	132.91	4.750	6.82		

Max.Eff.Inten.(mm/hr)=	132.91	122.55		
over (min)	5.00	15.00		
Storage Coeff. (min)=	5.55 (ii)	12.05 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	0.20	0.09		
			TOTALS	
PEAK FLOW (cms)=	5.65	2.12	7.498 (iii)	
TIME TO PEAK (hrs)=	3.25	3.33	3.25	
RUNOFF VOLUME (mm)=	84.20	47.78	67.81	
TOTAL RAINFALL (mm)=	85.20	85.20	85.20	
RUNOFF COEFFICIENT =	0.99	0.56	0.80	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0020)	Area (ha)=	3.80	
ID= 1 DT= 5.0 min	Total Imp(%)=	80.00	Dir. Conn.(%)= 60.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	1.667	5.11	3.250	132.91	4.83	5.11
0.167	0.00	1.750	5.11	3.333	18.75	4.92	5.11
0.250	0.00	1.833	8.52	3.417	18.74	5.00	5.11
0.333	3.41	1.917	8.52	3.500	18.74	5.08	5.11
0.417	3.41	2.000	8.52	3.583	18.74	5.17	5.11
0.500	3.41	2.083	8.52	3.667	18.74	5.25	5.11
0.583	3.41	2.167	8.52	3.750	18.74	5.33	3.41
0.667	3.41	2.250	8.52	3.833	8.52	5.42	3.41
0.750	3.41	2.333	10.22	3.917	8.52	5.50	3.41
0.833	5.11	2.417	10.22	4.000	8.52	5.58	3.41
0.917	5.11	2.500	10.22	4.083	8.52	5.67	3.41
1.000	5.11	2.583	10.22	4.167	8.52	5.75	3.41
1.083	5.11	2.667	10.22	4.250	8.52	5.83	3.41
1.167	5.11	2.750	10.22	4.333	6.82	5.92	3.41
1.250	5.11	2.833	51.12	4.417	6.82	6.00	3.41
1.333	5.11	2.917	51.12	4.500	6.82	6.08	3.41
1.417	5.11	3.000	51.12	4.583	6.82	6.17	3.41
1.500	5.11	3.083	132.91	4.667	6.82	6.25	3.41
1.583	5.11	3.167	132.91	4.750	6.82		

Max.Eff.Inten.(mm/hr)=	132.91	213.91		
over (min)	5.00	10.00		
Storage Coeff. (min)=	3.01 (ii)	7.07 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.28	0.14		
			TOTALS	
PEAK FLOW (cms)=	0.84	0.37	1.210 (iii)	
TIME TO PEAK (hrs)=	3.25	3.25	3.25	
RUNOFF VOLUME (mm)=	84.20	56.69	73.20	
TOTAL RAINFALL (mm)=	85.20	85.20	85.20	
RUNOFF COEFFICIENT =	0.99	0.67	0.86	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0023)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0020):		3.80	1.210	3.25	73.20
+ ID2= 2 (0006):		29.06	7.498	3.25	67.81
ID = 3 (0023):		32.86	8.708	3.25	68.43

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0012)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.4930	1.5666
	0.0360	0.7150	0.7890	1.8478
	0.0660	1.0737	1.0520	2.0613
	0.2630	1.3645	1.3140	2.2797

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0023)	32.860	8.708	3.25	68.43
OUTFLOW: ID= 1 (0012)	32.860	0.664	4.42	66.47

PEAK FLOW REDUCTION [Qout/Qin](%)= 7.62
TIME SHIFT OF PEAK FLOW (min)= 70.00
MAXIMUM STORAGE USED (ha.m.)= 1.7291

CALIB	
STANDHYD (0017)	Area (ha)= 15.53
ID= 1 DT= 5.0 min	Total Imp(%)= 65.00 Dir. Conn.(%)= 49.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	10.09	5.44
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	321.77	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	1.667	5.11	3.250	132.91	4.83	5.11
0.167	0.00	1.750	5.11	3.333	18.75	4.92	5.11
0.250	0.00	1.833	8.52	3.417	18.74	5.00	5.11
0.333	3.41	1.917	8.52	3.500	18.74	5.08	5.11
0.417	3.41	2.000	8.52	3.583	18.74	5.17	5.11
0.500	3.41	2.083	8.52	3.667	18.74	5.25	5.11
0.583	3.41	2.167	8.52	3.750	18.74	5.33	3.41
0.667	3.41	2.250	8.52	3.833	8.52	5.42	3.41
0.750	3.41	2.333	10.22	3.917	8.52	5.50	3.41
0.833	5.11	2.417	10.22	4.000	8.52	5.58	3.41
0.917	5.11	2.500	10.22	4.083	8.52	5.67	3.41
1.000	5.11	2.583	10.22	4.167	8.52	5.75	3.41
1.083	5.11	2.667	10.22	4.250	8.52	5.83	3.41
1.167	5.11	2.750	10.22	4.333	6.82	5.92	3.41
1.250	5.11	2.833	51.12	4.417	6.82	6.00	3.41
1.333	5.11	2.917	51.12	4.500	6.82	6.08	3.41
1.417	5.11	3.000	51.12	4.583	6.82	6.17	3.41
1.500	5.11	3.083	132.91	4.667	6.82	6.25	3.41
1.583	5.11	3.167	132.91	4.750	6.82		

Max.Eff.Inten.(mm/hr)=		132.91	140.25	
over (min)		5.00	15.00	
Storage Coeff. (min)=		4.60 (ii)	10.76 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.23	0.09	
				TOTALS
PEAK FLOW	(cms)=	2.74	1.40	3.982 (iii)
TIME TO PEAK	(hrs)=	3.25	3.33	3.25
RUNOFF VOLUME	(mm)=	84.20	49.96	66.74
TOTAL RAINFALL	(mm)=	85.20	85.20	85.20
RUNOFF COEFFICIENT	=	0.99	0.59	0.78

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0002)	Area (ha)= 20.06
ID= 1 DT= 5.0 min	Total Imp(%)= 67.00 Dir. Conn.(%)= 56.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	13.44	6.62
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	365.70	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	1.667	5.11	3.250	132.91	4.83	5.11
0.167	0.00	1.750	5.11	3.333	18.75	4.92	5.11
0.250	0.00	1.833	8.52	3.417	18.74	5.00	5.11
0.333	3.41	1.917	8.52	3.500	18.74	5.08	5.11
0.417	3.41	2.000	8.52	3.583	18.74	5.17	5.11
0.500	3.41	2.083	8.52	3.667	18.74	5.25	5.11
0.583	3.41	2.167	8.52	3.750	18.74	5.33	3.41
0.667	3.41	2.250	8.52	3.833	8.52	5.42	3.41
0.750	3.41	2.333	10.22	3.917	8.52	5.50	3.41
0.833	5.11	2.417	10.22	4.000	8.52	5.58	3.41
0.917	5.11	2.500	10.22	4.083	8.52	5.67	3.41
1.000	5.11	2.583	10.22	4.167	8.52	5.75	3.41
1.083	5.11	2.667	10.22	4.250	8.52	5.83	3.41
1.167	5.11	2.750	10.22	4.333	6.82	5.92	3.41
1.250	5.11	2.833	51.12	4.417	6.82	6.00	3.41
1.333	5.11	2.917	51.12	4.500	6.82	6.08	3.41
1.417	5.11	3.000	51.12	4.583	6.82	6.17	3.41
1.500	5.11	3.083	132.91	4.667	6.82	6.25	3.41
1.583	5.11	3.167	132.91	4.750	6.82		

Max.Eff.Inten.(mm/hr)=		132.91	123.84	
over (min)		5.00	15.00	
Storage Coeff. (min)=		4.96 (ii)	11.44 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.22	0.09	
				TOTALS
PEAK FLOW	(cms)=	4.02	1.46	5.303 (iii)
TIME TO PEAK	(hrs)=	3.25	3.33	3.25
RUNOFF VOLUME	(mm)=	84.20	47.95	68.25
TOTAL RAINFALL	(mm)=	85.20	85.20	85.20
RUNOFF COEFFICIENT	=	0.99	0.56	0.80

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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  (  0018)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0017):    15.53   3.982     3.25    66.74
     + ID2= 2 (  0002):    20.06   5.303     3.25    68.25
       ================================================
       ID = 3 (  0018):    35.59   9.285     3.25    67.59

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0008)|     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   |   0.4480      1.7011
                          0.0360     0.7282   |   0.7160      2.0238
                          0.0600     1.1698   |   0.9550      2.2595
                          0.2380     1.4871   |   1.1940      2.5034

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0018)     35.590     9.285      3.25      67.59
   OUTFLOW: ID= 1 (  0008)     35.590     0.609      4.75      65.38

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  6.56
                  TIME SHIFT OF PEAK FLOW          (min)= 90.00
                  MAXIMUM  STORAGE   USED        (ha.m.)=  1.8950

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--------------------
| CALIB            |
| STANDHYD (  0037)|   Area     (ha)=   2.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  59.00
--------------------

                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.58         0.42
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     115.47        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 | 1.667    5.11 | 3.250  132.91 |  4.83    5.11
 0.167    0.00 | 1.750    5.11 | 3.333   18.75 |  4.92    5.11
 0.250    0.00 | 1.833    8.52 | 3.417   18.74 |  5.00    5.11
 0.333    3.41 | 1.917    8.52 | 3.500   18.74 |  5.08    5.11
 0.417    3.41 | 2.000    8.52 | 3.583   18.74 |  5.17    5.11
 0.500    3.41 | 2.083    8.52 | 3.667   18.74 |  5.25    5.11
 0.583    3.41 | 2.167    8.52 | 3.750   18.74 |  5.33    3.41
 0.667    3.41 | 2.250    8.52 | 3.833    8.52 |  5.42    3.41
 0.750    3.41 | 2.333   10.22 | 3.917    8.52 |  5.50    3.41
 0.833    5.11 | 2.417   10.22 | 4.000    8.52 |  5.58    3.41
 0.917    5.11 | 2.500   10.22 | 4.083    8.52 |  5.67    3.41
 1.000    5.11 | 2.583   10.22 | 4.167    8.52 |  5.75    3.41
 1.083    5.11 | 2.667   10.22 | 4.250    8.52 |  5.83    3.41
 1.167    5.11 | 2.750   10.22 | 4.333    6.82 |  5.92    3.41
 1.250    5.11 | 2.833   51.12 | 4.417    6.82 |  6.00    3.41
 1.333    5.11 | 2.917   51.12 | 4.500    6.82 |  6.08    3.41
 1.417    5.11 | 3.000   51.12 | 4.583    6.82 |  6.17    3.41
 1.500    5.11 | 3.083  132.91 | 4.667    6.82 |  6.25    3.41
 1.583    5.11 | 3.167  132.91 | 4.750    6.82 |

     Max.Eff.Inten.(mm/hr)=     132.91       207.38
                  over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.49 (ii)    6.65 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.29         0.14
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.44         0.20          0.638 (iii)
     TIME TO PEAK    (hrs)=       3.25         3.25           3.25
     RUNOFF VOLUME    (mm)=      84.20        56.21          72.72
     TOTAL RAINFALL   (mm)=      85.20        85.20          85.20
     RUNOFF COEFFICIENT   =       0.99         0.66           0.85

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| RESERVOIR(  0033)|     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   |   0.0250      0.1054
                          0.0020     0.0490   |   0.0410      0.1239
                          0.0030     0.0750   |   0.0540      0.1381
                          0.0130     0.0932   |   0.0670      0.1527

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0037)     2.000      0.638      3.25      72.72
   OUTFLOW: ID= 1 (  0033)     2.000      0.034      4.75      68.59

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  5.40
                  TIME SHIFT OF PEAK FLOW          (min)= 90.00
                  MAXIMUM  STORAGE   USED        (ha.m.)=  0.1163

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\e1797a1d-c614-4375-ae83-c7ed18f00cd4\scen
  Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\e1797a1d-c614-4375-ae83-c7ed18f00cd4\scen


DATE: 05-01-2024                          TIME: 02:51:11

USER:



COMMENTS: _____________________________________________________________

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  ***********************************************
  ** SIMULATION : 17. 50-Year-6-Hour-SCS-Type-I **
  ***********************************************


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|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              1c68ae73-c69b-4a60-ad0c-90425c95e5fe\573d0df0
| Ptotal= 95.90 mm |    Comments: 50-Year-6-Hour-SCS-Type-II
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.00 |  1.75    9.59 |  3.50   21.10 |  5.25    3.84
                0.25    3.84 |  2.00    9.59 |  3.75    9.59 |  5.50    3.84
                0.50    3.84 |  2.25   11.51 |  4.00    9.59 |  5.75    3.84
                0.75    5.75 |  2.50   11.51 |  4.25    7.67 |  6.00    3.84
                1.00    5.75 |  2.75   57.54 |  4.50    7.67 |
                1.25    5.75 |  3.00  149.60 |  4.75    5.75 |
                1.50    5.75 |  3.25   21.10 |  5.00    5.75 |

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| CALIB            |
| STANDHYD (  0006)|   Area    (ha)=  29.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  66.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      19.18          9.88
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope    (%)=       1.00          2.00
     Length           (m)=     440.15         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 | 1.667    5.75 | 3.250  149.60 |  4.83    5.75
               0.167    0.00 | 1.750    5.75 | 3.333   21.10 |  4.92    5.75
               0.250    0.00 | 1.833    9.59 | 3.417   21.10 |  5.00    5.75
               0.333    3.84 | 1.917    9.59 | 3.500   21.10 |  5.08    5.75
               0.417    3.84 | 2.000    9.59 | 3.583   21.10 |  5.17    5.75
               0.500    3.84 | 2.083    9.59 | 3.667   21.10 |  5.25    5.75
               0.583    3.84 | 2.167    9.59 | 3.750   21.10 |  5.33    3.84
               0.667    3.84 | 2.250    9.59 | 3.833    9.59 |  5.42    3.84
               0.750    3.84 | 2.333   11.51 | 3.917    9.59 |  5.50    3.84
               0.833    5.75 | 2.417   11.51 | 4.000    9.59 |  5.58    3.84
               0.917    5.75 | 2.500   11.51 | 4.083    9.59 |  5.67    3.84
               1.000    5.75 | 2.583   11.51 | 4.167    9.59 |  5.75    3.84
               1.083    5.75 | 2.667   11.51 | 4.250    9.59 |  5.83    3.84
               1.167    5.75 | 2.750   11.51 | 4.333    7.67 |  5.92    3.84
               1.250    5.75 | 2.833   57.54 | 4.417    7.67 |  6.00    3.84
               1.333    5.75 | 2.917   57.54 | 4.500    7.67 |  6.08    3.84
               1.417    5.75 | 3.000   57.54 | 4.583    7.67 |  6.17    3.84
               1.500    5.75 | 3.083  149.60 | 4.667    7.67 |  6.25    3.84
               1.583    5.75 | 3.167  149.60 | 4.750    7.67 |

     Max.Eff.Inten.(mm/hr)=     149.60       144.61
               over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.29 (ii)   10.25 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.21         0.09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       6.40         2.68          8.775 (iii)
     TIME TO PEAK    (hrs)=       3.25         3.33           3.25
     RUNOFF VOLUME    (mm)=      94.90        56.79          77.75
     TOTAL RAINFALL   (mm)=      95.90        95.90          95.90
     RUNOFF COEFFICIENT   =       0.99         0.59           0.81


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0020)|   Area    (ha)=   3.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  60.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.04          0.76
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope    (%)=       1.00          2.00
     Length           (m)=     159.16         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	1.667	5.75	3.250	149.60	4.83	5.75
0.167	0.00	1.750	5.75	3.333	21.10	4.92	5.75
0.250	0.00	1.833	9.59	3.417	21.10	5.00	5.75
0.333	3.84	1.917	9.59	3.500	21.10	5.08	5.75
0.417	3.84	2.000	9.59	3.583	21.10	5.17	5.75
0.500	3.84	2.083	9.59	3.667	21.10	5.25	5.75
0.583	3.84	2.167	9.59	3.750	21.10	5.33	3.84
0.667	3.84	2.250	9.59	3.833	9.59	5.42	3.84
0.750	3.84	2.333	11.51	3.917	9.59	5.50	3.84
0.833	5.75	2.417	11.51	4.000	9.59	5.58	3.84
0.917	5.75	2.500	11.51	4.083	9.59	5.67	3.84
1.000	5.75	2.583	11.51	4.167	9.59	5.75	3.84
1.083	5.75	2.667	11.51	4.250	9.59	5.83	3.84
1.167	5.75	2.750	11.51	4.333	7.67	5.92	3.84
1.250	5.75	2.833	57.54	4.417	7.67	6.00	3.84
1.333	5.75	2.917	57.54	4.500	7.67	6.08	3.84
1.417	5.75	3.000	57.54	4.583	7.67	6.17	3.84
1.500	5.75	3.083	149.60	4.667	7.67	6.25	3.84
1.583	5.75	3.167	149.60	4.750	7.67		

Max.Eff.Inten.(mm/hr)=		149.60	248.49	
over (min)		5.00	10.00	
Storage Coeff. (min)=		2.87 (ii)	6.74 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.28	0.14	
				TOTALS
PEAK FLOW	(cms)=	0.94	0.44	1.385 (iii)
TIME TO PEAK	(hrs)=	3.25	3.25	3.25
RUNOFF VOLUME	(mm)=	94.90	66.42	83.51
TOTAL RAINFALL	(mm)=	95.90	95.90	95.90
RUNOFF COEFFICIENT	=	0.99	0.69	0.87

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0023)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0020):	3.80	1.385	3.25	83.51
+ ID2= 2 (0006):	29.06	8.775	3.25	77.75
ID = 3 (0023):	32.86	10.160	3.25	78.41

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0012)	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
IN= 2---> OUT= 1				
DT= 5.0 min	0.0000	0.0000	0.4930	1.5666
	0.0360	0.7150	0.7890	1.8478
	0.0660	1.0737	1.0520	2.0613
	0.2630	1.3645	1.3140	2.2797

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0023)	32.860	10.160	3.25	78.41
OUTFLOW: ID= 1 (0012)	32.860	0.889	4.17	76.43

PEAK FLOW REDUCTION [Qout/Qin](%)= 8.75
TIME SHIFT OF PEAK FLOW (min)= 55.00
MAXIMUM STORAGE USED (ha.m.)= 1.9288

CALIB				
STANDHYD (0017)	Area (ha)= 15.53			
ID= 1 DT= 5.0 min	Total Imp(%)= 65.00		Dir. Conn.(%)= 49.00	
		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	10.09	5.44	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	1.00	2.00	
Length	(m)=	321.77	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	1.667	5.75	3.250	149.60	4.83	5.75
0.167	0.00	1.750	5.75	3.333	21.10	4.92	5.75
0.250	0.00	1.833	9.59	3.417	21.10	5.00	5.75
0.333	3.84	1.917	9.59	3.500	21.10	5.08	5.75
0.417	3.84	2.000	9.59	3.583	21.10	5.17	5.75
0.500	3.84	2.083	9.59	3.667	21.10	5.25	5.75
0.583	3.84	2.167	9.59	3.750	21.10	5.33	3.84
0.667	3.84	2.250	9.59	3.833	9.59	5.42	3.84
0.750	3.84	2.333	11.51	3.917	9.59	5.50	3.84
0.833	5.75	2.417	11.51	4.000	9.59	5.58	3.84
0.917	5.75	2.500	11.51	4.083	9.59	5.67	3.84
1.000	5.75	2.583	11.51	4.167	9.59	5.75	3.84
1.083	5.75	2.667	11.51	4.250	9.59	5.83	3.84
1.167	5.75	2.750	11.51	4.333	7.67	5.92	3.84
1.250	5.75	2.833	57.54	4.417	7.67	6.00	3.84
1.333	5.75	2.917	57.54	4.500	7.67	6.08	3.84
1.417	5.75	3.000	57.54	4.583	7.67	6.17	3.84
1.500	5.75	3.083	149.60	4.667	7.67	6.25	3.84
1.583	5.75	3.167	149.60	4.750	7.67		

Max.Eff.Inten.(mm/hr)=		149.60	164.84	
over (min)		5.00	15.00	
Storage Coeff. (min)=		4.38 (ii)	10.16 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	

```
     Unit Hyd. peak  (cms)=       0.23         0.10
                                                        *TOTALS*
     PEAK FLOW       (cms)=       3.10         1.69          4.612 (iii)
     TIME TO PEAK    (hrs)=       3.25         3.33          3.25
     RUNOFF VOLUME    (mm)=      94.90        59.16         76.67
     TOTAL RAINFALL   (mm)=      95.90        95.90         95.90
     RUNOFF COEFFICIENT   =       0.99         0.62          0.80

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0002)|   Area    (ha)=  20.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  56.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      13.44         6.62
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     365.70        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 | 1.667    5.75 | 3.250  149.60 |  4.83    5.75
              0.167    0.00 | 1.750    5.75 | 3.333   21.10 |  4.92    5.75
              0.250    0.00 | 1.833    9.59 | 3.417   21.10 |  5.00    5.75
              0.333    3.84 | 1.917    9.59 | 3.500   21.10 |  5.08    5.75
              0.417    3.84 | 2.000    9.59 | 3.583   21.10 |  5.17    5.75
              0.500    3.84 | 2.083    9.59 | 3.667   21.10 |  5.25    5.75
              0.583    3.84 | 2.167    9.59 | 3.750   21.10 |  5.33    3.84
              0.667    3.84 | 2.250    9.59 | 3.833    9.59 |  5.42    3.84
              0.750    3.84 | 2.333   11.51 | 3.917    9.59 |  5.50    3.84
              0.833    5.75 | 2.417   11.51 | 4.000    9.59 |  5.58    3.84
              0.917    5.75 | 2.500   11.51 | 4.083    9.59 |  5.67    3.84
              1.000    5.75 | 2.583   11.51 | 4.167    9.59 |  5.75    3.84
              1.083    5.75 | 2.667   11.51 | 4.250    9.59 |  5.83    3.84
              1.167    5.75 | 2.750   11.51 | 4.333    7.67 |  5.92    3.84
              1.250    5.75 | 2.833   57.54 | 4.417    7.67 |  6.00    3.84
              1.333    5.75 | 2.917   57.54 | 4.500    7.67 |  6.08    3.84
              1.417    5.75 | 3.000   57.54 | 4.583    7.67 |  6.17    3.84
              1.500    5.75 | 3.083  149.60 | 4.667    7.67 |  6.25    3.84
              1.583    5.75 | 3.167  149.60 | 4.750    7.67 |

     Max.Eff.Inten.(mm/hr)=     149.60       146.08
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       4.73 (ii)    9.60 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.22         0.11
                                                        *TOTALS*
     PEAK FLOW       (cms)=       4.54         1.96          6.506 (iii)
     TIME TO PEAK    (hrs)=       3.25         3.25          3.25
     RUNOFF VOLUME    (mm)=      94.90        56.97         78.21
     TOTAL RAINFALL   (mm)=      95.90        95.90         95.90
     RUNOFF COEFFICIENT   =       0.99         0.59          0.82

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    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  (  0018)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0017):    15.53   4.612     3.25    76.67
      + ID2= 2 (  0002):    20.06   6.506     3.25    78.21
        ================================================
        ID = 3 (  0018):    35.59  11.117     3.25    77.54

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0008)|     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   |   0.4480     1.7011
                          0.0360     0.7282   |   0.7160     2.0238
                          0.0600     1.1698   |   0.9550     2.2595
                          0.2380     1.4871   |   1.1940     2.5034

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0018)     35.590    11.117      3.25      77.54
   OUTFLOW: ID= 1 (  0008)     35.590     0.809      4.33      75.30

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  7.28
                  TIME SHIFT OF PEAK FLOW          (min)= 65.00
                  MAXIMUM  STORAGE   USED        (ha.m.)=  2.1158

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--------------------
| CALIB            |
| STANDHYD (  0037)|   Area    (ha)=   2.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  59.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.58         0.42
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     115.47        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	1.667	5.75	3.250	149.60	4.83	5.75
0.167	0.00	1.750	5.75	3.333	21.10	4.92	5.75
0.250	0.00	1.833	9.59	3.417	21.10	5.00	5.75
0.333	3.84	1.917	9.59	3.500	21.10	5.08	5.75
0.417	3.84	2.000	9.59	3.583	21.10	5.17	5.75
0.500	3.84	2.083	9.59	3.667	21.10	5.25	5.75
0.583	3.84	2.167	9.59	3.750	21.10	5.33	3.84
0.667	3.84	2.250	9.59	3.833	9.59	5.42	3.84
0.750	3.84	2.333	11.51	3.917	9.59	5.50	3.84
0.833	5.75	2.417	11.51	4.000	9.59	5.58	3.84
0.917	5.75	2.500	11.51	4.083	9.59	5.67	3.84
1.000	5.75	2.583	11.51	4.167	9.59	5.75	3.84
1.083	5.75	2.667	11.51	4.250	9.59	5.83	3.84
1.167	5.75	2.750	11.51	4.333	7.67	5.92	3.84
1.250	5.75	2.833	57.54	4.417	7.67	6.00	3.84
1.333	5.75	2.917	57.54	4.500	7.67	6.08	3.84
1.417	5.75	3.000	57.54	4.583	7.67	6.17	3.84
1.500	5.75	3.083	149.60	4.667	7.67	6.25	3.84
1.583	5.75	3.167	149.60	4.750	7.67		

			TOTALS
Max.Eff.Inten.(mm/hr)=	149.60	241.09	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.37 (ii)	6.34 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.30	0.15	
PEAK FLOW (cms)=	0.49	0.24	0.730 (iii)
TIME TO PEAK (hrs)=	3.25	3.25	3.25
RUNOFF VOLUME (mm)=	94.90	65.90	83.01
TOTAL RAINFALL (mm)=	95.90	95.90	95.90
RUNOFF COEFFICIENT =	0.99	0.69	0.87

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0033) | 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	0.0250	0.1054
	0.0020	0.0490	0.0410	0.1239
	0.0030	0.0750	0.0540	0.1381
	0.0130	0.0932	0.0670	0.1527

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0037)	2.000	0.730	3.25	83.01
OUTFLOW: ID= 1 (0033)	2.000	0.046	4.33	78.84

PEAK FLOW REDUCTION [Qout/Qin](%)= 6.28

TIME SHIFT OF PEAK FLOW (min)= 65.00
MAXIMUM STORAGE USED (ha.m.)= 0.1292

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

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\b7d5bf46-5dc8-4124-9e05-a15beb394392\scen
Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\b7d5bf46-5dc8-4124-9e05-a15beb394392\scen

DATE: 05-01-2024 TIME: 02:51:11

USER:

COMMENTS: _____

```
  ***********************************************
  ** SIMULATION : 18. 100-Year-6-Hour-SCS-Type- **
  ***********************************************
```

READ STORM | Ptotal=106.50 mm	Filename: C:\Users\mmsingh\AppData\Local\Temp\1c68ae73-c69b-4a60-ad0c-90425c95e5fe\a340cffa Comments: 100-Year-6-Hour-SCS-Type-II

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	1.75	10.65	3.50	23.43	5.25	4.26
0.25	4.26	2.00	10.65	3.75	10.65	5.50	4.26
0.50	4.26	2.25	12.78	4.00	10.65	5.75	4.26
0.75	6.39	2.50	12.78	4.25	8.52	6.00	4.26
1.00	6.39	2.75	63.90	4.50	8.52		

1.25	6.39	3.00	166.14	4.75	6.39
1.50	6.39	3.25	23.43	5.00	6.39

CALIB	
STANDHYD (0006)	Area (ha)= 29.06
ID= 1 DT= 5.0 min	Total Imp(%)= 66.00 Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	1.667	6.39	3.250	166.14	4.83	6.39
0.167	0.00	1.750	6.39	3.333	23.43	4.92	6.39
0.250	0.00	1.833	10.65	3.417	23.43	5.00	6.39
0.333	4.26	1.917	10.65	3.500	23.43	5.08	6.39
0.417	4.26	2.000	10.65	3.583	23.43	5.17	6.39
0.500	4.26	2.083	10.65	3.667	23.43	5.25	6.39
0.583	4.26	2.167	10.65	3.750	23.43	5.33	4.26
0.667	4.26	2.250	10.65	3.833	10.65	5.42	4.26
0.750	4.26	2.333	12.78	3.917	10.65	5.50	4.26
0.833	6.39	2.417	12.78	4.000	10.65	5.58	4.26
0.917	6.39	2.500	12.78	4.083	10.65	5.67	4.26
1.000	6.39	2.583	12.78	4.167	10.65	5.75	4.26
1.083	6.39	2.667	12.78	4.250	10.65	5.83	4.26
1.167	6.39	2.750	12.78	4.333	8.52	5.92	4.26
1.250	6.39	2.833	63.90	4.417	8.52	6.00	4.26
1.333	6.39	2.917	63.90	4.500	8.52	6.08	4.26
1.417	6.39	3.000	63.90	4.583	8.52	6.17	4.26
1.500	6.39	3.083	166.14	4.667	8.52	6.25	4.26
1.583	6.39	3.167	166.14	4.750	8.52		

Max.Eff.Inten.(mm/hr)=		166.14	166.77	
over (min)		5.00	10.00	
Storage Coeff. (min)=		5.07 (ii)	9.83 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.21	0.11	
				TOTALS
PEAK FLOW	(cms)=	7.13	3.33	10.467 (iii)
TIME TO PEAK	(hrs)=	3.25	3.25	3.25
RUNOFF VOLUME	(mm)=	105.50	65.93	87.69
TOTAL RAINFALL	(mm)=	106.50	106.50	106.50
RUNOFF COEFFICIENT	=	0.99	0.62	0.82

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0020)	Area (ha)= 3.80
ID= 1 DT= 5.0 min	Total Imp(%)= 80.00 Dir. Conn.(%)= 60.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	1.667	6.39	3.250	166.14	4.83	6.39
0.167	0.00	1.750	6.39	3.333	23.43	4.92	6.39
0.250	0.00	1.833	10.65	3.417	23.43	5.00	6.39
0.333	4.26	1.917	10.65	3.500	23.43	5.08	6.39
0.417	4.26	2.000	10.65	3.583	23.43	5.17	6.39
0.500	4.26	2.083	10.65	3.667	23.43	5.25	6.39
0.583	4.26	2.167	10.65	3.750	23.43	5.33	4.26
0.667	4.26	2.250	10.65	3.833	10.65	5.42	4.26
0.750	4.26	2.333	12.78	3.917	10.65	5.50	4.26
0.833	6.39	2.417	12.78	4.000	10.65	5.58	4.26
0.917	6.39	2.500	12.78	4.083	10.65	5.67	4.26
1.000	6.39	2.583	12.78	4.167	10.65	5.75	4.26
1.083	6.39	2.667	12.78	4.250	10.65	5.83	4.26
1.167	6.39	2.750	12.78	4.333	8.52	5.92	4.26
1.250	6.39	2.833	63.90	4.417	8.52	6.00	4.26
1.333	6.39	2.917	63.90	4.500	8.52	6.08	4.26
1.417	6.39	3.000	63.90	4.583	8.52	6.17	4.26
1.500	6.39	3.083	166.14	4.667	8.52	6.25	4.26
1.583	6.39	3.167	166.14	4.750	8.52		

Max.Eff.Inten.(mm/hr)=		166.14	282.86	
over (min)		5.00	10.00	
Storage Coeff. (min)=		2.76 (ii)	6.47 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.28	0.14	
				TOTALS
PEAK FLOW	(cms)=	1.05	0.51	1.559 (iii)
TIME TO PEAK	(hrs)=	3.25	3.25	3.25
RUNOFF VOLUME	(mm)=	105.50	76.20	93.78
TOTAL RAINFALL	(mm)=	106.50	106.50	106.50
RUNOFF COEFFICIENT	=	0.99	0.72	0.88

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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  (  0023)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0020):     3.80   1.559     3.25    93.78
     + ID2= 2 (  0006):    29.06  10.467     3.25    87.69
       ================================================
       ID = 3 (  0023):    32.86  12.026     3.25    88.40

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0012)|     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   |   0.4930      1.5666
                          0.0360     0.7150   |   0.7890      1.8478
                          0.0660     1.0737   |   1.0520      2.0613
                          0.2630     1.3645   |   1.3140      2.2797

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0023)     32.860    12.026      3.25      88.40
   OUTFLOW: ID= 1 (  0012)     32.860     1.137      4.00      86.40

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.46
                  TIME SHIFT OF PEAK FLOW         (min)= 45.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  2.1329

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--------------------
| CALIB            |
| STANDHYD (  0017)|   Area    (ha)=  15.53
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  49.00
--------------------

                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.09         5.44
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     321.77        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 | 1.667    6.39 | 3.250  166.14 |  4.83    6.39
 0.167    0.00 | 1.750    6.39 | 3.333   23.43 |  4.92    6.39
 0.250    0.00 | 1.833   10.65 | 3.417   23.43 |  5.00    6.39
 0.333    4.26 | 1.917   10.65 | 3.500   23.43 |  5.08    6.39
 0.417    4.26 | 2.000   10.65 | 3.583   23.43 |  5.17    6.39
 0.500    4.26 | 2.083   10.65 | 3.667   23.43 |  5.25    6.39
 0.583    4.26 | 2.167   10.65 | 3.750   23.43 |  5.33    4.26
 0.667    4.26 | 2.250   10.65 | 3.833   10.65 |  5.42    4.26
 0.750    4.26 | 2.333   12.78 | 3.917   10.65 |  5.50    4.26
 0.833    6.39 | 2.417   12.78 | 4.000   10.65 |  5.58    4.26
 0.917    6.39 | 2.500   12.78 | 4.083   10.65 |  5.67    4.26
 1.000    6.39 | 2.583   12.78 | 4.167   10.65 |  5.75    4.26
 1.083    6.39 | 2.667   12.78 | 4.250   10.65 |  5.83    4.26
 1.167    6.39 | 2.750   12.78 | 4.333    8.52 |  5.92    4.26
 1.250    6.39 | 2.833   63.90 | 4.417    8.52 |  6.00    4.26
 1.333    6.39 | 2.917   63.90 | 4.500    8.52 |  6.08    4.26
 1.417    6.39 | 3.000   63.90 | 4.583    8.52 |  6.17    4.26
 1.500    6.39 | 3.083  166.14 | 4.667    8.52 |  6.25    4.26
 1.583    6.39 | 3.167  166.14 | 4.750    8.52 |

     Max.Eff.Inten.(mm/hr)=     166.14       189.47
               over (min)          5.00        10.00
     Storage Coeff.  (min)=       4.20 (ii)    9.67 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.24         0.11
                                                          *TOTALS*
     PEAK FLOW       (cms)=       3.45         2.11          5.560 (iii)
     TIME TO PEAK    (hrs)=       3.25         3.25           3.25
     RUNOFF VOLUME    (mm)=     105.50        68.48          86.62
     TOTAL RAINFALL   (mm)=     106.50       106.50         106.50
     RUNOFF COEFFICIENT   =       0.99         0.64           0.81

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0002)|   Area    (ha)=  20.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  56.00
--------------------

                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      13.44         6.62
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     365.70        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 | 1.667    6.39 | 3.250  166.14 |  4.83    6.39
 0.167    0.00 | 1.750    6.39 | 3.333   23.43 |  4.92    6.39
 0.250    0.00 | 1.833   10.65 | 3.417   23.43 |  5.00    6.39
 0.333    4.26 | 1.917   10.65 | 3.500   23.43 |  5.08    6.39
 0.417    4.26 | 2.000   10.65 | 3.583   23.43 |  5.17    6.39
 0.500    4.26 | 2.083   10.65 | 3.667   23.43 |  5.25    6.39
 0.583    4.26 | 2.167   10.65 | 3.750   23.43 |  5.33    4.26
 0.667    4.26 | 2.250   10.65 | 3.833   10.65 |  5.42    4.26
 0.750    4.26 | 2.333   12.78 | 3.917   10.65 |  5.50    4.26
 0.833    6.39 | 2.417   12.78 | 4.000   10.65 |  5.58    4.26
 0.917    6.39 | 2.500   12.78 | 4.083   10.65 |  5.67    4.26
 1.000    6.39 | 2.583   12.78 | 4.167   10.65 |  5.75    4.26
 1.083    6.39 | 2.667   12.78 | 4.250   10.65 |  5.83    4.26
```

1.167	6.39	2.750	12.78	4.333	8.52	5.92	4.26
1.250	6.39	2.833	63.90	4.417	8.52	6.00	4.26
1.333	6.39	2.917	63.90	4.500	8.52	6.08	4.26
1.417	6.39	3.000	63.90	4.583	8.52	6.17	4.26
1.500	6.39	3.083	166.14	4.667	8.52	6.25	4.26
1.583	6.39	3.167	166.14	4.750	8.52		

Max.Eff.Inten.(mm/hr)=	166.14	168.43		
over (min)	5.00	10.00		
Storage Coeff. (min)=	4.54 (ii)	9.20 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.23	0.12		
			TOTALS	
PEAK FLOW (cms)=	5.07	2.31	7.379 (iii)	
TIME TO PEAK (hrs)=	3.25	3.25	3.25	
RUNOFF VOLUME (mm)=	105.50	66.13	88.18	
TOTAL RAINFALL (mm)=	106.50	106.50	106.50	
RUNOFF COEFFICIENT =	0.99	0.62	0.83	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0018)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0017):	15.53	5.560	3.25	86.62
+ ID2= 2 (0002):	20.06	7.379	3.25	88.18
ID = 3 (0018):	35.59	12.939	3.25	87.50

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0008)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.4480	1.7011
	0.0360	0.7282	0.7160	2.0238
	0.0600	1.1698	0.9550	2.2595
	0.2380	1.4871	1.1940	2.5034

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0018)	35.590	12.939	3.25	87.50
OUTFLOW: ID= 1 (0008)	35.590	1.032	4.25	85.24

PEAK FLOW REDUCTION [Qout/Qin](%)= 7.98
TIME SHIFT OF PEAK FLOW (min)= 60.00
MAXIMUM STORAGE USED (ha.m.)= 2.3385

CALIB	
STANDHYD (0037)	Area (ha)= 2.00
ID= 1 DT= 5.0 min	Total Imp(%)= 79.00 Dir. Conn.(%)= 59.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.58	0.42
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	115.47	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	1.667	6.39	3.250	166.14	4.83	6.39
0.167	0.00	1.750	6.39	3.333	23.43	4.92	6.39
0.250	0.00	1.833	10.65	3.417	23.43	5.00	6.39
0.333	4.26	1.917	10.65	3.500	23.43	5.08	6.39
0.417	4.26	2.000	10.65	3.583	23.43	5.17	6.39
0.500	4.26	2.083	10.65	3.667	23.43	5.25	6.39
0.583	4.26	2.167	10.65	3.750	23.43	5.33	4.26
0.667	4.26	2.250	10.65	3.833	10.65	5.42	4.26
0.750	4.26	2.333	12.78	3.917	10.65	5.50	4.26
0.833	6.39	2.417	12.78	4.000	10.65	5.58	4.26
0.917	6.39	2.500	12.78	4.083	10.65	5.67	4.26
1.000	6.39	2.583	12.78	4.167	10.65	5.75	4.26
1.083	6.39	2.667	12.78	4.250	10.65	5.83	4.26
1.167	6.39	2.750	12.78	4.333	8.52	5.92	4.26
1.250	6.39	2.833	63.90	4.417	8.52	6.00	4.26
1.333	6.39	2.917	63.90	4.500	8.52	6.08	4.26
1.417	6.39	3.000	63.90	4.583	8.52	6.17	4.26
1.500	6.39	3.083	166.14	4.667	8.52	6.25	4.26
1.583	6.39	3.167	166.14	4.750	8.52		

Max.Eff.Inten.(mm/hr)=	166.14	274.63		
over (min)	5.00	10.00		
Storage Coeff. (min)=	2.27 (ii)	6.08 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.30	0.15		
			TOTALS	
PEAK FLOW (cms)=	0.54	0.28	0.821 (iii)	
TIME TO PEAK (hrs)=	3.25	3.25	3.25	
RUNOFF VOLUME (mm)=	105.50	75.65	93.26	
TOTAL RAINFALL (mm)=	106.50	106.50	106.50	
RUNOFF COEFFICIENT =	0.99	0.71	0.88	

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

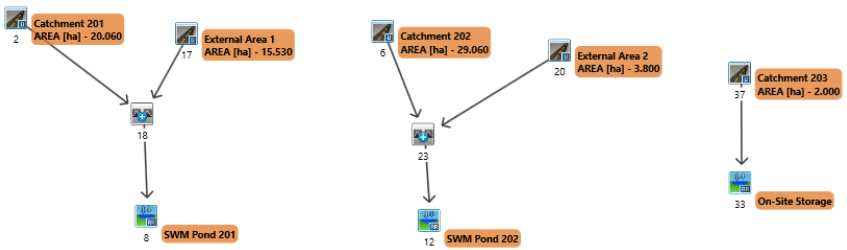
(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0033)	OVERFLOW IS OFF
IN= 2---> OUT= 1	

DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0250	0.1054
	0.0020	0.0490	0.0410	0.1239
	0.0030	0.0750	0.0540	0.1381
	0.0130	0.0932	0.0670	0.1527

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0037)	2.000	0.821	3.25	93.26
OUTFLOW: ID= 1 (0033)	2.000	0.058	4.17	89.05

PEAK FLOW REDUCTION [Qout/Qin](%)= 7.03
TIME SHIFT OF PEAK FLOW (min)= 55.00
MAXIMUM STORAGE USED (ha.m.)= 0.1423



SCHAEFFERS
CONSULTING ENGINEERS

Visual OTTHYMO™ Schematic

POST- DEVELOPMENT
2-100yr, 12HR SCS

Job #: 5170	**Date: April 2024**

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

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


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DATE: 05-01-2024                          TIME: 02:32:46

USER:


COMMENTS: _____________________________________________________________

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  ***********************************************
  ** SIMULATION : 07. 2-Year-12-Hour-SCS-Type-I **
  ***********************************************


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| Ptotal= 46.70 mm |    Comments: 2-Year-12-Hour-SCS-Type-II
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TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	1.87	6.50	8.41	9.75	1.63
0.25	1.17	3.50	1.87	6.75	3.74	10.00	1.63
0.50	1.17	3.75	1.87	7.00	3.74	10.25	0.93
0.75	1.17	4.00	1.87	7.25	2.80	10.50	0.93
1.00	1.17	4.25	2.80	7.50	2.80	10.75	0.93
1.25	1.17	4.50	2.80	7.75	2.80	11.00	0.93
1.50	1.17	4.75	3.74	8.00	2.80	11.25	0.93
1.75	1.17	5.00	3.74	8.25	1.63	11.50	0.93
2.00	1.17	5.25	5.60	8.50	1.63	11.75	0.93

2.25	1.40	5.50	5.60	8.75	1.63	12.00	0.93
2.50	1.40	5.75	22.42	9.00	1.63		
2.75	1.40	6.00	61.64	9.25	1.63		
3.00	1.40	6.25	8.41	9.50	1.63		

CALIB			
STANDHYD (0006)	Area (ha)= 29.06		
ID= 1 DT= 5.0 min	Total Imp(%)= 66.00	Dir. Conn.(%)= 55.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	1.40	6.250	61.64	9.33	1.63
0.167	0.00	3.250	1.40	6.333	8.41	9.42	1.63
0.250	0.00	3.333	1.87	6.417	8.41	9.50	1.63
0.333	1.17	3.417	1.87	6.500	8.41	9.58	1.63
0.417	1.17	3.500	1.87	6.583	8.41	9.67	1.63
0.500	1.17	3.583	1.87	6.667	8.41	9.75	1.63
0.583	1.17	3.667	1.87	6.750	8.41	9.83	1.63
0.667	1.17	3.750	1.87	6.833	3.74	9.92	1.63
0.750	1.17	3.833	1.87	6.917	3.74	10.00	1.63
0.833	1.17	3.917	1.87	7.000	3.74	10.08	1.63
0.917	1.17	4.000	1.87	7.083	3.74	10.17	1.63
1.000	1.17	4.083	1.87	7.167	3.74	10.25	1.63
1.083	1.17	4.167	1.87	7.250	3.74	10.33	0.93
1.167	1.17	4.250	1.87	7.333	2.80	10.42	0.93
1.250	1.17	4.333	2.80	7.417	2.80	10.50	0.93
1.333	1.17	4.417	2.80	7.500	2.80	10.58	0.93
1.417	1.17	4.500	2.80	7.583	2.80	10.67	0.93
1.500	1.17	4.583	2.80	7.667	2.80	10.75	0.93
1.583	1.17	4.667	2.80	7.750	2.80	10.83	0.93
1.667	1.17	4.750	2.80	7.833	2.80	10.92	0.93
1.750	1.17	4.833	3.74	7.917	2.80	11.00	0.93
1.833	1.17	4.917	3.74	8.000	2.80	11.08	0.93
1.917	1.17	5.000	3.74	8.083	2.80	11.17	0.93
2.000	1.17	5.083	3.74	8.167	2.80	11.25	0.93
2.083	1.17	5.167	3.74	8.250	2.80	11.33	0.93
2.167	1.17	5.250	3.74	8.333	1.63	11.42	0.93
2.250	1.17	5.333	5.60	8.417	1.63	11.50	0.93
2.333	1.40	5.417	5.60	8.500	1.63	11.58	0.93
2.417	1.40	5.500	5.60	8.583	1.63	11.67	0.93
2.500	1.40	5.583	5.60	8.667	1.63	11.75	0.93
2.583	1.40	5.667	5.60	8.750	1.63	11.83	0.93
2.667	1.40	5.750	5.60	8.833	1.63	11.92	0.93
2.750	1.40	5.833	22.42	8.917	1.63	12.00	0.93
2.833	1.40	5.917	22.42	9.000	1.63	12.08	0.93
2.917	1.40	6.000	22.42	9.083	1.63	12.17	0.93
3.000	1.40	6.083	61.64	9.167	1.63	12.25	0.93
3.083	1.40	6.167	61.64	9.250	1.63		

				TOTALS
Max.Eff.Inten.(mm/hr)=		61.64	37.69	
over (min)		10.00	20.00	
Storage Coeff. (min)=		7.54 (ii)	17.97 (ii)	
Unit Hyd. Tpeak (min)=		10.00	20.00	
Unit Hyd. peak (cms)=		0.13	0.06	
PEAK FLOW	(cms)=	2.34	0.55	2.716 (iii)
TIME TO PEAK	(hrs)=	6.25	6.42	6.25
RUNOFF VOLUME	(mm)=	45.70	18.38	33.40
TOTAL RAINFALL	(mm)=	46.70	46.70	46.70
RUNOFF COEFFICIENT	=	0.98	0.39	0.72

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0020)	Area (ha)= 3.80		
ID= 1 DT= 5.0 min	Total Imp(%)= 80.00	Dir. Conn.(%)= 60.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	1.40	6.250	61.64	9.33	1.63
0.167	0.00	3.250	1.40	6.333	8.41	9.42	1.63
0.250	0.00	3.333	1.87	6.417	8.41	9.50	1.63
0.333	1.17	3.417	1.87	6.500	8.41	9.58	1.63
0.417	1.17	3.500	1.87	6.583	8.41	9.67	1.63
0.500	1.17	3.583	1.87	6.667	8.41	9.75	1.63
0.583	1.17	3.667	1.87	6.750	8.41	9.83	1.63
0.667	1.17	3.750	1.87	6.833	3.74	9.92	1.63
0.750	1.17	3.833	1.87	6.917	3.74	10.00	1.63
0.833	1.17	3.917	1.87	7.000	3.74	10.08	1.63
0.917	1.17	4.000	1.87	7.083	3.74	10.17	1.63
1.000	1.17	4.083	1.87	7.167	3.74	10.25	1.63
1.083	1.17	4.167	1.87	7.250	3.74	10.33	0.93
1.167	1.17	4.250	1.87	7.333	2.80	10.42	0.93
1.250	1.17	4.333	2.80	7.417	2.80	10.50	0.93
1.333	1.17	4.417	2.80	7.500	2.80	10.58	0.93
1.417	1.17	4.500	2.80	7.583	2.80	10.67	0.93
1.500	1.17	4.583	2.80	7.667	2.80	10.75	0.93
1.583	1.17	4.667	2.80	7.750	2.80	10.83	0.93
1.667	1.17	4.750	2.80	7.833	2.80	10.92	0.93
1.750	1.17	4.833	3.74	7.917	2.80	11.00	0.93

1.833	1.17	4.917	3.74	8.000	2.80	11.08	0.93
1.917	1.17	5.000	3.74	8.083	2.80	11.17	0.93
2.000	1.17	5.083	3.74	8.167	2.80	11.25	0.93
2.083	1.17	5.167	3.74	8.250	2.80	11.33	0.93
2.167	1.17	5.250	3.74	8.333	1.63	11.42	0.93
2.250	1.17	5.333	5.60	8.417	1.63	11.50	0.93
2.333	1.40	5.417	5.60	8.500	1.63	11.58	0.93
2.417	1.40	5.500	5.60	8.583	1.63	11.67	0.93
2.500	1.40	5.583	5.60	8.667	1.63	11.75	0.93
2.583	1.40	5.667	5.60	8.750	1.63	11.83	0.93
2.667	1.40	5.750	5.60	8.833	1.63	11.92	0.93
2.750	1.40	5.833	22.42	8.917	1.63	12.00	0.93
2.833	1.40	5.917	22.42	9.000	1.63	12.08	0.93
2.917	1.40	6.000	22.42	9.083	1.63	12.17	0.93
3.000	1.40	6.083	61.64	9.167	1.63	12.25	0.93
3.083	1.40	6.167	61.64	9.250	1.63		

				TOTALS
Max.Eff.Inten.(mm/hr)=	61.64	78.27		
over (min)	5.00	15.00		
Storage Coeff. (min)=	4.10 (ii)	11.88 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	0.24	0.09		
PEAK FLOW (cms)=	0.38	0.11		0.476 (iii)
TIME TO PEAK (hrs)=	6.25	6.33		6.25
RUNOFF VOLUME (mm)=	45.70	23.79		36.93
TOTAL RAINFALL (mm)=	46.70	46.70		46.70
RUNOFF COEFFICIENT =	0.98	0.51		0.79

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0023)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0020):	3.80	0.476	6.25	36.93
	+ ID2= 2 (0006):	29.06	2.716	6.25	33.40
	ID = 3 (0023):	32.86	3.192	6.25	33.81

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0012)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.4930	1.5666
	0.0360	0.7150	0.7890	1.8478
	0.0660	1.0737	1.0520	2.0613
	0.2630	1.3645	1.3140	2.2797

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (0023)	32.860	3.192	6.25	33.81
OUTFLOW: ID= 1 (0012)	32.860	0.059	12.33	32.03

PEAK FLOW REDUCTION [Qout/Qin](%)= 1.83
TIME SHIFT OF PEAK FLOW (min)=365.00
MAXIMUM STORAGE USED (ha.m.)= 0.9844

CALIB	
STANDHYD (0017)	Area (ha)= 15.53
ID= 1 DT= 5.0 min	Total Imp(%)= 65.00 Dir. Conn.(%)= 49.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	10.09	5.44
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	321.77	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	1.40	6.250	61.64	9.33	1.63
0.167	0.00	3.250	1.40	6.333	8.41	9.42	1.63
0.250	0.00	3.333	1.87	6.417	8.41	9.50	1.63
0.333	1.17	3.417	1.87	6.500	8.41	9.58	1.63
0.417	1.17	3.500	1.87	6.583	8.41	9.67	1.63
0.500	1.17	3.583	1.87	6.667	8.41	9.75	1.63
0.583	1.17	3.667	1.87	6.750	8.41	9.83	1.63
0.667	1.17	3.750	1.87	6.833	3.74	9.92	1.63
0.750	1.17	3.833	1.87	6.917	3.74	10.00	1.63
0.833	1.17	3.917	1.87	7.000	3.74	10.08	1.63
0.917	1.17	4.000	1.87	7.083	3.74	10.17	1.63
1.000	1.17	4.083	1.87	7.167	3.74	10.25	1.63
1.083	1.17	4.167	1.87	7.250	3.74	10.33	0.93
1.167	1.17	4.250	1.87	7.333	2.80	10.42	0.93
1.250	1.17	4.333	2.80	7.417	2.80	10.50	0.93
1.333	1.17	4.417	2.80	7.500	2.80	10.58	0.93
1.417	1.17	4.500	2.80	7.583	2.80	10.67	0.93
1.500	1.17	4.583	2.80	7.667	2.80	10.75	0.93
1.583	1.17	4.667	2.80	7.750	2.80	10.83	0.93
1.667	1.17	4.750	2.80	7.833	2.80	10.92	0.93
1.750	1.17	4.833	3.74	7.917	2.80	11.00	0.93
1.833	1.17	4.917	3.74	8.000	2.80	11.08	0.93
1.917	1.17	5.000	3.74	8.083	2.80	11.17	0.93
2.000	1.17	5.083	3.74	8.167	2.80	11.25	0.93
2.083	1.17	5.167	3.74	8.250	2.80	11.33	0.93
2.167	1.17	5.250	3.74	8.333	1.63	11.42	0.93
2.250	1.17	5.333	5.60	8.417	1.63	11.50	0.93
2.333	1.40	5.417	5.60	8.500	1.63	11.58	0.93
2.417	1.40	5.500	5.60	8.583	1.63	11.67	0.93
2.500	1.40	5.583	5.60	8.667	1.63	11.75	0.93
2.583	1.40	5.667	5.60	8.750	1.63	11.83	0.93
2.667	1.40	5.750	5.60	8.833	1.63	11.92	0.93
2.750	1.40	5.833	22.42	8.917	1.63	12.00	0.93
2.833	1.40	5.917	22.42	9.000	1.63	12.08	0.93

2.917	1.40	6.000	22.42	9.083	1.63	12.17	0.93
3.000	1.40	6.083	61.64	9.167	1.63	12.25	0.93
3.083	1.40	6.167	61.64	9.250	1.63		

Max.Eff.Inten.(mm/hr)=	61.64	47.68	
over (min)	5.00	20.00	
Storage Coeff. (min)=	6.25 (ii)	15.74 (ii)	
Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	0.19	0.07	
			TOTALS
PEAK FLOW (cms)=	1.22	0.38	1.487 (iii)
TIME TO PEAK (hrs)=	6.25	6.42	6.25
RUNOFF VOLUME (mm)=	45.70	19.64	32.41
TOTAL RAINFALL (mm)=	46.70	46.70	46.70
RUNOFF COEFFICIENT =	0.98	0.42	0.69

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0002) | Area (ha)= 20.06
ID= 1 DT= 5.0 min | Total Imp(%)= 67.00 Dir. Conn.(%)= 56.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	13.44	6.62
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	365.70	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	1.40	6.250	61.64	9.33	1.63
0.167	0.00	3.250	1.40	6.333	8.41	9.42	1.63
0.250	0.00	3.333	1.87	6.417	8.41	9.50	1.63
0.333	1.17	3.417	1.87	6.500	8.41	9.58	1.63
0.417	1.17	3.500	1.87	6.583	8.41	9.67	1.63
0.500	1.17	3.583	1.87	6.667	8.41	9.75	1.63
0.583	1.17	3.667	1.87	6.750	8.41	9.83	1.63
0.667	1.17	3.750	1.87	6.833	3.74	9.92	1.63
0.750	1.17	3.833	1.87	6.917	3.74	10.00	1.63
0.833	1.17	3.917	1.87	7.000	3.74	10.08	1.63
0.917	1.17	4.000	1.87	7.083	3.74	10.17	1.63
1.000	1.17	4.083	1.87	7.167	3.74	10.25	1.63
1.083	1.17	4.167	1.87	7.250	3.74	10.33	0.93
1.167	1.17	4.250	1.87	7.333	2.80	10.42	0.93
1.250	1.17	4.333	2.80	7.417	2.80	10.50	0.93
1.333	1.17	4.417	2.80	7.500	2.80	10.58	0.93
1.417	1.17	4.500	2.80	7.583	2.80	10.67	0.93
1.500	1.17	4.583	2.80	7.667	2.80	10.75	0.93
1.583	1.17	4.667	2.80	7.750	2.80	10.83	0.93
1.667	1.17	4.750	2.80	7.833	2.80	10.92	0.93
1.750	1.17	4.833	3.74	7.917	2.80	11.00	0.93
1.833	1.17	4.917	3.74	8.000	2.80	11.08	0.93
1.917	1.17	5.000	3.74	8.083	2.80	11.17	0.93
2.000	1.17	5.083	3.74	8.167	2.80	11.25	0.93
2.083	1.17	5.167	3.74	8.250	2.80	11.33	0.93
2.167	1.17	5.250	3.74	8.333	1.63	11.42	0.93
2.250	1.17	5.333	5.60	8.417	1.63	11.50	0.93
2.333	1.40	5.417	5.60	8.500	1.63	11.58	0.93
2.417	1.40	5.500	5.60	8.583	1.63	11.67	0.93
2.500	1.40	5.583	5.60	8.667	1.63	11.75	0.93
2.583	1.40	5.667	5.60	8.750	1.63	11.83	0.93
2.667	1.40	5.750	5.60	8.833	1.63	11.92	0.93
2.750	1.40	5.833	22.42	8.917	1.63	12.00	0.93
2.833	1.40	5.917	22.42	9.000	1.63	12.08	0.93
2.917	1.40	6.000	22.42	9.083	1.63	12.17	0.93
3.000	1.40	6.083	61.64	9.167	1.63	12.25	0.93
3.083	1.40	6.167	61.64	9.250	1.63		

Max.Eff.Inten.(mm/hr)=	61.64	38.17	
over (min)	5.00	20.00	
Storage Coeff. (min)=	6.75 (ii)	17.12 (ii)	
Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	0.18	0.06	
			TOTALS
PEAK FLOW (cms)=	1.78	0.38	2.045 (iii)
TIME TO PEAK (hrs)=	6.25	6.42	6.25
RUNOFF VOLUME (mm)=	45.70	18.47	33.72
TOTAL RAINFALL (mm)=	46.70	46.70	46.70
RUNOFF COEFFICIENT =	0.98	0.40	0.72

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0018)|				
1 + 2 = 3 |	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0017):	15.53	1.487	6.25	32.41
+ ID2= 2 (0002):	20.06	2.045	6.25	33.72
ID = 3 (0018):	35.59	3.532	6.25	33.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0008)|	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	0.4480	1.7011
	0.0360	0.7282	0.7160	2.0238
	0.0600	1.1698	0.9550	2.2595
	0.2380	1.4871	1.1940	2.5034

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0018)	35.590	3.532	6.25	33.15
OUTFLOW: ID= 1 (0008)	35.590	0.054	12.33	31.24

PEAK FLOW REDUCTION [Qout/Qin](%)= 1.53
TIME SHIFT OF PEAK FLOW (min)=365.00
MAXIMUM STORAGE USED (ha.m.)= 1.0595

CALIB
STANDHYD (0037)
ID= 1 DT= 5.0 min

Area (ha)= 2.00
Total Imp(%)= 79.00 Dir. Conn.(%)= 59.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.58	0.42
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	115.47	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	1.40	6.250	61.64	9.33	1.63
0.167	0.00	3.250	1.40	6.333	8.41	9.42	1.63
0.250	0.00	3.333	1.87	6.417	8.41	9.50	1.63
0.333	1.17	3.417	1.87	6.500	8.41	9.58	1.63
0.417	1.17	3.500	1.87	6.583	8.41	9.67	1.63
0.500	1.17	3.583	1.87	6.667	8.41	9.75	1.63
0.583	1.17	3.667	1.87	6.750	8.41	9.83	1.63
0.667	1.17	3.750	1.87	6.833	3.74	9.92	1.63
0.750	1.17	3.833	1.87	6.917	3.74	10.00	1.63
0.833	1.17	3.917	1.87	7.000	3.74	10.08	1.63
0.917	1.17	4.000	1.87	7.083	3.74	10.17	1.63
1.000	1.17	4.083	1.87	7.167	3.74	10.25	1.63
1.083	1.17	4.167	1.87	7.250	3.74	10.33	0.93
1.167	1.17	4.250	1.87	7.333	2.80	10.42	0.93
1.250	1.17	4.333	2.80	7.417	2.80	10.50	0.93
1.333	1.17	4.417	2.80	7.500	2.80	10.58	0.93
1.417	1.17	4.500	2.80	7.583	2.80	10.67	0.93
1.500	1.17	4.583	2.80	7.667	2.80	10.75	0.93
1.583	1.17	4.667	2.80	7.750	2.80	10.83	0.93
1.667	1.17	4.750	2.80	7.833	2.80	10.92	0.93
1.750	1.17	4.833	3.74	7.917	2.80	11.00	0.93
1.833	1.17	4.917	3.74	8.000	2.80	11.08	0.93
1.917	1.17	5.000	3.74	8.083	2.80	11.17	0.93
2.000	1.17	5.083	3.74	8.167	2.80	11.25	0.93
2.083	1.17	5.167	3.74	8.250	2.80	11.33	0.93
2.167	1.17	5.250	3.74	8.333	1.63	11.42	0.93
2.250	1.17	5.333	5.60	8.417	1.63	11.50	0.93
2.333	1.40	5.417	5.60	8.500	1.63	11.58	0.93
2.417	1.40	5.500	5.60	8.583	1.63	11.67	0.93
2.500	1.40	5.583	5.60	8.667	1.63	11.75	0.93
2.583	1.40	5.667	5.60	8.750	1.63	11.83	0.93
2.667	1.40	5.750	5.60	8.833	1.63	11.92	0.93
2.750	1.40	5.833	22.42	8.917	1.63	12.00	0.93
2.833	1.40	5.917	22.42	9.000	1.63	12.08	0.93
2.917	1.40	6.000	22.42	9.083	1.63	12.17	0.93
3.000	1.40	6.083	61.64	9.167	1.63	12.25	0.93
3.083	1.40	6.167	61.64	9.250	1.63		

				TOTALS
Max.Eff.Inten.(mm/hr)=		61.64	75.48	
over (min)		5.00	15.00	
Storage Coeff. (min)=		3.38 (ii)	11.28 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.26	0.09	
PEAK FLOW	(cms)=	0.20	0.06	0.251 (iii)
TIME TO PEAK	(hrs)=	6.25	6.33	6.25
RUNOFF VOLUME	(mm)=	45.70	23.47	36.58
TOTAL RAINFALL	(mm)=	46.70	46.70	46.70
RUNOFF COEFFICIENT	=	0.98	0.50	0.78

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0033)
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	0.0250	0.1054
0.0020	0.0490	0.0410	0.1239
0.0030	0.0750	0.0540	0.1381
0.0130	0.0932	0.0670	0.1527

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0037)	2.000	0.251	6.25	36.58
OUTFLOW: ID= 1 (0033)	2.000	0.003	12.33	33.09

PEAK FLOW REDUCTION [Qout/Qin](%)= 1.08
TIME SHIFT OF PEAK FLOW (min)=365.00
MAXIMUM STORAGE USED (ha.m.)= 0.0672

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

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\6bec7f61-6fdc-424a-b42e-f3ae0299ea7c\scen
Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\6bec7f61-6fdc-424a-b42e-f3ae0299ea7c\scen

DATE: 05-01-2024 TIME: 02:32:45

USER:

COMMENTS: _____

** SIMULATION : 08. 5-Year-12-Hour-SCS-Type-I **

READ STORM	Filename: C:\Users\mmsingh\AppData\Local\Temp\b1f80b62-66be-4935-988c-4039744e3694\8c2f7a62
Ptotal= 64.30 mm	Comments: 5-Year-12-Hour-SCS-Type-II

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	2.57	6.50	11.57	9.75	2.25
0.25	1.61	3.50	2.57	6.75	5.14	10.00	2.25
0.50	1.61	3.75	2.57	7.00	5.14	10.25	1.29
0.75	1.61	4.00	2.57	7.25	3.86	10.50	1.29
1.00	1.61	4.25	3.86	7.50	3.86	10.75	1.29
1.25	1.61	4.50	3.86	7.75	3.86	11.00	1.29
1.50	1.61	4.75	5.14	8.00	3.86	11.25	1.29
1.75	1.61	5.00	5.14	8.25	2.25	11.50	1.29
2.00	1.61	5.25	7.72	8.50	2.25	11.75	1.29
2.25	1.93	5.50	7.72	8.75	2.25	12.00	1.29
2.50	1.93	5.75	30.86	9.00	2.25		
2.75	1.93	6.00	84.88	9.25	2.25		
3.00	1.93	6.25	11.57	9.50	2.25		

CALIB	Area (ha)= 29.06
STANDHYD (0006)	Total Imp(%)= 66.00 Dir. Conn.(%)= 55.00
ID= 1 DT= 5.0 min	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	1.93	6.250	84.87	9.33	2.25
0.167	0.00	3.250	1.93	6.333	11.57	9.42	2.25
0.250	0.00	3.333	2.57	6.417	11.57	9.50	2.25
0.333	1.61	3.417	2.57	6.500	11.57	9.58	2.25
0.417	1.61	3.500	2.57	6.583	11.57	9.67	2.25
0.500	1.61	3.583	2.57	6.667	11.57	9.75	2.25
0.583	1.61	3.667	2.57	6.750	11.57	9.83	2.25
0.667	1.61	3.750	2.57	6.833	5.14	9.92	2.25
0.750	1.61	3.833	2.57	6.917	5.14	10.00	2.25
0.833	1.61	3.917	2.57	7.000	5.14	10.08	2.25
0.917	1.61	4.000	2.57	7.083	5.14	10.17	2.25
1.000	1.61	4.083	2.57	7.167	5.14	10.25	2.25
1.083	1.61	4.167	2.57	7.250	5.14	10.33	1.29
1.167	1.61	4.250	2.57	7.333	3.86	10.42	1.29
1.250	1.61	4.333	3.86	7.417	3.86	10.50	1.29
1.333	1.61	4.417	3.86	7.500	3.86	10.58	1.29
1.417	1.61	4.500	3.86	7.583	3.86	10.67	1.29
1.500	1.61	4.583	3.86	7.667	3.86	10.75	1.29
1.583	1.61	4.667	3.86	7.750	3.86	10.83	1.29
1.667	1.61	4.750	3.86	7.833	3.86	10.92	1.29
1.750	1.61	4.833	5.14	7.917	3.86	11.00	1.29
1.833	1.61	4.917	5.14	8.000	3.86	11.08	1.29
1.917	1.61	5.000	5.14	8.083	3.86	11.17	1.29
2.000	1.61	5.083	5.14	8.167	3.86	11.25	1.29
2.083	1.61	5.167	5.14	8.250	3.86	11.33	1.29
2.167	1.61	5.250	5.14	8.333	2.25	11.42	1.29
2.250	1.61	5.333	7.72	8.417	2.25	11.50	1.29
2.333	1.93	5.417	7.72	8.500	2.25	11.58	1.29
2.417	1.93	5.500	7.72	8.583	2.25	11.67	1.29
2.500	1.93	5.583	7.72	8.667	2.25	11.75	1.29
2.583	1.93	5.667	7.72	8.750	2.25	11.83	1.29
2.667	1.93	5.750	7.72	8.833	2.25	11.92	1.29
2.750	1.93	5.833	30.86	8.917	2.25	12.00	1.29
2.833	1.93	5.917	30.86	9.000	2.25	12.08	1.29
2.917	1.93	6.000	30.87	9.083	2.25	12.17	1.29
3.000	1.93	6.083	84.88	9.167	2.25	12.25	1.29
3.083	1.93	6.167	84.88	9.250	2.25		

				TOTALS
Max.Eff.Inten.(mm/hr)	=	84.88	67.96	
over (min)		5.00	15.00	
Storage Coeff.	(min)=	6.64 (ii)	14.87 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	15.00	
Unit Hyd. peak	(cms)=	0.18	0.08	
PEAK FLOW	(cms)=	3.51	1.07	4.428 (iii)
TIME TO PEAK	(hrs)=	6.25	6.33	6.25
RUNOFF VOLUME	(mm)=	63.30	31.08	48.80
TOTAL RAINFALL	(mm)=	64.30	64.30	64.30
RUNOFF COEFFICIENT	=	0.98	0.48	0.76

```
       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0020)|   Area    (ha)=   3.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  60.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.04         0.76
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     159.16        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    1.93 | 6.250   84.87 |  9.33    2.25
 0.167    0.00 | 3.250    1.93 | 6.333   11.57 |  9.42    2.25
 0.250    0.00 | 3.333    2.57 | 6.417   11.57 |  9.50    2.25
 0.333    1.61 | 3.417    2.57 | 6.500   11.57 |  9.58    2.25
 0.417    1.61 | 3.500    2.57 | 6.583   11.57 |  9.67    2.25
 0.500    1.61 | 3.583    2.57 | 6.667   11.57 |  9.75    2.25
 0.583    1.61 | 3.667    2.57 | 6.750   11.57 |  9.83    2.25
 0.667    1.61 | 3.750    2.57 | 6.833    5.14 |  9.92    2.25
 0.750    1.61 | 3.833    2.57 | 6.917    5.14 | 10.00    2.25
 0.833    1.61 | 3.917    2.57 | 7.000    5.14 | 10.08    2.25
 0.917    1.61 | 4.000    2.57 | 7.083    5.14 | 10.17    2.25
 1.000    1.61 | 4.083    2.57 | 7.167    5.14 | 10.25    2.25
 1.083    1.61 | 4.167    2.57 | 7.250    5.14 | 10.33    1.29
 1.167    1.61 | 4.250    2.57 | 7.333    3.86 | 10.42    1.29
 1.250    1.61 | 4.333    3.86 | 7.417    3.86 | 10.50    1.29
 1.333    1.61 | 4.417    3.86 | 7.500    3.86 | 10.58    1.29
 1.417    1.61 | 4.500    3.86 | 7.583    3.86 | 10.67    1.29
 1.500    1.61 | 4.583    3.86 | 7.667    3.86 | 10.75    1.29
 1.583    1.61 | 4.667    3.86 | 7.750    3.86 | 10.83    1.29
 1.667    1.61 | 4.750    3.86 | 7.833    3.86 | 10.92    1.29
 1.750    1.61 | 4.833    5.14 | 7.917    3.86 | 11.00    1.29
 1.833    1.61 | 4.917    5.14 | 8.000    3.86 | 11.08    1.29
 1.917    1.61 | 5.000    5.14 | 8.083    3.86 | 11.17    1.29
 2.000    1.61 | 5.083    5.14 | 8.167    3.86 | 11.25    1.29
 2.083    1.61 | 5.167    5.14 | 8.250    3.86 | 11.33    1.29
 2.167    1.61 | 5.250    5.14 | 8.333    2.25 | 11.42    1.29
 2.250    1.61 | 5.333    7.72 | 8.417    2.25 | 11.50    1.29
 2.333    1.93 | 5.417    7.72 | 8.500    2.25 | 11.58    1.29
 2.417    1.93 | 5.500    7.72 | 8.583    2.25 | 11.67    1.29
 2.500    1.93 | 5.583    7.72 | 8.667    2.25 | 11.75    1.29
 2.583    1.93 | 5.667    7.72 | 8.750    2.25 | 11.83    1.29
 2.667    1.93 | 5.750    7.72 | 8.833    2.25 | 11.92    1.29
 2.750    1.93 | 5.833   30.86 | 8.917    2.25 | 12.00    1.29
 2.833    1.93 | 5.917   30.86 | 9.000    2.25 | 12.08    1.29
 2.917    1.93 | 6.000   30.87 | 9.083    2.25 | 12.17    1.29
 3.000    1.93 | 6.083   84.88 | 9.167    2.25 | 12.25    1.29
 3.083    1.93 | 6.167   84.88 | 9.250    2.25 |

     Max.Eff.Inten.(mm/hr)=      84.88       123.95
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      3.61 (ii)    8.46 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.25         0.12
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.53         0.20          0.735 (iii)
     TIME TO PEAK    (hrs)=      6.25         6.25           6.25
     RUNOFF VOLUME    (mm)=     63.30        38.29          53.30
     TOTAL RAINFALL   (mm)=     64.30        64.30          64.30
     RUNOFF COEFFICIENT   =      0.98         0.60           0.83

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    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  (  0023)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0020):     3.80   0.735     6.25    53.30
     + ID2= 2 (  0006):    29.06   4.428     6.25    48.80
       ================================================
       ID = 3 (  0023):    32.86   5.163     6.25    49.32

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0012)|     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   |   0.4930      1.5666
                          0.0360     0.7150   |   0.7890      1.8478
                          0.0660     1.0737   |   1.0520      2.0613
                          0.2630     1.3645   |   1.3140      2.2797

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0023)     32.860     5.163      6.25      49.32
   OUTFLOW: ID= 1 (  0012)     32.860     0.206      8.58      47.27

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  3.99
                  TIME SHIFT OF PEAK FLOW          (min)=140.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.2807

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--------------------
| CALIB            |
| STANDHYD (  0017)|   Area    (ha)=  15.53
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  49.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
```

Surface Area	(ha)=	10.09	5.44
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	321.77	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	1.93	6.250	84.87	9.33	2.25
0.167	0.00	3.250	1.93	6.333	11.57	9.42	2.25
0.250	0.00	3.333	2.57	6.417	11.57	9.50	2.25
0.333	1.61	3.417	2.57	6.500	11.57	9.58	2.25
0.417	1.61	3.500	2.57	6.583	11.57	9.67	2.25
0.500	1.61	3.583	2.57	6.667	11.57	9.75	2.25
0.583	1.61	3.667	2.57	6.750	11.57	9.83	2.25
0.667	1.61	3.750	2.57	6.833	5.14	9.92	2.25
0.750	1.61	3.833	2.57	6.917	5.14	10.00	2.25
0.833	1.61	3.917	2.57	7.000	5.14	10.08	2.25
0.917	1.61	4.000	2.57	7.083	5.14	10.17	2.25
1.000	1.61	4.083	2.57	7.167	5.14	10.25	2.25
1.083	1.61	4.167	2.57	7.250	5.14	10.33	1.29
1.167	1.61	4.250	2.57	7.333	3.86	10.42	1.29
1.250	1.61	4.333	3.86	7.417	3.86	10.50	1.29
1.333	1.61	4.417	3.86	7.500	3.86	10.58	1.29
1.417	1.61	4.500	3.86	7.583	3.86	10.67	1.29
1.500	1.61	4.583	3.86	7.667	3.86	10.75	1.29
1.583	1.61	4.667	3.86	7.750	3.86	10.83	1.29
1.667	1.61	4.750	3.86	7.833	3.86	10.92	1.29
1.750	1.61	4.833	5.14	7.917	3.86	11.00	1.29
1.833	1.61	4.917	5.14	8.000	3.86	11.08	1.29
1.917	1.61	5.000	5.14	8.083	3.86	11.17	1.29
2.000	1.61	5.083	5.14	8.167	3.86	11.25	1.29
2.083	1.61	5.167	5.14	8.250	3.86	11.33	1.29
2.167	1.61	5.250	5.14	8.333	2.25	11.42	1.29
2.250	1.61	5.333	7.72	8.417	2.25	11.50	1.29
2.333	1.93	5.417	7.72	8.500	2.25	11.58	1.29
2.417	1.93	5.500	7.72	8.583	2.25	11.67	1.29
2.500	1.93	5.583	7.72	8.667	2.25	11.75	1.29
2.583	1.93	5.667	7.72	8.750	2.25	11.83	1.29
2.667	1.93	5.750	7.72	8.833	2.25	11.92	1.29
2.750	1.93	5.833	30.86	8.917	2.25	12.00	1.29
2.833	1.93	5.917	30.86	9.000	2.25	12.08	1.29
2.917	1.93	6.000	30.87	9.083	2.25	12.17	1.29
3.000	1.93	6.083	84.88	9.167	2.25	12.25	1.29
3.083	1.93	6.167	84.88	9.250	2.25		

Max.Eff.Inten.(mm/hr)=		84.88	78.64	
over (min)		5.00	15.00	
Storage Coeff. (min)=		5.50 (ii)	13.27 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.20	0.08	
				TOTALS
PEAK FLOW	(cms)=	1.72	0.72	2.345 (iii)
TIME TO PEAK	(hrs)=	6.25	6.33	6.25
RUNOFF VOLUME	(mm)=	63.30	32.81	47.75
TOTAL RAINFALL	(mm)=	64.30	64.30	64.30
RUNOFF COEFFICIENT	=	0.98	0.51	0.74

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0002)	Area (ha)= 20.06
ID= 1 DT= 5.0 min	Total Imp(%)= 67.00 Dir. Conn.(%)= 56.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	13.44	6.62
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	365.70	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	1.93	6.250	84.87	9.33	2.25
0.167	0.00	3.250	1.93	6.333	11.57	9.42	2.25
0.250	0.00	3.333	2.57	6.417	11.57	9.50	2.25
0.333	1.61	3.417	2.57	6.500	11.57	9.58	2.25
0.417	1.61	3.500	2.57	6.583	11.57	9.67	2.25
0.500	1.61	3.583	2.57	6.667	11.57	9.75	2.25
0.583	1.61	3.667	2.57	6.750	11.57	9.83	2.25
0.667	1.61	3.750	2.57	6.833	5.14	9.92	2.25
0.750	1.61	3.833	2.57	6.917	5.14	10.00	2.25
0.833	1.61	3.917	2.57	7.000	5.14	10.08	2.25
0.917	1.61	4.000	2.57	7.083	5.14	10.17	2.25
1.000	1.61	4.083	2.57	7.167	5.14	10.25	2.25
1.083	1.61	4.167	2.57	7.250	5.14	10.33	1.29
1.167	1.61	4.250	2.57	7.333	3.86	10.42	1.29
1.250	1.61	4.333	3.86	7.417	3.86	10.50	1.29
1.333	1.61	4.417	3.86	7.500	3.86	10.58	1.29
1.417	1.61	4.500	3.86	7.583	3.86	10.67	1.29
1.500	1.61	4.583	3.86	7.667	3.86	10.75	1.29
1.583	1.61	4.667	3.86	7.750	3.86	10.83	1.29
1.667	1.61	4.750	3.86	7.833	3.86	10.92	1.29
1.750	1.61	4.833	5.14	7.917	3.86	11.00	1.29
1.833	1.61	4.917	5.14	8.000	3.86	11.08	1.29
1.917	1.61	5.000	5.14	8.083	3.86	11.17	1.29
2.000	1.61	5.083	5.14	8.167	3.86	11.25	1.29
2.083	1.61	5.167	5.14	8.250	3.86	11.33	1.29
2.167	1.61	5.250	5.14	8.333	2.25	11.42	1.29
2.250	1.61	5.333	7.72	8.417	2.25	11.50	1.29
2.333	1.93	5.417	7.72	8.500	2.25	11.58	1.29
2.417	1.93	5.500	7.72	8.583	2.25	11.67	1.29
2.500	1.93	5.583	7.72	8.667	2.25	11.75	1.29
2.583	1.93	5.667	7.72	8.750	2.25	11.83	1.29
2.667	1.93	5.750	7.72	8.833	2.25	11.92	1.29
2.750	1.93	5.833	30.86	8.917	2.25	12.00	1.29
2.833	1.93	5.917	30.86	9.000	2.25	12.08	1.29

```
              2.917    1.93 | 6.000   30.87 | 9.083    2.25 | 12.17    1.29
              3.000    1.93 | 6.083   84.88 | 9.167    2.25 | 12.25    1.29
              3.083    1.93 | 6.167   84.88 | 9.250    2.25 |

     Max.Eff.Inten.(mm/hr)=      84.88        68.74
               over (min)         5.00        15.00
     Storage Coeff.  (min)=       5.94 (ii)   14.14 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.19         0.08
                                                      *TOTALS*
     PEAK FLOW       (cms)=       2.51         0.74          3.150 (iii)
     TIME TO PEAK    (hrs)=       6.25         6.33           6.25
     RUNOFF VOLUME    (mm)=      63.30        31.22          49.18
     TOTAL RAINFALL   (mm)=      64.30        64.30          64.30
     RUNOFF COEFFICIENT   =       0.98         0.49           0.76


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    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  (  0018)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0017):    15.53   2.345     6.25    47.75
      + ID2= 2 (  0002):    20.06   3.150     6.25    49.18
        ================================================
        ID = 3 (  0018):    35.59   5.495     6.25    48.56

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0008)|     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   |   0.4480      1.7011
                          0.0360     0.7282   |   0.7160      2.0238
                          0.0600     1.1698   |   0.9550      2.2595
                          0.2380     1.4871   |   1.1940      2.5034

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0018)     35.590     5.495      6.25      48.56
   OUTFLOW: ID= 1 (  0008)     35.590     0.189     10.25      46.27

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  3.43
                  TIME SHIFT OF PEAK FLOW         (min)=240.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.3991

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--------------------
| CALIB            |
| STANDHYD (  0037)|   Area    (ha)=   2.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  59.00
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                         IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=       1.58         0.42
Dep. Storage     (mm)=       1.00         5.00
Average Slope     (%)=       1.00         2.00
Length            (m)=     115.47        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    1.93 | 6.250   84.87 |  9.33    2.25
0.167    0.00 | 3.250    1.93 | 6.333   11.57 |  9.42    2.25
0.250    0.00 | 3.333    2.57 | 6.417   11.57 |  9.50    2.25
0.333    1.61 | 3.417    2.57 | 6.500   11.57 |  9.58    2.25
0.417    1.61 | 3.500    2.57 | 6.583   11.57 |  9.67    2.25
0.500    1.61 | 3.583    2.57 | 6.667   11.57 |  9.75    2.25
0.583    1.61 | 3.667    2.57 | 6.750   11.57 |  9.83    2.25
0.667    1.61 | 3.750    2.57 | 6.833    5.14 |  9.92    2.25
0.750    1.61 | 3.833    2.57 | 6.917    5.14 | 10.00    2.25
0.833    1.61 | 3.917    2.57 | 7.000    5.14 | 10.08    2.25
0.917    1.61 | 4.000    2.57 | 7.083    5.14 | 10.17    2.25
1.000    1.61 | 4.083    2.57 | 7.167    5.14 | 10.25    2.25
1.083    1.61 | 4.167    2.57 | 7.250    5.14 | 10.33    1.29
1.167    1.61 | 4.250    2.57 | 7.333    3.86 | 10.42    1.29
1.250    1.61 | 4.333    3.86 | 7.417    3.86 | 10.50    1.29
1.333    1.61 | 4.417    3.86 | 7.500    3.86 | 10.58    1.29
1.417    1.61 | 4.500    3.86 | 7.583    3.86 | 10.67    1.29
1.500    1.61 | 4.583    3.86 | 7.667    3.86 | 10.75    1.29
1.583    1.61 | 4.667    3.86 | 7.750    3.86 | 10.83    1.29
1.667    1.61 | 4.750    3.86 | 7.833    3.86 | 10.92    1.29
1.750    1.61 | 4.833    5.14 | 7.917    3.86 | 11.00    1.29
1.833    1.61 | 4.917    5.14 | 8.000    3.86 | 11.08    1.29
1.917    1.61 | 5.000    5.14 | 8.083    3.86 | 11.17    1.29
2.000    1.61 | 5.083    5.14 | 8.167    3.86 | 11.25    1.29
2.083    1.61 | 5.167    5.14 | 8.250    3.86 | 11.33    1.29
2.167    1.61 | 5.250    5.14 | 8.333    2.25 | 11.42    1.29
2.250    1.61 | 5.333    7.72 | 8.417    2.25 | 11.50    1.29
2.333    1.93 | 5.417    7.72 | 8.500    2.25 | 11.58    1.29
2.417    1.93 | 5.500    7.72 | 8.583    2.25 | 11.67    1.29
2.500    1.93 | 5.583    7.72 | 8.667    2.25 | 11.75    1.29
2.583    1.93 | 5.667    7.72 | 8.750    2.25 | 11.83    1.29
2.667    1.93 | 5.750    7.72 | 8.833    2.25 | 11.92    1.29
2.750    1.93 | 5.833   30.86 | 8.917    2.25 | 12.00    1.29
2.833    1.93 | 5.917   30.86 | 9.000    2.25 | 12.08    1.29
2.917    1.93 | 6.000   30.87 | 9.083    2.25 | 12.17    1.29
3.000    1.93 | 6.083   84.88 | 9.167    2.25 | 12.25    1.29
3.083    1.93 | 6.167   84.88 | 9.250    2.25 |

Max.Eff.Inten.(mm/hr)=      84.88       119.89
          over (min)         5.00        10.00
Storage Coeff.  (min)=       2.97 (ii)    7.96 (ii)
Unit Hyd. Tpeak (min)=       5.00        10.00
Unit Hyd. peak  (cms)=       0.28         0.13
                                                 *TOTALS*
PEAK FLOW       (cms)=       0.28         0.11          0.388 (iii)
TIME TO PEAK    (hrs)=       6.25         6.25           6.25
RUNOFF VOLUME    (mm)=      63.30        37.89          52.88
TOTAL RAINFALL   (mm)=      64.30        64.30          64.30
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     RUNOFF COEFFICIENT   =       0.98         0.59          0.82

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0033)|     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   |  0.0250      0.1054
                          0.0020     0.0490   |  0.0410      0.1239
                          0.0030     0.0750   |  0.0540      0.1381
                          0.0130     0.0932   |  0.0670      0.1527

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0037)      2.000     0.388      6.25      52.88
   OUTFLOW: ID= 1 (  0033)      2.000     0.010     10.25      48.64

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  2.64
                  TIME SHIFT OF PEAK FLOW         (min)=240.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0882

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

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

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\6ffbfc14-d2f0-4c62-9c5f-51c883cb9cad\scen
  Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\6ffbfc14-d2f0-4c62-9c5f-51c883cb9cad\scen

DATE: 05-01-2024                          TIME: 02:32:46

USER:


COMMENTS: _____________________________________________________

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  ********************************************
  ** SIMULATION : 09. 10-Year-12-Hour-SCS-Type- **
  ********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              b1f80b62-66be-4935-988c-4039744e3694\6041a8cc
| Ptotal= 76.00 mm |    Comments: 10-Year-12-Hour-SCS-Type-II
--------------------
                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    3.04 |  6.50   13.68 |  9.75    2.66
                0.25    1.90 |  3.50    3.04 |  6.75    6.08 | 10.00    2.66
                0.50    1.90 |  3.75    3.04 |  7.00    6.08 | 10.25    1.52
                0.75    1.90 |  4.00    3.04 |  7.25    4.56 | 10.50    1.52
                1.00    1.90 |  4.25    4.56 |  7.50    4.56 | 10.75    1.52
                1.25    1.90 |  4.50    4.56 |  7.75    4.56 | 11.00    1.52
                1.50    1.90 |  4.75    6.08 |  8.00    4.56 | 11.25    1.52
                1.75    1.90 |  5.00    6.08 |  8.25    2.66 | 11.50    1.52
                2.00    1.90 |  5.25    9.12 |  8.50    2.66 | 11.75    1.52
                2.25    2.28 |  5.50    9.12 |  8.75    2.66 | 12.00    1.52
                2.50    2.28 |  5.75   36.48 |  9.00    2.66 |
                2.75    2.28 |  6.00  100.32 |  9.25    2.66 |
                3.00    2.28 |  6.25   13.68 |  9.50    2.66 |

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--------------------
| CALIB            |
| STANDHYD (  0006)|   Area    (ha)=  29.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  66.00   Dir. Conn.(%)=  55.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      19.18         9.88
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     440.15        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    2.28 | 6.250  100.32 |  9.33    2.66
               0.167    0.00 | 3.250    2.28 | 6.333   13.68 |  9.42    2.66
               0.250    0.00 | 3.333    3.04 | 6.417   13.68 |  9.50    2.66
               0.333    1.90 | 3.417    3.04 | 6.500   13.68 |  9.58    2.66
               0.417    1.90 | 3.500    3.04 | 6.583   13.68 |  9.67    2.66
```

0.500	1.90	3.583	3.04	6.667	13.68	9.75	2.66
0.583	1.90	3.667	3.04	6.750	13.68	9.83	2.66
0.667	1.90	3.750	3.04	6.833	6.08	9.92	2.66
0.750	1.90	3.833	3.04	6.917	6.08	10.00	2.66
0.833	1.90	3.917	3.04	7.000	6.08	10.08	2.66
0.917	1.90	4.000	3.04	7.083	6.08	10.17	2.66
1.000	1.90	4.083	3.04	7.167	6.08	10.25	2.66
1.083	1.90	4.167	3.04	7.250	6.08	10.33	1.52
1.167	1.90	4.250	3.04	7.333	4.56	10.42	1.52
1.250	1.90	4.333	4.56	7.417	4.56	10.50	1.52
1.333	1.90	4.417	4.56	7.500	4.56	10.58	1.52
1.417	1.90	4.500	4.56	7.583	4.56	10.67	1.52
1.500	1.90	4.583	4.56	7.667	4.56	10.75	1.52
1.583	1.90	4.667	4.56	7.750	4.56	10.83	1.52
1.667	1.90	4.750	4.56	7.833	4.56	10.92	1.52
1.750	1.90	4.833	6.08	7.917	4.56	11.00	1.52
1.833	1.90	4.917	6.08	8.000	4.56	11.08	1.52
1.917	1.90	5.000	6.08	8.083	4.56	11.17	1.52
2.000	1.90	5.083	6.08	8.167	4.56	11.25	1.52
2.083	1.90	5.167	6.08	8.250	4.56	11.33	1.52
2.167	1.90	5.250	6.08	8.333	2.66	11.42	1.52
2.250	1.90	5.333	9.12	8.417	2.66	11.50	1.52
2.333	2.28	5.417	9.12	8.500	2.66	11.58	1.52
2.417	2.28	5.500	9.12	8.583	2.66	11.67	1.52
2.500	2.28	5.583	9.12	8.667	2.66	11.75	1.52
2.583	2.28	5.667	9.12	8.750	2.66	11.83	1.52
2.667	2.28	5.750	9.12	8.833	2.66	11.92	1.52
2.750	2.28	5.833	36.48	8.917	2.66	12.00	1.52
2.833	2.28	5.917	36.48	9.000	2.66	12.08	1.52
2.917	2.28	6.000	36.48	9.083	2.66	12.17	1.52
3.000	2.28	6.083	100.32	9.167	2.66	12.25	1.52
3.083	2.28	6.167	100.32	9.250	2.66		

Max.Eff.Inten.(mm/hr)=	100.32	87.37	
over (min)	5.00	15.00	
Storage Coeff. (min)=	6.21 (ii)	13.66 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.19	0.08	
			TOTALS
PEAK FLOW (cms)=	4.19	1.45	5.451 (iii)
TIME TO PEAK (hrs)=	6.25	6.33	6.25
RUNOFF VOLUME (mm)=	75.00	40.26	59.37
TOTAL RAINFALL (mm)=	76.00	76.00	76.00
RUNOFF COEFFICIENT =	0.99	0.53	0.78

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB		
STANDHYD (0020)	Area (ha)=	3.80
ID= 1 DT= 5.0 min	Total Imp(%)=	80.00 Dir. Conn.(%)= 60.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	2.28	6.250	100.32	9.33	2.66
0.167	0.00	3.250	2.28	6.333	13.68	9.42	2.66
0.250	0.00	3.333	3.04	6.417	13.68	9.50	2.66
0.333	1.90	3.417	3.04	6.500	13.68	9.58	2.66
0.417	1.90	3.500	3.04	6.583	13.68	9.67	2.66
0.500	1.90	3.583	3.04	6.667	13.68	9.75	2.66
0.583	1.90	3.667	3.04	6.750	13.68	9.83	2.66
0.667	1.90	3.750	3.04	6.833	6.08	9.92	2.66
0.750	1.90	3.833	3.04	6.917	6.08	10.00	2.66
0.833	1.90	3.917	3.04	7.000	6.08	10.08	2.66
0.917	1.90	4.000	3.04	7.083	6.08	10.17	2.66
1.000	1.90	4.083	3.04	7.167	6.08	10.25	2.66
1.083	1.90	4.167	3.04	7.250	6.08	10.33	1.52
1.167	1.90	4.250	3.04	7.333	4.56	10.42	1.52
1.250	1.90	4.333	4.56	7.417	4.56	10.50	1.52
1.333	1.90	4.417	4.56	7.500	4.56	10.58	1.52
1.417	1.90	4.500	4.56	7.583	4.56	10.67	1.52
1.500	1.90	4.583	4.56	7.667	4.56	10.75	1.52
1.583	1.90	4.667	4.56	7.750	4.56	10.83	1.52
1.667	1.90	4.750	4.56	7.833	4.56	10.92	1.52
1.750	1.90	4.833	6.08	7.917	4.56	11.00	1.52
1.833	1.90	4.917	6.08	8.000	4.56	11.08	1.52
1.917	1.90	5.000	6.08	8.083	4.56	11.17	1.52
2.000	1.90	5.083	6.08	8.167	4.56	11.25	1.52
2.083	1.90	5.167	6.08	8.250	4.56	11.33	1.52
2.167	1.90	5.250	6.08	8.333	2.66	11.42	1.52
2.250	1.90	5.333	9.12	8.417	2.66	11.50	1.52
2.333	2.28	5.417	9.12	8.500	2.66	11.58	1.52
2.417	2.28	5.500	9.12	8.583	2.66	11.67	1.52
2.500	2.28	5.583	9.12	8.667	2.66	11.75	1.52
2.583	2.28	5.667	9.12	8.750	2.66	11.83	1.52
2.667	2.28	5.750	9.12	8.833	2.66	11.92	1.52
2.750	2.28	5.833	36.48	8.917	2.66	12.00	1.52
2.833	2.28	5.917	36.48	9.000	2.66	12.08	1.52
2.917	2.28	6.000	36.48	9.083	2.66	12.17	1.52
3.000	2.28	6.083	100.32	9.167	2.66	12.25	1.52
3.083	2.28	6.167	100.32	9.250	2.66		

Max.Eff.Inten.(mm/hr)=	100.32	155.34	
over (min)	5.00	10.00	
Storage Coeff. (min)=	3.37 (ii)	7.91 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.26	0.13	
			TOTALS
PEAK FLOW (cms)=	0.63	0.26	0.893 (iii)
TIME TO PEAK (hrs)=	6.25	6.25	6.25
RUNOFF VOLUME (mm)=	75.00	48.48	64.39
TOTAL RAINFALL (mm)=	76.00	76.00	76.00
RUNOFF COEFFICIENT =	0.99	0.64	0.85

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

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       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    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  (  0023)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0020):     3.80   0.893     6.25    64.39
      + ID2= 2 (  0006):    29.06   5.451     6.25    59.37
        ================================================
        ID = 3 (  0023):    32.86   6.344     6.25    59.95

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| RESERVOIR(  0012)|     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   |   0.4930      1.5666
                          0.0360     0.7150   |   0.7890      1.8478
                          0.0660     1.0737   |   1.0520      2.0613
                          0.2630     1.3645   |   1.3140      2.2797

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0023)     32.860     6.344      6.25      59.95
   OUTFLOW: ID= 1 (  0012)     32.860     0.373      8.25      57.85

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  5.88
                  TIME SHIFT OF PEAK FLOW          (min)=120.00
                  MAXIMUM  STORAGE   USED        (ha.m.)=  1.4611

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| CALIB            |
| STANDHYD (  0017)|   Area    (ha)=  15.53
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  49.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.09         5.44
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     321.77        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    2.28 | 6.250  100.32 |  9.33    2.66
 0.167    0.00 | 3.250    2.28 | 6.333   13.68 |  9.42    2.66
 0.250    0.00 | 3.333    3.04 | 6.417   13.68 |  9.50    2.66
 0.333    1.90 | 3.417    3.04 | 6.500   13.68 |  9.58    2.66
 0.417    1.90 | 3.500    3.04 | 6.583   13.68 |  9.67    2.66
 0.500    1.90 | 3.583    3.04 | 6.667   13.68 |  9.75    2.66
 0.583    1.90 | 3.667    3.04 | 6.750   13.68 |  9.83    2.66
 0.667    1.90 | 3.750    3.04 | 6.833    6.08 |  9.92    2.66
 0.750    1.90 | 3.833    3.04 | 6.917    6.08 | 10.00    2.66
 0.833    1.90 | 3.917    3.04 | 7.000    6.08 | 10.08    2.66
 0.917    1.90 | 4.000    3.04 | 7.083    6.08 | 10.17    2.66
 1.000    1.90 | 4.083    3.04 | 7.167    6.08 | 10.25    2.66
 1.083    1.90 | 4.167    3.04 | 7.250    6.08 | 10.33    1.52
 1.167    1.90 | 4.250    3.04 | 7.333    4.56 | 10.42    1.52
 1.250    1.90 | 4.333    4.56 | 7.417    4.56 | 10.50    1.52
 1.333    1.90 | 4.417    4.56 | 7.500    4.56 | 10.58    1.52
 1.417    1.90 | 4.500    4.56 | 7.583    4.56 | 10.67    1.52
 1.500    1.90 | 4.583    4.56 | 7.667    4.56 | 10.75    1.52
 1.583    1.90 | 4.667    4.56 | 7.750    4.56 | 10.83    1.52
 1.667    1.90 | 4.750    4.56 | 7.833    4.56 | 10.92    1.52
 1.750    1.90 | 4.833    6.08 | 7.917    4.56 | 11.00    1.52
 1.833    1.90 | 4.917    6.08 | 8.000    4.56 | 11.08    1.52
 1.917    1.90 | 5.000    6.08 | 8.083    4.56 | 11.17    1.52
 2.000    1.90 | 5.083    6.08 | 8.167    4.56 | 11.25    1.52
 2.083    1.90 | 5.167    6.08 | 8.250    4.56 | 11.33    1.52
 2.167    1.90 | 5.250    6.08 | 8.333    2.66 | 11.42    1.52
 2.250    1.90 | 5.333    9.12 | 8.417    2.66 | 11.50    1.52
 2.333    2.28 | 5.417    9.12 | 8.500    2.66 | 11.58    1.52
 2.417    2.28 | 5.500    9.12 | 8.583    2.66 | 11.67    1.52
 2.500    2.28 | 5.583    9.12 | 8.667    2.66 | 11.75    1.52
 2.583    2.28 | 5.667    9.12 | 8.750    2.66 | 11.83    1.52
 2.667    2.28 | 5.750    9.12 | 8.833    2.66 | 11.92    1.52
 2.750    2.28 | 5.833   36.48 | 8.917    2.66 | 12.00    1.52
 2.833    2.28 | 5.917   36.48 | 9.000    2.66 | 12.08    1.52
 2.917    2.28 | 6.000   36.48 | 9.083    2.66 | 12.17    1.52
 3.000    2.28 | 6.083  100.32 | 9.167    2.66 | 12.25    1.52
 3.083    2.28 | 6.167  100.32 | 9.250    2.66 |

Max.Eff.Inten.(mm/hr)=     100.32       100.46
          over (min)          5.00        15.00
Storage Coeff.  (min)=        5.14 (ii)   12.19 (ii)
Unit Hyd. Tpeak (min)=        5.00        15.00
Unit Hyd. peak  (cms)=        0.21         0.09
                                                    *TOTALS*
PEAK FLOW       (cms)=        2.05         0.96          2.896 (iii)
TIME TO PEAK    (hrs)=        6.25         6.33           6.25
RUNOFF VOLUME    (mm)=       75.00        42.25          58.30
TOTAL RAINFALL   (mm)=       76.00        76.00          76.00
RUNOFF COEFFICIENT   =        0.99         0.56           0.77


  (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
       CN*  =  77.0    Ia = Dep. Storage  (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
      THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
| STANDHYD (  0002)|   Area    (ha)=  20.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  56.00
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                           IMPERVIOUS    PERVIOUS (i)
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Surface Area	(ha)=	13.44	6.62
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	365.70	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	2.28	6.250	100.32	9.33	2.66
0.167	0.00	3.250	2.28	6.333	13.68	9.42	2.66
0.250	0.00	3.333	3.04	6.417	13.68	9.50	2.66
0.333	1.90	3.417	3.04	6.500	13.68	9.58	2.66
0.417	1.90	3.500	3.04	6.583	13.68	9.67	2.66
0.500	1.90	3.583	3.04	6.667	13.68	9.75	2.66
0.583	1.90	3.667	3.04	6.750	13.68	9.83	2.66
0.667	1.90	3.750	3.04	6.833	6.08	9.92	2.66
0.750	1.90	3.833	3.04	6.917	6.08	10.00	2.66
0.833	1.90	3.917	3.04	7.000	6.08	10.08	2.66
0.917	1.90	4.000	3.04	7.083	6.08	10.17	2.66
1.000	1.90	4.083	3.04	7.167	6.08	10.25	2.66
1.083	1.90	4.167	3.04	7.250	6.08	10.33	1.52
1.167	1.90	4.250	3.04	7.333	4.56	10.42	1.52
1.250	1.90	4.333	4.56	7.417	4.56	10.50	1.52
1.333	1.90	4.417	4.56	7.500	4.56	10.58	1.52
1.417	1.90	4.500	4.56	7.583	4.56	10.67	1.52
1.500	1.90	4.583	4.56	7.667	4.56	10.75	1.52
1.583	1.90	4.667	4.56	7.750	4.56	10.83	1.52
1.667	1.90	4.750	4.56	7.833	4.56	10.92	1.52
1.750	1.90	4.833	6.08	7.917	4.56	11.00	1.52
1.833	1.90	4.917	6.08	8.000	4.56	11.08	1.52
1.917	1.90	5.000	6.08	8.083	4.56	11.17	1.52
2.000	1.90	5.083	6.08	8.167	4.56	11.25	1.52
2.083	1.90	5.167	6.08	8.250	4.56	11.33	1.52
2.167	1.90	5.250	6.08	8.333	2.66	11.42	1.52
2.250	1.90	5.333	9.12	8.417	2.66	11.50	1.52
2.333	2.28	5.417	9.12	8.500	2.66	11.58	1.52
2.417	2.28	5.500	9.12	8.583	2.66	11.67	1.52
2.500	2.28	5.583	9.12	8.667	2.66	11.75	1.52
2.583	2.28	5.667	9.12	8.750	2.66	11.83	1.52
2.667	2.28	5.750	9.12	8.833	2.66	11.92	1.52
2.750	2.28	5.833	36.48	8.917	2.66	12.00	1.52
2.833	2.28	5.917	36.48	9.000	2.66	12.08	1.52
2.917	2.28	6.000	36.48	9.083	2.66	12.17	1.52
3.000	2.28	6.083	100.32	9.167	2.66	12.25	1.52
3.083	2.28	6.167	100.32	9.250	2.66		

Max.Eff.Inten.	(mm/hr)=	100.32	88.33	
over	(min)	5.00	15.00	
Storage Coeff.	(min)=	5.55 (ii)	12.97 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	15.00	
Unit Hyd. peak	(cms)=	0.20	0.08	
				TOTALS
PEAK FLOW	(cms)=	2.99	1.00	3.869 (iii)
TIME TO PEAK	(hrs)=	6.25	6.33	6.25
RUNOFF VOLUME	(mm)=	75.00	40.42	59.78
TOTAL RAINFALL	(mm)=	76.00	76.00	76.00
RUNOFF COEFFICIENT	=	0.99	0.53	0.79

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0018)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0017):	15.53	2.896	6.25	58.30
	+ ID2= 2 (0002):	20.06	3.869	6.25	59.78
	ID = 3 (0018):	35.59	6.765	6.25	59.14

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0008) | OVERFLOW IS OFF
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.4480	1.7011
0.0360	0.7282	0.7160	2.0238
0.0600	1.1698	0.9550	2.2595
0.2380	1.4871	1.1940	2.5034

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0018)	35.590	6.765	6.25	59.14
OUTFLOW: ID= 1 (0008)	35.590	0.349	8.33	56.78

PEAK FLOW REDUCTION [Qout/Qin](%)= 5.16
TIME SHIFT OF PEAK FLOW (min)=125.00
MAXIMUM STORAGE USED (ha.m.)= 1.6006

CALIB
STANDHYD (0037) | Area (ha)= 2.00
ID= 1 DT= 5.0 min | Total Imp(%)= 79.00 Dir. Conn.(%)= 59.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.58	0.42
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	115.47	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	2.28	6.250	100.32	9.33	2.66
0.167	0.00	3.250	2.28	6.333	13.68	9.42	2.66

0.250	0.00	3.333	3.04	6.417	13.68	9.50	2.66
0.333	1.90	3.417	3.04	6.500	13.68	9.58	2.66
0.417	1.90	3.500	3.04	6.583	13.68	9.67	2.66
0.500	1.90	3.583	3.04	6.667	13.68	9.75	2.66
0.583	1.90	3.667	3.04	6.750	13.68	9.83	2.66
0.667	1.90	3.750	3.04	6.833	6.08	9.92	2.66
0.750	1.90	3.833	3.04	6.917	6.08	10.00	2.66
0.833	1.90	3.917	3.04	7.000	6.08	10.08	2.66
0.917	1.90	4.000	3.04	7.083	6.08	10.17	2.66
1.000	1.90	4.083	3.04	7.167	6.08	10.25	2.66
1.083	1.90	4.167	3.04	7.250	6.08	10.33	1.52
1.167	1.90	4.250	3.04	7.333	4.56	10.42	1.52
1.250	1.90	4.333	4.56	7.417	4.56	10.50	1.52
1.333	1.90	4.417	4.56	7.500	4.56	10.58	1.52
1.417	1.90	4.500	4.56	7.583	4.56	10.67	1.52
1.500	1.90	4.583	4.56	7.667	4.56	10.75	1.52
1.583	1.90	4.667	4.56	7.750	4.56	10.83	1.52
1.667	1.90	4.750	4.56	7.833	4.56	10.92	1.52
1.750	1.90	4.833	6.08	7.917	4.56	11.00	1.52
1.833	1.90	4.917	6.08	8.000	4.56	11.08	1.52
1.917	1.90	5.000	6.08	8.083	4.56	11.17	1.52
2.000	1.90	5.083	6.08	8.167	4.56	11.25	1.52
2.083	1.90	5.167	6.08	8.250	4.56	11.33	1.52
2.167	1.90	5.250	6.08	8.333	2.66	11.42	1.52
2.250	1.90	5.333	9.12	8.417	2.66	11.50	1.52
2.333	2.28	5.417	9.12	8.500	2.66	11.58	1.52
2.417	2.28	5.500	9.12	8.583	2.66	11.67	1.52
2.500	2.28	5.583	9.12	8.667	2.66	11.75	1.52
2.583	2.28	5.667	9.12	8.750	2.66	11.83	1.52
2.667	2.28	5.750	9.12	8.833	2.66	11.92	1.52
2.750	2.28	5.833	36.48	8.917	2.66	12.00	1.52
2.833	2.28	5.917	36.48	9.000	2.66	12.08	1.52
2.917	2.28	6.000	36.48	9.083	2.66	12.17	1.52
3.000	2.28	6.083	100.32	9.167	2.66	12.25	1.52
3.083	2.28	6.167	100.32	9.250	2.66		

Max.Eff.Inten.(mm/hr)=	100.32	150.45	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.78 (ii)	7.44 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.28	0.13	
			TOTALS
PEAK FLOW (cms)=	0.33	0.14	0.471 (iii)
TIME TO PEAK (hrs)=	6.25	6.25	6.25
RUNOFF VOLUME (mm)=	75.00	48.03	63.94
TOTAL RAINFALL (mm)=	76.00	76.00	76.00
RUNOFF COEFFICIENT =	0.99	0.63	0.84

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0033)	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	0.0250	0.1054
	0.0020	0.0490	0.0410	0.1239
	0.0030	0.0750	0.0540	0.1381
	0.0130	0.0932	0.0670	0.1527

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0037)	2.000	0.471	6.25	63.94
OUTFLOW: ID= 1 (0033)	2.000	0.019	8.33	59.59

PEAK FLOW REDUCTION [Qout/Qin](%)= 4.09
TIME SHIFT OF PEAK FLOW (min)=125.00
MAXIMUM STORAGE USED (ha.m.)= 0.0996

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

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\6092a691-8b8e-47f2-8527-ff362a0ab961\scen
Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\6092a691-8b8e-47f2-8527-ff362a0ab961\scen

DATE: 05-01-2024 TIME: 02:32:45

USER:

COMMENTS: _____

** SIMULATION : 10. 25-Year-12-Hour-SCS-Type- **

```
|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              b1f80b62-66be-4935-988c-4039744e3694\5eef7ed8
| Ptotal= 90.70 mm |    Comments: 25-Year-12-Hour-SCS-Type-II
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	3.63	6.50	16.33	9.75	3.17
0.25	2.27	3.50	3.63	6.75	7.26	10.00	3.17
0.50	2.27	3.75	3.63	7.00	7.26	10.25	1.81
0.75	2.27	4.00	3.63	7.25	5.44	10.50	1.81
1.00	2.27	4.25	5.44	7.50	5.44	10.75	1.81
1.25	2.27	4.50	5.44	7.75	5.44	11.00	1.81
1.50	2.27	4.75	7.26	8.00	5.44	11.25	1.81
1.75	2.27	5.00	7.26	8.25	3.17	11.50	1.81
2.00	2.27	5.25	10.88	8.50	3.17	11.75	1.81
2.25	2.72	5.50	10.88	8.75	3.17	12.00	1.81
2.50	2.72	5.75	43.54	9.00	3.17		
2.75	2.72	6.00	119.72	9.25	3.17		
3.00	2.72	6.25	16.33	9.50	3.17		

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| CALIB            |
| STANDHYD (  0006)|   Area    (ha)=  29.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  66.00   Dir. Conn.(%)=  55.00
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		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	2.72	6.250	119.72	9.33	3.17
0.167	0.00	3.250	2.72	6.333	16.33	9.42	3.17
0.250	0.00	3.333	3.63	6.417	16.33	9.50	3.17
0.333	2.27	3.417	3.63	6.500	16.33	9.58	3.17
0.417	2.27	3.500	3.63	6.583	16.33	9.67	3.17
0.500	2.27	3.583	3.63	6.667	16.33	9.75	3.17
0.583	2.27	3.667	3.63	6.750	16.33	9.83	3.17
0.667	2.27	3.750	3.63	6.833	7.26	9.92	3.17
0.750	2.27	3.833	3.63	6.917	7.26	10.00	3.17
0.833	2.27	3.917	3.63	7.000	7.26	10.08	3.17
0.917	2.27	4.000	3.63	7.083	7.26	10.17	3.17
1.000	2.27	4.083	3.63	7.167	7.26	10.25	3.17
1.083	2.27	4.167	3.63	7.250	7.26	10.33	1.81
1.167	2.27	4.250	3.63	7.333	5.44	10.42	1.81
1.250	2.27	4.333	5.44	7.417	5.44	10.50	1.81
1.333	2.27	4.417	5.44	7.500	5.44	10.58	1.81
1.417	2.27	4.500	5.44	7.583	5.44	10.67	1.81
1.500	2.27	4.583	5.44	7.667	5.44	10.75	1.81
1.583	2.27	4.667	5.44	7.750	5.44	10.83	1.81
1.667	2.27	4.750	5.44	7.833	5.44	10.92	1.81
1.750	2.27	4.833	7.26	7.917	5.44	11.00	1.81
1.833	2.27	4.917	7.26	8.000	5.44	11.08	1.81
1.917	2.27	5.000	7.26	8.083	5.44	11.17	1.81
2.000	2.27	5.083	7.26	8.167	5.44	11.25	1.81
2.083	2.27	5.167	7.26	8.250	5.44	11.33	1.81
2.167	2.27	5.250	7.26	8.333	3.17	11.42	1.81
2.250	2.27	5.333	10.88	8.417	3.17	11.50	1.81
2.333	2.72	5.417	10.88	8.500	3.17	11.58	1.81
2.417	2.72	5.500	10.88	8.583	3.17	11.67	1.81
2.500	2.72	5.583	10.88	8.667	3.17	11.75	1.81
2.583	2.72	5.667	10.88	8.750	3.17	11.83	1.81
2.667	2.72	5.750	10.88	8.833	3.17	11.92	1.81
2.750	2.72	5.833	43.54	8.917	3.17	12.00	1.81
2.833	2.72	5.917	43.54	9.000	3.17	12.08	1.81
2.917	2.72	6.000	43.54	9.083	3.17	12.17	1.81
3.000	2.72	6.083	119.72	9.167	3.17	12.25	1.81
3.083	2.72	6.167	119.72	9.250	3.17		

				TOTALS
Max.Eff.Inten.	(mm/hr)=	119.72	112.63	
over	(min)	5.00	15.00	
Storage Coeff.	(min)=	5.78 (ii)	12.51 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	15.00	
Unit Hyd. peak	(cms)=	0.20	0.08	
PEAK FLOW	(cms)=	5.05	1.95	6.781 (iii)
TIME TO PEAK	(hrs)=	6.25	6.33	6.25
RUNOFF VOLUME	(mm)=	89.70	52.38	72.91
TOTAL RAINFALL	(mm)=	90.70	90.70	90.70
RUNOFF COEFFICIENT	=	0.99	0.58	0.80

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
| STANDHYD (  0020)|   Area    (ha)=   3.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  60.00
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		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	2.72	6.250	119.72	9.33	3.17
0.167	0.00	3.250	2.72	6.333	16.33	9.42	3.17
0.250	0.00	3.333	3.63	6.417	16.33	9.50	3.17
0.333	2.27	3.417	3.63	6.500	16.33	9.58	3.17
0.417	2.27	3.500	3.63	6.583	16.33	9.67	3.17

0.500	2.27	3.583	3.63	6.667	16.33	9.75	3.17
0.583	2.27	3.667	3.63	6.750	16.33	9.83	3.17
0.667	2.27	3.750	3.63	6.833	7.26	9.92	3.17
0.750	2.27	3.833	3.63	6.917	7.26	10.00	3.17
0.833	2.27	3.917	3.63	7.000	7.26	10.08	3.17
0.917	2.27	4.000	3.63	7.083	7.26	10.17	3.17
1.000	2.27	4.083	3.63	7.167	7.26	10.25	3.17
1.083	2.27	4.167	3.63	7.250	7.26	10.33	1.81
1.167	2.27	4.250	3.63	7.333	5.44	10.42	1.81
1.250	2.27	4.333	5.44	7.417	5.44	10.50	1.81
1.333	2.27	4.417	5.44	7.500	5.44	10.58	1.81
1.417	2.27	4.500	5.44	7.583	5.44	10.67	1.81
1.500	2.27	4.583	5.44	7.667	5.44	10.75	1.81
1.583	2.27	4.667	5.44	7.750	5.44	10.83	1.81
1.667	2.27	4.750	5.44	7.833	5.44	10.92	1.81
1.750	2.27	4.833	7.26	7.917	5.44	11.00	1.81
1.833	2.27	4.917	7.26	8.000	5.44	11.08	1.81
1.917	2.27	5.000	7.26	8.083	5.44	11.17	1.81
2.000	2.27	5.083	7.26	8.167	5.44	11.25	1.81
2.083	2.27	5.167	7.26	8.250	5.44	11.33	1.81
2.167	2.27	5.250	7.26	8.333	3.17	11.42	1.81
2.250	2.27	5.333	10.88	8.417	3.17	11.50	1.81
2.333	2.72	5.417	10.88	8.500	3.17	11.58	1.81
2.417	2.72	5.500	10.88	8.583	3.17	11.67	1.81
2.500	2.72	5.583	10.88	8.667	3.17	11.75	1.81
2.583	2.72	5.667	10.88	8.750	3.17	11.83	1.81
2.667	2.72	5.750	10.88	8.833	3.17	11.92	1.81
2.750	2.72	5.833	43.54	8.917	3.17	12.00	1.81
2.833	2.72	5.917	43.54	9.000	3.17	12.08	1.81
2.917	2.72	6.000	43.54	9.083	3.17	12.17	1.81
3.000	2.72	6.083	119.72	9.167	3.17	12.25	1.81
3.083	2.72	6.167	119.72	9.250	3.17		

Max.Eff.Inten.(mm/hr)=	119.72	195.34		
over (min)	5.00	10.00		
Storage Coeff. (min)=	3.14 (ii)	7.37 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.27	0.13		
			TOTALS	
PEAK FLOW (cms)=	0.75	0.34	1.094 (iii)	
TIME TO PEAK (hrs)=	6.25	6.25	6.25	
RUNOFF VOLUME (mm)=	89.70	61.67	78.49	
TOTAL RAINFALL (mm)=	90.70	90.70	90.70	
RUNOFF COEFFICIENT =	0.99	0.68	0.87	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0023)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0020):	3.80	1.094	6.25	78.49
+ ID2= 2 (0006):	29.06	6.781	6.25	72.91
ID = 3 (0023):	32.86	7.874	6.25	73.55

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0012) / 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	0.4930	1.5666
	0.0360	0.7150	0.7890	1.8478
	0.0660	1.0737	1.0520	2.0613
	0.2630	1.3645	1.3140	2.2797

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0023)	32.860	7.874	6.25	73.55
OUTFLOW: ID= 1 (0012)	32.860	0.638	7.25	71.43

PEAK FLOW REDUCTION [Qout/Qin](%)= 8.11
TIME SHIFT OF PEAK FLOW (min)= 60.00
MAXIMUM STORAGE USED (ha.m.)= 1.7052

CALIB / STANDHYD (0017) / ID= 1 DT= 5.0 min	Area (ha)= 15.53	Total Imp(%)= 65.00	Dir. Conn.(%)= 49.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	10.09	5.44
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	321.77	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	2.72	6.250	119.72	9.33	3.17
0.167	0.00	3.250	2.72	6.333	16.33	9.42	3.17
0.250	0.00	3.333	3.63	6.417	16.33	9.50	3.17
0.333	2.27	3.417	3.63	6.500	16.33	9.58	3.17
0.417	2.27	3.500	3.63	6.583	16.33	9.67	3.17
0.500	2.27	3.583	3.63	6.667	16.33	9.75	3.17
0.583	2.27	3.667	3.63	6.750	16.33	9.83	3.17
0.667	2.27	3.750	3.63	6.833	7.26	9.92	3.17
0.750	2.27	3.833	3.63	6.917	7.26	10.00	3.17
0.833	2.27	3.917	3.63	7.000	7.26	10.08	3.17
0.917	2.27	4.000	3.63	7.083	7.26	10.17	3.17
1.000	2.27	4.083	3.63	7.167	7.26	10.25	3.17
1.083	2.27	4.167	3.63	7.250	7.26	10.33	1.81
1.167	2.27	4.250	3.63	7.333	5.44	10.42	1.81
1.250	2.27	4.333	5.44	7.417	5.44	10.50	1.81
1.333	2.27	4.417	5.44	7.500	5.44	10.58	1.81
1.417	2.27	4.500	5.44	7.583	5.44	10.67	1.81
1.500	2.27	4.583	5.44	7.667	5.44	10.75	1.81

1.583	2.27	4.667	5.44	7.750	5.44	10.83	1.81
1.667	2.27	4.750	5.44	7.833	5.44	10.92	1.81
1.750	2.27	4.833	7.26	7.917	5.44	11.00	1.81
1.833	2.27	4.917	7.26	8.000	5.44	11.08	1.81
1.917	2.27	5.000	7.26	8.083	5.44	11.17	1.81
2.000	2.27	5.083	7.26	8.167	5.44	11.25	1.81
2.083	2.27	5.167	7.26	8.250	5.44	11.33	1.81
2.167	2.27	5.250	7.26	8.333	3.17	11.42	1.81
2.250	2.27	5.333	10.88	8.417	3.17	11.50	1.81
2.333	2.72	5.417	10.88	8.500	3.17	11.58	1.81
2.417	2.72	5.500	10.88	8.583	3.17	11.67	1.81
2.500	2.72	5.583	10.88	8.667	3.17	11.75	1.81
2.583	2.72	5.667	10.88	8.750	3.17	11.83	1.81
2.667	2.72	5.750	10.88	8.833	3.17	11.92	1.81
2.750	2.72	5.833	43.54	8.917	3.17	12.00	1.81
2.833	2.72	5.917	43.54	9.000	3.17	12.08	1.81
2.917	2.72	6.000	43.54	9.083	3.17	12.17	1.81
3.000	2.72	6.083	119.72	9.167	3.17	12.25	1.81
3.083	2.72	6.167	119.72	9.250	3.17		

Max.Eff.Inten.(mm/hr)=	119.72	128.69	
over (min)	5.00	15.00	
Storage Coeff. (min)=	4.79 (ii)	11.17 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.22	0.09	
			TOTALS
PEAK FLOW (cms)=	2.46	1.29	3.612 (iii)
TIME TO PEAK (hrs)=	6.25	6.33	6.25
RUNOFF VOLUME (mm)=	89.70	54.66	71.83
TOTAL RAINFALL (mm)=	90.70	90.70	90.70
RUNOFF COEFFICIENT =	0.99	0.60	0.79

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0002)	Area (ha)=	20.06	
ID= 1 DT= 5.0 min	Total Imp(%)=	67.00	Dir. Conn.(%)= 56.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	13.44	6.62
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	365.70	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	2.72	6.250	119.72	9.33	3.17
0.167	0.00	3.250	2.72	6.333	16.33	9.42	3.17
0.250	0.00	3.333	3.63	6.417	16.33	9.50	3.17
0.333	2.27	3.417	3.63	6.500	16.33	9.58	3.17
0.417	2.27	3.500	3.63	6.583	16.33	9.67	3.17
0.500	2.27	3.583	3.63	6.667	16.33	9.75	3.17
0.583	2.27	3.667	3.63	6.750	16.33	9.83	3.17
0.667	2.27	3.750	3.63	6.833	7.26	9.92	3.17
0.750	2.27	3.833	3.63	6.917	7.26	10.00	3.17
0.833	2.27	3.917	3.63	7.000	7.26	10.08	3.17
0.917	2.27	4.000	3.63	7.083	7.26	10.17	3.17
1.000	2.27	4.083	3.63	7.167	7.26	10.25	3.17
1.083	2.27	4.167	3.63	7.250	7.26	10.33	1.81
1.167	2.27	4.250	3.63	7.333	5.44	10.42	1.81
1.250	2.27	4.333	5.44	7.417	5.44	10.50	1.81
1.333	2.27	4.417	5.44	7.500	5.44	10.58	1.81
1.417	2.27	4.500	5.44	7.583	5.44	10.67	1.81
1.500	2.27	4.583	5.44	7.667	5.44	10.75	1.81
1.583	2.27	4.667	5.44	7.750	5.44	10.83	1.81
1.667	2.27	4.750	5.44	7.833	5.44	10.92	1.81
1.750	2.27	4.833	7.26	7.917	5.44	11.00	1.81
1.833	2.27	4.917	7.26	8.000	5.44	11.08	1.81
1.917	2.27	5.000	7.26	8.083	5.44	11.17	1.81
2.000	2.27	5.083	7.26	8.167	5.44	11.25	1.81
2.083	2.27	5.167	7.26	8.250	5.44	11.33	1.81
2.167	2.27	5.250	7.26	8.333	3.17	11.42	1.81
2.250	2.27	5.333	10.88	8.417	3.17	11.50	1.81
2.333	2.72	5.417	10.88	8.500	3.17	11.58	1.81
2.417	2.72	5.500	10.88	8.583	3.17	11.67	1.81
2.500	2.72	5.583	10.88	8.667	3.17	11.75	1.81
2.583	2.72	5.667	10.88	8.750	3.17	11.83	1.81
2.667	2.72	5.750	10.88	8.833	3.17	11.92	1.81
2.750	2.72	5.833	43.54	8.917	3.17	12.00	1.81
2.833	2.72	5.917	43.54	9.000	3.17	12.08	1.81
2.917	2.72	6.000	43.54	9.083	3.17	12.17	1.81
3.000	2.72	6.083	119.72	9.167	3.17	12.25	1.81
3.083	2.72	6.167	119.72	9.250	3.17		

Max.Eff.Inten.(mm/hr)=	119.72	113.80	
over (min)	5.00	15.00	
Storage Coeff. (min)=	5.18 (ii)	11.88 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.21	0.09	
			TOTALS
PEAK FLOW (cms)=	3.60	1.35	4.800 (iii)
TIME TO PEAK (hrs)=	6.25	6.33	6.25
RUNOFF VOLUME (mm)=	89.70	52.56	73.36
TOTAL RAINFALL (mm)=	90.70	90.70	90.70
RUNOFF COEFFICIENT =	0.99	0.58	0.81

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0018)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)

```
       ID1= 1 (  0017):    15.53   3.612     6.25    71.83
     + ID2= 2 (  0002):    20.06   4.800     6.25    73.36
       ================================================
       ID = 3 (  0018):    35.59   8.412     6.25    72.69

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

RESERVOIR(0008)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.4480	1.7011
	0.0360	0.7282	0.7160	2.0238
	0.0600	1.1698	0.9550	2.2595
	0.2380	1.4871	1.1940	2.5034

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0018)	35.590	8.412	6.25	72.69
OUTFLOW: ID= 1 (0008)	35.590	0.581	7.42	70.30

```
                PEAK   FLOW   REDUCTION [Qout/Qin](%)=  6.90
                TIME SHIFT OF PEAK FLOW         (min)= 70.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  1.8608
```

CALIB STANDHYD (0037)	Area (ha)= 2.00		
ID= 1 DT= 5.0 min	Total Imp(%)= 79.00	Dir. Conn.(%)= 59.00	
	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	1.58	0.42	
Dep. Storage (mm)=	1.00	5.00	
Average Slope (%)=	1.00	2.00	
Length (m)=	115.47	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	2.72	6.250	119.72	9.33	3.17
0.167	0.00	3.250	2.72	6.333	16.33	9.42	3.17
0.250	0.00	3.333	3.63	6.417	16.33	9.50	3.17
0.333	2.27	3.417	3.63	6.500	16.33	9.58	3.17
0.417	2.27	3.500	3.63	6.583	16.33	9.67	3.17
0.500	2.27	3.583	3.63	6.667	16.33	9.75	3.17
0.583	2.27	3.667	3.63	6.750	16.33	9.83	3.17
0.667	2.27	3.750	3.63	6.833	7.26	9.92	3.17
0.750	2.27	3.833	3.63	6.917	7.26	10.00	3.17
0.833	2.27	3.917	3.63	7.000	7.26	10.08	3.17
0.917	2.27	4.000	3.63	7.083	7.26	10.17	3.17
1.000	2.27	4.083	3.63	7.167	7.26	10.25	3.17
1.083	2.27	4.167	3.63	7.250	7.26	10.33	1.81
1.167	2.27	4.250	3.63	7.333	5.44	10.42	1.81
1.250	2.27	4.333	5.44	7.417	5.44	10.50	1.81
1.333	2.27	4.417	5.44	7.500	5.44	10.58	1.81
1.417	2.27	4.500	5.44	7.583	5.44	10.67	1.81
1.500	2.27	4.583	5.44	7.667	5.44	10.75	1.81
1.583	2.27	4.667	5.44	7.750	5.44	10.83	1.81
1.667	2.27	4.750	5.44	7.833	5.44	10.92	1.81
1.750	2.27	4.833	7.26	7.917	5.44	11.00	1.81
1.833	2.27	4.917	7.26	8.000	5.44	11.08	1.81
1.917	2.27	5.000	7.26	8.083	5.44	11.17	1.81
2.000	2.27	5.083	7.26	8.167	5.44	11.25	1.81
2.083	2.27	5.167	7.26	8.250	5.44	11.33	1.81
2.167	2.27	5.250	7.26	8.333	3.17	11.42	1.81
2.250	2.27	5.333	10.88	8.417	3.17	11.50	1.81
2.333	2.72	5.417	10.88	8.500	3.17	11.58	1.81
2.417	2.72	5.500	10.88	8.583	3.17	11.67	1.81
2.500	2.72	5.583	10.88	8.667	3.17	11.75	1.81
2.583	2.72	5.667	10.88	8.750	3.17	11.83	1.81
2.667	2.72	5.750	10.88	8.833	3.17	11.92	1.81
2.750	2.72	5.833	43.54	8.917	3.17	12.00	1.81
2.833	2.72	5.917	43.54	9.000	3.17	12.08	1.81
2.917	2.72	6.000	43.54	9.083	3.17	12.17	1.81
3.000	2.72	6.083	119.72	9.167	3.17	12.25	1.81
3.083	2.72	6.167	119.72	9.250	3.17		

			TOTALS
Max.Eff.Inten.(mm/hr)=	119.72	189.44	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.59 (ii)	6.94 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.29	0.14	
PEAK FLOW (cms)=	0.39	0.18	0.577 (iii)
TIME TO PEAK (hrs)=	6.25	6.25	6.25
RUNOFF VOLUME (mm)=	89.70	61.17	78.00
TOTAL RAINFALL (mm)=	90.70	90.70	90.70
RUNOFF COEFFICIENT =	0.99	0.67	0.86

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
```

RESERVOIR(0033)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0250	0.1054
	0.0020	0.0490	0.0410	0.1239
	0.0030	0.0750	0.0540	0.1381
	0.0130	0.0932	0.0670	0.1527

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0037)	2.000	0.577	6.25	78.00
OUTFLOW: ID= 1 (0033)	2.000	0.033	7.33	73.60

```
                PEAK   FLOW   REDUCTION [Qout/Qin](%)=  5.68
                TIME SHIFT OF PEAK FLOW         (min)= 65.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  0.1143
```

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\d2ba5f26-01c6-4b3c-8bc5-46a557c25649\scen
  Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\d2ba5f26-01c6-4b3c-8bc5-46a557c25649\scen


DATE: 05-01-2024                          TIME: 02:32:46

USER:



COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------
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  ***********************************************
  ** SIMULATION : 11. 50-Year-12-Hour-SCS-Type- **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              b1f80b62-66be-4935-988c-4039744e3694\69aab664
| Ptotal=101.70 mm |    Comments: 50-Year-12-Hour-SCS-Type-II
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	4.07	6.50	18.31	9.75	3.56
0.25	2.54	3.50	4.07	6.75	8.14	10.00	3.56
0.50	2.54	3.75	4.07	7.00	8.14	10.25	2.03
0.75	2.54	4.00	4.07	7.25	6.10	10.50	2.03
1.00	2.54	4.25	6.10	7.50	6.10	10.75	2.03
1.25	2.54	4.50	6.10	7.75	6.10	11.00	2.03
1.50	2.54	4.75	8.14	8.00	6.10	11.25	2.03
1.75	2.54	5.00	8.14	8.25	3.56	11.50	2.03
2.00	2.54	5.25	12.20	8.50	3.56	11.75	2.03
2.25	3.05	5.50	12.20	8.75	3.56	12.00	2.03
2.50	3.05	5.75	48.82	9.00	3.56		
2.75	3.05	6.00	134.24	9.25	3.56		
3.00	3.05	6.25	18.31	9.50	3.56		

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--------------------
| CALIB            |
| STANDHYD (  0006)|   Area     (ha)=  29.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  66.00   Dir. Conn.(%)=  55.00
--------------------

                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      19.18          9.88
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     440.15         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	3.05	6.250	134.24	9.33	3.56
0.167	0.00	3.250	3.05	6.333	18.31	9.42	3.56
0.250	0.00	3.333	4.07	6.417	18.31	9.50	3.56
0.333	2.54	3.417	4.07	6.500	18.31	9.58	3.56
0.417	2.54	3.500	4.07	6.583	18.31	9.67	3.56
0.500	2.54	3.583	4.07	6.667	18.31	9.75	3.56
0.583	2.54	3.667	4.07	6.750	18.31	9.83	3.56
0.667	2.54	3.750	4.07	6.833	8.14	9.92	3.56
0.750	2.54	3.833	4.07	6.917	8.14	10.00	3.56
0.833	2.54	3.917	4.07	7.000	8.14	10.08	3.56
0.917	2.54	4.000	4.07	7.083	8.14	10.17	3.56
1.000	2.54	4.083	4.07	7.167	8.14	10.25	3.56
1.083	2.54	4.167	4.07	7.250	8.14	10.33	2.03
1.167	2.54	4.250	4.07	7.333	6.10	10.42	2.03
1.250	2.54	4.333	6.10	7.417	6.10	10.50	2.03
1.333	2.54	4.417	6.10	7.500	6.10	10.58	2.03
1.417	2.54	4.500	6.10	7.583	6.10	10.67	2.03
1.500	2.54	4.583	6.10	7.667	6.10	10.75	2.03
1.583	2.54	4.667	6.10	7.750	6.10	10.83	2.03
1.667	2.54	4.750	6.10	7.833	6.10	10.92	2.03
1.750	2.54	4.833	8.14	7.917	6.10	11.00	2.03
1.833	2.54	4.917	8.14	8.000	6.10	11.08	2.03
1.917	2.54	5.000	8.14	8.083	6.10	11.17	2.03
2.000	2.54	5.083	8.14	8.167	6.10	11.25	2.03
2.083	2.54	5.167	8.14	8.250	6.10	11.33	2.03
2.167	2.54	5.250	8.14	8.333	3.56	11.42	2.03
2.250	2.54	5.333	12.20	8.417	3.56	11.50	2.03
2.333	3.05	5.417	12.20	8.500	3.56	11.58	2.03
2.417	3.05	5.500	12.20	8.583	3.56	11.67	2.03
2.500	3.05	5.583	12.20	8.667	3.56	11.75	2.03
2.583	3.05	5.667	12.20	8.750	3.56	11.83	2.03
2.667	3.05	5.750	12.20	8.833	3.56	11.92	2.03
2.750	3.05	5.833	48.82	8.917	3.56	12.00	2.03
2.833	3.05	5.917	48.82	9.000	3.56	12.08	2.03

2.917	3.05	6.000	48.82	9.083	3.56	12.17	2.03
3.000	3.05	6.083	134.24	9.167	3.56	12.25	2.03
3.083	3.05	6.167	134.24	9.250	3.56		

			TOTALS
Max.Eff.Inten.(mm/hr)=	134.24	131.95	
over (min)	5.00	15.00	
Storage Coeff. (min)=	5.53 (ii)	11.84 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.20	0.09	
PEAK FLOW (cms)=	5.70	2.35	7.800 (iii)
TIME TO PEAK (hrs)=	6.25	6.33	6.25
RUNOFF VOLUME (mm)=	100.70	61.76	83.18
TOTAL RAINFALL (mm)=	101.70	101.70	101.70
RUNOFF COEFFICIENT =	0.99	0.61	0.82

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0020) | Area (ha)= 3.80
ID= 1 DT= 5.0 min | Total Imp(%)= 80.00 Dir. Conn.(%)= 60.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	3.05	6.250	134.24	9.33	3.56
0.167	0.00	3.250	3.05	6.333	18.31	9.42	3.56
0.250	0.00	3.333	4.07	6.417	18.31	9.50	3.56
0.333	2.54	3.417	4.07	6.500	18.31	9.58	3.56
0.417	2.54	3.500	4.07	6.583	18.31	9.67	3.56
0.500	2.54	3.583	4.07	6.667	18.31	9.75	3.56
0.583	2.54	3.667	4.07	6.750	18.31	9.83	3.56
0.667	2.54	3.750	4.07	6.833	8.14	9.92	3.56
0.750	2.54	3.833	4.07	6.917	8.14	10.00	3.56
0.833	2.54	3.917	4.07	7.000	8.14	10.08	3.56
0.917	2.54	4.000	4.07	7.083	8.14	10.17	3.56
1.000	2.54	4.083	4.07	7.167	8.14	10.25	3.56
1.083	2.54	4.167	4.07	7.250	8.14	10.33	2.03
1.167	2.54	4.250	4.07	7.333	6.10	10.42	2.03
1.250	2.54	4.333	6.10	7.417	6.10	10.50	2.03
1.333	2.54	4.417	6.10	7.500	6.10	10.58	2.03
1.417	2.54	4.500	6.10	7.583	6.10	10.67	2.03
1.500	2.54	4.583	6.10	7.667	6.10	10.75	2.03
1.583	2.54	4.667	6.10	7.750	6.10	10.83	2.03
1.667	2.54	4.750	6.10	7.833	6.10	10.92	2.03
1.750	2.54	4.833	8.14	7.917	6.10	11.00	2.03
1.833	2.54	4.917	8.14	8.000	6.10	11.08	2.03
1.917	2.54	5.000	8.14	8.083	6.10	11.17	2.03
2.000	2.54	5.083	8.14	8.167	6.10	11.25	2.03
2.083	2.54	5.167	8.14	8.250	6.10	11.33	2.03
2.167	2.54	5.250	8.14	8.333	3.56	11.42	2.03
2.250	2.54	5.333	12.20	8.417	3.56	11.50	2.03
2.333	3.05	5.417	12.20	8.500	3.56	11.58	2.03
2.417	3.05	5.500	12.20	8.583	3.56	11.67	2.03
2.500	3.05	5.583	12.20	8.667	3.56	11.75	2.03
2.583	3.05	5.667	12.20	8.750	3.56	11.83	2.03
2.667	3.05	5.750	12.20	8.833	3.56	11.92	2.03
2.750	3.05	5.833	48.82	8.917	3.56	12.00	2.03
2.833	3.05	5.917	48.82	9.000	3.56	12.08	2.03
2.917	3.05	6.000	48.82	9.083	3.56	12.17	2.03
3.000	3.05	6.083	134.24	9.167	3.56	12.25	2.03
3.083	3.05	6.167	134.24	9.250	3.56		

			TOTALS
Max.Eff.Inten.(mm/hr)=	134.24	225.48	
over (min)	5.00	10.00	
Storage Coeff. (min)=	3.00 (ii)	7.04 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.28	0.14	
PEAK FLOW (cms)=	0.85	0.40	1.245 (iii)
TIME TO PEAK (hrs)=	6.25	6.25	6.25
RUNOFF VOLUME (mm)=	100.70	71.76	89.12
TOTAL RAINFALL (mm)=	101.70	101.70	101.70
RUNOFF COEFFICIENT =	0.99	0.71	0.88

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0023) | 1 + 2 = 3 |	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0020):	3.80	1.245	6.25	89.12
+ ID2= 2 (0006):	29.06	7.800	6.25	83.18
ID = 3 (0023):	32.86	9.045	6.25	83.87

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0012) | OVERFLOW IS OFF IN= 2---> OUT= 1 |				
DT= 5.0 min |	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.4930	1.5666
	0.0360	0.7150	0.7890	1.8478
	0.0660	1.0737	1.0520	2.0613
	0.2630	1.3645	1.3140	2.2797

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0023)	32.860	9.045	6.25	83.87
OUTFLOW: ID= 1 (0012)	32.860	0.852	7.08	81.72

PEAK FLOW REDUCTION [Qout/Qin](%)= 9.42
TIME SHIFT OF PEAK FLOW (min)= 50.00
MAXIMUM STORAGE USED (ha.m.)= 1.8991

CALIB
STANDHYD (0017) | Area (ha)= 15.53
ID= 1 DT= 5.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 49.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	10.09	5.44
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	321.77	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	3.05	6.250	134.24	9.33	3.56
0.167	0.00	3.250	3.05	6.333	18.31	9.42	3.56
0.250	0.00	3.333	4.07	6.417	18.31	9.50	3.56
0.333	2.54	3.417	4.07	6.500	18.31	9.58	3.56
0.417	2.54	3.500	4.07	6.583	18.31	9.67	3.56
0.500	2.54	3.583	4.07	6.667	18.31	9.75	3.56
0.583	2.54	3.667	4.07	6.750	18.31	9.83	3.56
0.667	2.54	3.750	4.07	6.833	8.14	9.92	3.56
0.750	2.54	3.833	4.07	6.917	8.14	10.00	3.56
0.833	2.54	3.917	4.07	7.000	8.14	10.08	3.56
0.917	2.54	4.000	4.07	7.083	8.14	10.17	3.56
1.000	2.54	4.083	4.07	7.167	8.14	10.25	3.56
1.083	2.54	4.167	4.07	7.250	8.14	10.33	2.03
1.167	2.54	4.250	4.07	7.333	6.10	10.42	2.03
1.250	2.54	4.333	6.10	7.417	6.10	10.50	2.03
1.333	2.54	4.417	6.10	7.500	6.10	10.58	2.03
1.417	2.54	4.500	6.10	7.583	6.10	10.67	2.03
1.500	2.54	4.583	6.10	7.667	6.10	10.75	2.03
1.583	2.54	4.667	6.10	7.750	6.10	10.83	2.03
1.667	2.54	4.750	6.10	7.833	6.10	10.92	2.03
1.750	2.54	4.833	8.14	7.917	6.10	11.00	2.03
1.833	2.54	4.917	8.14	8.000	6.10	11.08	2.03
1.917	2.54	5.000	8.14	8.083	6.10	11.17	2.03
2.000	2.54	5.083	8.14	8.167	6.10	11.25	2.03
2.083	2.54	5.167	8.14	8.250	6.10	11.33	2.03
2.167	2.54	5.250	8.14	8.333	3.56	11.42	2.03
2.250	2.54	5.333	12.20	8.417	3.56	11.50	2.03
2.333	3.05	5.417	12.20	8.500	3.56	11.58	2.03
2.417	3.05	5.500	12.20	8.583	3.56	11.67	2.03
2.500	3.05	5.583	12.20	8.667	3.56	11.75	2.03
2.583	3.05	5.667	12.20	8.750	3.56	11.83	2.03
2.667	3.05	5.750	12.20	8.833	3.56	11.92	2.03
2.750	3.05	5.833	48.82	8.917	3.56	12.00	2.03
2.833	3.05	5.917	48.82	9.000	3.56	12.08	2.03
2.917	3.05	6.000	48.82	9.083	3.56	12.17	2.03
3.000	3.05	6.083	134.24	9.167	3.56	12.25	2.03
3.083	3.05	6.167	134.24	9.250	3.56		

				TOTALS
Max.Eff.Inten.(mm/hr)=		134.24	150.20	
over (min)		5.00	15.00	
Storage Coeff. (min)=		4.58 (ii)	10.58 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.23	0.09	
PEAK FLOW	(cms)=	2.77	1.54	4.161 (iii)
TIME TO PEAK	(hrs)=	6.25	6.33	6.25
RUNOFF VOLUME	(mm)=	100.70	64.23	82.10
TOTAL RAINFALL	(mm)=	101.70	101.70	101.70
RUNOFF COEFFICIENT	=	0.99	0.63	0.81

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0002) | Area (ha)= 20.06
ID= 1 DT= 5.0 min | Total Imp(%)= 67.00 Dir. Conn.(%)= 56.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	13.44	6.62
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	365.70	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	3.05	6.250	134.24	9.33	3.56
0.167	0.00	3.250	3.05	6.333	18.31	9.42	3.56
0.250	0.00	3.333	4.07	6.417	18.31	9.50	3.56
0.333	2.54	3.417	4.07	6.500	18.31	9.58	3.56
0.417	2.54	3.500	4.07	6.583	18.31	9.67	3.56
0.500	2.54	3.583	4.07	6.667	18.31	9.75	3.56
0.583	2.54	3.667	4.07	6.750	18.31	9.83	3.56
0.667	2.54	3.750	4.07	6.833	8.14	9.92	3.56
0.750	2.54	3.833	4.07	6.917	8.14	10.00	3.56
0.833	2.54	3.917	4.07	7.000	8.14	10.08	3.56
0.917	2.54	4.000	4.07	7.083	8.14	10.17	3.56
1.000	2.54	4.083	4.07	7.167	8.14	10.25	3.56
1.083	2.54	4.167	4.07	7.250	8.14	10.33	2.03
1.167	2.54	4.250	4.07	7.333	6.10	10.42	2.03
1.250	2.54	4.333	6.10	7.417	6.10	10.50	2.03
1.333	2.54	4.417	6.10	7.500	6.10	10.58	2.03

1.417	2.54	4.500	6.10	7.583	6.10	10.67	2.03
1.500	2.54	4.583	6.10	7.667	6.10	10.75	2.03
1.583	2.54	4.667	6.10	7.750	6.10	10.83	2.03
1.667	2.54	4.750	6.10	7.833	6.10	10.92	2.03
1.750	2.54	4.833	8.14	7.917	6.10	11.00	2.03
1.833	2.54	4.917	8.14	8.000	6.10	11.08	2.03
1.917	2.54	5.000	8.14	8.083	6.10	11.17	2.03
2.000	2.54	5.083	8.14	8.167	6.10	11.25	2.03
2.083	2.54	5.167	8.14	8.250	6.10	11.33	2.03
2.167	2.54	5.250	8.14	8.333	3.56	11.42	2.03
2.250	2.54	5.333	12.20	8.417	3.56	11.50	2.03
2.333	3.05	5.417	12.20	8.500	3.56	11.58	2.03
2.417	3.05	5.500	12.20	8.583	3.56	11.67	2.03
2.500	3.05	5.583	12.20	8.667	3.56	11.75	2.03
2.583	3.05	5.667	12.20	8.750	3.56	11.83	2.03
2.667	3.05	5.750	12.20	8.833	3.56	11.92	2.03
2.750	3.05	5.833	48.82	8.917	3.56	12.00	2.03
2.833	3.05	5.917	48.82	9.000	3.56	12.08	2.03
2.917	3.05	6.000	48.82	9.083	3.56	12.17	2.03
3.000	3.05	6.083	134.24	9.167	3.56	12.25	2.03
3.083	3.05	6.167	134.24	9.250	3.56		

				TOTALS
Max.Eff.Inten.(mm/hr)=	134.24	133.28		
over (min)	5.00	15.00		
Storage Coeff. (min)=	4.94 (ii)	11.24 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	0.22	0.09		
PEAK FLOW (cms)=	4.06	1.63		5.512 (iii)
TIME TO PEAK (hrs)=	6.25	6.33		6.25
RUNOFF VOLUME (mm)=	100.70	61.96		83.65
TOTAL RAINFALL (mm)=	101.70	101.70		101.70
RUNOFF COEFFICIENT =	0.99	0.61		0.82

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0018)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0017):		15.53	4.161	6.25	82.10
+ ID2= 2 (0002):		20.06	5.512	6.25	83.65
ID = 3 (0018):		35.59	9.673	6.25	82.98

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0008)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.4480	1.7011
	0.0360	0.7282	0.7160	2.0238
	0.0600	1.1698	0.9550	2.2595
	0.2380	1.4871	1.1940	2.5034

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0018)	35.590	9.673	6.25	82.98
OUTFLOW: ID= 1 (0008)	35.590	0.771	7.25	80.56

PEAK FLOW REDUCTION [Qout/Qin](%)= 7.97
TIME SHIFT OF PEAK FLOW (min)= 60.00
MAXIMUM STORAGE USED (ha.m.)= 2.0790

CALIB	
STANDHYD (0037)	Area (ha)= 2.00
ID= 1 DT= 5.0 min	Total Imp(%)= 79.00 Dir. Conn.(%)= 59.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.58	0.42
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	115.47	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	3.05	6.250	134.24	9.33	3.56
0.167	0.00	3.250	3.05	6.333	18.31	9.42	3.56
0.250	0.00	3.333	4.07	6.417	18.31	9.50	3.56
0.333	2.54	3.417	4.07	6.500	18.31	9.58	3.56
0.417	2.54	3.500	4.07	6.583	18.31	9.67	3.56
0.500	2.54	3.583	4.07	6.667	18.31	9.75	3.56
0.583	2.54	3.667	4.07	6.750	18.31	9.83	3.56
0.667	2.54	3.750	4.07	6.833	8.14	9.92	3.56
0.750	2.54	3.833	4.07	6.917	8.14	10.00	3.56
0.833	2.54	3.917	4.07	7.000	8.14	10.08	3.56
0.917	2.54	4.000	4.07	7.083	8.14	10.17	3.56
1.000	2.54	4.083	4.07	7.167	8.14	10.25	3.56
1.083	2.54	4.167	4.07	7.250	8.14	10.33	2.03
1.167	2.54	4.250	4.07	7.333	6.10	10.42	2.03
1.250	2.54	4.333	6.10	7.417	6.10	10.50	2.03
1.333	2.54	4.417	6.10	7.500	6.10	10.58	2.03
1.417	2.54	4.500	6.10	7.583	6.10	10.67	2.03
1.500	2.54	4.583	6.10	7.667	6.10	10.75	2.03
1.583	2.54	4.667	6.10	7.750	6.10	10.83	2.03
1.667	2.54	4.750	6.10	7.833	6.10	10.92	2.03
1.750	2.54	4.833	8.14	7.917	6.10	11.00	2.03
1.833	2.54	4.917	8.14	8.000	6.10	11.08	2.03
1.917	2.54	5.000	8.14	8.083	6.10	11.17	2.03
2.000	2.54	5.083	8.14	8.167	6.10	11.25	2.03
2.083	2.54	5.167	8.14	8.250	6.10	11.33	2.03
2.167	2.54	5.250	8.14	8.333	3.56	11.42	2.03
2.250	2.54	5.333	12.20	8.417	3.56	11.50	2.03
2.333	3.05	5.417	12.20	8.500	3.56	11.58	2.03
2.417	3.05	5.500	12.20	8.583	3.56	11.67	2.03

2.500	3.05	5.583	12.20	8.667	3.56	11.75	2.03
2.583	3.05	5.667	12.20	8.750	3.56	11.83	2.03
2.667	3.05	5.750	12.20	8.833	3.56	11.92	2.03
2.750	3.05	5.833	48.82	8.917	3.56	12.00	2.03
2.833	3.05	5.917	48.82	9.000	3.56	12.08	2.03
2.917	3.05	6.000	48.82	9.083	3.56	12.17	2.03
3.000	3.05	6.083	134.24	9.167	3.56	12.25	2.03
3.083	3.05	6.167	134.24	9.250	3.56		

Max.Eff.Inten.(mm/hr)=	134.24	218.83	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.48 (ii)	6.63 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.29	0.14	
			TOTALS
PEAK FLOW (cms)=	0.44	0.22	0.657 (iii)
TIME TO PEAK (hrs)=	6.25	6.25	6.25
RUNOFF VOLUME (mm)=	100.70	71.22	88.61
TOTAL RAINFALL (mm)=	101.70	101.70	101.70
RUNOFF COEFFICIENT =	0.99	0.70	0.87

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0033)| 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	0.0250	0.1054
	0.0020	0.0490	0.0410	0.1239
	0.0030	0.0750	0.0540	0.1381
	0.0130	0.0932	0.0670	0.1527

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0037)	2.000	0.657	6.25	88.61
OUTFLOW: ID= 1 (0033)	2.000	0.044	7.17	84.17

PEAK FLOW REDUCTION [Qout/Qin](%)= 6.68
TIME SHIFT OF PEAK FLOW (min)= 55.00
MAXIMUM STORAGE USED (ha.m.)= 0.1270

FINISH

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

V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\c7eb5589-45be-4c56-a0d2-ef5effdea8b9\scen
Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\c7eb5589-45be-4c56-a0d2-ef5effdea8b9\scen

DATE: 05-01-2024 TIME: 02:32:46

USER:

COMMENTS: _____

** SIMULATION : 12. 100-Year-12-Hour-SCS-Type **

READ STORM | Ptotal=112.50 mm	Filename: C:\Users\mmsingh\AppData\Local\Temp\b1f80b62-66be-4935-988c-4039744e3694\9f01baed Comments: 100-Year-12-Hour-SCS-Type-II

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	4.50	6.50	20.25	9.75	3.94
0.25	2.81	3.50	4.50	6.75	9.00	10.00	3.94
0.50	2.81	3.75	4.50	7.00	9.00	10.25	2.25
0.75	2.81	4.00	4.50	7.25	6.75	10.50	2.25
1.00	2.81	4.25	6.75	7.50	6.75	10.75	2.25
1.25	2.81	4.50	6.75	7.75	6.75	11.00	2.25
1.50	2.81	4.75	9.00	8.00	6.75	11.25	2.25
1.75	2.81	5.00	9.00	8.25	3.94	11.50	2.25
2.00	2.81	5.25	13.50	8.50	3.94	11.75	2.25
2.25	3.38	5.50	13.50	8.75	3.94	12.00	2.25
2.50	3.37	5.75	54.00	9.00	3.94		
2.75	3.38	6.00	148.50	9.25	3.94		
3.00	3.38	6.25	20.25	9.50	3.94		

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| CALIB            |
| STANDHYD (  0006)|   Area    (ha)=  29.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  66.00   Dir. Conn.(%)=  55.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     19.18         9.88
     Dep. Storage     (mm)=      1.00         5.00
     Average Slope     (%)=      1.00         2.00
     Length            (m)=    440.15        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 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	3.38	6.250	148.50	9.33	3.94
0.167	0.00	3.250	3.38	6.333	20.25	9.42	3.94
0.250	0.00	3.333	4.50	6.417	20.25	9.50	3.94
0.333	2.81	3.417	4.50	6.500	20.25	9.58	3.94
0.417	2.81	3.500	4.50	6.583	20.25	9.67	3.94
0.500	2.81	3.583	4.50	6.667	20.25	9.75	3.94
0.583	2.81	3.667	4.50	6.750	20.25	9.83	3.94
0.667	2.81	3.750	4.50	6.833	9.00	9.92	3.94
0.750	2.81	3.833	4.50	6.917	9.00	10.00	3.94
0.833	2.81	3.917	4.50	7.000	9.00	10.08	3.94
0.917	2.81	4.000	4.50	7.083	9.00	10.17	3.94
1.000	2.81	4.083	4.50	7.167	9.00	10.25	3.94
1.083	2.81	4.167	4.50	7.250	9.00	10.33	2.25
1.167	2.81	4.250	4.50	7.333	6.75	10.42	2.25
1.250	2.81	4.333	6.75	7.417	6.75	10.50	2.25
1.333	2.81	4.417	6.75	7.500	6.75	10.58	2.25
1.417	2.81	4.500	6.75	7.583	6.75	10.67	2.25
1.500	2.81	4.583	6.75	7.667	6.75	10.75	2.25
1.583	2.81	4.667	6.75	7.750	6.75	10.83	2.25
1.667	2.81	4.750	6.75	7.833	6.75	10.92	2.25
1.750	2.81	4.833	9.00	7.917	6.75	11.00	2.25
1.833	2.81	4.917	9.00	8.000	6.75	11.08	2.25
1.917	2.81	5.000	9.00	8.083	6.75	11.17	2.25
2.000	2.81	5.083	9.00	8.167	6.75	11.25	2.25
2.083	2.81	5.167	9.00	8.250	6.75	11.33	2.25
2.167	2.81	5.250	9.00	8.333	3.94	11.42	2.25
2.250	2.81	5.333	13.50	8.417	3.94	11.50	2.25
2.333	3.37	5.417	13.50	8.500	3.94	11.58	2.25
2.417	3.38	5.500	13.50	8.583	3.94	11.67	2.25
2.500	3.38	5.583	13.50	8.667	3.94	11.75	2.25
2.583	3.37	5.667	13.50	8.750	3.94	11.83	2.25
2.667	3.37	5.750	13.50	8.833	3.94	11.92	2.25
2.750	3.37	5.833	54.00	8.917	3.94	12.00	2.25
2.833	3.37	5.917	54.00	9.000	3.94	12.08	2.25
2.917	3.38	6.000	54.00	9.083	3.94	12.17	2.25
3.000	3.38	6.083	148.50	9.167	3.94	12.25	2.25
3.083	3.37	6.167	148.50	9.250	3.94		

```
     Max.Eff.Inten.(mm/hr)=     148.50       151.15
               over (min)          5.00        15.00
     Storage Coeff.  (min)=       5.31 (ii)   10.28 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.21         0.09
                                                      *TOTALS*
     PEAK FLOW       (cms)=       6.34         2.85        8.917 (iii)
     TIME TO PEAK    (hrs)=       6.25         6.33         6.25
     RUNOFF VOLUME    (mm)=     111.50        71.19        93.36
     TOTAL RAINFALL   (mm)=     112.50       112.50       112.50
     RUNOFF COEFFICIENT   =       0.99         0.63         0.83

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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| CALIB            |
| STANDHYD (  0020)|   Area    (ha)=   3.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  60.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      3.04         0.76
     Dep. Storage     (mm)=      1.00         5.00
     Average Slope     (%)=      1.00         2.00
     Length            (m)=    159.16        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	3.38	6.250	148.50	9.33	3.94
0.167	0.00	3.250	3.38	6.333	20.25	9.42	3.94
0.250	0.00	3.333	4.50	6.417	20.25	9.50	3.94
0.333	2.81	3.417	4.50	6.500	20.25	9.58	3.94
0.417	2.81	3.500	4.50	6.583	20.25	9.67	3.94
0.500	2.81	3.583	4.50	6.667	20.25	9.75	3.94
0.583	2.81	3.667	4.50	6.750	20.25	9.83	3.94
0.667	2.81	3.750	4.50	6.833	9.00	9.92	3.94
0.750	2.81	3.833	4.50	6.917	9.00	10.00	3.94
0.833	2.81	3.917	4.50	7.000	9.00	10.08	3.94
0.917	2.81	4.000	4.50	7.083	9.00	10.17	3.94
1.000	2.81	4.083	4.50	7.167	9.00	10.25	3.94
1.083	2.81	4.167	4.50	7.250	9.00	10.33	2.25
1.167	2.81	4.250	4.50	7.333	6.75	10.42	2.25
1.250	2.81	4.333	6.75	7.417	6.75	10.50	2.25
1.333	2.81	4.417	6.75	7.500	6.75	10.58	2.25
1.417	2.81	4.500	6.75	7.583	6.75	10.67	2.25
1.500	2.81	4.583	6.75	7.667	6.75	10.75	2.25
1.583	2.81	4.667	6.75	7.750	6.75	10.83	2.25
1.667	2.81	4.750	6.75	7.833	6.75	10.92	2.25
1.750	2.81	4.833	9.00	7.917	6.75	11.00	2.25
1.833	2.81	4.917	9.00	8.000	6.75	11.08	2.25
1.917	2.81	5.000	9.00	8.083	6.75	11.17	2.25
2.000	2.81	5.083	9.00	8.167	6.75	11.25	2.25
2.083	2.81	5.167	9.00	8.250	6.75	11.33	2.25
2.167	2.81	5.250	9.00	8.333	3.94	11.42	2.25
2.250	2.81	5.333	13.50	8.417	3.94	11.50	2.25

2.333	3.37	5.417	13.50	8.500	3.94	11.58	2.25
2.417	3.38	5.500	13.50	8.583	3.94	11.67	2.25
2.500	3.38	5.583	13.50	8.667	3.94	11.75	2.25
2.583	3.37	5.667	13.50	8.750	3.94	11.83	2.25
2.667	3.37	5.750	13.50	8.833	3.94	11.92	2.25
2.750	3.37	5.833	54.00	8.917	3.94	12.00	2.25
2.833	3.37	5.917	54.00	9.000	3.94	12.08	2.25
2.917	3.38	6.000	54.00	9.083	3.94	12.17	2.25
3.000	3.38	6.083	148.50	9.167	3.94	12.25	2.25
3.083	3.37	6.167	148.50	9.250	3.94		

Max.Eff.Inten.(mm/hr)=	148.50	255.14		
over (min)	5.00	10.00		
Storage Coeff. (min)=	2.88 (ii)	6.77 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.28	0.14		
			TOTALS	
PEAK FLOW (cms)=	0.94	0.46	1.395 (iii)	
TIME TO PEAK (hrs)=	6.25	6.25	6.25	
RUNOFF VOLUME (mm)=	111.50	81.79	99.62	
TOTAL RAINFALL (mm)=	112.50	112.50	112.50	
RUNOFF COEFFICIENT =	0.99	0.73	0.89	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0023)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0020):		3.80	1.395	6.25	99.62
+ ID2= 2 (0006):		29.06	8.917	6.25	93.36
ID = 3 (0023):		32.86	10.312	6.25	94.08

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0012)	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	0.4930	1.5666
	0.0360	0.7150	0.7890	1.8478
	0.0660	1.0737	1.0520	2.0613
	0.2630	1.3645	1.3140	2.2797

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (0023)	32.860	10.312	6.25	94.08
OUTFLOW: ID= 1 (0012)	32.860	1.092	7.00	91.93

PEAK FLOW REDUCTION [Qout/Qin](%)= 10.59
TIME SHIFT OF PEAK FLOW (min)= 45.00

MAXIMUM STORAGE USED (ha.m.)= 2.0954

CALIB		
STANDHYD (0017)	Area (ha)= 15.53	
ID= 1 DT= 5.0 min	Total Imp(%)= 65.00	Dir. Conn.(%)= 49.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	10.09	5.44
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	321.77	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	3.38	6.250	148.50	9.33	3.94
0.167	0.00	3.250	3.38	6.333	20.25	9.42	3.94
0.250	0.00	3.333	4.50	6.417	20.25	9.50	3.94
0.333	2.81	3.417	4.50	6.500	20.25	9.58	3.94
0.417	2.81	3.500	4.50	6.583	20.25	9.67	3.94
0.500	2.81	3.583	4.50	6.667	20.25	9.75	3.94
0.583	2.81	3.667	4.50	6.750	20.25	9.83	3.94
0.667	2.81	3.750	4.50	6.833	9.00	9.92	3.94
0.750	2.81	3.833	4.50	6.917	9.00	10.00	3.94
0.833	2.81	3.917	4.50	7.000	9.00	10.08	3.94
0.917	2.81	4.000	4.50	7.083	9.00	10.17	3.94
1.000	2.81	4.083	4.50	7.167	9.00	10.25	3.94
1.083	2.81	4.167	4.50	7.250	9.00	10.33	2.25
1.167	2.81	4.250	4.50	7.333	6.75	10.42	2.25
1.250	2.81	4.333	6.75	7.417	6.75	10.50	2.25
1.333	2.81	4.417	6.75	7.500	6.75	10.58	2.25
1.417	2.81	4.500	6.75	7.583	6.75	10.67	2.25
1.500	2.81	4.583	6.75	7.667	6.75	10.75	2.25
1.583	2.81	4.667	6.75	7.750	6.75	10.83	2.25
1.667	2.81	4.750	6.75	7.833	6.75	10.92	2.25
1.750	2.81	4.833	9.00	7.917	6.75	11.00	2.25
1.833	2.81	4.917	9.00	8.000	6.75	11.08	2.25
1.917	2.81	5.000	9.00	8.083	6.75	11.17	2.25
2.000	2.81	5.083	9.00	8.167	6.75	11.25	2.25
2.083	2.81	5.167	9.00	8.250	6.75	11.33	2.25
2.167	2.81	5.250	9.00	8.333	3.94	11.42	2.25
2.250	2.81	5.333	13.50	8.417	3.94	11.50	2.25
2.333	3.37	5.417	13.50	8.500	3.94	11.58	2.25
2.417	3.38	5.500	13.50	8.583	3.94	11.67	2.25
2.500	3.38	5.583	13.50	8.667	3.94	11.75	2.25
2.583	3.37	5.667	13.50	8.750	3.94	11.83	2.25
2.667	3.37	5.750	13.50	8.833	3.94	11.92	2.25
2.750	3.37	5.833	54.00	8.917	3.94	12.00	2.25
2.833	3.37	5.917	54.00	9.000	3.94	12.08	2.25
2.917	3.38	6.000	54.00	9.083	3.94	12.17	2.25
3.000	3.38	6.083	148.50	9.167	3.94	12.25	2.25
3.083	3.37	6.167	148.50	9.250	3.94		

Max.Eff.Inten.(mm/hr)=	148.50	171.52		
over (min)	5.00	15.00		

Storage Coeff. (min)=	4.40 (ii)	10.09 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.23	0.10	
			TOTALS
PEAK FLOW (cms)=	3.07	1.80	4.708 (iii)
TIME TO PEAK (hrs)=	6.25	6.33	6.25
RUNOFF VOLUME (mm)=	111.50	73.83	92.29
TOTAL RAINFALL (mm)=	112.50	112.50	112.50
RUNOFF COEFFICIENT =	0.99	0.66	0.82

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0002) | Area (ha)= 20.06
ID= 1 DT= 5.0 min | Total Imp(%)= 67.00 Dir. Conn.(%)= 56.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	13.44	6.62
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	365.70	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	3.38	6.250	148.50	9.33	3.94
0.167	0.00	3.250	3.38	6.333	20.25	9.42	3.94
0.250	0.00	3.333	4.50	6.417	20.25	9.50	3.94
0.333	2.81	3.417	4.50	6.500	20.25	9.58	3.94
0.417	2.81	3.500	4.50	6.583	20.25	9.67	3.94
0.500	2.81	3.583	4.50	6.667	20.25	9.75	3.94
0.583	2.81	3.667	4.50	6.750	20.25	9.83	3.94
0.667	2.81	3.750	4.50	6.833	9.00	9.92	3.94
0.750	2.81	3.833	4.50	6.917	9.00	10.00	3.94
0.833	2.81	3.917	4.50	7.000	9.00	10.08	3.94
0.917	2.81	4.000	4.50	7.083	9.00	10.17	3.94
1.000	2.81	4.083	4.50	7.167	9.00	10.25	3.94
1.083	2.81	4.167	4.50	7.250	9.00	10.33	2.25
1.167	2.81	4.250	4.50	7.333	6.75	10.42	2.25
1.250	2.81	4.333	6.75	7.417	6.75	10.50	2.25
1.333	2.81	4.417	6.75	7.500	6.75	10.58	2.25
1.417	2.81	4.500	6.75	7.583	6.75	10.67	2.25
1.500	2.81	4.583	6.75	7.667	6.75	10.75	2.25
1.583	2.81	4.667	6.75	7.750	6.75	10.83	2.25
1.667	2.81	4.750	6.75	7.833	6.75	10.92	2.25
1.750	2.81	4.833	9.00	7.917	6.75	11.00	2.25
1.833	2.81	4.917	9.00	8.000	6.75	11.08	2.25
1.917	2.81	5.000	9.00	8.083	6.75	11.17	2.25
2.000	2.81	5.083	9.00	8.167	6.75	11.25	2.25
2.083	2.81	5.167	9.00	8.250	6.75	11.33	2.25
2.167	2.81	5.250	9.00	8.333	3.94	11.42	2.25
2.250	2.81	5.333	13.50	8.417	3.94	11.50	2.25
2.333	3.37	5.417	13.50	8.500	3.94	11.58	2.25
2.417	3.38	5.500	13.50	8.583	3.94	11.67	2.25
2.500	3.38	5.583	13.50	8.667	3.94	11.75	2.25
2.583	3.37	5.667	13.50	8.750	3.94	11.83	2.25
2.667	3.37	5.750	13.50	8.833	3.94	11.92	2.25
2.750	3.37	5.833	54.00	8.917	3.94	12.00	2.25
2.833	3.37	5.917	54.00	9.000	3.94	12.08	2.25
2.917	3.38	6.000	54.00	9.083	3.94	12.17	2.25
3.000	3.38	6.083	148.50	9.167	3.94	12.25	2.25
3.083	3.37	6.167	148.50	9.250	3.94		

Max.Eff.Inten.(mm/hr)=	148.50	152.64	
over (min)	5.00	10.00	
Storage Coeff. (min)=	4.75 (ii)	9.62 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.22	0.11	
			TOTALS
PEAK FLOW (cms)=	4.51	2.09	6.600 (iii)
TIME TO PEAK (hrs)=	6.25	6.25	6.25
RUNOFF VOLUME (mm)=	111.50	71.39	93.85
TOTAL RAINFALL (mm)=	112.50	112.50	112.50
RUNOFF COEFFICIENT =	0.99	0.63	0.83

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0018) | 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0017):	15.53	4.708	6.25	92.29
+ ID2= 2 (0002):	20.06	6.600	6.25	93.85
ID = 3 (0018):	35.59	11.308	6.25	93.17

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0008) \| 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	0.4480	1.7011
0.0360	0.7282	0.7160	2.0238
0.0600	1.1698	0.9550	2.2595
0.2380	1.4871	1.1940	2.5034

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0018)	35.590	11.308	6.25	93.17
OUTFLOW: ID= 1 (0008)	35.590	0.988	7.08	90.73

PEAK FLOW REDUCTION [Qout/Qin](%)= 8.74
TIME SHIFT OF PEAK FLOW (min)= 50.00
MAXIMUM STORAGE USED (ha.m.)= 2.2938

CALIB	
STANDHYD (0037)	Area (ha)= 2.00
ID= 1 DT= 5.0 min	Total Imp(%)= 79.00 Dir. Conn.(%)= 59.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.58	0.42
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	115.47	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	3.38	6.250	148.50	9.33	3.94
0.167	0.00	3.250	3.38	6.333	20.25	9.42	3.94
0.250	0.00	3.333	4.50	6.417	20.25	9.50	3.94
0.333	2.81	3.417	4.50	6.500	20.25	9.58	3.94
0.417	2.81	3.500	4.50	6.583	20.25	9.67	3.94
0.500	2.81	3.583	4.50	6.667	20.25	9.75	3.94
0.583	2.81	3.667	4.50	6.750	20.25	9.83	3.94
0.667	2.81	3.750	4.50	6.833	9.00	9.92	3.94
0.750	2.81	3.833	4.50	6.917	9.00	10.00	3.94
0.833	2.81	3.917	4.50	7.000	9.00	10.08	3.94
0.917	2.81	4.000	4.50	7.083	9.00	10.17	3.94
1.000	2.81	4.083	4.50	7.167	9.00	10.25	3.94
1.083	2.81	4.167	4.50	7.250	9.00	10.33	2.25
1.167	2.81	4.250	4.50	7.333	6.75	10.42	2.25
1.250	2.81	4.333	6.75	7.417	6.75	10.50	2.25
1.333	2.81	4.417	6.75	7.500	6.75	10.58	2.25
1.417	2.81	4.500	6.75	7.583	6.75	10.67	2.25
1.500	2.81	4.583	6.75	7.667	6.75	10.75	2.25
1.583	2.81	4.667	6.75	7.750	6.75	10.83	2.25
1.667	2.81	4.750	6.75	7.833	6.75	10.92	2.25
1.750	2.81	4.833	9.00	7.917	6.75	11.00	2.25
1.833	2.81	4.917	9.00	8.000	6.75	11.08	2.25
1.917	2.81	5.000	9.00	8.083	6.75	11.17	2.25
2.000	2.81	5.083	9.00	8.167	6.75	11.25	2.25
2.083	2.81	5.167	9.00	8.250	6.75	11.33	2.25
2.167	2.81	5.250	9.00	8.333	3.94	11.42	2.25
2.250	2.81	5.333	13.50	8.417	3.94	11.50	2.25
2.333	3.37	5.417	13.50	8.500	3.94	11.58	2.25
2.417	3.38	5.500	13.50	8.583	3.94	11.67	2.25
2.500	3.38	5.583	13.50	8.667	3.94	11.75	2.25
2.583	3.37	5.667	13.50	8.750	3.94	11.83	2.25
2.667	3.37	5.750	13.50	8.833	3.94	11.92	2.25
2.750	3.37	5.833	54.00	8.917	3.94	12.00	2.25
2.833	3.37	5.917	54.00	9.000	3.94	12.08	2.25
2.917	3.38	6.000	54.00	9.083	3.94	12.17	2.25
3.000	3.38	6.083	148.50	9.167	3.94	12.25	2.25
3.083	3.37	6.167	148.50	9.250	3.94		

					TOTALS
Max.Eff.Inten.(mm/hr)=		148.50	247.78		
over (min)		5.00	10.00		
Storage Coeff. (min)=		2.38 (ii)	6.36 (ii)		
Unit Hyd. Tpeak (min)=		5.00	10.00		
Unit Hyd. peak (cms)=		0.30	0.15		
PEAK FLOW	(cms)=	0.49	0.25		0.736 (iii)
TIME TO PEAK	(hrs)=	6.25	6.25		6.25
RUNOFF VOLUME	(mm)=	111.50	81.23		99.09
TOTAL RAINFALL	(mm)=	112.50	112.50		112.50
RUNOFF COEFFICIENT	=	0.99	0.72		0.88

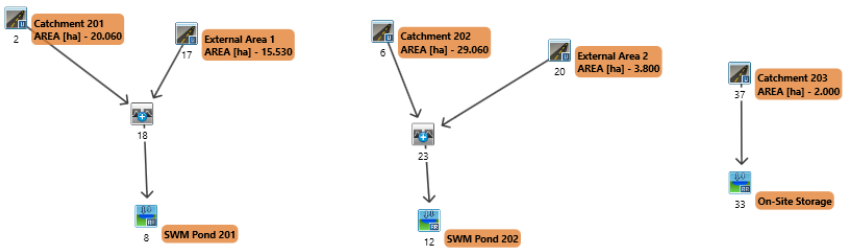
***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0033)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0250	0.1054
	0.0020	0.0490	0.0410	0.1239
	0.0030	0.0750	0.0540	0.1381
	0.0130	0.0932	0.0670	0.1527

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0037)	2.000	0.736	6.25	99.09
OUTFLOW: ID= 1 (0033)	2.000	0.056	6.92	94.61

PEAK FLOW REDUCTION [Qout/Qin](%)= 7.56
TIME SHIFT OF PEAK FLOW (min)= 40.00
MAXIMUM STORAGE USED (ha.m.)= 0.1399



SCHAEFFERS
CONSULTING ENGINEERS

Visual OTTHYMO™ Schematic

POST- DEVELOPMENT
2-100yr, 24HR SCS

Job #: 5170	**Date: April 2024**

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

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


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DATE: 05-01-2024                          TIME: 02:27:00

USER:


COMMENTS: _____________________________________________________________

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  ***********************************************
  ** SIMULATION : 01. 2-Year-24-Hour-SCS-Type-I **
  ***********************************************


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|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              d7ebc3fa-4e57-492f-bbed-8129d1e23af0\4d3f0190
| Ptotal= 55.00 mm |    Comments: 2-Year-24-Hour-SCS-Type-II
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.10	12.50	7.92	18.75	0.99
0.25	0.55	6.50	1.10	12.75	4.07	19.00	0.99
0.50	0.55	6.75	1.10	13.00	4.07	19.25	0.99
0.75	0.55	7.00	1.10	13.25	0.77	19.50	0.99
1.00	0.55	7.25	1.10	13.50	0.77	19.75	0.99
1.25	0.55	7.50	1.10	13.75	4.51	20.00	0.99
1.50	0.55	7.75	1.10	14.00	4.51	20.25	0.66
1.75	0.55	8.00	1.10	14.25	1.65	20.50	0.66
2.00	0.99	8.25	1.49	14.50	1.65	20.75	0.66

2.25	0.72	8.50	1.48	14.75	1.65	21.00	0.66
2.50	0.71	8.75	1.49	15.00	1.65	21.25	0.66
2.75	0.72	9.00	1.49	15.25	1.65	21.50	0.66
3.00	0.71	9.25	1.76	15.50	1.65	21.75	0.66
3.25	0.71	9.50	1.76	15.75	1.65	22.00	0.66
3.50	0.71	9.75	1.98	16.00	1.65	22.25	0.66
3.75	0.72	10.00	1.98	16.25	0.99	22.50	0.66
4.00	0.71	10.25	2.53	16.50	0.99	22.75	0.66
4.25	0.88	10.50	2.53	16.75	0.99	23.00	0.66
4.50	0.88	10.75	3.41	17.00	0.99	23.25	0.66
4.75	0.88	11.00	3.41	17.25	0.99	23.50	0.66
5.00	0.88	11.25	5.28	17.50	0.99	23.75	0.66
5.25	0.88	11.50	5.28	17.75	0.99	24.00	0.66
5.50	0.88	11.75	22.88	18.00	0.99		
5.75	0.88	12.00	60.72	18.25	0.99		
6.00	0.88	12.25	7.92	18.50	0.99		

CALIB	
STANDHYD (0006)	Area (ha)= 29.06
ID= 1 DT= 5.0 min	Total Imp(%)= 66.00 Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	6.167	0.88	12.250	60.72	18.33	0.99
0.167	0.00	6.250	0.88	12.333	7.93	18.42	0.99
0.250	0.00	6.333	1.10	12.417	7.92	18.50	0.99
0.333	0.55	6.417	1.10	12.500	7.92	18.58	0.99
0.417	0.55	6.500	1.10	12.583	7.92	18.67	0.99
0.500	0.55	6.583	1.10	12.667	7.92	18.75	0.99
0.583	0.55	6.667	1.10	12.750	7.92	18.83	0.99
0.667	0.55	6.750	1.10	12.833	4.07	18.92	0.99
0.750	0.55	6.833	1.10	12.917	4.07	19.00	0.99
0.833	0.55	6.917	1.10	13.000	4.07	19.08	0.99
0.917	0.55	7.000	1.10	13.083	4.07	19.17	0.99
1.000	0.55	7.083	1.10	13.167	4.07	19.25	0.99
1.083	0.55	7.167	1.10	13.250	4.07	19.33	0.99
1.167	0.55	7.250	1.10	13.333	0.77	19.42	0.99
1.250	0.55	7.333	1.10	13.417	0.77	19.50	0.99
1.333	0.55	7.417	1.10	13.500	0.77	19.58	0.99
1.417	0.55	7.500	1.10	13.583	0.77	19.67	0.99
1.500	0.55	7.583	1.10	13.667	0.77	19.75	0.99
1.583	0.55	7.667	1.10	13.750	0.77	19.83	0.99
1.667	0.55	7.750	1.10	13.833	4.51	19.92	0.99
1.750	0.55	7.833	1.10	13.917	4.51	20.00	0.99
1.833	0.55	7.917	1.10	14.000	4.51	20.08	0.99
1.917	0.55	8.000	1.10	14.083	4.51	20.17	0.99
2.000	0.55	8.083	1.10	14.167	4.51	20.25	0.99
2.083	0.99	8.167	1.10	14.250	4.51	20.33	0.66
2.167	0.99	8.250	1.10	14.333	1.65	20.42	0.66
2.250	0.99	8.333	1.49	14.417	1.65	20.50	0.66
2.333	0.71	8.417	1.49	14.500	1.65	20.58	0.66
2.417	0.72	8.500	1.48	14.583	1.65	20.67	0.66
2.500	0.72	8.583	1.48	14.667	1.65	20.75	0.66
2.583	0.71	8.667	1.48	14.750	1.65	20.83	0.66
2.667	0.71	8.750	1.48	14.833	1.65	20.92	0.66
2.750	0.71	8.833	1.49	14.917	1.65	21.00	0.66
2.833	0.71	8.917	1.49	15.000	1.65	21.08	0.66
2.917	0.72	9.000	1.48	15.083	1.65	21.17	0.66
3.000	0.72	9.083	1.49	15.167	1.65	21.25	0.66
3.083	0.71	9.167	1.49	15.250	1.65	21.33	0.66
3.167	0.71	9.250	1.48	15.333	1.65	21.42	0.66
3.250	0.71	9.333	1.76	15.417	1.65	21.50	0.66
3.333	0.71	9.417	1.76	15.500	1.65	21.58	0.66
3.417	0.71	9.500	1.76	15.583	1.65	21.67	0.66
3.500	0.71	9.583	1.76	15.667	1.65	21.75	0.66
3.583	0.71	9.667	1.76	15.750	1.65	21.83	0.66
3.667	0.71	9.750	1.76	15.833	1.65	21.92	0.66
3.750	0.71	9.833	1.98	15.917	1.65	22.00	0.66
3.833	0.71	9.917	1.98	16.000	1.65	22.08	0.66
3.917	0.72	10.000	1.98	16.083	1.65	22.17	0.66
4.000	0.72	10.083	1.98	16.167	1.65	22.25	0.66
4.083	0.71	10.167	1.98	16.250	1.65	22.33	0.66
4.167	0.71	10.250	1.98	16.333	0.99	22.42	0.66
4.250	0.71	10.333	2.53	16.417	0.99	22.50	0.66
4.333	0.88	10.417	2.53	16.500	0.99	22.58	0.66
4.417	0.88	10.500	2.53	16.583	0.99	22.67	0.66
4.500	0.88	10.583	2.53	16.667	0.99	22.75	0.66
4.583	0.88	10.667	2.53	16.750	0.99	22.83	0.66
4.667	0.88	10.750	2.53	16.833	0.99	22.92	0.66
4.750	0.88	10.833	3.41	16.917	0.99	23.00	0.66
4.833	0.88	10.917	3.41	17.000	0.99	23.08	0.66
4.917	0.88	11.000	3.41	17.083	0.99	23.17	0.66
5.000	0.88	11.083	3.41	17.167	0.99	23.25	0.66
5.083	0.88	11.167	3.41	17.250	0.99	23.33	0.66
5.167	0.88	11.250	3.41	17.333	0.99	23.42	0.66
5.250	0.88	11.333	5.28	17.417	0.99	23.50	0.66
5.333	0.88	11.417	5.28	17.500	0.99	23.58	0.66
5.417	0.88	11.500	5.28	17.583	0.99	23.67	0.66
5.500	0.88	11.583	5.28	17.667	0.99	23.75	0.66
5.583	0.88	11.667	5.28	17.750	0.99	23.83	0.66
5.667	0.88	11.750	5.28	17.833	0.99	23.92	0.66
5.750	0.88	11.833	22.88	17.917	0.99	24.00	0.66
5.833	0.88	11.917	22.88	18.000	0.99	24.08	0.66
5.917	0.88	12.000	22.88	18.083	0.99	24.17	0.66
6.000	0.88	12.083	60.72	18.167	0.99	24.25	0.66
6.083	0.88	12.167	60.72	18.250	0.99		

Max.Eff.Inten.	(mm/hr)=	60.72	43.64	
over	(min)	10.00	20.00	
Storage Coeff.	(min)=	7.59 (ii)	17.42 (ii)	
Unit Hyd. Tpeak	(min)=	10.00	20.00	
Unit Hyd. peak	(cms)=	0.13	0.06	
				TOTALS
PEAK FLOW	(cms)=	2.31	0.62	2.751 (iii)
TIME TO PEAK	(hrs)=	12.25	12.42	12.25
RUNOFF VOLUME	(mm)=	54.00	24.17	40.58
TOTAL RAINFALL	(mm)=	55.00	55.00	55.00
RUNOFF COEFFICIENT	=	0.98	0.44	0.74

```
      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  77.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0020)|   Area    (ha)=   3.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  60.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.04         0.76
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     159.16        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	6.167	0.88	12.250	60.72	18.33	0.99
0.167	0.00	6.250	0.88	12.333	7.93	18.42	0.99
0.250	0.00	6.333	1.10	12.417	7.92	18.50	0.99
0.333	0.55	6.417	1.10	12.500	7.92	18.58	0.99
0.417	0.55	6.500	1.10	12.583	7.92	18.67	0.99
0.500	0.55	6.583	1.10	12.667	7.92	18.75	0.99
0.583	0.55	6.667	1.10	12.750	7.92	18.83	0.99
0.667	0.55	6.750	1.10	12.833	4.07	18.92	0.99
0.750	0.55	6.833	1.10	12.917	4.07	19.00	0.99
0.833	0.55	6.917	1.10	13.000	4.07	19.08	0.99
0.917	0.55	7.000	1.10	13.083	4.07	19.17	0.99
1.000	0.55	7.083	1.10	13.167	4.07	19.25	0.99
1.083	0.55	7.167	1.10	13.250	4.07	19.33	0.99
1.167	0.55	7.250	1.10	13.333	0.77	19.42	0.99
1.250	0.55	7.333	1.10	13.417	0.77	19.50	0.99
1.333	0.55	7.417	1.10	13.500	0.77	19.58	0.99
1.417	0.55	7.500	1.10	13.583	0.77	19.67	0.99
1.500	0.55	7.583	1.10	13.667	0.77	19.75	0.99
1.583	0.55	7.667	1.10	13.750	0.77	19.83	0.99
1.667	0.55	7.750	1.10	13.833	4.51	19.92	0.99
1.750	0.55	7.833	1.10	13.917	4.51	20.00	0.99
1.833	0.55	7.917	1.10	14.000	4.51	20.08	0.99
1.917	0.55	8.000	1.10	14.083	4.51	20.17	0.99
2.000	0.55	8.083	1.10	14.167	4.51	20.25	0.99
2.083	0.99	8.167	1.10	14.250	4.51	20.33	0.66
2.167	0.99	8.250	1.10	14.333	1.65	20.42	0.66
2.250	0.99	8.333	1.49	14.417	1.65	20.50	0.66
2.333	0.71	8.417	1.49	14.500	1.65	20.58	0.66
2.417	0.72	8.500	1.48	14.583	1.65	20.67	0.66
2.500	0.72	8.583	1.48	14.667	1.65	20.75	0.66
2.583	0.71	8.667	1.48	14.750	1.65	20.83	0.66
2.667	0.71	8.750	1.48	14.833	1.65	20.92	0.66
2.750	0.71	8.833	1.49	14.917	1.65	21.00	0.66
2.833	0.71	8.917	1.49	15.000	1.65	21.08	0.66
2.917	0.72	9.000	1.48	15.083	1.65	21.17	0.66
3.000	0.72	9.083	1.49	15.167	1.65	21.25	0.66
3.083	0.71	9.167	1.49	15.250	1.65	21.33	0.66
3.167	0.71	9.250	1.48	15.333	1.65	21.42	0.66
3.250	0.71	9.333	1.76	15.417	1.65	21.50	0.66
3.333	0.71	9.417	1.76	15.500	1.65	21.58	0.66
3.417	0.71	9.500	1.76	15.583	1.65	21.67	0.66
3.500	0.71	9.583	1.76	15.667	1.65	21.75	0.66
3.583	0.71	9.667	1.76	15.750	1.65	21.83	0.66
3.667	0.71	9.750	1.76	15.833	1.65	21.92	0.66
3.750	0.71	9.833	1.98	15.917	1.65	22.00	0.66
3.833	0.71	9.917	1.98	16.000	1.65	22.08	0.66
3.917	0.72	10.000	1.98	16.083	1.65	22.17	0.66
4.000	0.72	10.083	1.98	16.167	1.65	22.25	0.66
4.083	0.71	10.167	1.98	16.250	1.65	22.33	0.66
4.167	0.71	10.250	1.98	16.333	0.99	22.42	0.66
4.250	0.71	10.333	2.53	16.417	0.99	22.50	0.66
4.333	0.88	10.417	2.53	16.500	0.99	22.58	0.66
4.417	0.88	10.500	2.53	16.583	0.99	22.67	0.66
4.500	0.88	10.583	2.53	16.667	0.99	22.75	0.66
4.583	0.88	10.667	2.53	16.750	0.99	22.83	0.66
4.667	0.88	10.750	2.53	16.833	0.99	22.92	0.66
4.750	0.88	10.833	3.41	16.917	0.99	23.00	0.66
4.833	0.88	10.917	3.41	17.000	0.99	23.08	0.66
4.917	0.88	11.000	3.41	17.083	0.99	23.17	0.66
5.000	0.88	11.083	3.41	17.167	0.99	23.25	0.66
5.083	0.88	11.167	3.41	17.250	0.99	23.33	0.66
5.167	0.88	11.250	3.41	17.333	0.99	23.42	0.66
5.250	0.88	11.333	5.28	17.417	0.99	23.50	0.66
5.333	0.88	11.417	5.28	17.500	0.99	23.58	0.66
5.417	0.88	11.500	5.28	17.583	0.99	23.67	0.66
5.500	0.88	11.583	5.28	17.667	0.99	23.75	0.66
5.583	0.88	11.667	5.28	17.750	0.99	23.83	0.66
5.667	0.88	11.750	5.28	17.833	0.99	23.92	0.66
5.750	0.88	11.833	22.88	17.917	0.99	24.00	0.66
5.833	0.88	11.917	22.88	18.000	0.99	24.08	0.66
5.917	0.88	12.000	22.88	18.083	0.99	24.17	0.66
6.000	0.88	12.083	60.72	18.167	0.99	24.25	0.66
6.083	0.88	12.167	60.72	18.250	0.99		

```
     Max.Eff.Inten.(mm/hr)=      60.72         82.10
               over (min)         5.00         15.00
     Storage Coeff.  (min)=       4.12 (ii)    11.76 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=       0.24          0.09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.38          0.11          0.480 (iii)
     TIME TO PEAK    (hrs)=      12.25         12.33         12.25
     RUNOFF VOLUME    (mm)=      54.00         30.48         44.59
     TOTAL RAINFALL   (mm)=      55.00         55.00         55.00
     RUNOFF COEFFICIENT   =       0.98          0.55          0.81

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  77.0    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  (  0023)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0020):     3.80   0.480    12.25    44.59
      + ID2= 2 (  0006):    29.06   2.751    12.25    40.58
        ================================================
        ID = 3 (  0023):    32.86   3.230    12.25    41.04

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0012)|     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   |   0.4930     1.5666
                           0.0360     0.7150   |   0.7890     1.8478
                           0.0660     1.0737   |   1.0520     2.0613
                           0.2630     1.3645   |   1.3140     2.2797

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0023)     32.860     3.230     12.25      41.04
   OUTFLOW: ID= 1 (  0012)     32.860     0.066     20.42      38.69

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  2.04
                  TIME SHIFT OF PEAK FLOW          (min)=490.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.0737

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--------------------
| CALIB            |
| STANDHYD (  0017)|   Area    (ha)=  15.53
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  49.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     10.09         5.44
     Dep. Storage     (mm)=      1.00         5.00
     Average Slope     (%)=      1.00         2.00
     Length            (m)=    321.77        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 | 6.167    0.88 |12.250   60.72 | 18.33    0.99
              0.167    0.00 | 6.250    0.88 |12.333    7.93 | 18.42    0.99
              0.250    0.00 | 6.333    1.10 |12.417    7.92 | 18.50    0.99
              0.333    0.55 | 6.417    1.10 |12.500    7.92 | 18.58    0.99
              0.417    0.55 | 6.500    1.10 |12.583    7.92 | 18.67    0.99
              0.500    0.55 | 6.583    1.10 |12.667    7.92 | 18.75    0.99
              0.583    0.55 | 6.667    1.10 |12.750    7.92 | 18.83    0.99
              0.667    0.55 | 6.750    1.10 |12.833    4.07 | 18.92    0.99
              0.750    0.55 | 6.833    1.10 |12.917    4.07 | 19.00    0.99
              0.833    0.55 | 6.917    1.10 |13.000    4.07 | 19.08    0.99
              0.917    0.55 | 7.000    1.10 |13.083    4.07 | 19.17    0.99
              1.000    0.55 | 7.083    1.10 |13.167    4.07 | 19.25    0.99
              1.083    0.55 | 7.167    1.10 |13.250    4.07 | 19.33    0.99
              1.167    0.55 | 7.250    1.10 |13.333    0.77 | 19.42    0.99
              1.250    0.55 | 7.333    1.10 |13.417    0.77 | 19.50    0.99
              1.333    0.55 | 7.417    1.10 |13.500    0.77 | 19.58    0.99
              1.417    0.55 | 7.500    1.10 |13.583    0.77 | 19.67    0.99
              1.500    0.55 | 7.583    1.10 |13.667    0.77 | 19.75    0.99
              1.583    0.55 | 7.667    1.10 |13.750    0.77 | 19.83    0.99
              1.667    0.55 | 7.750    1.10 |13.833    4.51 | 19.92    0.99
              1.750    0.55 | 7.833    1.10 |13.917    4.51 | 20.00    0.99
              1.833    0.55 | 7.917    1.10 |14.000    4.51 | 20.08    0.99
              1.917    0.55 | 8.000    1.10 |14.083    4.51 | 20.17    0.99
              2.000    0.55 | 8.083    1.10 |14.167    4.51 | 20.25    0.99
              2.083    0.99 | 8.167    1.10 |14.250    4.51 | 20.33    0.66
              2.167    0.99 | 8.250    1.10 |14.333    1.65 | 20.42    0.66
              2.250    0.99 | 8.333    1.49 |14.417    1.65 | 20.50    0.66
              2.333    0.71 | 8.417    1.49 |14.500    1.65 | 20.58    0.66
              2.417    0.72 | 8.500    1.48 |14.583    1.65 | 20.67    0.66
              2.500    0.72 | 8.583    1.48 |14.667    1.65 | 20.75    0.66
              2.583    0.71 | 8.667    1.48 |14.750    1.65 | 20.83    0.66
              2.667    0.71 | 8.750    1.48 |14.833    1.65 | 20.92    0.66
              2.750    0.71 | 8.833    1.49 |14.917    1.65 | 21.00    0.66
              2.833    0.71 | 8.917    1.49 |15.000    1.65 | 21.08    0.66
              2.917    0.72 | 9.000    1.48 |15.083    1.65 | 21.17    0.66
              3.000    0.72 | 9.083    1.49 |15.167    1.65 | 21.25    0.66
              3.083    0.71 | 9.167    1.49 |15.250    1.65 | 21.33    0.66
              3.167    0.71 | 9.250    1.48 |15.333    1.65 | 21.42    0.66
              3.250    0.71 | 9.333    1.76 |15.417    1.65 | 21.50    0.66
              3.333    0.71 | 9.417    1.76 |15.500    1.65 | 21.58    0.66
              3.417    0.71 | 9.500    1.76 |15.583    1.65 | 21.67    0.66
              3.500    0.71 | 9.583    1.76 |15.667    1.65 | 21.75    0.66
              3.583    0.71 | 9.667    1.76 |15.750    1.65 | 21.83    0.66
              3.667    0.71 | 9.750    1.76 |15.833    1.65 | 21.92    0.66
              3.750    0.71 | 9.833    1.98 |15.917    1.65 | 22.00    0.66
              3.833    0.71 | 9.917    1.98 |16.000    1.65 | 22.08    0.66
              3.917    0.72 |10.000    1.98 |16.083    1.65 | 22.17    0.66
              4.000    0.72 |10.083    1.98 |16.167    1.65 | 22.25    0.66
              4.083    0.71 |10.167    1.98 |16.250    1.65 | 22.33    0.66
              4.167    0.71 |10.250    1.98 |16.333    0.99 | 22.42    0.66
              4.250    0.71 |10.333    2.53 |16.417    0.99 | 22.50    0.66
              4.333    0.88 |10.417    2.53 |16.500    0.99 | 22.58    0.66
              4.417    0.88 |10.500    2.53 |16.583    0.99 | 22.67    0.66
              4.500    0.88 |10.583    2.53 |16.667    0.99 | 22.75    0.66
              4.583    0.88 |10.667    2.53 |16.750    0.99 | 22.83    0.66
              4.667    0.88 |10.750    2.53 |16.833    0.99 | 22.92    0.66
              4.750    0.88 |10.833    3.41 |16.917    0.99 | 23.00    0.66
              4.833    0.88 |10.917    3.41 |17.000    0.99 | 23.08    0.66
              4.917    0.88 |11.000    3.41 |17.083    0.99 | 23.17    0.66
              5.000    0.88 |11.083    3.41 |17.167    0.99 | 23.25    0.66
              5.083    0.88 |11.167    3.41 |17.250    0.99 | 23.33    0.66
              5.167    0.88 |11.250    3.41 |17.333    0.99 | 23.42    0.66
              5.250    0.88 |11.333    5.28 |17.417    0.99 | 23.50    0.66
              5.333    0.88 |11.417    5.28 |17.500    0.99 | 23.58    0.66
              5.417    0.88 |11.500    5.28 |17.583    0.99 | 23.67    0.66
              5.500    0.88 |11.583    5.28 |17.667    0.99 | 23.75    0.66
              5.583    0.88 |11.667    5.28 |17.750    0.99 | 23.83    0.66
              5.667    0.88 |11.750    5.28 |17.833    0.99 | 23.92    0.66
              5.750    0.88 |11.833   22.88 |17.917    0.99 | 24.00    0.66
              5.833    0.88 |11.917   22.88 |18.000    0.99 | 24.08    0.66
              5.917    0.88 |12.000   22.88 |18.083    0.99 | 24.17    0.66
              6.000    0.88 |12.083   60.72 |18.167    0.99 | 24.25    0.66
```

	6.083	0.88	12.167	60.72	18.250	0.99					

Max.Eff.Inten.(mm/hr)=	60.72	50.89		
over (min)	5.00	20.00		
Storage Coeff. (min)=	6.29 (ii)	15.54 (ii)		
Unit Hyd. Tpeak (min)=	5.00	20.00		
Unit Hyd. peak (cms)=	0.19	0.07		
			TOTALS	
PEAK FLOW (cms)=	1.21	0.42	1.510 (iii)	
TIME TO PEAK (hrs)=	12.25	12.42	12.25	
RUNOFF VOLUME (mm)=	54.00	25.66	39.55	
TOTAL RAINFALL (mm)=	55.00	55.00	55.00	
RUNOFF COEFFICIENT =	0.98	0.47	0.72	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB				
STANDHYD (0002)	Area (ha)= 20.06			
ID= 1 DT= 5.0 min	Total Imp(%)= 67.00	Dir. Conn.(%)= 56.00		

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	13.44	6.62
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	365.70	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	6.167	0.88	12.250	60.72	18.33	0.99
0.167	0.00	6.250	0.88	12.333	7.93	18.42	0.99
0.250	0.00	6.333	1.10	12.417	7.92	18.50	0.99
0.333	0.55	6.417	1.10	12.500	7.92	18.58	0.99
0.417	0.55	6.500	1.10	12.583	7.92	18.67	0.99
0.500	0.55	6.583	1.10	12.667	7.92	18.75	0.99
0.583	0.55	6.667	1.10	12.750	7.92	18.83	0.99
0.667	0.55	6.750	1.10	12.833	4.07	18.92	0.99
0.750	0.55	6.833	1.10	12.917	4.07	19.00	0.99
0.833	0.55	6.917	1.10	13.000	4.07	19.08	0.99
0.917	0.55	7.000	1.10	13.083	4.07	19.17	0.99
1.000	0.55	7.083	1.10	13.167	4.07	19.25	0.99
1.083	0.55	7.167	1.10	13.250	4.07	19.33	0.99
1.167	0.55	7.250	1.10	13.333	0.77	19.42	0.99
1.250	0.55	7.333	1.10	13.417	0.77	19.50	0.99
1.333	0.55	7.417	1.10	13.500	0.77	19.58	0.99
1.417	0.55	7.500	1.10	13.583	0.77	19.67	0.99
1.500	0.55	7.583	1.10	13.667	0.77	19.75	0.99
1.583	0.55	7.667	1.10	13.750	0.77	19.83	0.99
1.667	0.55	7.750	1.10	13.833	4.51	19.92	0.99
1.750	0.55	7.833	1.10	13.917	4.51	20.00	0.99
1.833	0.55	7.917	1.10	14.000	4.51	20.08	0.99
1.917	0.55	8.000	1.10	14.083	4.51	20.17	0.99
2.000	0.55	8.083	1.10	14.167	4.51	20.25	0.99
2.083	0.99	8.167	1.10	14.250	4.51	20.33	0.66
2.167	0.99	8.250	1.10	14.333	1.65	20.42	0.66
2.250	0.99	8.333	1.49	14.417	1.65	20.50	0.66
2.333	0.71	8.417	1.49	14.500	1.65	20.58	0.66
2.417	0.72	8.500	1.48	14.583	1.65	20.67	0.66
2.500	0.72	8.583	1.48	14.667	1.65	20.75	0.66
2.583	0.71	8.667	1.48	14.750	1.65	20.83	0.66
2.667	0.71	8.750	1.48	14.833	1.65	20.92	0.66
2.750	0.71	8.833	1.49	14.917	1.65	21.00	0.66
2.833	0.71	8.917	1.49	15.000	1.65	21.08	0.66
2.917	0.72	9.000	1.48	15.083	1.65	21.17	0.66
3.000	0.72	9.083	1.49	15.167	1.65	21.25	0.66
3.083	0.71	9.167	1.49	15.250	1.65	21.33	0.66
3.167	0.71	9.250	1.48	15.333	1.65	21.42	0.66
3.250	0.71	9.333	1.76	15.417	1.65	21.50	0.66
3.333	0.71	9.417	1.76	15.500	1.65	21.58	0.66
3.417	0.71	9.500	1.76	15.583	1.65	21.67	0.66
3.500	0.71	9.583	1.76	15.667	1.65	21.75	0.66
3.583	0.71	9.667	1.76	15.750	1.65	21.83	0.66
3.667	0.71	9.750	1.76	15.833	1.65	21.92	0.66
3.750	0.71	9.833	1.98	15.917	1.65	22.00	0.66
3.833	0.71	9.917	1.98	16.000	1.65	22.08	0.66
3.917	0.72	10.000	1.98	16.083	1.65	22.17	0.66
4.000	0.72	10.083	1.98	16.167	1.65	22.25	0.66
4.083	0.71	10.167	1.98	16.250	1.65	22.33	0.66
4.167	0.71	10.250	1.98	16.333	0.99	22.42	0.66
4.250	0.71	10.333	2.53	16.417	0.99	22.50	0.66
4.333	0.88	10.417	2.53	16.500	0.99	22.58	0.66
4.417	0.88	10.500	2.53	16.583	0.99	22.67	0.66
4.500	0.88	10.583	2.53	16.667	0.99	22.75	0.66
4.583	0.88	10.667	2.53	16.750	0.99	22.83	0.66
4.667	0.88	10.750	2.53	16.833	0.99	22.92	0.66
4.750	0.88	10.833	3.41	16.917	0.99	23.00	0.66
4.833	0.88	10.917	3.41	17.000	0.99	23.08	0.66
4.917	0.88	11.000	3.41	17.083	0.99	23.17	0.66
5.000	0.88	11.083	3.41	17.167	0.99	23.25	0.66
5.083	0.88	11.167	3.41	17.250	0.99	23.33	0.66
5.167	0.88	11.250	3.41	17.333	0.99	23.42	0.66
5.250	0.88	11.333	5.28	17.417	0.99	23.50	0.66
5.333	0.88	11.417	5.28	17.500	0.99	23.58	0.66
5.417	0.88	11.500	5.28	17.583	0.99	23.67	0.66
5.500	0.88	11.583	5.28	17.667	0.99	23.75	0.66
5.583	0.88	11.667	5.28	17.750	0.99	23.83	0.66
5.667	0.88	11.750	5.28	17.833	0.99	23.92	0.66
5.750	0.88	11.833	22.88	17.917	0.99	24.00	0.66
5.833	0.88	11.917	22.88	18.000	0.99	24.08	0.66
5.917	0.88	12.000	22.88	18.083	0.99	24.17	0.66
6.000	0.88	12.083	60.72	18.167	0.99	24.25	0.66
6.083	0.88	12.167	60.72	18.250	0.99		

Max.Eff.Inten.(mm/hr)=	60.72	44.16		
over (min)	5.00	20.00		
Storage Coeff. (min)=	6.79 (ii)	16.58 (ii)		
Unit Hyd. Tpeak (min)=	5.00	20.00		
Unit Hyd. peak (cms)=	0.18	0.06		
			TOTALS	
PEAK FLOW (cms)=	1.76	0.43	2.065 (iii)	
TIME TO PEAK (hrs)=	12.25	12.42	12.25	

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     RUNOFF VOLUME     (mm)=      54.00        24.29          40.93
     TOTAL RAINFALL    (mm)=      55.00        55.00          55.00
     RUNOFF COEFFICIENT   =       0.98         0.44           0.74


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    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  (  0018)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0017):    15.53   1.510    12.25    39.55
      + ID2= 2 (  0002):    20.06   2.065    12.25    40.93
        ================================================
        ID = 3 (  0018):    35.59   3.575    12.25    40.32

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0008)|     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   |   0.4480     1.7011
                           0.0360     0.7282   |   0.7160     2.0238
                           0.0600     1.1698   |   0.9550     2.2595
                           0.2380     1.4871   |   1.1940     2.5034

                                 AREA     QPEAK     TPEAK       R.V.
                                 (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0018)     35.590     3.575     12.25      40.32
   OUTFLOW: ID= 1 (  0008)     35.590     0.060     20.75      37.74

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.68
                  TIME SHIFT OF PEAK FLOW          (min)=510.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.1698

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0037)|   Area    (ha)=   2.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  59.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.58         0.42
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     115.47        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	6.167	0.88	12.250	60.72	18.33	0.99
0.167	0.00	6.250	0.88	12.333	7.93	18.42	0.99
0.250	0.00	6.333	1.10	12.417	7.92	18.50	0.99
0.333	0.55	6.417	1.10	12.500	7.92	18.58	0.99
0.417	0.55	6.500	1.10	12.583	7.92	18.67	0.99
0.500	0.55	6.583	1.10	12.667	7.92	18.75	0.99
0.583	0.55	6.667	1.10	12.750	7.92	18.83	0.99
0.667	0.55	6.750	1.10	12.833	4.07	18.92	0.99
0.750	0.55	6.833	1.10	12.917	4.07	19.00	0.99
0.833	0.55	6.917	1.10	13.000	4.07	19.08	0.99
0.917	0.55	7.000	1.10	13.083	4.07	19.17	0.99
1.000	0.55	7.083	1.10	13.167	4.07	19.25	0.99
1.083	0.55	7.167	1.10	13.250	4.07	19.33	0.99
1.167	0.55	7.250	1.10	13.333	0.77	19.42	0.99
1.250	0.55	7.333	1.10	13.417	0.77	19.50	0.99
1.333	0.55	7.417	1.10	13.500	0.77	19.58	0.99
1.417	0.55	7.500	1.10	13.583	0.77	19.67	0.99
1.500	0.55	7.583	1.10	13.667	0.77	19.75	0.99
1.583	0.55	7.667	1.10	13.750	0.77	19.83	0.99
1.667	0.55	7.750	1.10	13.833	4.51	19.92	0.99
1.750	0.55	7.833	1.10	13.917	4.51	20.00	0.99
1.833	0.55	7.917	1.10	14.000	4.51	20.08	0.99
1.917	0.55	8.000	1.10	14.083	4.51	20.17	0.99
2.000	0.55	8.083	1.10	14.167	4.51	20.25	0.99
2.083	0.99	8.167	1.10	14.250	4.51	20.33	0.66
2.167	0.99	8.250	1.10	14.333	1.65	20.42	0.66
2.250	0.99	8.333	1.49	14.417	1.65	20.50	0.66
2.333	0.71	8.417	1.49	14.500	1.65	20.58	0.66
2.417	0.72	8.500	1.48	14.583	1.65	20.67	0.66
2.500	0.72	8.583	1.48	14.667	1.65	20.75	0.66
2.583	0.71	8.667	1.48	14.750	1.65	20.83	0.66
2.667	0.71	8.750	1.48	14.833	1.65	20.92	0.66
2.750	0.71	8.833	1.49	14.917	1.65	21.00	0.66
2.833	0.71	8.917	1.49	15.000	1.65	21.08	0.66
2.917	0.72	9.000	1.48	15.083	1.65	21.17	0.66
3.000	0.72	9.083	1.49	15.167	1.65	21.25	0.66
3.083	0.71	9.167	1.49	15.250	1.65	21.33	0.66
3.167	0.71	9.250	1.48	15.333	1.65	21.42	0.66
3.250	0.71	9.333	1.76	15.417	1.65	21.50	0.66
3.333	0.71	9.417	1.76	15.500	1.65	21.58	0.66
3.417	0.71	9.500	1.76	15.583	1.65	21.67	0.66
3.500	0.71	9.583	1.76	15.667	1.65	21.75	0.66
3.583	0.71	9.667	1.76	15.750	1.65	21.83	0.66
3.667	0.71	9.750	1.76	15.833	1.65	21.92	0.66
3.750	0.71	9.833	1.98	15.917	1.65	22.00	0.66
3.833	0.71	9.917	1.98	16.000	1.65	22.08	0.66
3.917	0.72	10.000	1.98	16.083	1.65	22.17	0.66
4.000	0.72	10.083	1.98	16.167	1.65	22.25	0.66
4.083	0.71	10.167	1.98	16.250	1.65	22.33	0.66
4.167	0.71	10.250	1.98	16.333	0.99	22.42	0.66
4.250	0.71	10.333	2.53	16.417	0.99	22.50	0.66
4.333	0.88	10.417	2.53	16.500	0.99	22.58	0.66
4.417	0.88	10.500	2.53	16.583	0.99	22.67	0.66
4.500	0.88	10.583	2.53	16.667	0.99	22.75	0.66
4.583	0.88	10.667	2.53	16.750	0.99	22.83	0.66
4.667	0.88	10.750	2.53	16.833	0.99	22.92	0.66
4.750	0.88	10.833	3.41	16.917	0.99	23.00	0.66
4.833	0.88	10.917	3.41	17.000	0.99	23.08	0.66
4.917	0.88	11.000	3.41	17.083	0.99	23.17	0.66
5.000	0.88	11.083	3.41	17.167	0.99	23.25	0.66

5.083	0.88	11.167	3.41	17.250	0.99	23.33	0.66
5.167	0.88	11.250	3.41	17.333	0.99	23.42	0.66
5.250	0.88	11.333	5.28	17.417	0.99	23.50	0.66
5.333	0.88	11.417	5.28	17.500	0.99	23.58	0.66
5.417	0.88	11.500	5.28	17.583	0.99	23.67	0.66
5.500	0.88	11.583	5.28	17.667	0.99	23.75	0.66
5.583	0.88	11.667	5.28	17.750	0.99	23.83	0.66
5.667	0.88	11.750	5.28	17.833	0.99	23.92	0.66
5.750	0.88	11.833	22.88	17.917	0.99	24.00	0.66
5.833	0.88	11.917	22.88	18.000	0.99	24.08	0.66
5.917	0.88	12.000	22.88	18.083	0.99	24.17	0.66
6.000	0.88	12.083	60.72	18.167	0.99	24.25	0.66
6.083	0.88	12.167	60.72	18.250	0.99		

			TOTALS
Max.Eff.Inten.(mm/hr)=	60.72	79.27	
over (min)	5.00	15.00	
Storage Coeff. (min)=	3.40 (ii)	11.14 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.26	0.09	
PEAK FLOW (cms)=	0.20	0.06	0.253 (iii)
TIME TO PEAK (hrs)=	12.25	12.33	12.25
RUNOFF VOLUME (mm)=	54.00	30.12	44.20
TOTAL RAINFALL (mm)=	55.00	55.00	55.00
RUNOFF COEFFICIENT =	0.98	0.55	0.80

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0033)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0250	0.1054
	0.0020	0.0490	0.0410	0.1239
	0.0030	0.0750	0.0540	0.1381
	0.0130	0.0932	0.0670	0.1527

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0037)	2.000	0.253	12.25	44.20
OUTFLOW: ID= 1 (0033)	2.000	0.003	24.25	39.55

PEAK FLOW REDUCTION [Qout/Qin](%)= 1.19
TIME SHIFT OF PEAK FLOW (min)=720.00
MAXIMUM STORAGE USED (ha.m.)= 0.0750

FINISH

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\4e6ab089-f9fd-451b-8989-f261cde323ef\scen
Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\4e6ab089-f9fd-451b-8989-f261cde323ef\scen

DATE: 05-01-2024 TIME: 02:27:00

USER:

COMMENTS: _____

****
** SIMULATION : 02. 5-Year-24-Hour-SCS-Type-I **
****

READ STORM	Filename: C:\Users\mmsingh\AppData\Local\Temp\d7ebc3fa-4e57-492f-bbed-8129d1e23af0\361a8f55
Ptotal= 76.00 mm	Comments: 5-Year-24-Hour-SCS-Type-II

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.52	12.50	10.94	18.75	1.37
0.25	0.76	6.50	1.52	12.75	5.62	19.00	1.37
0.50	0.76	6.75	1.52	13.00	5.62	19.25	1.37
0.75	0.76	7.00	1.52	13.25	1.06	19.50	1.37
1.00	0.76	7.25	1.52	13.50	1.06	19.75	1.37
1.25	0.76	7.50	1.52	13.75	6.23	20.00	1.37
1.50	0.76	7.75	1.52	14.00	6.23	20.25	0.91
1.75	0.76	8.00	1.52	14.25	2.28	20.50	0.91
2.00	1.37	8.25	2.05	14.50	2.28	20.75	0.91

2.25	0.99	8.50	2.05	14.75	2.28	21.00	0.91
2.50	0.99	8.75	2.05	15.00	2.28	21.25	0.91
2.75	0.99	9.00	2.05	15.25	2.28	21.50	0.91
3.00	0.99	9.25	2.43	15.50	2.28	21.75	0.91
3.25	0.99	9.50	2.43	15.75	2.28	22.00	0.91
3.50	0.99	9.75	2.74	16.00	2.28	22.25	0.91
3.75	0.99	10.00	2.74	16.25	1.37	22.50	0.91
4.00	0.99	10.25	3.50	16.50	1.37	22.75	0.91
4.25	1.22	10.50	3.50	16.75	1.37	23.00	0.91
4.50	1.22	10.75	4.71	17.00	1.37	23.25	0.91
4.75	1.22	11.00	4.71	17.25	1.37	23.50	0.91
5.00	1.22	11.25	7.30	17.50	1.37	23.75	0.91
5.25	1.22	11.50	7.30	17.75	1.37	24.00	0.91
5.50	1.22	11.75	31.62	18.00	1.37		
5.75	1.22	12.00	83.90	18.25	1.37		
6.00	1.22	12.25	10.94	18.50	1.37		

CALIB	
STANDHYD (0006)	Area (ha)= 29.06
ID= 1 DT= 5.0 min	Total Imp(%)= 66.00 Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	6.167	1.22	12.250	83.90	18.33	1.37
0.167	0.00	6.250	1.22	12.333	10.95	18.42	1.37
0.250	0.00	6.333	1.52	12.417	10.94	18.50	1.37
0.333	0.76	6.417	1.52	12.500	10.94	18.58	1.37
0.417	0.76	6.500	1.52	12.583	10.94	18.67	1.37
0.500	0.76	6.583	1.52	12.667	10.94	18.75	1.37
0.583	0.76	6.667	1.52	12.750	10.94	18.83	1.37
0.667	0.76	6.750	1.52	12.833	5.62	18.92	1.37
0.750	0.76	6.833	1.52	12.917	5.62	19.00	1.37
0.833	0.76	6.917	1.52	13.000	5.62	19.08	1.37
0.917	0.76	7.000	1.52	13.083	5.62	19.17	1.37
1.000	0.76	7.083	1.52	13.167	5.62	19.25	1.37
1.083	0.76	7.167	1.52	13.250	5.62	19.33	1.37
1.167	0.76	7.250	1.52	13.333	1.06	19.42	1.37
1.250	0.76	7.333	1.52	13.417	1.06	19.50	1.37
1.333	0.76	7.417	1.52	13.500	1.06	19.58	1.37
1.417	0.76	7.500	1.52	13.583	1.06	19.67	1.37
1.500	0.76	7.583	1.52	13.667	1.06	19.75	1.37
1.583	0.76	7.667	1.52	13.750	1.06	19.83	1.37
1.667	0.76	7.750	1.52	13.833	6.23	19.92	1.37
1.750	0.76	7.833	1.52	13.917	6.23	20.00	1.37
1.833	0.76	7.917	1.52	14.000	6.23	20.08	1.37
1.917	0.76	8.000	1.52	14.083	6.23	20.17	1.37
2.000	0.76	8.083	1.52	14.167	6.23	20.25	1.37
2.083	1.37	8.167	1.52	14.250	6.23	20.33	0.91
2.167	1.37	8.250	1.52	14.333	2.28	20.42	0.91
2.250	1.37	8.333	2.05	14.417	2.28	20.50	0.91
2.333	0.99	8.417	2.05	14.500	2.28	20.58	0.91
2.417	0.99	8.500	2.05	14.583	2.28	20.67	0.91
2.500	0.99	8.583	2.05	14.667	2.28	20.75	0.91
2.583	0.99	8.667	2.05	14.750	2.28	20.83	0.91
2.667	0.99	8.750	2.05	14.833	2.28	20.92	0.91
2.750	0.99	8.833	2.05	14.917	2.28	21.00	0.91
2.833	0.99	8.917	2.05	15.000	2.28	21.08	0.91
2.917	0.99	9.000	2.05	15.083	2.28	21.17	0.91
3.000	0.99	9.083	2.05	15.167	2.28	21.25	0.91
3.083	0.99	9.167	2.05	15.250	2.28	21.33	0.91
3.167	0.99	9.250	2.05	15.333	2.28	21.42	0.91
3.250	0.99	9.333	2.43	15.417	2.28	21.50	0.91
3.333	0.99	9.417	2.43	15.500	2.28	21.58	0.91
3.417	0.99	9.500	2.43	15.583	2.28	21.67	0.91
3.500	0.99	9.583	2.43	15.667	2.28	21.75	0.91
3.583	0.99	9.667	2.43	15.750	2.28	21.83	0.91
3.667	0.99	9.750	2.43	15.833	2.28	21.92	0.91
3.750	0.99	9.833	2.74	15.917	2.28	22.00	0.91
3.833	0.99	9.917	2.74	16.000	2.28	22.08	0.91
3.917	0.99	10.000	2.74	16.083	2.28	22.17	0.91
4.000	0.99	10.083	2.74	16.167	2.28	22.25	0.91
4.083	0.99	10.167	2.74	16.250	2.28	22.33	0.91
4.167	0.99	10.250	2.74	16.333	1.37	22.42	0.91
4.250	0.99	10.333	3.50	16.417	1.37	22.50	0.91
4.333	1.22	10.417	3.50	16.500	1.37	22.58	0.91
4.417	1.22	10.500	3.50	16.583	1.37	22.67	0.91
4.500	1.22	10.583	3.50	16.667	1.37	22.75	0.91
4.583	1.22	10.667	3.50	16.750	1.37	22.83	0.91
4.667	1.22	10.750	3.50	16.833	1.37	22.92	0.91
4.750	1.22	10.833	4.71	16.917	1.37	23.00	0.91
4.833	1.22	10.917	4.71	17.000	1.37	23.08	0.91
4.917	1.22	11.000	4.71	17.083	1.37	23.17	0.91
5.000	1.22	11.083	4.71	17.167	1.37	23.25	0.91
5.083	1.22	11.167	4.71	17.250	1.37	23.33	0.91
5.167	1.22	11.250	4.71	17.333	1.37	23.42	0.91
5.250	1.22	11.333	7.30	17.417	1.37	23.50	0.91
5.333	1.22	11.417	7.30	17.500	1.37	23.58	0.91
5.417	1.22	11.500	7.30	17.583	1.37	23.67	0.91
5.500	1.22	11.583	7.30	17.667	1.37	23.75	0.91
5.583	1.22	11.667	7.30	17.750	1.37	23.83	0.91
5.667	1.22	11.750	7.30	17.833	1.37	23.92	0.91
5.750	1.22	11.833	31.61	17.917	1.37	24.00	0.91
5.833	1.22	11.917	31.62	18.000	1.37	24.08	0.91
5.917	1.22	12.000	31.62	18.083	1.37	24.17	0.91
6.000	1.22	12.083	83.90	18.167	1.37	24.25	0.91
6.083	1.22	12.167	83.90	18.250	1.37		

Max.Eff.Inten.	(mm/hr)=	83.90	72.02	
over	(min)	5.00	15.00	
Storage Coeff.	(min)=	6.67 (ii)	14.72 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	15.00	
Unit Hyd. peak	(cms)=	0.18	0.08	
				TOTALS
PEAK FLOW	(cms)=	3.47	1.18	4.500 (iii)
TIME TO PEAK	(hrs)=	12.25	12.33	12.25
RUNOFF VOLUME	(mm)=	75.00	40.26	59.37
TOTAL RAINFALL	(mm)=	76.00	76.00	76.00
RUNOFF COEFFICIENT	=	0.99	0.53	0.78

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0020)	Area (ha)= 3.80
ID= 1 DT= 5.0 min	Total Imp(%)= 80.00 Dir. Conn.(%)= 60.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	6.167	1.22	12.250	83.90	18.33	1.37
0.167	0.00	6.250	1.22	12.333	10.95	18.42	1.37
0.250	0.00	6.333	1.52	12.417	10.94	18.50	1.37
0.333	0.76	6.417	1.52	12.500	10.94	18.58	1.37
0.417	0.76	6.500	1.52	12.583	10.94	18.67	1.37
0.500	0.76	6.583	1.52	12.667	10.94	18.75	1.37
0.583	0.76	6.667	1.52	12.750	10.94	18.83	1.37
0.667	0.76	6.750	1.52	12.833	5.62	18.92	1.37
0.750	0.76	6.833	1.52	12.917	5.62	19.00	1.37
0.833	0.76	6.917	1.52	13.000	5.62	19.08	1.37
0.917	0.76	7.000	1.52	13.083	5.62	19.17	1.37
1.000	0.76	7.083	1.52	13.167	5.62	19.25	1.37
1.083	0.76	7.167	1.52	13.250	5.62	19.33	1.37
1.167	0.76	7.250	1.52	13.333	1.06	19.42	1.37
1.250	0.76	7.333	1.52	13.417	1.06	19.50	1.37
1.333	0.76	7.417	1.52	13.500	1.06	19.58	1.37
1.417	0.76	7.500	1.52	13.583	1.06	19.67	1.37
1.500	0.76	7.583	1.52	13.667	1.06	19.75	1.37
1.583	0.76	7.667	1.52	13.750	1.06	19.83	1.37
1.667	0.76	7.750	1.52	13.833	6.23	19.92	1.37
1.750	0.76	7.833	1.52	13.917	6.23	20.00	1.37
1.833	0.76	7.917	1.52	14.000	6.23	20.08	1.37
1.917	0.76	8.000	1.52	14.083	6.23	20.17	1.37
2.000	0.76	8.083	1.52	14.167	6.23	20.25	1.37
2.083	1.37	8.167	1.52	14.250	6.23	20.33	0.91
2.167	1.37	8.250	1.52	14.333	2.28	20.42	0.91
2.250	1.37	8.333	2.05	14.417	2.28	20.50	0.91
2.333	0.99	8.417	2.05	14.500	2.28	20.58	0.91
2.417	0.99	8.500	2.05	14.583	2.28	20.67	0.91
2.500	0.99	8.583	2.05	14.667	2.28	20.75	0.91
2.583	0.99	8.667	2.05	14.750	2.28	20.83	0.91
2.667	0.99	8.750	2.05	14.833	2.28	20.92	0.91
2.750	0.99	8.833	2.05	14.917	2.28	21.00	0.91
2.833	0.99	8.917	2.05	15.000	2.28	21.08	0.91
2.917	0.99	9.000	2.05	15.083	2.28	21.17	0.91
3.000	0.99	9.083	2.05	15.167	2.28	21.25	0.91
3.083	0.99	9.167	2.05	15.250	2.28	21.33	0.91
3.167	0.99	9.250	2.05	15.333	2.28	21.42	0.91
3.250	0.99	9.333	2.43	15.417	2.28	21.50	0.91
3.333	0.99	9.417	2.43	15.500	2.28	21.58	0.91
3.417	0.99	9.500	2.43	15.583	2.28	21.67	0.91
3.500	0.99	9.583	2.43	15.667	2.28	21.75	0.91
3.583	0.99	9.667	2.43	15.750	2.28	21.83	0.91
3.667	0.99	9.750	2.43	15.833	2.28	21.92	0.91
3.750	0.99	9.833	2.74	15.917	2.28	22.00	0.91
3.833	0.99	9.917	2.74	16.000	2.28	22.08	0.91
3.917	0.99	10.000	2.74	16.083	2.28	22.17	0.91
4.000	0.99	10.083	2.74	16.167	2.28	22.25	0.91
4.083	0.99	10.167	2.74	16.250	2.28	22.33	0.91
4.167	0.99	10.250	2.74	16.333	1.37	22.42	0.91
4.250	0.99	10.333	3.50	16.417	1.37	22.50	0.91
4.333	1.22	10.417	3.50	16.500	1.37	22.58	0.91
4.417	1.22	10.500	3.50	16.583	1.37	22.67	0.91
4.500	1.22	10.583	3.50	16.667	1.37	22.75	0.91
4.583	1.22	10.667	3.50	16.750	1.37	22.83	0.91
4.667	1.22	10.750	3.50	16.833	1.37	22.92	0.91
4.750	1.22	10.833	4.71	16.917	1.37	23.00	0.91
4.833	1.22	10.917	4.71	17.000	1.37	23.08	0.91
4.917	1.22	11.000	4.71	17.083	1.37	23.17	0.91
5.000	1.22	11.083	4.71	17.167	1.37	23.25	0.91
5.083	1.22	11.167	4.71	17.250	1.37	23.33	0.91
5.167	1.22	11.250	4.71	17.333	1.37	23.42	0.91
5.250	1.22	11.333	7.30	17.417	1.37	23.50	0.91
5.333	1.22	11.417	7.30	17.500	1.37	23.58	0.91
5.417	1.22	11.500	7.30	17.583	1.37	23.67	0.91
5.500	1.22	11.583	7.30	17.667	1.37	23.75	0.91
5.583	1.22	11.667	7.30	17.750	1.37	23.83	0.91
5.667	1.22	11.750	7.30	17.833	1.37	23.92	0.91
5.750	1.22	11.833	31.61	17.917	1.37	24.00	0.91
5.833	1.22	11.917	31.62	18.000	1.37	24.08	0.91
5.917	1.22	12.000	31.62	18.083	1.37	24.17	0.91
6.000	1.22	12.083	83.90	18.167	1.37	24.25	0.91
6.083	1.22	12.167	83.90	18.250	1.37		

Max.Eff.Inten.	(mm/hr)=	83.90	128.64	
over	(min)	5.00	10.00	
Storage Coeff.	(min)=	3.62 (ii)	8.50 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	10.00	
Unit Hyd. peak	(cms)=	0.25	0.12	
				TOTALS
PEAK FLOW	(cms)=	0.53	0.21	0.741 (iii)
TIME TO PEAK	(hrs)=	12.25	12.25	12.25
RUNOFF VOLUME	(mm)=	75.00	48.48	64.39
TOTAL RAINFALL	(mm)=	76.00	76.00	76.00
RUNOFF COEFFICIENT	=	0.99	0.64	0.85

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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  (  0023)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0020):     3.80   0.741    12.25    64.39
     + ID2= 2 (  0006):    29.06   4.500    12.25    59.37
       ================================================
       ID = 3 (  0023):    32.86   5.241    12.25    59.95

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0012)|     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   |   0.4930      1.5666
                          0.0360     0.7150   |   0.7890      1.8478
                          0.0660     1.0737   |   1.0520      2.0613
                          0.2630     1.3645   |   1.3140      2.2797

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0023)     32.860     5.241     12.25      59.95
   OUTFLOW: ID= 1 (  0012)     32.860     0.262     14.50      57.48

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  5.00
                  TIME SHIFT OF PEAK FLOW          (min)=135.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.3645

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--------------------
| CALIB            |
| STANDHYD (  0017)|   Area    (ha)=  15.53
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  49.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.09         5.44
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     321.77        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 | 6.167    1.22 |12.250   83.90 | 18.33    1.37
 0.167    0.00 | 6.250    1.22 |12.333   10.95 | 18.42    1.37
 0.250    0.00 | 6.333    1.52 |12.417   10.94 | 18.50    1.37
 0.333    0.76 | 6.417    1.52 |12.500   10.94 | 18.58    1.37
 0.417    0.76 | 6.500    1.52 |12.583   10.94 | 18.67    1.37
 0.500    0.76 | 6.583    1.52 |12.667   10.94 | 18.75    1.37
 0.583    0.76 | 6.667    1.52 |12.750   10.94 | 18.83    1.37
 0.667    0.76 | 6.750    1.52 |12.833    5.62 | 18.92    1.37
 0.750    0.76 | 6.833    1.52 |12.917    5.62 | 19.00    1.37
 0.833    0.76 | 6.917    1.52 |13.000    5.62 | 19.08    1.37
 0.917    0.76 | 7.000    1.52 |13.083    5.62 | 19.17    1.37
 1.000    0.76 | 7.083    1.52 |13.167    5.62 | 19.25    1.37
 1.083    0.76 | 7.167    1.52 |13.250    5.62 | 19.33    1.37
 1.167    0.76 | 7.250    1.52 |13.333    1.06 | 19.42    1.37
 1.250    0.76 | 7.333    1.52 |13.417    1.06 | 19.50    1.37
 1.333    0.76 | 7.417    1.52 |13.500    1.06 | 19.58    1.37
 1.417    0.76 | 7.500    1.52 |13.583    1.06 | 19.67    1.37
 1.500    0.76 | 7.583    1.52 |13.667    1.06 | 19.75    1.37
 1.583    0.76 | 7.667    1.52 |13.750    1.06 | 19.83    1.37
 1.667    0.76 | 7.750    1.52 |13.833    6.23 | 19.92    1.37
 1.750    0.76 | 7.833    1.52 |13.917    6.23 | 20.00    1.37
 1.833    0.76 | 7.917    1.52 |14.000    6.23 | 20.08    1.37
 1.917    0.76 | 8.000    1.52 |14.083    6.23 | 20.17    1.37
 2.000    0.76 | 8.083    1.52 |14.167    6.23 | 20.25    1.37
 2.083    1.37 | 8.167    1.52 |14.250    6.23 | 20.33    0.91
 2.167    1.37 | 8.250    1.52 |14.333    2.28 | 20.42    0.91
 2.250    1.37 | 8.333    2.05 |14.417    2.28 | 20.50    0.91
 2.333    0.99 | 8.417    2.05 |14.500    2.28 | 20.58    0.91
 2.417    0.99 | 8.500    2.05 |14.583    2.28 | 20.67    0.91
 2.500    0.99 | 8.583    2.05 |14.667    2.28 | 20.75    0.91
 2.583    0.99 | 8.667    2.05 |14.750    2.28 | 20.83    0.91
 2.667    0.99 | 8.750    2.05 |14.833    2.28 | 20.92    0.91
 2.750    0.99 | 8.833    2.05 |14.917    2.28 | 21.00    0.91
 2.833    0.99 | 8.917    2.05 |15.000    2.28 | 21.08    0.91
 2.917    0.99 | 9.000    2.05 |15.083    2.28 | 21.17    0.91
 3.000    0.99 | 9.083    2.05 |15.167    2.28 | 21.25    0.91
 3.083    0.99 | 9.167    2.05 |15.250    2.28 | 21.33    0.91
 3.167    0.99 | 9.250    2.05 |15.333    2.28 | 21.42    0.91
 3.250    0.99 | 9.333    2.43 |15.417    2.28 | 21.50    0.91
 3.333    0.99 | 9.417    2.43 |15.500    2.28 | 21.58    0.91
 3.417    0.99 | 9.500    2.43 |15.583    2.28 | 21.67    0.91
 3.500    0.99 | 9.583    2.43 |15.667    2.28 | 21.75    0.91
 3.583    0.99 | 9.667    2.43 |15.750    2.28 | 21.83    0.91
 3.667    0.99 | 9.750    2.43 |15.833    2.28 | 21.92    0.91
 3.750    0.99 | 9.833    2.74 |15.917    2.28 | 22.00    0.91
 3.833    0.99 | 9.917    2.74 |16.000    2.28 | 22.08    0.91
 3.917    0.99 |10.000    2.74 |16.083    2.28 | 22.17    0.91
 4.000    0.99 |10.083    2.74 |16.167    2.28 | 22.25    0.91
 4.083    0.99 |10.167    2.74 |16.250    2.28 | 22.33    0.91
 4.167    0.99 |10.250    2.74 |16.333    1.37 | 22.42    0.91
 4.250    0.99 |10.333    3.50 |16.417    1.37 | 22.50    0.91
 4.333    1.22 |10.417    3.50 |16.500    1.37 | 22.58    0.91
 4.417    1.22 |10.500    3.50 |16.583    1.37 | 22.67    0.91
 4.500    1.22 |10.583    3.50 |16.667    1.37 | 22.75    0.91
 4.583    1.22 |10.667    3.50 |16.750    1.37 | 22.83    0.91
 4.667    1.22 |10.750    3.50 |16.833    1.37 | 22.92    0.91
 4.750    1.22 |10.833    4.71 |16.917    1.37 | 23.00    0.91
 4.833    1.22 |10.917    4.71 |17.000    1.37 | 23.08    0.91
 4.917    1.22 |11.000    4.71 |17.083    1.37 | 23.17    0.91
 5.000    1.22 |11.083    4.71 |17.167    1.37 | 23.25    0.91
 5.083    1.22 |11.167    4.71 |17.250    1.37 | 23.33    0.91
 5.167    1.22 |11.250    4.71 |17.333    1.37 | 23.42    0.91
 5.250    1.22 |11.333    7.30 |17.417    1.37 | 23.50    0.91
 5.333    1.22 |11.417    7.30 |17.500    1.37 | 23.58    0.91
 5.417    1.22 |11.500    7.30 |17.583    1.37 | 23.67    0.91
 5.500    1.22 |11.583    7.30 |17.667    1.37 | 23.75    0.91
 5.583    1.22 |11.667    7.30 |17.750    1.37 | 23.83    0.91
 5.667    1.22 |11.750    7.30 |17.833    1.37 | 23.92    0.91
 5.750    1.22 |11.833   31.61 |17.917    1.37 | 24.00    0.91
 5.833    1.22 |11.917   31.62 |18.000    1.37 | 24.08    0.91
 5.917    1.22 |12.000   31.62 |18.083    1.37 | 24.17    0.91
 6.000    1.22 |12.083   83.90 |18.167    1.37 | 24.25    0.91
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	6.083	1.22	12.167	83.90	18.250	1.37					

Max.Eff.Inten.(mm/hr)=	83.90	82.90		
over (min)	5.00	15.00		
Storage Coeff. (min)=	5.53 (ii)	13.13 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	0.20	0.08		
			TOTALS	
PEAK FLOW (cms)=	1.70	0.79	2.395 (iii)	
TIME TO PEAK (hrs)=	12.25	12.33	12.25	
RUNOFF VOLUME (mm)=	75.00	42.25	58.30	
TOTAL RAINFALL (mm)=	76.00	76.00	76.00	
RUNOFF COEFFICIENT =	0.99	0.56	0.77	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0002)	Area (ha)=	20.06	
ID= 1 DT= 5.0 min	Total Imp(%)=	67.00	Dir. Conn.(%)= 56.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	13.44	6.62
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	365.70	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	6.167	1.22	12.250	83.90	18.33	1.37
0.167	0.00	6.250	1.22	12.333	10.95	18.42	1.37
0.250	0.00	6.333	1.52	12.417	10.94	18.50	1.37
0.333	0.76	6.417	1.52	12.500	10.94	18.58	1.37
0.417	0.76	6.500	1.52	12.583	10.94	18.67	1.37
0.500	0.76	6.583	1.52	12.667	10.94	18.75	1.37
0.583	0.76	6.667	1.52	12.750	10.94	18.83	1.37
0.667	0.76	6.750	1.52	12.833	5.62	18.92	1.37
0.750	0.76	6.833	1.52	12.917	5.62	19.00	1.37
0.833	0.76	6.917	1.52	13.000	5.62	19.08	1.37
0.917	0.76	7.000	1.52	13.083	5.62	19.17	1.37
1.000	0.76	7.083	1.52	13.167	5.62	19.25	1.37
1.083	0.76	7.167	1.52	13.250	5.62	19.33	1.37
1.167	0.76	7.250	1.52	13.333	1.06	19.42	1.37
1.250	0.76	7.333	1.52	13.417	1.06	19.50	1.37
1.333	0.76	7.417	1.52	13.500	1.06	19.58	1.37
1.417	0.76	7.500	1.52	13.583	1.06	19.67	1.37
1.500	0.76	7.583	1.52	13.667	1.06	19.75	1.37
1.583	0.76	7.667	1.52	13.750	1.06	19.83	1.37
1.667	0.76	7.750	1.52	13.833	6.23	19.92	1.37
1.750	0.76	7.833	1.52	13.917	6.23	20.00	1.37
1.833	0.76	7.917	1.52	14.000	6.23	20.08	1.37
1.917	0.76	8.000	1.52	14.083	6.23	20.17	1.37
2.000	0.76	8.083	1.52	14.167	6.23	20.25	1.37
2.083	1.37	8.167	1.52	14.250	6.23	20.33	0.91
2.167	1.37	8.250	1.52	14.333	2.28	20.42	0.91
2.250	1.37	8.333	2.05	14.417	2.28	20.50	0.91
2.333	0.99	8.417	2.05	14.500	2.28	20.58	0.91
2.417	0.99	8.500	2.05	14.583	2.28	20.67	0.91
2.500	0.99	8.583	2.05	14.667	2.28	20.75	0.91
2.583	0.99	8.667	2.05	14.750	2.28	20.83	0.91
2.667	0.99	8.750	2.05	14.833	2.28	20.92	0.91
2.750	0.99	8.833	2.05	14.917	2.28	21.00	0.91
2.833	0.99	8.917	2.05	15.000	2.28	21.08	0.91
2.917	0.99	9.000	2.05	15.083	2.28	21.17	0.91
3.000	0.99	9.083	2.05	15.167	2.28	21.25	0.91
3.083	0.99	9.167	2.05	15.250	2.28	21.33	0.91
3.167	0.99	9.250	2.05	15.333	2.28	21.42	0.91
3.250	0.99	9.333	2.43	15.417	2.28	21.50	0.91
3.333	0.99	9.417	2.43	15.500	2.28	21.58	0.91
3.417	0.99	9.500	2.43	15.583	2.28	21.67	0.91
3.500	0.99	9.583	2.43	15.667	2.28	21.75	0.91
3.583	0.99	9.667	2.43	15.750	2.28	21.83	0.91
3.667	0.99	9.750	2.43	15.833	2.28	21.92	0.91
3.750	0.99	9.833	2.74	15.917	2.28	22.00	0.91
3.833	0.99	9.917	2.74	16.000	2.28	22.08	0.91
3.917	0.99	10.000	2.74	16.083	2.28	22.17	0.91
4.000	0.99	10.083	2.74	16.167	2.28	22.25	0.91
4.083	0.99	10.167	2.74	16.250	2.28	22.33	0.91
4.167	0.99	10.250	2.74	16.333	1.37	22.42	0.91
4.250	0.99	10.333	3.50	16.417	1.37	22.50	0.91
4.333	1.22	10.417	3.50	16.500	1.37	22.58	0.91
4.417	1.22	10.500	3.50	16.583	1.37	22.67	0.91
4.500	1.22	10.583	3.50	16.667	1.37	22.75	0.91
4.583	1.22	10.667	3.50	16.750	1.37	22.83	0.91
4.667	1.22	10.750	3.50	16.833	1.37	22.92	0.91
4.750	1.22	10.833	4.71	16.917	1.37	23.00	0.91
4.833	1.22	10.917	4.71	17.000	1.37	23.08	0.91
4.917	1.22	11.000	4.71	17.083	1.37	23.17	0.91
5.000	1.22	11.083	4.71	17.167	1.37	23.25	0.91
5.083	1.22	11.167	4.71	17.250	1.37	23.33	0.91
5.167	1.22	11.250	4.71	17.333	1.37	23.42	0.91
5.250	1.22	11.333	7.30	17.417	1.37	23.50	0.91
5.333	1.22	11.417	7.30	17.500	1.37	23.58	0.91
5.417	1.22	11.500	7.30	17.583	1.37	23.67	0.91
5.500	1.22	11.583	7.30	17.667	1.37	23.75	0.91
5.583	1.22	11.667	7.30	17.750	1.37	23.83	0.91
5.667	1.22	11.750	7.30	17.833	1.37	23.92	0.91
5.750	1.22	11.833	31.61	17.917	1.37	24.00	0.91
5.833	1.22	11.917	31.62	18.000	1.37	24.08	0.91
5.917	1.22	12.000	31.62	18.083	1.37	24.17	0.91
6.000	1.22	12.083	83.90	18.167	1.37	24.25	0.91
6.083	1.22	12.167	83.90	18.250	1.37		

Max.Eff.Inten.(mm/hr)=	83.90	72.81		
over (min)	5.00	15.00		
Storage Coeff. (min)=	5.97 (ii)	13.98 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	0.19	0.08		
			TOTALS	
PEAK FLOW (cms)=	2.48	0.81	3.199 (iii)	
TIME TO PEAK (hrs)=	12.25	12.33	12.25	

```
     RUNOFF VOLUME     (mm)=      75.00        40.42          59.78
     TOTAL RAINFALL    (mm)=      76.00        76.00          76.00
     RUNOFF COEFFICIENT   =       0.99         0.53           0.79


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    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  (  0018)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0017):    15.53   2.395    12.25    58.30
      + ID2= 2 (  0002):    20.06   3.199    12.25    59.78
        ================================================
        ID = 3 (  0018):    35.59   5.594    12.25    59.14

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0008)|     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   |   0.4480     1.7011
                          0.0360     0.7282   |   0.7160     2.0238
                          0.0600     1.1698   |   0.9550     2.2595
                          0.2380     1.4871   |   1.1940     2.5034

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0018)     35.590     5.594     12.25      59.14
   OUTFLOW: ID= 1 (  0008)     35.590     0.239     14.67      56.38

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  4.27
                  TIME SHIFT OF PEAK FLOW          (min)=145.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.4871

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0037)|   Area    (ha)=   2.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  59.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.58         0.42
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     115.47        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	6.167	1.22	12.250	83.90	18.33	1.37
0.167	0.00	6.250	1.22	12.333	10.95	18.42	1.37
0.250	0.00	6.333	1.52	12.417	10.94	18.50	1.37
0.333	0.76	6.417	1.52	12.500	10.94	18.58	1.37
0.417	0.76	6.500	1.52	12.583	10.94	18.67	1.37
0.500	0.76	6.583	1.52	12.667	10.94	18.75	1.37
0.583	0.76	6.667	1.52	12.750	10.94	18.83	1.37
0.667	0.76	6.750	1.52	12.833	5.62	18.92	1.37
0.750	0.76	6.833	1.52	12.917	5.62	19.00	1.37
0.833	0.76	6.917	1.52	13.000	5.62	19.08	1.37
0.917	0.76	7.000	1.52	13.083	5.62	19.17	1.37
1.000	0.76	7.083	1.52	13.167	5.62	19.25	1.37
1.083	0.76	7.167	1.52	13.250	5.62	19.33	1.37
1.167	0.76	7.250	1.52	13.333	1.06	19.42	1.37
1.250	0.76	7.333	1.52	13.417	1.06	19.50	1.37
1.333	0.76	7.417	1.52	13.500	1.06	19.58	1.37
1.417	0.76	7.500	1.52	13.583	1.06	19.67	1.37
1.500	0.76	7.583	1.52	13.667	1.06	19.75	1.37
1.583	0.76	7.667	1.52	13.750	1.06	19.83	1.37
1.667	0.76	7.750	1.52	13.833	6.23	19.92	1.37
1.750	0.76	7.833	1.52	13.917	6.23	20.00	1.37
1.833	0.76	7.917	1.52	14.000	6.23	20.08	1.37
1.917	0.76	8.000	1.52	14.083	6.23	20.17	1.37
2.000	0.76	8.083	1.52	14.167	6.23	20.25	1.37
2.083	1.37	8.167	1.52	14.250	6.23	20.33	0.91
2.167	1.37	8.250	1.52	14.333	2.28	20.42	0.91
2.250	1.37	8.333	2.05	14.417	2.28	20.50	0.91
2.333	0.99	8.417	2.05	14.500	2.28	20.58	0.91
2.417	0.99	8.500	2.05	14.583	2.28	20.67	0.91
2.500	0.99	8.583	2.05	14.667	2.28	20.75	0.91
2.583	0.99	8.667	2.05	14.750	2.28	20.83	0.91
2.667	0.99	8.750	2.05	14.833	2.28	20.92	0.91
2.750	0.99	8.833	2.05	14.917	2.28	21.00	0.91
2.833	0.99	8.917	2.05	15.000	2.28	21.08	0.91
2.917	0.99	9.000	2.05	15.083	2.28	21.17	0.91
3.000	0.99	9.083	2.05	15.167	2.28	21.25	0.91
3.083	0.99	9.167	2.05	15.250	2.28	21.33	0.91
3.167	0.99	9.250	2.05	15.333	2.28	21.42	0.91
3.250	0.99	9.333	2.43	15.417	2.28	21.50	0.91
3.333	0.99	9.417	2.43	15.500	2.28	21.58	0.91
3.417	0.99	9.500	2.43	15.583	2.28	21.67	0.91
3.500	0.99	9.583	2.43	15.667	2.28	21.75	0.91
3.583	0.99	9.667	2.43	15.750	2.28	21.83	0.91
3.667	0.99	9.750	2.43	15.833	2.28	21.92	0.91
3.750	0.99	9.833	2.74	15.917	2.28	22.00	0.91
3.833	0.99	9.917	2.74	16.000	2.28	22.08	0.91
3.917	0.99	10.000	2.74	16.083	2.28	22.17	0.91
4.000	0.99	10.083	2.74	16.167	2.28	22.25	0.91
4.083	0.99	10.167	2.74	16.250	2.28	22.33	0.91
4.167	0.99	10.250	2.74	16.333	1.37	22.42	0.91
4.250	0.99	10.333	3.50	16.417	1.37	22.50	0.91
4.333	1.22	10.417	3.50	16.500	1.37	22.58	0.91
4.417	1.22	10.500	3.50	16.583	1.37	22.67	0.91
4.500	1.22	10.583	3.50	16.667	1.37	22.75	0.91
4.583	1.22	10.667	3.50	16.750	1.37	22.83	0.91
4.667	1.22	10.750	3.50	16.833	1.37	22.92	0.91
4.750	1.22	10.833	4.71	16.917	1.37	23.00	0.91
4.833	1.22	10.917	4.71	17.000	1.37	23.08	0.91
4.917	1.22	11.000	4.71	17.083	1.37	23.17	0.91
5.000	1.22	11.083	4.71	17.167	1.37	23.25	0.91

5.083	1.22	11.167	4.71	17.250	1.37	23.33	0.91
5.167	1.22	11.250	4.71	17.333	1.37	23.42	0.91
5.250	1.22	11.333	7.30	17.417	1.37	23.50	0.91
5.333	1.22	11.417	7.30	17.500	1.37	23.58	0.91
5.417	1.22	11.500	7.30	17.583	1.37	23.67	0.91
5.500	1.22	11.583	7.30	17.667	1.37	23.75	0.91
5.583	1.22	11.667	7.30	17.750	1.37	23.83	0.91
5.667	1.22	11.750	7.30	17.833	1.37	23.92	0.91
5.750	1.22	11.833	31.61	17.917	1.37	24.00	0.91
5.833	1.22	11.917	31.62	18.000	1.37	24.08	0.91
5.917	1.22	12.000	31.62	18.083	1.37	24.17	0.91
6.000	1.22	12.083	83.90	18.167	1.37	24.25	0.91
6.083	1.22	12.167	83.90	18.250	1.37		

			TOTALS
Max.Eff.Inten.(mm/hr)=	83.90	124.56	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.99 (ii)	9.45 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.28	0.12	
PEAK FLOW (cms)=	0.27	0.11	0.384 (iii)
TIME TO PEAK (hrs)=	12.25	12.25	12.25
RUNOFF VOLUME (mm)=	75.00	48.03	63.94
TOTAL RAINFALL (mm)=	76.00	76.00	76.00
RUNOFF COEFFICIENT =	0.99	0.63	0.84

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| RESERVOIR(0033)| OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 5.0 min |

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0250	0.1054
0.0020	0.0490	0.0410	0.1239
0.0030	0.0750	0.0540	0.1381
0.0130	0.0932	0.0670	0.1527

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0037)	2.000	0.384	12.25	63.94
OUTFLOW: ID= 1 (0033)	2.000	0.013	14.58	58.98

PEAK FLOW REDUCTION [Qout/Qin](%)= 3.35
TIME SHIFT OF PEAK FLOW (min)=140.00
MAXIMUM STORAGE USED (ha.m.)= 0.0932

```
V V I SS U U A A L (v 6.2.2015)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SSSSS UUUUU A A LLLLL
OOO TTTTT TTTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO
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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\2f3f2494-b067-4bce-a809-50a1ee09cde1\scen
Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\2f3f2494-b067-4bce-a809-50a1ee09cde1\scen

DATE: 05-01-2024 TIME: 02:27:00

USER:

COMMENTS: _____

```
**********
** SIMULATION : 03. 10-Year-24-Hour-SCS-Type- **
**********
```

READ STORM	Filename: C:\Users\mmsingh\AppD ata\Local\Temp\ d7ebc3fa-4e57-492f-bbed-8129d1e23af0\efc9bd42
Ptotal= 89.90 mm	Comments: New DesignStormManualInput

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.80	12.50	12.95	18.75	1.62
0.25	0.90	6.50	1.80	12.75	6.65	19.00	1.62
0.50	0.90	6.75	1.80	13.00	6.65	19.25	1.62
0.75	0.90	7.00	1.80	13.25	1.26	19.50	1.62
1.00	0.90	7.25	1.80	13.50	1.26	19.75	1.62
1.25	0.90	7.50	1.80	13.75	7.37	20.00	1.62
1.50	0.90	7.75	1.80	14.00	7.37	20.25	1.08
1.75	0.90	8.00	1.80	14.25	2.70	20.50	1.08
2.00	1.62	8.25	2.43	14.50	2.70	20.75	1.08
2.25	1.17	8.50	2.43	14.75	2.70	21.00	1.08
2.50	1.17	8.75	2.43	15.00	2.70	21.25	1.08
2.75	1.17	9.00	2.43	15.25	2.70	21.50	1.08
3.00	1.17	9.25	2.88	15.50	2.70	21.75	1.08
3.25	1.17	9.50	2.88	15.75	2.70	22.00	1.08
3.50	1.17	9.75	3.24	16.00	2.70	22.25	1.08

3.75	1.17	10.00	3.24	16.25	1.62	22.50	1.08
4.00	1.17	10.25	4.14	16.50	1.62	22.75	1.08
4.25	1.44	10.50	4.14	16.75	1.62	23.00	1.08
4.50	1.44	10.75	5.57	17.00	1.62	23.25	1.08
4.75	1.44	11.00	5.57	17.25	1.62	23.50	1.08
5.00	1.44	11.25	8.63	17.50	1.62	23.75	1.08
5.25	1.44	11.50	8.63	17.75	1.62	24.00	1.08
5.50	1.44	11.75	37.40	18.00	1.62		
5.75	1.44	12.00	99.25	18.25	1.62		
6.00	1.44	12.25	12.95	18.50	1.62		

CALIB			
STANDHYD (0006)	Area (ha)= 29.06		
ID= 1 DT= 5.0 min	Total Imp(%)= 66.00	Dir. Conn.(%)= 55.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	6.167	1.44	12.250	99.25	18.33	1.62
0.167	0.00	6.250	1.44	12.333	12.96	18.42	1.62
0.250	0.00	6.333	1.80	12.417	12.95	18.50	1.62
0.333	0.90	6.417	1.80	12.500	12.95	18.58	1.62
0.417	0.90	6.500	1.80	12.583	12.95	18.67	1.62
0.500	0.90	6.583	1.80	12.667	12.95	18.75	1.62
0.583	0.90	6.667	1.80	12.750	12.95	18.83	1.62
0.667	0.90	6.750	1.80	12.833	6.65	18.92	1.62
0.750	0.90	6.833	1.80	12.917	6.65	19.00	1.62
0.833	0.90	6.917	1.80	13.000	6.65	19.08	1.62
0.917	0.90	7.000	1.80	13.083	6.65	19.17	1.62
1.000	0.90	7.083	1.80	13.167	6.65	19.25	1.62
1.083	0.90	7.167	1.80	13.250	6.65	19.33	1.62
1.167	0.90	7.250	1.80	13.333	1.26	19.42	1.62
1.250	0.90	7.333	1.80	13.417	1.26	19.50	1.62
1.333	0.90	7.417	1.80	13.500	1.26	19.58	1.62
1.417	0.90	7.500	1.80	13.583	1.26	19.67	1.62
1.500	0.90	7.583	1.80	13.667	1.26	19.75	1.62
1.583	0.90	7.667	1.80	13.750	1.26	19.83	1.62
1.667	0.90	7.750	1.80	13.833	7.37	19.92	1.62
1.750	0.90	7.833	1.80	13.917	7.37	20.00	1.62
1.833	0.90	7.917	1.80	14.000	7.37	20.08	1.62
1.917	0.90	8.000	1.80	14.083	7.37	20.17	1.62
2.000	0.90	8.083	1.80	14.167	7.37	20.25	1.62
2.083	1.62	8.167	1.80	14.250	7.37	20.33	1.08
2.167	1.62	8.250	1.80	14.333	2.70	20.42	1.08
2.250	1.62	8.333	2.43	14.417	2.70	20.50	1.08
2.333	1.17	8.417	2.43	14.500	2.70	20.58	1.08
2.417	1.17	8.500	2.43	14.583	2.70	20.67	1.08
2.500	1.17	8.583	2.43	14.667	2.70	20.75	1.08
2.583	1.17	8.667	2.43	14.750	2.70	20.83	1.08
2.667	1.17	8.750	2.43	14.833	2.70	20.92	1.08
2.750	1.17	8.833	2.43	14.917	2.70	21.00	1.08
2.833	1.17	8.917	2.43	15.000	2.70	21.08	1.08
2.917	1.17	9.000	2.43	15.083	2.70	21.17	1.08
3.000	1.17	9.083	2.43	15.167	2.70	21.25	1.08
3.083	1.17	9.167	2.43	15.250	2.70	21.33	1.08
3.167	1.17	9.250	2.43	15.333	2.70	21.42	1.08
3.250	1.17	9.333	2.88	15.417	2.70	21.50	1.08
3.333	1.17	9.417	2.88	15.500	2.70	21.58	1.08
3.417	1.17	9.500	2.88	15.583	2.70	21.67	1.08
3.500	1.17	9.583	2.88	15.667	2.70	21.75	1.08
3.583	1.17	9.667	2.88	15.750	2.70	21.83	1.08
3.667	1.17	9.750	2.88	15.833	2.70	21.92	1.08
3.750	1.17	9.833	3.24	15.917	2.70	22.00	1.08
3.833	1.17	9.917	3.24	16.000	2.70	22.08	1.08
3.917	1.17	10.000	3.24	16.083	2.70	22.17	1.08
4.000	1.17	10.083	3.24	16.167	2.70	22.25	1.08
4.083	1.17	10.167	3.24	16.250	2.70	22.33	1.08
4.167	1.17	10.250	3.24	16.333	1.62	22.42	1.08
4.250	1.17	10.333	4.14	16.417	1.62	22.50	1.08
4.333	1.44	10.417	4.14	16.500	1.62	22.58	1.08
4.417	1.44	10.500	4.14	16.583	1.62	22.67	1.08
4.500	1.44	10.583	4.14	16.667	1.62	22.75	1.08
4.583	1.44	10.667	4.14	16.750	1.62	22.83	1.08
4.667	1.44	10.750	4.14	16.833	1.62	22.92	1.08
4.750	1.44	10.833	5.57	16.917	1.62	23.00	1.08
4.833	1.44	10.917	5.57	17.000	1.62	23.08	1.08
4.917	1.44	11.000	5.57	17.083	1.62	23.17	1.08
5.000	1.44	11.083	5.57	17.167	1.62	23.25	1.08
5.083	1.44	11.167	5.57	17.250	1.62	23.33	1.08
5.167	1.44	11.250	5.57	17.333	1.62	23.42	1.08
5.250	1.44	11.333	8.63	17.417	1.62	23.50	1.08
5.333	1.44	11.417	8.63	17.500	1.62	23.58	1.08
5.417	1.44	11.500	8.63	17.583	1.62	23.67	1.08
5.500	1.44	11.583	8.63	17.667	1.62	23.75	1.08
5.583	1.44	11.667	8.63	17.750	1.62	23.83	1.08
5.667	1.44	11.750	8.63	17.833	1.62	23.92	1.08
5.750	1.44	11.833	37.40	17.917	1.62	24.00	1.08
5.833	1.44	11.917	37.40	18.000	1.62	24.08	1.08
5.917	1.44	12.000	37.40	18.083	1.62	24.17	1.08
6.000	1.44	12.083	99.24	18.167	1.62	24.25	1.08
6.083	1.44	12.167	99.25	18.250	1.62		

Max.Eff.Inten.	(mm/hr)=	99.25	91.87	
over	(min)	5.00	15.00	
Storage Coeff.	(min)=	6.23 (ii)	13.54 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	15.00	
Unit Hyd. peak	(cms)=	0.19	0.08	
				TOTALS
PEAK FLOW	(cms)=	4.15	1.57	5.542 (iii)
TIME TO PEAK	(hrs)=	12.25	12.33	12.25
RUNOFF VOLUME	(mm)=	88.90	51.71	72.16
TOTAL RAINFALL	(mm)=	89.90	89.90	89.90
RUNOFF COEFFICIENT	=	0.99	0.58	0.80

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.

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

CALIB	
STANDHYD (0020)	Area (ha)= 3.80
ID= 1 DT= 5.0 min	Total Imp(%)= 80.00 Dir. Conn.(%)= 60.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	6.167	1.44	12.250	99.25	18.33	1.62
0.167	0.00	6.250	1.44	12.333	12.96	18.42	1.62
0.250	0.00	6.333	1.80	12.417	12.95	18.50	1.62
0.333	0.90	6.417	1.80	12.500	12.95	18.58	1.62
0.417	0.90	6.500	1.80	12.583	12.95	18.67	1.62
0.500	0.90	6.583	1.80	12.667	12.95	18.75	1.62
0.583	0.90	6.667	1.80	12.750	12.95	18.83	1.62
0.667	0.90	6.750	1.80	12.833	6.65	18.92	1.62
0.750	0.90	6.833	1.80	12.917	6.65	19.00	1.62
0.833	0.90	6.917	1.80	13.000	6.65	19.08	1.62
0.917	0.90	7.000	1.80	13.083	6.65	19.17	1.62
1.000	0.90	7.083	1.80	13.167	6.65	19.25	1.62
1.083	0.90	7.167	1.80	13.250	6.65	19.33	1.62
1.167	0.90	7.250	1.80	13.333	1.26	19.42	1.62
1.250	0.90	7.333	1.80	13.417	1.26	19.50	1.62
1.333	0.90	7.417	1.80	13.500	1.26	19.58	1.62
1.417	0.90	7.500	1.80	13.583	1.26	19.67	1.62
1.500	0.90	7.583	1.80	13.667	1.26	19.75	1.62
1.583	0.90	7.667	1.80	13.750	1.26	19.83	1.62
1.667	0.90	7.750	1.80	13.833	7.37	19.92	1.62
1.750	0.90	7.833	1.80	13.917	7.37	20.00	1.62
1.833	0.90	7.917	1.80	14.000	7.37	20.08	1.62
1.917	0.90	8.000	1.80	14.083	7.37	20.17	1.62
2.000	0.90	8.083	1.80	14.167	7.37	20.25	1.62
2.083	1.62	8.167	1.80	14.250	7.37	20.33	1.08
2.167	1.62	8.250	1.80	14.333	2.70	20.42	1.08
2.250	1.62	8.333	2.43	14.417	2.70	20.50	1.08
2.333	1.17	8.417	2.43	14.500	2.70	20.58	1.08
2.417	1.17	8.500	2.43	14.583	2.70	20.67	1.08
2.500	1.17	8.583	2.43	14.667	2.70	20.75	1.08
2.583	1.17	8.667	2.43	14.750	2.70	20.83	1.08
2.667	1.17	8.750	2.43	14.833	2.70	20.92	1.08
2.750	1.17	8.833	2.43	14.917	2.70	21.00	1.08
2.833	1.17	8.917	2.43	15.000	2.70	21.08	1.08
2.917	1.17	9.000	2.43	15.083	2.70	21.17	1.08
3.000	1.17	9.083	2.43	15.167	2.70	21.25	1.08
3.083	1.17	9.167	2.43	15.250	2.70	21.33	1.08
3.167	1.17	9.250	2.43	15.333	2.70	21.42	1.08
3.250	1.17	9.333	2.88	15.417	2.70	21.50	1.08
3.333	1.17	9.417	2.88	15.500	2.70	21.58	1.08
3.417	1.17	9.500	2.88	15.583	2.70	21.67	1.08
3.500	1.17	9.583	2.88	15.667	2.70	21.75	1.08
3.583	1.17	9.667	2.88	15.750	2.70	21.83	1.08
3.667	1.17	9.750	2.88	15.833	2.70	21.92	1.08
3.750	1.17	9.833	3.24	15.917	2.70	22.00	1.08
3.833	1.17	9.917	3.24	16.000	2.70	22.08	1.08
3.917	1.17	10.000	3.24	16.083	2.70	22.17	1.08
4.000	1.17	10.083	3.24	16.167	2.70	22.25	1.08
4.083	1.17	10.167	3.24	16.250	2.70	22.33	1.08
4.167	1.17	10.250	3.24	16.333	1.62	22.42	1.08
4.250	1.17	10.333	4.14	16.417	1.62	22.50	1.08
4.333	1.44	10.417	4.14	16.500	1.62	22.58	1.08
4.417	1.44	10.500	4.14	16.583	1.62	22.67	1.08
4.500	1.44	10.583	4.14	16.667	1.62	22.75	1.08
4.583	1.44	10.667	4.14	16.750	1.62	22.83	1.08
4.667	1.44	10.750	4.14	16.833	1.62	22.92	1.08
4.750	1.44	10.833	5.57	16.917	1.62	23.00	1.08
4.833	1.44	10.917	5.57	17.000	1.62	23.08	1.08
4.917	1.44	11.000	5.57	17.083	1.62	23.17	1.08
5.000	1.44	11.083	5.57	17.167	1.62	23.25	1.08
5.083	1.44	11.167	5.57	17.250	1.62	23.33	1.08
5.167	1.44	11.250	5.57	17.333	1.62	23.42	1.08
5.250	1.44	11.333	8.63	17.417	1.62	23.50	1.08
5.333	1.44	11.417	8.63	17.500	1.62	23.58	1.08
5.417	1.44	11.500	8.63	17.583	1.62	23.67	1.08
5.500	1.44	11.583	8.63	17.667	1.62	23.75	1.08
5.583	1.44	11.667	8.63	17.750	1.62	23.83	1.08
5.667	1.44	11.750	8.63	17.833	1.62	23.92	1.08
5.750	1.44	11.833	37.40	17.917	1.62	24.00	1.08
5.833	1.44	11.917	37.40	18.000	1.62	24.08	1.08
5.917	1.44	12.000	37.40	18.083	1.62	24.17	1.08
6.000	1.44	12.083	99.24	18.167	1.62	24.25	1.08
6.083	1.44	12.167	99.25	18.250	1.62		

				TOTALS
Max.Eff.Inten.(mm/hr)=		99.25	160.21	
over (min)		5.00	10.00	
Storage Coeff. (min)=		3.39 (ii)	7.95 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.26	0.13	
PEAK FLOW	(cms)=	0.62	0.27	0.899 (iii)
TIME TO PEAK	(hrs)=	12.25	12.25	12.25
RUNOFF VOLUME	(mm)=	88.90	60.95	77.72
TOTAL RAINFALL	(mm)=	89.90	89.90	89.90
RUNOFF COEFFICIENT	=	0.99	0.68	0.86

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0023)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0020):	3.80	0.899	12.25	77.72

```
      + ID2= 2 (  0006):    29.06   5.542    12.25    72.16
        ================================================
        ID = 3 (  0023):    32.86   6.440    12.25    72.80

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0012)|     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   |   0.4930     1.5666
                          0.0360     0.7150   |   0.7890     1.8478
                          0.0660     1.0737   |   1.0520     2.0613
                          0.2630     1.3645   |   1.3140     2.2797

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0023)     32.860     6.440     12.25      72.80
   OUTFLOW: ID= 1 (  0012)     32.860     0.492     13.33      70.30

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  7.64
                  TIME SHIFT OF PEAK FLOW          (min)= 65.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.5666

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0017)|   Area    (ha)=  15.53
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  49.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.09         5.44
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     321.77        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 | 6.167    1.44 |12.250   99.25 | 18.33    1.62
 0.167    0.00 | 6.250    1.44 |12.333   12.96 | 18.42    1.62
 0.250    0.00 | 6.333    1.80 |12.417   12.95 | 18.50    1.62
 0.333    0.90 | 6.417    1.80 |12.500   12.95 | 18.58    1.62
 0.417    0.90 | 6.500    1.80 |12.583   12.95 | 18.67    1.62
 0.500    0.90 | 6.583    1.80 |12.667   12.95 | 18.75    1.62
 0.583    0.90 | 6.667    1.80 |12.750   12.95 | 18.83    1.62
 0.667    0.90 | 6.750    1.80 |12.833    6.65 | 18.92    1.62
 0.750    0.90 | 6.833    1.80 |12.917    6.65 | 19.00    1.62
 0.833    0.90 | 6.917    1.80 |13.000    6.65 | 19.08    1.62
 0.917    0.90 | 7.000    1.80 |13.083    6.65 | 19.17    1.62
 1.000    0.90 | 7.083    1.80 |13.167    6.65 | 19.25    1.62
 1.083    0.90 | 7.167    1.80 |13.250    6.65 | 19.33    1.62
 1.167    0.90 | 7.250    1.80 |13.333    1.26 | 19.42    1.62
 1.250    0.90 | 7.333    1.80 |13.417    1.26 | 19.50    1.62
 1.333    0.90 | 7.417    1.80 |13.500    1.26 | 19.58    1.62
 1.417    0.90 | 7.500    1.80 |13.583    1.26 | 19.67    1.62
 1.500    0.90 | 7.583    1.80 |13.667    1.26 | 19.75    1.62
 1.583    0.90 | 7.667    1.80 |13.750    1.26 | 19.83    1.62
 1.667    0.90 | 7.750    1.80 |13.833    7.37 | 19.92    1.62
 1.750    0.90 | 7.833    1.80 |13.917    7.37 | 20.00    1.62
 1.833    0.90 | 7.917    1.80 |14.000    7.37 | 20.08    1.62
 1.917    0.90 | 8.000    1.80 |14.083    7.37 | 20.17    1.62
 2.000    0.90 | 8.083    1.80 |14.167    7.37 | 20.25    1.62
 2.083    1.62 | 8.167    1.80 |14.250    7.37 | 20.33    1.08
 2.167    1.62 | 8.250    1.80 |14.333    2.70 | 20.42    1.08
 2.250    1.62 | 8.333    2.43 |14.417    2.70 | 20.50    1.08
 2.333    1.17 | 8.417    2.43 |14.500    2.70 | 20.58    1.08
 2.417    1.17 | 8.500    2.43 |14.583    2.70 | 20.67    1.08
 2.500    1.17 | 8.583    2.43 |14.667    2.70 | 20.75    1.08
 2.583    1.17 | 8.667    2.43 |14.750    2.70 | 20.83    1.08
 2.667    1.17 | 8.750    2.43 |14.833    2.70 | 20.92    1.08
 2.750    1.17 | 8.833    2.43 |14.917    2.70 | 21.00    1.08
 2.833    1.17 | 8.917    2.43 |15.000    2.70 | 21.08    1.08
 2.917    1.17 | 9.000    2.43 |15.083    2.70 | 21.17    1.08
 3.000    1.17 | 9.083    2.43 |15.167    2.70 | 21.25    1.08
 3.083    1.17 | 9.167    2.43 |15.250    2.70 | 21.33    1.08
 3.167    1.17 | 9.250    2.43 |15.333    2.70 | 21.42    1.08
 3.250    1.17 | 9.333    2.88 |15.417    2.70 | 21.50    1.08
 3.333    1.17 | 9.417    2.88 |15.500    2.70 | 21.58    1.08
 3.417    1.17 | 9.500    2.88 |15.583    2.70 | 21.67    1.08
 3.500    1.17 | 9.583    2.88 |15.667    2.70 | 21.75    1.08
 3.583    1.17 | 9.667    2.88 |15.750    2.70 | 21.83    1.08
 3.667    1.17 | 9.750    2.88 |15.833    2.70 | 21.92    1.08
 3.750    1.17 | 9.833    3.24 |15.917    2.70 | 22.00    1.08
 3.833    1.17 | 9.917    3.24 |16.000    2.70 | 22.08    1.08
 3.917    1.17 |10.000    3.24 |16.083    2.70 | 22.17    1.08
 4.000    1.17 |10.083    3.24 |16.167    2.70 | 22.25    1.08
 4.083    1.17 |10.167    3.24 |16.250    2.70 | 22.33    1.08
 4.167    1.17 |10.250    3.24 |16.333    1.62 | 22.42    1.08
 4.250    1.17 |10.333    4.14 |16.417    1.62 | 22.50    1.08
 4.333    1.44 |10.417    4.14 |16.500    1.62 | 22.58    1.08
 4.417    1.44 |10.500    4.14 |16.583    1.62 | 22.67    1.08
 4.500    1.44 |10.583    4.14 |16.667    1.62 | 22.75    1.08
 4.583    1.44 |10.667    4.14 |16.750    1.62 | 22.83    1.08
 4.667    1.44 |10.750    4.14 |16.833    1.62 | 22.92    1.08
 4.750    1.44 |10.833    5.57 |16.917    1.62 | 23.00    1.08
 4.833    1.44 |10.917    5.57 |17.000    1.62 | 23.08    1.08
 4.917    1.44 |11.000    5.57 |17.083    1.62 | 23.17    1.08
 5.000    1.44 |11.083    5.57 |17.167    1.62 | 23.25    1.08
 5.083    1.44 |11.167    5.57 |17.250    1.62 | 23.33    1.08
 5.167    1.44 |11.250    5.57 |17.333    1.62 | 23.42    1.08
 5.250    1.44 |11.333    8.63 |17.417    1.62 | 23.50    1.08
 5.333    1.44 |11.417    8.63 |17.500    1.62 | 23.58    1.08
 5.417    1.44 |11.500    8.63 |17.583    1.62 | 23.67    1.08
 5.500    1.44 |11.583    8.63 |17.667    1.62 | 23.75    1.08
 5.583    1.44 |11.667    8.63 |17.750    1.62 | 23.83    1.08
 5.667    1.44 |11.750    8.63 |17.833    1.62 | 23.92    1.08
 5.750    1.44 |11.833   37.40 |17.917    1.62 | 24.00    1.08
 5.833    1.44 |11.917   37.40 |18.000    1.62 | 24.08    1.08
 5.917    1.44 |12.000   37.40 |18.083    1.62 | 24.17    1.08
 6.000    1.44 |12.083   99.24 |18.167    1.62 | 24.25    1.08
 6.083    1.44 |12.167   99.25 |18.250    1.62 |

Max.Eff.Inten.(mm/hr)=      99.25       105.12
          over (min)         5.00        15.00
Storage Coeff.  (min)=       5.17 (ii)   12.08 (ii)
Unit Hyd. Tpeak (min)=       5.00        15.00
```

Unit Hyd. peak	(cms)=	0.21	0.09	
				TOTALS
PEAK FLOW	(cms)=	2.02	1.04	2.956 (iii)
TIME TO PEAK	(hrs)=	12.25	12.33	12.25
RUNOFF VOLUME	(mm)=	88.90	53.97	71.09
TOTAL RAINFALL	(mm)=	89.90	89.90	89.90
RUNOFF COEFFICIENT	=	0.99	0.60	0.79

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0002)	Area (ha)= 20.06		
ID= 1 DT= 5.0 min	Total Imp(%)= 67.00	Dir. Conn.(%)= 56.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	13.44	6.62
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	365.70	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	6.167	1.44	12.250	99.25	18.33	1.62
0.167	0.00	6.250	1.44	12.333	12.96	18.42	1.62
0.250	0.00	6.333	1.80	12.417	12.95	18.50	1.62
0.333	0.90	6.417	1.80	12.500	12.95	18.58	1.62
0.417	0.90	6.500	1.80	12.583	12.95	18.67	1.62
0.500	0.90	6.583	1.80	12.667	12.95	18.75	1.62
0.583	0.90	6.667	1.80	12.750	12.95	18.83	1.62
0.667	0.90	6.750	1.80	12.833	6.65	18.92	1.62
0.750	0.90	6.833	1.80	12.917	6.65	19.00	1.62
0.833	0.90	6.917	1.80	13.000	6.65	19.08	1.62
0.917	0.90	7.000	1.80	13.083	6.65	19.17	1.62
1.000	0.90	7.083	1.80	13.167	6.65	19.25	1.62
1.083	0.90	7.167	1.80	13.250	6.65	19.33	1.62
1.167	0.90	7.250	1.80	13.333	1.26	19.42	1.62
1.250	0.90	7.333	1.80	13.417	1.26	19.50	1.62
1.333	0.90	7.417	1.80	13.500	1.26	19.58	1.62
1.417	0.90	7.500	1.80	13.583	1.26	19.67	1.62
1.500	0.90	7.583	1.80	13.667	1.26	19.75	1.62
1.583	0.90	7.667	1.80	13.750	1.26	19.83	1.62
1.667	0.90	7.750	1.80	13.833	7.37	19.92	1.62
1.750	0.90	7.833	1.80	13.917	7.37	20.00	1.62
1.833	0.90	7.917	1.80	14.000	7.37	20.08	1.62
1.917	0.90	8.000	1.80	14.083	7.37	20.17	1.62
2.000	0.90	8.083	1.80	14.167	7.37	20.25	1.62
2.083	1.62	8.167	1.80	14.250	7.37	20.33	1.08
2.167	1.62	8.250	1.80	14.333	2.70	20.42	1.08
2.250	1.62	8.333	2.43	14.417	2.70	20.50	1.08
2.333	1.17	8.417	2.43	14.500	2.70	20.58	1.08
2.417	1.17	8.500	2.43	14.583	2.70	20.67	1.08
2.500	1.17	8.583	2.43	14.667	2.70	20.75	1.08
2.583	1.17	8.667	2.43	14.750	2.70	20.83	1.08
2.667	1.17	8.750	2.43	14.833	2.70	20.92	1.08
2.750	1.17	8.833	2.43	14.917	2.70	21.00	1.08
2.833	1.17	8.917	2.43	15.000	2.70	21.08	1.08
2.917	1.17	9.000	2.43	15.083	2.70	21.17	1.08
3.000	1.17	9.083	2.43	15.167	2.70	21.25	1.08
3.083	1.17	9.167	2.43	15.250	2.70	21.33	1.08
3.167	1.17	9.250	2.43	15.333	2.70	21.42	1.08
3.250	1.17	9.333	2.88	15.417	2.70	21.50	1.08
3.333	1.17	9.417	2.88	15.500	2.70	21.58	1.08
3.417	1.17	9.500	2.88	15.583	2.70	21.67	1.08
3.500	1.17	9.583	2.88	15.667	2.70	21.75	1.08
3.583	1.17	9.667	2.88	15.750	2.70	21.83	1.08
3.667	1.17	9.750	2.88	15.833	2.70	21.92	1.08
3.750	1.17	9.833	3.24	15.917	2.70	22.00	1.08
3.833	1.17	9.917	3.24	16.000	2.70	22.08	1.08
3.917	1.17	10.000	3.24	16.083	2.70	22.17	1.08
4.000	1.17	10.083	3.24	16.167	2.70	22.25	1.08
4.083	1.17	10.167	3.24	16.250	2.70	22.33	1.08
4.167	1.17	10.250	3.24	16.333	1.62	22.42	1.08
4.250	1.17	10.333	4.14	16.417	1.62	22.50	1.08
4.333	1.44	10.417	4.14	16.500	1.62	22.58	1.08
4.417	1.44	10.500	4.14	16.583	1.62	22.67	1.08
4.500	1.44	10.583	4.14	16.667	1.62	22.75	1.08
4.583	1.44	10.667	4.14	16.750	1.62	22.83	1.08
4.667	1.44	10.750	4.14	16.833	1.62	22.92	1.08
4.750	1.44	10.833	5.57	16.917	1.62	23.00	1.08
4.833	1.44	10.917	5.57	17.000	1.62	23.08	1.08
4.917	1.44	11.000	5.57	17.083	1.62	23.17	1.08
5.000	1.44	11.083	5.57	17.167	1.62	23.25	1.08
5.083	1.44	11.167	5.57	17.250	1.62	23.33	1.08
5.167	1.44	11.250	5.57	17.333	1.62	23.42	1.08
5.250	1.44	11.333	8.63	17.417	1.62	23.50	1.08
5.333	1.44	11.417	8.63	17.500	1.62	23.58	1.08
5.417	1.44	11.500	8.63	17.583	1.62	23.67	1.08
5.500	1.44	11.583	8.63	17.667	1.62	23.75	1.08
5.583	1.44	11.667	8.63	17.750	1.62	23.83	1.08
5.667	1.44	11.750	8.63	17.833	1.62	23.92	1.08
5.750	1.44	11.833	37.40	17.917	1.62	24.00	1.08
5.833	1.44	11.917	37.40	18.000	1.62	24.08	1.08
5.917	1.44	12.000	37.40	18.083	1.62	24.17	1.08
6.000	1.44	12.083	99.24	18.167	1.62	24.25	1.08
6.083	1.44	12.167	99.25	18.250	1.62		

Max.Eff.Inten.	(mm/hr)=	99.25	92.84	
	over (min)	5.00	15.00	
Storage Coeff.	(min)=	5.58 (ii)	12.85 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	15.00	
Unit Hyd. peak	(cms)=	0.20	0.08	
				TOTALS
PEAK FLOW	(cms)=	2.96	1.08	3.929 (iii)
TIME TO PEAK	(hrs)=	12.25	12.33	12.25
RUNOFF VOLUME	(mm)=	88.90	51.88	72.61
TOTAL RAINFALL	(mm)=	89.90	89.90	89.90
RUNOFF COEFFICIENT	=	0.99	0.58	0.81

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

```
           CN*  =  77.0    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  (  0018)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0017):    15.53   2.956    12.25    71.09
     + ID2= 2 (  0002):    20.06   3.929    12.25    72.61
       ================================================
       ID = 3 (  0018):    35.59   6.885    12.25    71.95

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0008)|     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   |   0.4480      1.7011
                          0.0360     0.7282   |   0.7160      2.0238
                          0.0600     1.1698   |   0.9550      2.2595
                          0.2380     1.4871   |   1.1940      2.5034

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0018)     35.590     6.885     12.25      71.95
   OUTFLOW: ID= 1 (  0008)     35.590     0.448     13.33      69.14

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  6.51
                  TIME SHIFT OF PEAK FLOW         (min)= 65.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.7011

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0037)|   Area    (ha)=   2.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  59.00
--------------------

                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.58         0.42
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     115.47        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 | 6.167    1.44 |12.250   99.25 | 18.33    1.62
              0.167    0.00 | 6.250    1.44 |12.333   12.96 | 18.42    1.62
              0.250    0.00 | 6.333    1.80 |12.417   12.95 | 18.50    1.62
              0.333    0.90 | 6.417    1.80 |12.500   12.95 | 18.58    1.62
              0.417    0.90 | 6.500    1.80 |12.583   12.95 | 18.67    1.62
              0.500    0.90 | 6.583    1.80 |12.667   12.95 | 18.75    1.62
              0.583    0.90 | 6.667    1.80 |12.750   12.95 | 18.83    1.62
              0.667    0.90 | 6.750    1.80 |12.833    6.65 | 18.92    1.62
              0.750    0.90 | 6.833    1.80 |12.917    6.65 | 19.00    1.62
              0.833    0.90 | 6.917    1.80 |13.000    6.65 | 19.08    1.62
              0.917    0.90 | 7.000    1.80 |13.083    6.65 | 19.17    1.62
              1.000    0.90 | 7.083    1.80 |13.167    6.65 | 19.25    1.62
              1.083    0.90 | 7.167    1.80 |13.250    6.65 | 19.33    1.62
              1.167    0.90 | 7.250    1.80 |13.333    1.26 | 19.42    1.62
              1.250    0.90 | 7.333    1.80 |13.417    1.26 | 19.50    1.62
              1.333    0.90 | 7.417    1.80 |13.500    1.26 | 19.58    1.62
              1.417    0.90 | 7.500    1.80 |13.583    1.26 | 19.67    1.62
              1.500    0.90 | 7.583    1.80 |13.667    1.26 | 19.75    1.62
              1.583    0.90 | 7.667    1.80 |13.750    1.26 | 19.83    1.62
              1.667    0.90 | 7.750    1.80 |13.833    7.37 | 19.92    1.62
              1.750    0.90 | 7.833    1.80 |13.917    7.37 | 20.00    1.62
              1.833    0.90 | 7.917    1.80 |14.000    7.37 | 20.08    1.62
              1.917    0.90 | 8.000    1.80 |14.083    7.37 | 20.17    1.62
              2.000    0.90 | 8.083    1.80 |14.167    7.37 | 20.25    1.62
              2.083    1.62 | 8.167    1.80 |14.250    7.37 | 20.33    1.08
              2.167    1.62 | 8.250    1.80 |14.333    2.70 | 20.42    1.08
              2.250    1.62 | 8.333    2.43 |14.417    2.70 | 20.50    1.08
              2.333    1.17 | 8.417    2.43 |14.500    2.70 | 20.58    1.08
              2.417    1.17 | 8.500    2.43 |14.583    2.70 | 20.67    1.08
              2.500    1.17 | 8.583    2.43 |14.667    2.70 | 20.75    1.08
              2.583    1.17 | 8.667    2.43 |14.750    2.70 | 20.83    1.08
              2.667    1.17 | 8.750    2.43 |14.833    2.70 | 20.92    1.08
              2.750    1.17 | 8.833    2.43 |14.917    2.70 | 21.00    1.08
              2.833    1.17 | 8.917    2.43 |15.000    2.70 | 21.08    1.08
              2.917    1.17 | 9.000    2.43 |15.083    2.70 | 21.17    1.08
              3.000    1.17 | 9.083    2.43 |15.167    2.70 | 21.25    1.08
              3.083    1.17 | 9.167    2.43 |15.250    2.70 | 21.33    1.08
              3.167    1.17 | 9.250    2.43 |15.333    2.70 | 21.42    1.08
              3.250    1.17 | 9.333    2.88 |15.417    2.70 | 21.50    1.08
              3.333    1.17 | 9.417    2.88 |15.500    2.70 | 21.58    1.08
              3.417    1.17 | 9.500    2.88 |15.583    2.70 | 21.67    1.08
              3.500    1.17 | 9.583    2.88 |15.667    2.70 | 21.75    1.08
              3.583    1.17 | 9.667    2.88 |15.750    2.70 | 21.83    1.08
              3.667    1.17 | 9.750    2.88 |15.833    2.70 | 21.92    1.08
              3.750    1.17 | 9.833    3.24 |15.917    2.70 | 22.00    1.08
              3.833    1.17 | 9.917    3.24 |16.000    2.70 | 22.08    1.08
              3.917    1.17 |10.000    3.24 |16.083    2.70 | 22.17    1.08
              4.000    1.17 |10.083    3.24 |16.167    2.70 | 22.25    1.08
              4.083    1.17 |10.167    3.24 |16.250    2.70 | 22.33    1.08
              4.167    1.17 |10.250    3.24 |16.333    1.62 | 22.42    1.08
              4.250    1.17 |10.333    4.14 |16.417    1.62 | 22.50    1.08
              4.333    1.44 |10.417    4.14 |16.500    1.62 | 22.58    1.08
              4.417    1.44 |10.500    4.14 |16.583    1.62 | 22.67    1.08
              4.500    1.44 |10.583    4.14 |16.667    1.62 | 22.75    1.08
              4.583    1.44 |10.667    4.14 |16.750    1.62 | 22.83    1.08
              4.667    1.44 |10.750    4.14 |16.833    1.62 | 22.92    1.08
              4.750    1.44 |10.833    5.57 |16.917    1.62 | 23.00    1.08
              4.833    1.44 |10.917    5.57 |17.000    1.62 | 23.08    1.08
              4.917    1.44 |11.000    5.57 |17.083    1.62 | 23.17    1.08
              5.000    1.44 |11.083    5.57 |17.167    1.62 | 23.25    1.08
              5.083    1.44 |11.167    5.57 |17.250    1.62 | 23.33    1.08
              5.167    1.44 |11.250    5.57 |17.333    1.62 | 23.42    1.08
              5.250    1.44 |11.333    8.63 |17.417    1.62 | 23.50    1.08
              5.333    1.44 |11.417    8.63 |17.500    1.62 | 23.58    1.08
              5.417    1.44 |11.500    8.63 |17.583    1.62 | 23.67    1.08
              5.500    1.44 |11.583    8.63 |17.667    1.62 | 23.75    1.08
```

5.583	1.44	11.667	8.63	17.750	1.62	23.83	1.08
5.667	1.44	11.750	8.63	17.833	1.62	23.92	1.08
5.750	1.44	11.833	37.40	17.917	1.62	24.00	1.08
5.833	1.44	11.917	37.40	18.000	1.62	24.08	1.08
5.917	1.44	12.000	37.40	18.083	1.62	24.17	1.08
6.000	1.44	12.083	99.24	18.167	1.62	24.25	1.08
6.083	1.44	12.167	99.25	18.250	1.62		

			TOTALS
Max.Eff.Inten.(mm/hr)=	99.25	155.33	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.79 (ii)	7.48 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.28	0.13	
PEAK FLOW (cms)=	0.32	0.15	0.474 (iii)
TIME TO PEAK (hrs)=	12.25	12.25	12.25
RUNOFF VOLUME (mm)=	88.90	60.45	77.23
TOTAL RAINFALL (mm)=	89.90	89.90	89.90
RUNOFF COEFFICIENT =	0.99	0.67	0.86

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0033) | 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	0.0250	0.1054
	0.0020	0.0490	0.0410	0.1239
	0.0030	0.0750	0.0540	0.1381
	0.0130	0.0932	0.0670	0.1527

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0037)	2.000	0.474	12.25	77.23
OUTFLOW: ID= 1 (0033)	2.000	0.025	13.33	72.20

PEAK FLOW REDUCTION [Qout/Qin](%)= 5.24
TIME SHIFT OF PEAK FLOW (min)= 65.00
MAXIMUM STORAGE USED (ha.m.)= 0.1054

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

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

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

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  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\3bb948b8-8f80-400f-982b-5e4f2365f6cf\scen
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86e9-d1c81bbaf91e\3bb948b8-8f80-400f-982b-5e4f2365f6cf\scen

DATE: 05-01-2024                          TIME: 02:27:00

USER:

COMMENTS: _____
```

```
  ************************************************
  ** SIMULATION : 04. 25-Year-24-Hour-SCS-Type- **
  ************************************************
```

READ STORM	Filename: C:\Users\mmsingh\AppData\Local\Temp\d7ebc3fa-4e57-492f-bbed-8129d1e23af0\6b809c2e
Ptotal=107.50 mm	Comments: 25-Year-24-Hour-SCS-Type-II

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	2.15	12.50	15.48	18.75	1.93
0.25	1.07	6.50	2.15	12.75	7.95	19.00	1.94
0.50	1.07	6.75	2.15	13.00	7.96	19.25	1.93
0.75	1.07	7.00	2.15	13.25	1.50	19.50	1.94
1.00	1.07	7.25	2.15	13.50	1.50	19.75	1.93
1.25	1.08	7.50	2.15	13.75	8.82	20.00	1.94
1.50	1.07	7.75	2.15	14.00	8.82	20.25	1.29
1.75	1.08	8.00	2.15	14.25	3.22	20.50	1.29
2.00	1.93	8.25	2.90	14.50	3.22	20.75	1.29
2.25	1.40	8.50	2.90	14.75	3.22	21.00	1.29
2.50	1.40	8.75	2.90	15.00	3.23	21.25	1.29
2.75	1.40	9.00	2.90	15.25	3.22	21.50	1.29
3.00	1.40	9.25	3.44	15.50	3.22	21.75	1.29
3.25	1.40	9.50	3.44	15.75	3.22	22.00	1.29
3.50	1.40	9.75	3.87	16.00	3.22	22.25	1.29
3.75	1.40	10.00	3.87	16.25	1.94	22.50	1.29
4.00	1.40	10.25	4.95	16.50	1.93	22.75	1.29
4.25	1.72	10.50	4.95	16.75	1.93	23.00	1.29
4.50	1.72	10.75	6.67	17.00	1.94	23.25	1.29
4.75	1.72	11.00	6.66	17.25	1.93	23.50	1.29
5.00	1.72	11.25	10.32	17.50	1.94	23.75	1.29

5.25	1.72	11.50	10.32	17.75	1.93	24.00	1.29
5.50	1.72	11.75	44.72	18.00	1.94		
5.75	1.72	12.00	118.68	18.25	1.93		
6.00	1.72	12.25	15.48	18.50	1.94		

CALIB	
STANDHYD (0006)	Area (ha)= 29.06
ID= 1 DT= 5.0 min	Total Imp(%)= 66.00 Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	6.167	1.72	12.250	118.68	18.33	1.94
0.167	0.00	6.250	1.72	12.333	15.49	18.42	1.93
0.250	0.00	6.333	2.15	12.417	15.48	18.50	1.93
0.333	1.08	6.417	2.15	12.500	15.48	18.58	1.94
0.417	1.07	6.500	2.15	12.583	15.48	18.67	1.94
0.500	1.07	6.583	2.15	12.667	15.48	18.75	1.94
0.583	1.08	6.667	2.15	12.750	15.48	18.83	1.94
0.667	1.07	6.750	2.15	12.833	7.96	18.92	1.93
0.750	1.07	6.833	2.15	12.917	7.95	19.00	1.93
0.833	1.07	6.917	2.15	13.000	7.95	19.08	1.94
0.917	1.07	7.000	2.15	13.083	7.95	19.17	1.94
1.000	1.07	7.083	2.15	13.167	7.96	19.25	1.94
1.083	1.07	7.167	2.15	13.250	7.96	19.33	1.94
1.167	1.07	7.250	2.15	13.333	1.51	19.42	1.93
1.250	1.07	7.333	2.15	13.417	1.50	19.50	1.94
1.333	1.08	7.417	2.15	13.500	1.50	19.58	1.94
1.417	1.08	7.500	2.15	13.583	1.50	19.67	1.94
1.500	1.08	7.583	2.15	13.667	1.50	19.75	1.94
1.583	1.07	7.667	2.15	13.750	1.50	19.83	1.93
1.667	1.07	7.750	2.15	13.833	8.81	19.92	1.93
1.750	1.08	7.833	2.15	13.917	8.82	20.00	1.94
1.833	1.08	7.917	2.15	14.000	8.82	20.08	1.94
1.917	1.08	8.000	2.15	14.083	8.81	20.17	1.94
2.000	1.08	8.083	2.15	14.167	8.82	20.25	1.93
2.083	1.93	8.167	2.15	14.250	8.82	20.33	1.29
2.167	1.93	8.250	2.15	14.333	3.23	20.42	1.29
2.250	1.93	8.333	2.90	14.417	3.22	20.50	1.29
2.333	1.40	8.417	2.90	14.500	3.22	20.58	1.29
2.417	1.40	8.500	2.90	14.583	3.22	20.67	1.29
2.500	1.40	8.583	2.90	14.667	3.22	20.75	1.29
2.583	1.40	8.667	2.90	14.750	3.22	20.83	1.29
2.667	1.40	8.750	2.90	14.833	3.22	20.92	1.29
2.750	1.40	8.833	2.90	14.917	3.22	21.00	1.29
2.833	1.40	8.917	2.90	15.000	3.22	21.08	1.29
2.917	1.40	9.000	2.90	15.083	3.23	21.17	1.29
3.000	1.40	9.083	2.90	15.167	3.23	21.25	1.29
3.083	1.40	9.167	2.90	15.250	3.23	21.33	1.29
3.167	1.40	9.250	2.90	15.333	3.22	21.42	1.29
3.250	1.40	9.333	3.44	15.417	3.22	21.50	1.29
3.333	1.40	9.417	3.44	15.500	3.22	21.58	1.29
3.417	1.40	9.500	3.44	15.583	3.22	21.67	1.29
3.500	1.40	9.583	3.44	15.667	3.22	21.75	1.29
3.583	1.40	9.667	3.44	15.750	3.22	21.83	1.29
3.667	1.40	9.750	3.44	15.833	3.22	21.92	1.29
3.750	1.40	9.833	3.87	15.917	3.22	22.00	1.29
3.833	1.40	9.917	3.87	16.000	3.22	22.08	1.29
3.917	1.40	10.000	3.87	16.083	3.22	22.17	1.29
4.000	1.40	10.083	3.87	16.167	3.22	22.25	1.29
4.083	1.40	10.167	3.87	16.250	3.22	22.33	1.29
4.167	1.40	10.250	3.87	16.333	1.94	22.42	1.29
4.250	1.40	10.333	4.94	16.417	1.94	22.50	1.29
4.333	1.72	10.417	4.95	16.500	1.94	22.58	1.29
4.417	1.72	10.500	4.95	16.583	1.94	22.67	1.29
4.500	1.72	10.583	4.94	16.667	1.93	22.75	1.29
4.583	1.72	10.667	4.95	16.750	1.93	22.83	1.29
4.667	1.72	10.750	4.95	16.833	1.94	22.92	1.29
4.750	1.72	10.833	6.66	16.917	1.93	23.00	1.29
4.833	1.72	10.917	6.67	17.000	1.93	23.08	1.29
4.917	1.72	11.000	6.67	17.083	1.94	23.17	1.29
5.000	1.72	11.083	6.66	17.167	1.94	23.25	1.29
5.083	1.72	11.167	6.66	17.250	1.94	23.33	1.29
5.167	1.72	11.250	6.66	17.333	1.94	23.42	1.29
5.250	1.72	11.333	10.32	17.417	1.93	23.50	1.29
5.333	1.72	11.417	10.32	17.500	1.93	23.58	1.29
5.417	1.72	11.500	10.32	17.583	1.94	23.67	1.29
5.500	1.72	11.583	10.32	17.667	1.94	23.75	1.29
5.583	1.72	11.667	10.32	17.750	1.94	23.83	1.29
5.667	1.72	11.750	10.32	17.833	1.94	23.92	1.29
5.750	1.72	11.833	44.72	17.917	1.93	24.00	1.29
5.833	1.72	11.917	44.72	18.000	1.93	24.08	1.29
5.917	1.72	12.000	44.72	18.083	1.94	24.17	1.29
6.000	1.72	12.083	118.67	18.167	1.94	24.25	1.29
6.083	1.72	12.167	118.68	18.250	1.94		

					TOTALS
Max.Eff.Inten.	(mm/hr)=	118.68	117.71		
	over (min)	5.00	15.00		
Storage Coeff.	(min)=	5.80 (ii)	12.42 (ii)		
Unit Hyd. Tpeak	(min)=	5.00	15.00		
Unit Hyd. peak	(cms)=	0.20	0.08		
PEAK FLOW	(cms)=	5.01	2.10		6.899 (iii)
TIME TO PEAK	(hrs)=	12.25	12.33		12.25
RUNOFF VOLUME	(mm)=	106.50	66.80		88.64
TOTAL RAINFALL	(mm)=	107.50	107.50		107.50
RUNOFF COEFFICIENT	=	0.99	0.62		0.82

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0020)	Area (ha)= 3.80

|ID= 1 DT= 5.0 min | Total Imp(%)= 80.00 Dir. Conn.(%)= 60.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	6.167	1.72	12.250	118.68	18.33	1.94
0.167	0.00	6.250	1.72	12.333	15.49	18.42	1.93
0.250	0.00	6.333	2.15	12.417	15.48	18.50	1.93
0.333	1.08	6.417	2.15	12.500	15.48	18.58	1.94
0.417	1.07	6.500	2.15	12.583	15.48	18.67	1.94
0.500	1.07	6.583	2.15	12.667	15.48	18.75	1.94
0.583	1.08	6.667	2.15	12.750	15.48	18.83	1.94
0.667	1.07	6.750	2.15	12.833	7.96	18.92	1.93
0.750	1.07	6.833	2.15	12.917	7.95	19.00	1.93
0.833	1.07	6.917	2.15	13.000	7.95	19.08	1.94
0.917	1.07	7.000	2.15	13.083	7.95	19.17	1.94
1.000	1.07	7.083	2.15	13.167	7.96	19.25	1.94
1.083	1.07	7.167	2.15	13.250	7.96	19.33	1.94
1.167	1.07	7.250	2.15	13.333	1.51	19.42	1.93
1.250	1.07	7.333	2.15	13.417	1.50	19.50	1.94
1.333	1.08	7.417	2.15	13.500	1.50	19.58	1.94
1.417	1.08	7.500	2.15	13.583	1.50	19.67	1.94
1.500	1.08	7.583	2.15	13.667	1.50	19.75	1.94
1.583	1.07	7.667	2.15	13.750	1.50	19.83	1.93
1.667	1.07	7.750	2.15	13.833	8.81	19.92	1.93
1.750	1.08	7.833	2.15	13.917	8.82	20.00	1.94
1.833	1.08	7.917	2.15	14.000	8.82	20.08	1.94
1.917	1.08	8.000	2.15	14.083	8.81	20.17	1.94
2.000	1.08	8.083	2.15	14.167	8.82	20.25	1.93
2.083	1.93	8.167	2.15	14.250	8.82	20.33	1.29
2.167	1.93	8.250	2.15	14.333	3.23	20.42	1.29
2.250	1.93	8.333	2.90	14.417	3.22	20.50	1.29
2.333	1.40	8.417	2.90	14.500	3.22	20.58	1.29
2.417	1.40	8.500	2.90	14.583	3.22	20.67	1.29
2.500	1.40	8.583	2.90	14.667	3.22	20.75	1.29
2.583	1.40	8.667	2.90	14.750	3.22	20.83	1.29
2.667	1.40	8.750	2.90	14.833	3.22	20.92	1.29
2.750	1.40	8.833	2.90	14.917	3.22	21.00	1.29
2.833	1.40	8.917	2.90	15.000	3.22	21.08	1.29
2.917	1.40	9.000	2.90	15.083	3.23	21.17	1.29
3.000	1.40	9.083	2.90	15.167	3.23	21.25	1.29
3.083	1.40	9.167	2.90	15.250	3.23	21.33	1.29
3.167	1.40	9.250	2.90	15.333	3.22	21.42	1.29
3.250	1.40	9.333	3.44	15.417	3.22	21.50	1.29
3.333	1.40	9.417	3.44	15.500	3.22	21.58	1.29
3.417	1.40	9.500	3.44	15.583	3.22	21.67	1.29
3.500	1.40	9.583	3.44	15.667	3.22	21.75	1.29
3.583	1.40	9.667	3.44	15.750	3.22	21.83	1.29
3.667	1.40	9.750	3.44	15.833	3.22	21.92	1.29
3.750	1.40	9.833	3.87	15.917	3.22	22.00	1.29
3.833	1.40	9.917	3.87	16.000	3.22	22.08	1.29
3.917	1.40	10.000	3.87	16.083	3.22	22.17	1.29
4.000	1.40	10.083	3.87	16.167	3.22	22.25	1.29
4.083	1.40	10.167	3.87	16.250	3.22	22.33	1.29
4.167	1.40	10.250	3.87	16.333	1.94	22.42	1.29
4.250	1.40	10.333	4.94	16.417	1.94	22.50	1.29
4.333	1.72	10.417	4.95	16.500	1.94	22.58	1.29
4.417	1.72	10.500	4.95	16.583	1.94	22.67	1.29
4.500	1.72	10.583	4.94	16.667	1.93	22.75	1.29
4.583	1.72	10.667	4.95	16.750	1.93	22.83	1.29
4.667	1.72	10.750	4.95	16.833	1.94	22.92	1.29
4.750	1.72	10.833	6.66	16.917	1.93	23.00	1.29
4.833	1.72	10.917	6.67	17.000	1.93	23.08	1.29
4.917	1.72	11.000	6.67	17.083	1.94	23.17	1.29
5.000	1.72	11.083	6.66	17.167	1.94	23.25	1.29
5.083	1.72	11.167	6.66	17.250	1.94	23.33	1.29
5.167	1.72	11.250	6.66	17.333	1.94	23.42	1.29
5.250	1.72	11.333	10.32	17.417	1.93	23.50	1.29
5.333	1.72	11.417	10.32	17.500	1.93	23.58	1.29
5.417	1.72	11.500	10.32	17.583	1.94	23.67	1.29
5.500	1.72	11.583	10.32	17.667	1.94	23.75	1.29
5.583	1.72	11.667	10.32	17.750	1.94	23.83	1.29
5.667	1.72	11.750	10.32	17.833	1.94	23.92	1.29
5.750	1.72	11.833	44.72	17.917	1.93	24.00	1.29
5.833	1.72	11.917	44.72	18.000	1.93	24.08	1.29
5.917	1.72	12.000	44.72	18.083	1.94	24.17	1.29
6.000	1.72	12.083	118.67	18.167	1.94	24.25	1.29
6.083	1.72	12.167	118.68	18.250	1.94		

Max.Eff.Inten.(mm/hr)=		118.68		200.53	
over (min)		5.00		10.00	
Storage Coeff. (min)=		3.15	(ii)	7.40	(ii)
Unit Hyd. Tpeak (min)=		5.00		10.00	
Unit Hyd. peak (cms)=		0.27		0.13	
					TOTALS
PEAK FLOW	(cms)=	0.75		0.35	1.101 (iii)
TIME TO PEAK	(hrs)=	12.25		12.25	12.25
RUNOFF VOLUME	(mm)=	106.50		77.13	94.75
TOTAL RAINFALL	(mm)=	107.50		107.50	107.50
RUNOFF COEFFICIENT	=	0.99		0.72	0.88

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0023)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0020):		3.80	1.101	12.25	94.75
+ ID2= 2 (0006):		29.06	6.899	12.25	88.64
ID = 3 (0023):		32.86	8.000	12.25	89.34

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| RESERVOIR(  0012)|     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   |   0.4930     1.5666
                          0.0360     0.7150   |   0.7890     1.8478
                          0.0660     1.0737   |   1.0520     2.0613
                          0.2630     1.3645   |   1.3140     2.2797

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0023)     32.860     8.000     12.25      89.34
   OUTFLOW: ID= 1 (  0012)     32.860     0.789     13.17      86.80

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.86
                  TIME SHIFT OF PEAK FLOW          (min)= 55.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.8478

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--------------------
| CALIB            |
| STANDHYD (  0017)|   Area    (ha)=  15.53
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  49.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.09         5.44
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     321.77        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 | 6.167    1.72 |12.250  118.68 | 18.33    1.94
 0.167    0.00 | 6.250    1.72 |12.333   15.49 | 18.42    1.93
 0.250    0.00 | 6.333    2.15 |12.417   15.48 | 18.50    1.93
 0.333    1.08 | 6.417    2.15 |12.500   15.48 | 18.58    1.94
 0.417    1.07 | 6.500    2.15 |12.583   15.48 | 18.67    1.94
 0.500    1.07 | 6.583    2.15 |12.667   15.48 | 18.75    1.94
 0.583    1.08 | 6.667    2.15 |12.750   15.48 | 18.83    1.94
 0.667    1.07 | 6.750    2.15 |12.833    7.96 | 18.92    1.93
 0.750    1.07 | 6.833    2.15 |12.917    7.95 | 19.00    1.93
 0.833    1.07 | 6.917    2.15 |13.000    7.95 | 19.08    1.94
 0.917    1.07 | 7.000    2.15 |13.083    7.95 | 19.17    1.94
 1.000    1.07 | 7.083    2.15 |13.167    7.96 | 19.25    1.94
 1.083    1.07 | 7.167    2.15 |13.250    7.96 | 19.33    1.94
 1.167    1.07 | 7.250    2.15 |13.333    1.51 | 19.42    1.93
 1.250    1.07 | 7.333    2.15 |13.417    1.50 | 19.50    1.94
 1.333    1.08 | 7.417    2.15 |13.500    1.50 | 19.58    1.94
 1.417    1.08 | 7.500    2.15 |13.583    1.50 | 19.67    1.94
 1.500    1.08 | 7.583    2.15 |13.667    1.50 | 19.75    1.94
 1.583    1.07 | 7.667    2.15 |13.750    1.50 | 19.83    1.93
 1.667    1.07 | 7.750    2.15 |13.833    8.81 | 19.92    1.93
 1.750    1.08 | 7.833    2.15 |13.917    8.82 | 20.00    1.94
 1.833    1.08 | 7.917    2.15 |14.000    8.82 | 20.08    1.94
 1.917    1.08 | 8.000    2.15 |14.083    8.81 | 20.17    1.94
 2.000    1.08 | 8.083    2.15 |14.167    8.82 | 20.25    1.93
 2.083    1.93 | 8.167    2.15 |14.250    8.82 | 20.33    1.29
 2.167    1.93 | 8.250    2.15 |14.333    3.23 | 20.42    1.29
 2.250    1.93 | 8.333    2.90 |14.417    3.22 | 20.50    1.29
 2.333    1.40 | 8.417    2.90 |14.500    3.22 | 20.58    1.29
 2.417    1.40 | 8.500    2.90 |14.583    3.22 | 20.67    1.29
 2.500    1.40 | 8.583    2.90 |14.667    3.22 | 20.75    1.29
 2.583    1.40 | 8.667    2.90 |14.750    3.22 | 20.83    1.29
 2.667    1.40 | 8.750    2.90 |14.833    3.22 | 20.92    1.29
 2.750    1.40 | 8.833    2.90 |14.917    3.22 | 21.00    1.29
 2.833    1.40 | 8.917    2.90 |15.000    3.22 | 21.08    1.29
 2.917    1.40 | 9.000    2.90 |15.083    3.23 | 21.17    1.29
 3.000    1.40 | 9.083    2.90 |15.167    3.23 | 21.25    1.29
 3.083    1.40 | 9.167    2.90 |15.250    3.23 | 21.33    1.29
 3.167    1.40 | 9.250    2.90 |15.333    3.22 | 21.42    1.29
 3.250    1.40 | 9.333    3.44 |15.417    3.22 | 21.50    1.29
 3.333    1.40 | 9.417    3.44 |15.500    3.22 | 21.58    1.29
 3.417    1.40 | 9.500    3.44 |15.583    3.22 | 21.67    1.29
 3.500    1.40 | 9.583    3.44 |15.667    3.22 | 21.75    1.29
 3.583    1.40 | 9.667    3.44 |15.750    3.22 | 21.83    1.29
 3.667    1.40 | 9.750    3.44 |15.833    3.22 | 21.92    1.29
 3.750    1.40 | 9.833    3.87 |15.917    3.22 | 22.00    1.29
 3.833    1.40 | 9.917    3.87 |16.000    3.22 | 22.08    1.29
 3.917    1.40 |10.000    3.87 |16.083    3.22 | 22.17    1.29
 4.000    1.40 |10.083    3.87 |16.167    3.22 | 22.25    1.29
 4.083    1.40 |10.167    3.87 |16.250    3.22 | 22.33    1.29
 4.167    1.40 |10.250    3.87 |16.333    1.94 | 22.42    1.29
 4.250    1.40 |10.333    4.94 |16.417    1.94 | 22.50    1.29
 4.333    1.72 |10.417    4.95 |16.500    1.94 | 22.58    1.29
 4.417    1.72 |10.500    4.95 |16.583    1.94 | 22.67    1.29
 4.500    1.72 |10.583    4.94 |16.667    1.93 | 22.75    1.29
 4.583    1.72 |10.667    4.95 |16.750    1.93 | 22.83    1.29
 4.667    1.72 |10.750    4.95 |16.833    1.94 | 22.92    1.29
 4.750    1.72 |10.833    6.66 |16.917    1.93 | 23.00    1.29
 4.833    1.72 |10.917    6.67 |17.000    1.93 | 23.08    1.29
 4.917    1.72 |11.000    6.67 |17.083    1.94 | 23.17    1.29
 5.000    1.72 |11.083    6.66 |17.167    1.94 | 23.25    1.29
 5.083    1.72 |11.167    6.66 |17.250    1.94 | 23.33    1.29
 5.167    1.72 |11.250    6.66 |17.333    1.94 | 23.42    1.29
 5.250    1.72 |11.333   10.32 |17.417    1.93 | 23.50    1.29
 5.333    1.72 |11.417   10.32 |17.500    1.93 | 23.58    1.29
 5.417    1.72 |11.500   10.32 |17.583    1.94 | 23.67    1.29
 5.500    1.72 |11.583   10.32 |17.667    1.94 | 23.75    1.29
 5.583    1.72 |11.667   10.32 |17.750    1.94 | 23.83    1.29
 5.667    1.72 |11.750   10.32 |17.833    1.94 | 23.92    1.29
 5.750    1.72 |11.833   44.72 |17.917    1.93 | 24.00    1.29
 5.833    1.72 |11.917   44.72 |18.000    1.93 | 24.08    1.29
 5.917    1.72 |12.000   44.72 |18.083    1.94 | 24.17    1.29
 6.000    1.72 |12.083  118.67 |18.167    1.94 | 24.25    1.29
 6.083    1.72 |12.167  118.68 |18.250    1.94 |

Max.Eff.Inten.(mm/hr)=     118.68       133.88
          over (min)          5.00        15.00
Storage Coeff.  (min)=        4.81 (ii)   11.09 (ii)
Unit Hyd. Tpeak (min)=        5.00        15.00
Unit Hyd. peak  (cms)=        0.22         0.09
                                                    *TOTALS*
PEAK FLOW       (cms)=        2.44         1.37         3.688 (iii)
TIME TO PEAK    (hrs)=       12.25        12.33        12.25
RUNOFF VOLUME    (mm)=      106.50        69.36        87.56
TOTAL RAINFALL   (mm)=      107.50       107.50       107.50
```

```
     RUNOFF COEFFICIENT   =       0.99         0.65          0.81

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0002)|   Area    (ha)=  20.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  56.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      13.44         6.62
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     365.70        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	6.167	1.72	12.250	118.68	18.33	1.94
0.167	0.00	6.250	1.72	12.333	15.49	18.42	1.93
0.250	0.00	6.333	2.15	12.417	15.48	18.50	1.93
0.333	1.08	6.417	2.15	12.500	15.48	18.58	1.94
0.417	1.07	6.500	2.15	12.583	15.48	18.67	1.94
0.500	1.07	6.583	2.15	12.667	15.48	18.75	1.94
0.583	1.08	6.667	2.15	12.750	15.48	18.83	1.94
0.667	1.07	6.750	2.15	12.833	7.96	18.92	1.93
0.750	1.07	6.833	2.15	12.917	7.95	19.00	1.93
0.833	1.07	6.917	2.15	13.000	7.95	19.08	1.94
0.917	1.07	7.000	2.15	13.083	7.95	19.17	1.94
1.000	1.07	7.083	2.15	13.167	7.96	19.25	1.94
1.083	1.07	7.167	2.15	13.250	7.96	19.33	1.94
1.167	1.07	7.250	2.15	13.333	1.51	19.42	1.93
1.250	1.07	7.333	2.15	13.417	1.50	19.50	1.94
1.333	1.08	7.417	2.15	13.500	1.50	19.58	1.94
1.417	1.08	7.500	2.15	13.583	1.50	19.67	1.94
1.500	1.08	7.583	2.15	13.667	1.50	19.75	1.94
1.583	1.07	7.667	2.15	13.750	1.50	19.83	1.93
1.667	1.07	7.750	2.15	13.833	8.81	19.92	1.93
1.750	1.08	7.833	2.15	13.917	8.82	20.00	1.94
1.833	1.08	7.917	2.15	14.000	8.82	20.08	1.94
1.917	1.08	8.000	2.15	14.083	8.81	20.17	1.94
2.000	1.08	8.083	2.15	14.167	8.82	20.25	1.93
2.083	1.93	8.167	2.15	14.250	8.82	20.33	1.29
2.167	1.93	8.250	2.15	14.333	3.23	20.42	1.29
2.250	1.93	8.333	2.90	14.417	3.22	20.50	1.29
2.333	1.40	8.417	2.90	14.500	3.22	20.58	1.29
2.417	1.40	8.500	2.90	14.583	3.22	20.67	1.29
2.500	1.40	8.583	2.90	14.667	3.22	20.75	1.29
2.583	1.40	8.667	2.90	14.750	3.22	20.83	1.29
2.667	1.40	8.750	2.90	14.833	3.22	20.92	1.29
2.750	1.40	8.833	2.90	14.917	3.22	21.00	1.29
2.833	1.40	8.917	2.90	15.000	3.22	21.08	1.29
2.917	1.40	9.000	2.90	15.083	3.23	21.17	1.29
3.000	1.40	9.083	2.90	15.167	3.23	21.25	1.29
3.083	1.40	9.167	2.90	15.250	3.23	21.33	1.29
3.167	1.40	9.250	2.90	15.333	3.22	21.42	1.29
3.250	1.40	9.333	3.44	15.417	3.22	21.50	1.29
3.333	1.40	9.417	3.44	15.500	3.22	21.58	1.29
3.417	1.40	9.500	3.44	15.583	3.22	21.67	1.29
3.500	1.40	9.583	3.44	15.667	3.22	21.75	1.29
3.583	1.40	9.667	3.44	15.750	3.22	21.83	1.29
3.667	1.40	9.750	3.44	15.833	3.22	21.92	1.29
3.750	1.40	9.833	3.87	15.917	3.22	22.00	1.29
3.833	1.40	9.917	3.87	16.000	3.22	22.08	1.29
3.917	1.40	10.000	3.87	16.083	3.22	22.17	1.29
4.000	1.40	10.083	3.87	16.167	3.22	22.25	1.29
4.083	1.40	10.167	3.87	16.250	3.22	22.33	1.29
4.167	1.40	10.250	3.87	16.333	1.94	22.42	1.29
4.250	1.40	10.333	4.94	16.417	1.94	22.50	1.29
4.333	1.72	10.417	4.95	16.500	1.94	22.58	1.29
4.417	1.72	10.500	4.95	16.583	1.94	22.67	1.29
4.500	1.72	10.583	4.94	16.667	1.93	22.75	1.29
4.583	1.72	10.667	4.95	16.750	1.93	22.83	1.29
4.667	1.72	10.750	4.95	16.833	1.94	22.92	1.29
4.750	1.72	10.833	6.66	16.917	1.93	23.00	1.29
4.833	1.72	10.917	6.67	17.000	1.93	23.08	1.29
4.917	1.72	11.000	6.67	17.083	1.94	23.17	1.29
5.000	1.72	11.083	6.66	17.167	1.94	23.25	1.29
5.083	1.72	11.167	6.66	17.250	1.94	23.33	1.29
5.167	1.72	11.250	6.66	17.333	1.94	23.42	1.29
5.250	1.72	11.333	10.32	17.417	1.93	23.50	1.29
5.333	1.72	11.417	10.32	17.500	1.93	23.58	1.29
5.417	1.72	11.500	10.32	17.583	1.94	23.67	1.29
5.500	1.72	11.583	10.32	17.667	1.94	23.75	1.29
5.583	1.72	11.667	10.32	17.750	1.94	23.83	1.29
5.667	1.72	11.750	10.32	17.833	1.94	23.92	1.29
5.750	1.72	11.833	44.72	17.917	1.93	24.00	1.29
5.833	1.72	11.917	44.72	18.000	1.93	24.08	1.29
5.917	1.72	12.000	44.72	18.083	1.94	24.17	1.29
6.000	1.72	12.083	118.67	18.167	1.94	24.25	1.29
6.083	1.72	12.167	118.68	18.250	1.94		

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Max.Eff.Inten.(mm/hr)=     118.68       118.89
          over (min)          5.00        15.00
Storage Coeff.  (min)=        5.19 (ii)   11.78 (ii)
Unit Hyd. Tpeak (min)=        5.00        15.00
Unit Hyd. peak  (cms)=        0.21         0.09

                                                  *TOTALS*
PEAK FLOW       (cms)=        3.57         1.45      4.879 (iii)
TIME TO PEAK    (hrs)=       12.25        12.33        12.25
RUNOFF VOLUME    (mm)=      106.50        67.00        89.12
TOTAL RAINFALL   (mm)=      107.50       107.50       107.50
RUNOFF COEFFICIENT   =        0.99         0.62         0.83

  (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
       CN*  =  77.0    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  (  0018)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0017):    15.53   3.688    12.25    87.56
     + ID2= 2 (  0002):    20.06   4.879    12.25    89.12
       ================================================
       ID = 3 (  0018):    35.59   8.567    12.25    88.44

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| RESERVOIR(  0008)|     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   |   0.4480     1.7011
                          0.0360     0.7282   |   0.7160     2.0238
                          0.0600     1.1698   |   0.9550     2.2595
                          0.2380     1.4871   |   1.1940     2.5034

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0018)     35.590     8.567     12.25      88.44
   OUTFLOW: ID= 1 (  0008)     35.590     0.715     13.25      85.59

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  8.35
                  TIME SHIFT OF PEAK FLOW         (min)= 60.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  2.0238

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| CALIB            |
| STANDHYD (  0037)|   Area    (ha)=   2.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  59.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.58         0.42
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     115.47        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 | 6.167    1.72 |12.250  118.68 | 18.33    1.94
              0.167    0.00 | 6.250    1.72 |12.333   15.49 | 18.42    1.93
              0.250    0.00 | 6.333    2.15 |12.417   15.48 | 18.50    1.93
              0.333    1.08 | 6.417    2.15 |12.500   15.48 | 18.58    1.94
              0.417    1.07 | 6.500    2.15 |12.583   15.48 | 18.67    1.94
              0.500    1.07 | 6.583    2.15 |12.667   15.48 | 18.75    1.94
              0.583    1.08 | 6.667    2.15 |12.750   15.48 | 18.83    1.94
              0.667    1.07 | 6.750    2.15 |12.833    7.96 | 18.92    1.93
              0.750    1.07 | 6.833    2.15 |12.917    7.95 | 19.00    1.93
              0.833    1.07 | 6.917    2.15 |13.000    7.95 | 19.08    1.94
              0.917    1.07 | 7.000    2.15 |13.083    7.95 | 19.17    1.94
              1.000    1.07 | 7.083    2.15 |13.167    7.96 | 19.25    1.94
              1.083    1.07 | 7.167    2.15 |13.250    7.96 | 19.33    1.94
              1.167    1.07 | 7.250    2.15 |13.333    1.51 | 19.42    1.93
              1.250    1.07 | 7.333    2.15 |13.417    1.50 | 19.50    1.94
              1.333    1.08 | 7.417    2.15 |13.500    1.50 | 19.58    1.94
              1.417    1.08 | 7.500    2.15 |13.583    1.50 | 19.67    1.94
              1.500    1.08 | 7.583    2.15 |13.667    1.50 | 19.75    1.94
              1.583    1.07 | 7.667    2.15 |13.750    1.50 | 19.83    1.93
              1.667    1.07 | 7.750    2.15 |13.833    8.81 | 19.92    1.93
              1.750    1.08 | 7.833    2.15 |13.917    8.82 | 20.00    1.94
              1.833    1.08 | 7.917    2.15 |14.000    8.82 | 20.08    1.94
              1.917    1.08 | 8.000    2.15 |14.083    8.81 | 20.17    1.94
              2.000    1.08 | 8.083    2.15 |14.167    8.82 | 20.25    1.93
              2.083    1.93 | 8.167    2.15 |14.250    8.82 | 20.33    1.29
              2.167    1.93 | 8.250    2.15 |14.333    3.23 | 20.42    1.29
              2.250    1.93 | 8.333    2.90 |14.417    3.22 | 20.50    1.29
              2.333    1.40 | 8.417    2.90 |14.500    3.22 | 20.58    1.29
              2.417    1.40 | 8.500    2.90 |14.583    3.22 | 20.67    1.29
              2.500    1.40 | 8.583    2.90 |14.667    3.22 | 20.75    1.29
              2.583    1.40 | 8.667    2.90 |14.750    3.22 | 20.83    1.29
              2.667    1.40 | 8.750    2.90 |14.833    3.22 | 20.92    1.29
              2.750    1.40 | 8.833    2.90 |14.917    3.22 | 21.00    1.29
              2.833    1.40 | 8.917    2.90 |15.000    3.22 | 21.08    1.29
              2.917    1.40 | 9.000    2.90 |15.083    3.23 | 21.17    1.29
              3.000    1.40 | 9.083    2.90 |15.167    3.23 | 21.25    1.29
              3.083    1.40 | 9.167    2.90 |15.250    3.23 | 21.33    1.29
              3.167    1.40 | 9.250    2.90 |15.333    3.22 | 21.42    1.29
              3.250    1.40 | 9.333    3.44 |15.417    3.22 | 21.50    1.29
              3.333    1.40 | 9.417    3.44 |15.500    3.22 | 21.58    1.29
              3.417    1.40 | 9.500    3.44 |15.583    3.22 | 21.67    1.29
              3.500    1.40 | 9.583    3.44 |15.667    3.22 | 21.75    1.29
              3.583    1.40 | 9.667    3.44 |15.750    3.22 | 21.83    1.29
              3.667    1.40 | 9.750    3.44 |15.833    3.22 | 21.92    1.29
              3.750    1.40 | 9.833    3.87 |15.917    3.22 | 22.00    1.29
              3.833    1.40 | 9.917    3.87 |16.000    3.22 | 22.08    1.29
              3.917    1.40 |10.000    3.87 |16.083    3.22 | 22.17    1.29
              4.000    1.40 |10.083    3.87 |16.167    3.22 | 22.25    1.29
              4.083    1.40 |10.167    3.87 |16.250    3.22 | 22.33    1.29
              4.167    1.40 |10.250    3.87 |16.333    1.94 | 22.42    1.29
              4.250    1.40 |10.333    4.94 |16.417    1.94 | 22.50    1.29
              4.333    1.72 |10.417    4.95 |16.500    1.94 | 22.58    1.29
              4.417    1.72 |10.500    4.95 |16.583    1.94 | 22.67    1.29
              4.500    1.72 |10.583    4.94 |16.667    1.93 | 22.75    1.29
              4.583    1.72 |10.667    4.95 |16.750    1.93 | 22.83    1.29
              4.667    1.72 |10.750    4.95 |16.833    1.94 | 22.92    1.29
              4.750    1.72 |10.833    6.66 |16.917    1.93 | 23.00    1.29
              4.833    1.72 |10.917    6.67 |17.000    1.93 | 23.08    1.29
              4.917    1.72 |11.000    6.67 |17.083    1.94 | 23.17    1.29
              5.000    1.72 |11.083    6.66 |17.167    1.94 | 23.25    1.29
              5.083    1.72 |11.167    6.66 |17.250    1.94 | 23.33    1.29
              5.167    1.72 |11.250    6.66 |17.333    1.94 | 23.42    1.29
              5.250    1.72 |11.333   10.32 |17.417    1.93 | 23.50    1.29
              5.333    1.72 |11.417   10.32 |17.500    1.93 | 23.58    1.29
              5.417    1.72 |11.500   10.32 |17.583    1.94 | 23.67    1.29
              5.500    1.72 |11.583   10.32 |17.667    1.94 | 23.75    1.29
              5.583    1.72 |11.667   10.32 |17.750    1.94 | 23.83    1.29
              5.667    1.72 |11.750   10.32 |17.833    1.94 | 23.92    1.29
              5.750    1.72 |11.833   44.72 |17.917    1.93 | 24.00    1.29
              5.833    1.72 |11.917   44.72 |18.000    1.93 | 24.08    1.29
              5.917    1.72 |12.000   44.72 |18.083    1.94 | 24.17    1.29
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               6.000    1.72 |12.083  118.67 |18.167    1.94 | 24.25    1.29
               6.083    1.72 |12.167  118.68 |18.250    1.94 |

     Max.Eff.Inten.(mm/hr)=     118.68       194.66
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       2.60 (ii)    6.96 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.29         0.14
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.39         0.19          0.581 (iii)
     TIME TO PEAK    (hrs)=      12.25        12.25          12.25
     RUNOFF VOLUME    (mm)=     106.50        76.58          94.23
     TOTAL RAINFALL   (mm)=     107.50       107.50         107.50
     RUNOFF COEFFICIENT   =       0.99         0.71           0.88

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| RESERVOIR(  0033)|     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   |   0.0250     0.1054
                          0.0020     0.0490   |   0.0410     0.1239
                          0.0030     0.0750   |   0.0540     0.1381
                          0.0130     0.0932   |   0.0670     0.1527

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0037)      2.000     0.581     12.25      94.23
   OUTFLOW: ID= 1 (  0033)      2.000     0.041     13.25      89.13

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  7.06
                  TIME SHIFT OF PEAK FLOW         (min)= 60.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1239

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

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

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\76ca5756-c175-44ba-a2df-6743faadd7bd\scen
  Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\76ca5756-c175-44ba-a2df-6743faadd7bd\scen

DATE: 05-01-2024                          TIME: 02:27:00

USER:


COMMENTS: ____________________________________________________________

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  ***********************************************
  ** SIMULATION : 05. 50-Year-24-Hour-SCS-Type- **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              d7ebc3fa-4e57-492f-bbed-8129d1e23af0\ada53171
| Ptotal=120.60 mm |    Comments: 50-Year-24-Hour-SCS-Type-II
--------------------
                  TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                   hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
                  0.00     0.00 |  6.25     2.41 | 12.50    17.37 | 18.75     2.17
                  0.25     1.21 |  6.50     2.41 | 12.75     8.92 | 19.00     2.17
                  0.50     1.21 |  6.75     2.41 | 13.00     8.92 | 19.25     2.17
                  0.75     1.21 |  7.00     2.41 | 13.25     1.69 | 19.50     2.17
                  1.00     1.21 |  7.25     2.41 | 13.50     1.69 | 19.75     2.17
                  1.25     1.21 |  7.50     2.41 | 13.75     9.89 | 20.00     2.17
                  1.50     1.21 |  7.75     2.41 | 14.00     9.89 | 20.25     1.45
                  1.75     1.21 |  8.00     2.41 | 14.25     3.62 | 20.50     1.45
                  2.00     2.17 |  8.25     3.26 | 14.50     3.62 | 20.75     1.45
                  2.25     1.57 |  8.50     3.26 | 14.75     3.62 | 21.00     1.45
                  2.50     1.57 |  8.75     3.26 | 15.00     3.62 | 21.25     1.45
                  2.75     1.57 |  9.00     3.26 | 15.25     3.62 | 21.50     1.45
                  3.00     1.57 |  9.25     3.86 | 15.50     3.62 | 21.75     1.45
                  3.25     1.57 |  9.50     3.86 | 15.75     3.62 | 22.00     1.45
                  3.50     1.57 |  9.75     4.34 | 16.00     3.62 | 22.25     1.45
                  3.75     1.57 | 10.00     4.34 | 16.25     2.17 | 22.50     1.45
                  4.00     1.57 | 10.25     5.55 | 16.50     2.17 | 22.75     1.45
                  4.25     1.93 | 10.50     5.55 | 16.75     2.17 | 23.00     1.45
                  4.50     1.93 | 10.75     7.48 | 17.00     2.17 | 23.25     1.45
                  4.75     1.93 | 11.00     7.48 | 17.25     2.17 | 23.50     1.45
                  5.00     1.93 | 11.25    11.58 | 17.50     2.17 | 23.75     1.45
                  5.25     1.93 | 11.50    11.58 | 17.75     2.17 | 24.00     1.45
                  5.50     1.93 | 11.75    50.17 | 18.00     2.17 |
                  5.75     1.93 | 12.00   133.14 | 18.25     2.17 |
                  6.00     1.93 | 12.25    17.37 | 18.50     2.17 |
```

CALIB	
STANDHYD (0006)	Area (ha)= 29.06
ID= 1 DT= 5.0 min	Total Imp(%)= 66.00 Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	6.167	1.93	12.250	133.14	18.33	2.17
0.167	0.00	6.250	1.93	12.333	17.38	18.42	2.17
0.250	0.00	6.333	2.41	12.417	17.37	18.50	2.17
0.333	1.21	6.417	2.41	12.500	17.37	18.58	2.17
0.417	1.21	6.500	2.41	12.583	17.37	18.67	2.17
0.500	1.21	6.583	2.41	12.667	17.37	18.75	2.17
0.583	1.21	6.667	2.41	12.750	17.37	18.83	2.17
0.667	1.21	6.750	2.41	12.833	8.93	18.92	2.17
0.750	1.21	6.833	2.41	12.917	8.92	19.00	2.17
0.833	1.21	6.917	2.41	13.000	8.92	19.08	2.17
0.917	1.21	7.000	2.41	13.083	8.92	19.17	2.17
1.000	1.21	7.083	2.41	13.167	8.92	19.25	2.17
1.083	1.21	7.167	2.41	13.250	8.92	19.33	2.17
1.167	1.21	7.250	2.41	13.333	1.69	19.42	2.17
1.250	1.21	7.333	2.41	13.417	1.69	19.50	2.17
1.333	1.21	7.417	2.41	13.500	1.69	19.58	2.17
1.417	1.21	7.500	2.41	13.583	1.69	19.67	2.17
1.500	1.21	7.583	2.41	13.667	1.69	19.75	2.17
1.583	1.21	7.667	2.41	13.750	1.69	19.83	2.17
1.667	1.21	7.750	2.41	13.833	9.89	19.92	2.17
1.750	1.21	7.833	2.41	13.917	9.89	20.00	2.17
1.833	1.21	7.917	2.41	14.000	9.89	20.08	2.17
1.917	1.21	8.000	2.41	14.083	9.89	20.17	2.17
2.000	1.21	8.083	2.41	14.167	9.89	20.25	2.17
2.083	2.17	8.167	2.41	14.250	9.89	20.33	1.45
2.167	2.17	8.250	2.41	14.333	3.62	20.42	1.45
2.250	2.17	8.333	3.26	14.417	3.62	20.50	1.45
2.333	1.57	8.417	3.26	14.500	3.62	20.58	1.45
2.417	1.57	8.500	3.26	14.583	3.62	20.67	1.45
2.500	1.57	8.583	3.26	14.667	3.62	20.75	1.45
2.583	1.57	8.667	3.26	14.750	3.62	20.83	1.45
2.667	1.57	8.750	3.26	14.833	3.62	20.92	1.45
2.750	1.57	8.833	3.26	14.917	3.62	21.00	1.45
2.833	1.57	8.917	3.26	15.000	3.62	21.08	1.45
2.917	1.57	9.000	3.26	15.083	3.62	21.17	1.45
3.000	1.57	9.083	3.26	15.167	3.62	21.25	1.45
3.083	1.57	9.167	3.26	15.250	3.62	21.33	1.45
3.167	1.57	9.250	3.26	15.333	3.62	21.42	1.45
3.250	1.57	9.333	3.86	15.417	3.62	21.50	1.45
3.333	1.57	9.417	3.86	15.500	3.62	21.58	1.45
3.417	1.57	9.500	3.86	15.583	3.62	21.67	1.45
3.500	1.57	9.583	3.86	15.667	3.62	21.75	1.45
3.583	1.57	9.667	3.86	15.750	3.62	21.83	1.45
3.667	1.57	9.750	3.86	15.833	3.62	21.92	1.45
3.750	1.57	9.833	4.34	15.917	3.62	22.00	1.45
3.833	1.57	9.917	4.34	16.000	3.62	22.08	1.45
3.917	1.57	10.000	4.34	16.083	3.62	22.17	1.45
4.000	1.57	10.083	4.34	16.167	3.62	22.25	1.45
4.083	1.57	10.167	4.34	16.250	3.62	22.33	1.45
4.167	1.57	10.250	4.34	16.333	2.17	22.42	1.45
4.250	1.57	10.333	5.55	16.417	2.17	22.50	1.45
4.333	1.93	10.417	5.55	16.500	2.17	22.58	1.45
4.417	1.93	10.500	5.55	16.583	2.17	22.67	1.45
4.500	1.93	10.583	5.55	16.667	2.17	22.75	1.45
4.583	1.93	10.667	5.55	16.750	2.17	22.83	1.45
4.667	1.93	10.750	5.55	16.833	2.17	22.92	1.45
4.750	1.93	10.833	7.48	16.917	2.17	23.00	1.45
4.833	1.93	10.917	7.48	17.000	2.17	23.08	1.45
4.917	1.93	11.000	7.48	17.083	2.17	23.17	1.45
5.000	1.93	11.083	7.48	17.167	2.17	23.25	1.45
5.083	1.93	11.167	7.48	17.250	2.17	23.33	1.45
5.167	1.93	11.250	7.48	17.333	2.17	23.42	1.45
5.250	1.93	11.333	11.58	17.417	2.17	23.50	1.45
5.333	1.93	11.417	11.58	17.500	2.17	23.58	1.45
5.417	1.93	11.500	11.58	17.583	2.17	23.67	1.45
5.500	1.93	11.583	11.58	17.667	2.17	23.75	1.45
5.583	1.93	11.667	11.58	17.750	2.17	23.83	1.45
5.667	1.93	11.750	11.58	17.833	2.17	23.92	1.45
5.750	1.93	11.833	50.17	17.917	2.17	24.00	1.45
5.833	1.93	11.917	50.17	18.000	2.17	24.08	1.45
5.917	1.93	12.000	50.17	18.083	2.17	24.17	1.45
6.000	1.93	12.083	133.13	18.167	2.17	24.25	1.45
6.083	1.93	12.167	133.14	18.250	2.17		

Max.Eff.Inten.(mm/hr)=		133.14	137.25	
over (min)		5.00	15.00	
Storage Coeff. (min)=		5.54 (ii)	11.76 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.20	0.09	
				TOTALS
PEAK FLOW	(cms)=	5.66	2.51	7.931 (iii)
TIME TO PEAK	(hrs)=	12.25	12.33	12.25
RUNOFF VOLUME	(mm)=	119.60	78.37	101.05
TOTAL RAINFALL	(mm)=	120.60	120.60	120.60
RUNOFF COEFFICIENT	=	0.99	0.65	0.84

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0020)	Area (ha)= 3.80
ID= 1 DT= 5.0 min	Total Imp(%)= 80.00 Dir. Conn.(%)= 60.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00

Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	6.167	1.93	12.250	133.14	18.33	2.17
0.167	0.00	6.250	1.93	12.333	17.38	18.42	2.17
0.250	0.00	6.333	2.41	12.417	17.37	18.50	2.17
0.333	1.21	6.417	2.41	12.500	17.37	18.58	2.17
0.417	1.21	6.500	2.41	12.583	17.37	18.67	2.17
0.500	1.21	6.583	2.41	12.667	17.37	18.75	2.17
0.583	1.21	6.667	2.41	12.750	17.37	18.83	2.17
0.667	1.21	6.750	2.41	12.833	8.93	18.92	2.17
0.750	1.21	6.833	2.41	12.917	8.92	19.00	2.17
0.833	1.21	6.917	2.41	13.000	8.92	19.08	2.17
0.917	1.21	7.000	2.41	13.083	8.92	19.17	2.17
1.000	1.21	7.083	2.41	13.167	8.92	19.25	2.17
1.083	1.21	7.167	2.41	13.250	8.92	19.33	2.17
1.167	1.21	7.250	2.41	13.333	1.69	19.42	2.17
1.250	1.21	7.333	2.41	13.417	1.69	19.50	2.17
1.333	1.21	7.417	2.41	13.500	1.69	19.58	2.17
1.417	1.21	7.500	2.41	13.583	1.69	19.67	2.17
1.500	1.21	7.583	2.41	13.667	1.69	19.75	2.17
1.583	1.21	7.667	2.41	13.750	1.69	19.83	2.17
1.667	1.21	7.750	2.41	13.833	9.89	19.92	2.17
1.750	1.21	7.833	2.41	13.917	9.89	20.00	2.17
1.833	1.21	7.917	2.41	14.000	9.89	20.08	2.17
1.917	1.21	8.000	2.41	14.083	9.89	20.17	2.17
2.000	1.21	8.083	2.41	14.167	9.89	20.25	2.17
2.083	2.17	8.167	2.41	14.250	9.89	20.33	1.45
2.167	2.17	8.250	2.41	14.333	3.62	20.42	1.45
2.250	2.17	8.333	3.26	14.417	3.62	20.50	1.45
2.333	1.57	8.417	3.26	14.500	3.62	20.58	1.45
2.417	1.57	8.500	3.26	14.583	3.62	20.67	1.45
2.500	1.57	8.583	3.26	14.667	3.62	20.75	1.45
2.583	1.57	8.667	3.26	14.750	3.62	20.83	1.45
2.667	1.57	8.750	3.26	14.833	3.62	20.92	1.45
2.750	1.57	8.833	3.26	14.917	3.62	21.00	1.45
2.833	1.57	8.917	3.26	15.000	3.62	21.08	1.45
2.917	1.57	9.000	3.26	15.083	3.62	21.17	1.45
3.000	1.57	9.083	3.26	15.167	3.62	21.25	1.45
3.083	1.57	9.167	3.26	15.250	3.62	21.33	1.45
3.167	1.57	9.250	3.26	15.333	3.62	21.42	1.45
3.250	1.57	9.333	3.86	15.417	3.62	21.50	1.45
3.333	1.57	9.417	3.86	15.500	3.62	21.58	1.45
3.417	1.57	9.500	3.86	15.583	3.62	21.67	1.45
3.500	1.57	9.583	3.86	15.667	3.62	21.75	1.45
3.583	1.57	9.667	3.86	15.750	3.62	21.83	1.45
3.667	1.57	9.750	3.86	15.833	3.62	21.92	1.45
3.750	1.57	9.833	4.34	15.917	3.62	22.00	1.45
3.833	1.57	9.917	4.34	16.000	3.62	22.08	1.45
3.917	1.57	10.000	4.34	16.083	3.62	22.17	1.45
4.000	1.57	10.083	4.34	16.167	3.62	22.25	1.45
4.083	1.57	10.167	4.34	16.250	3.62	22.33	1.45
4.167	1.57	10.250	4.34	16.333	2.17	22.42	1.45
4.250	1.57	10.333	5.55	16.417	2.17	22.50	1.45
4.333	1.93	10.417	5.55	16.500	2.17	22.58	1.45
4.417	1.93	10.500	5.55	16.583	2.17	22.67	1.45
4.500	1.93	10.583	5.55	16.667	2.17	22.75	1.45
4.583	1.93	10.667	5.55	16.750	2.17	22.83	1.45
4.667	1.93	10.750	5.55	16.833	2.17	22.92	1.45
4.750	1.93	10.833	7.48	16.917	2.17	23.00	1.45
4.833	1.93	10.917	7.48	17.000	2.17	23.08	1.45
4.917	1.93	11.000	7.48	17.083	2.17	23.17	1.45
5.000	1.93	11.083	7.48	17.167	2.17	23.25	1.45
5.083	1.93	11.167	7.48	17.250	2.17	23.33	1.45
5.167	1.93	11.250	7.48	17.333	2.17	23.42	1.45
5.250	1.93	11.333	11.58	17.417	2.17	23.50	1.45
5.333	1.93	11.417	11.58	17.500	2.17	23.58	1.45
5.417	1.93	11.500	11.58	17.583	2.17	23.67	1.45
5.500	1.93	11.583	11.58	17.667	2.17	23.75	1.45
5.583	1.93	11.667	11.58	17.750	2.17	23.83	1.45
5.667	1.93	11.750	11.58	17.833	2.17	23.92	1.45
5.750	1.93	11.833	50.17	17.917	2.17	24.00	1.45
5.833	1.93	11.917	50.17	18.000	2.17	24.08	1.45
5.917	1.93	12.000	50.17	18.083	2.17	24.17	1.45
6.000	1.93	12.083	133.13	18.167	2.17	24.25	1.45
6.083	1.93	12.167	133.14	18.250	2.17		

Max.Eff.Inten.	(mm/hr)=	133.14	230.65	
over	(min)	5.00	10.00	
Storage Coeff.	(min)=	3.01 (ii)	7.07 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	10.00	
Unit Hyd. peak	(cms)=	0.28	0.14	
				TOTALS
PEAK FLOW	(cms)=	0.84	0.41	1.253 (iii)
TIME TO PEAK	(hrs)=	12.25	12.25	12.25
RUNOFF VOLUME	(mm)=	119.60	89.39	107.51
TOTAL RAINFALL	(mm)=	120.60	120.60	120.60
RUNOFF COEFFICIENT	=	0.99	0.74	0.89

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0023)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0020):		3.80	1.253	12.25	107.51
+ ID2= 2 (0006):		29.06	7.931	12.25	101.05
ID = 3 (0023):		32.86	9.184	12.25	101.79

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0012)	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	0.4930	1.5666
0.0360	0.7150	0.7890	1.8478
0.0660	1.0737	1.0520	2.0613
0.2630	1.3645	1.3140	2.2797

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0023)	32.860	9.184	12.25	101.79
OUTFLOW: ID= 1 (0012)	32.860	1.051	13.00	99.23

PEAK FLOW REDUCTION [Qout/Qin](%)= 11.45
TIME SHIFT OF PEAK FLOW (min)= 45.00
MAXIMUM STORAGE USED (ha.m.)= 2.0613

CALIB	
STANDHYD (0017)	Area (ha)= 15.53
ID= 1 DT= 5.0 min	Total Imp(%)= 65.00 Dir. Conn.(%)= 49.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	10.09	5.44
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	321.77	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	6.167	1.93	12.250	133.14	18.33	2.17
0.167	0.00	6.250	1.93	12.333	17.38	18.42	2.17
0.250	0.00	6.333	2.41	12.417	17.37	18.50	2.17
0.333	1.21	6.417	2.41	12.500	17.37	18.58	2.17
0.417	1.21	6.500	2.41	12.583	17.37	18.67	2.17
0.500	1.21	6.583	2.41	12.667	17.37	18.75	2.17
0.583	1.21	6.667	2.41	12.750	17.37	18.83	2.17
0.667	1.21	6.750	2.41	12.833	8.93	18.92	2.17
0.750	1.21	6.833	2.41	12.917	8.92	19.00	2.17
0.833	1.21	6.917	2.41	13.000	8.92	19.08	2.17
0.917	1.21	7.000	2.41	13.083	8.92	19.17	2.17
1.000	1.21	7.083	2.41	13.167	8.92	19.25	2.17
1.083	1.21	7.167	2.41	13.250	8.92	19.33	2.17
1.167	1.21	7.250	2.41	13.333	1.69	19.42	2.17
1.250	1.21	7.333	2.41	13.417	1.69	19.50	2.17
1.333	1.21	7.417	2.41	13.500	1.69	19.58	2.17
1.417	1.21	7.500	2.41	13.583	1.69	19.67	2.17
1.500	1.21	7.583	2.41	13.667	1.69	19.75	2.17
1.583	1.21	7.667	2.41	13.750	1.69	19.83	2.17
1.667	1.21	7.750	2.41	13.833	9.89	19.92	2.17
1.750	1.21	7.833	2.41	13.917	9.89	20.00	2.17
1.833	1.21	7.917	2.41	14.000	9.89	20.08	2.17
1.917	1.21	8.000	2.41	14.083	9.89	20.17	2.17
2.000	1.21	8.083	2.41	14.167	9.89	20.25	2.17
2.083	2.17	8.167	2.41	14.250	9.89	20.33	1.45
2.167	2.17	8.250	2.41	14.333	3.62	20.42	1.45
2.250	2.17	8.333	3.26	14.417	3.62	20.50	1.45
2.333	1.57	8.417	3.26	14.500	3.62	20.58	1.45
2.417	1.57	8.500	3.26	14.583	3.62	20.67	1.45
2.500	1.57	8.583	3.26	14.667	3.62	20.75	1.45
2.583	1.57	8.667	3.26	14.750	3.62	20.83	1.45
2.667	1.57	8.750	3.26	14.833	3.62	20.92	1.45
2.750	1.57	8.833	3.26	14.917	3.62	21.00	1.45
2.833	1.57	8.917	3.26	15.000	3.62	21.08	1.45
2.917	1.57	9.000	3.26	15.083	3.62	21.17	1.45
3.000	1.57	9.083	3.26	15.167	3.62	21.25	1.45
3.083	1.57	9.167	3.26	15.250	3.62	21.33	1.45
3.167	1.57	9.250	3.26	15.333	3.62	21.42	1.45
3.250	1.57	9.333	3.86	15.417	3.62	21.50	1.45
3.333	1.57	9.417	3.86	15.500	3.62	21.58	1.45
3.417	1.57	9.500	3.86	15.583	3.62	21.67	1.45
3.500	1.57	9.583	3.86	15.667	3.62	21.75	1.45
3.583	1.57	9.667	3.86	15.750	3.62	21.83	1.45
3.667	1.57	9.750	3.86	15.833	3.62	21.92	1.45
3.750	1.57	9.833	4.34	15.917	3.62	22.00	1.45
3.833	1.57	9.917	4.34	16.000	3.62	22.08	1.45
3.917	1.57	10.000	4.34	16.083	3.62	22.17	1.45
4.000	1.57	10.083	4.34	16.167	3.62	22.25	1.45
4.083	1.57	10.167	4.34	16.250	3.62	22.33	1.45
4.167	1.57	10.250	4.34	16.333	2.17	22.42	1.45
4.250	1.57	10.333	5.55	16.417	2.17	22.50	1.45
4.333	1.93	10.417	5.55	16.500	2.17	22.58	1.45
4.417	1.93	10.500	5.55	16.583	2.17	22.67	1.45
4.500	1.93	10.583	5.55	16.667	2.17	22.75	1.45
4.583	1.93	10.667	5.55	16.750	2.17	22.83	1.45
4.667	1.93	10.750	5.55	16.833	2.17	22.92	1.45
4.750	1.93	10.833	7.48	16.917	2.17	23.00	1.45
4.833	1.93	10.917	7.48	17.000	2.17	23.08	1.45
4.917	1.93	11.000	7.48	17.083	2.17	23.17	1.45
5.000	1.93	11.083	7.48	17.167	2.17	23.25	1.45
5.083	1.93	11.167	7.48	17.250	2.17	23.33	1.45
5.167	1.93	11.250	7.48	17.333	2.17	23.42	1.45
5.250	1.93	11.333	11.58	17.417	2.17	23.50	1.45
5.333	1.93	11.417	11.58	17.500	2.17	23.58	1.45
5.417	1.93	11.500	11.58	17.583	2.17	23.67	1.45
5.500	1.93	11.583	11.58	17.667	2.17	23.75	1.45
5.583	1.93	11.667	11.58	17.750	2.17	23.83	1.45
5.667	1.93	11.750	11.58	17.833	2.17	23.92	1.45
5.750	1.93	11.833	50.17	17.917	2.17	24.00	1.45
5.833	1.93	11.917	50.17	18.000	2.17	24.08	1.45
5.917	1.93	12.000	50.17	18.083	2.17	24.17	1.45
6.000	1.93	12.083	133.13	18.167	2.17	24.25	1.45
6.083	1.93	12.167	133.14	18.250	2.17		

				TOTALS
Max.Eff.Inten.(mm/hr)=	133.14	155.57		
over (min)	5.00	15.00		
Storage Coeff. (min)=	4.59 (ii)	10.51 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	0.23	0.09		
PEAK FLOW (cms)=	2.75	1.63	4.243 (iii)	
TIME TO PEAK (hrs)=	12.25	12.33	12.25	
RUNOFF VOLUME (mm)=	119.60	81.12	99.97	
TOTAL RAINFALL (mm)=	120.60	120.60	120.60	
RUNOFF COEFFICIENT =	0.99	0.67	0.83	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

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           CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
| STANDHYD (  0002)|   Area    (ha)=  20.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  56.00
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                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      13.44         6.62
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     365.70        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 | 6.167    1.93 |12.250  133.14 | 18.33    2.17
 0.167    0.00 | 6.250    1.93 |12.333   17.38 | 18.42    2.17
 0.250    0.00 | 6.333    2.41 |12.417   17.37 | 18.50    2.17
 0.333    1.21 | 6.417    2.41 |12.500   17.37 | 18.58    2.17
 0.417    1.21 | 6.500    2.41 |12.583   17.37 | 18.67    2.17
 0.500    1.21 | 6.583    2.41 |12.667   17.37 | 18.75    2.17
 0.583    1.21 | 6.667    2.41 |12.750   17.37 | 18.83    2.17
 0.667    1.21 | 6.750    2.41 |12.833    8.93 | 18.92    2.17
 0.750    1.21 | 6.833    2.41 |12.917    8.92 | 19.00    2.17
 0.833    1.21 | 6.917    2.41 |13.000    8.92 | 19.08    2.17
 0.917    1.21 | 7.000    2.41 |13.083    8.92 | 19.17    2.17
 1.000    1.21 | 7.083    2.41 |13.167    8.92 | 19.25    2.17
 1.083    1.21 | 7.167    2.41 |13.250    8.92 | 19.33    2.17
 1.167    1.21 | 7.250    2.41 |13.333    1.69 | 19.42    2.17
 1.250    1.21 | 7.333    2.41 |13.417    1.69 | 19.50    2.17
 1.333    1.21 | 7.417    2.41 |13.500    1.69 | 19.58    2.17
 1.417    1.21 | 7.500    2.41 |13.583    1.69 | 19.67    2.17
 1.500    1.21 | 7.583    2.41 |13.667    1.69 | 19.75    2.17
 1.583    1.21 | 7.667    2.41 |13.750    1.69 | 19.83    2.17
 1.667    1.21 | 7.750    2.41 |13.833    9.89 | 19.92    2.17
 1.750    1.21 | 7.833    2.41 |13.917    9.89 | 20.00    2.17
 1.833    1.21 | 7.917    2.41 |14.000    9.89 | 20.08    2.17
 1.917    1.21 | 8.000    2.41 |14.083    9.89 | 20.17    2.17
 2.000    1.21 | 8.083    2.41 |14.167    9.89 | 20.25    2.17
 2.083    2.17 | 8.167    2.41 |14.250    9.89 | 20.33    1.45
 2.167    2.17 | 8.250    2.41 |14.333    3.62 | 20.42    1.45
 2.250    2.17 | 8.333    3.26 |14.417    3.62 | 20.50    1.45
 2.333    1.57 | 8.417    3.26 |14.500    3.62 | 20.58    1.45
 2.417    1.57 | 8.500    3.26 |14.583    3.62 | 20.67    1.45
 2.500    1.57 | 8.583    3.26 |14.667    3.62 | 20.75    1.45
 2.583    1.57 | 8.667    3.26 |14.750    3.62 | 20.83    1.45
 2.667    1.57 | 8.750    3.26 |14.833    3.62 | 20.92    1.45
 2.750    1.57 | 8.833    3.26 |14.917    3.62 | 21.00    1.45
 2.833    1.57 | 8.917    3.26 |15.000    3.62 | 21.08    1.45
 2.917    1.57 | 9.000    3.26 |15.083    3.62 | 21.17    1.45
 3.000    1.57 | 9.083    3.26 |15.167    3.62 | 21.25    1.45
 3.083    1.57 | 9.167    3.26 |15.250    3.62 | 21.33    1.45
 3.167    1.57 | 9.250    3.26 |15.333    3.62 | 21.42    1.45
 3.250    1.57 | 9.333    3.86 |15.417    3.62 | 21.50    1.45
 3.333    1.57 | 9.417    3.86 |15.500    3.62 | 21.58    1.45
 3.417    1.57 | 9.500    3.86 |15.583    3.62 | 21.67    1.45
 3.500    1.57 | 9.583    3.86 |15.667    3.62 | 21.75    1.45
 3.583    1.57 | 9.667    3.86 |15.750    3.62 | 21.83    1.45
 3.667    1.57 | 9.750    3.86 |15.833    3.62 | 21.92    1.45
 3.750    1.57 | 9.833    4.34 |15.917    3.62 | 22.00    1.45
 3.833    1.57 | 9.917    4.34 |16.000    3.62 | 22.08    1.45
 3.917    1.57 |10.000    4.34 |16.083    3.62 | 22.17    1.45
 4.000    1.57 |10.083    4.34 |16.167    3.62 | 22.25    1.45
 4.083    1.57 |10.167    4.34 |16.250    3.62 | 22.33    1.45
 4.167    1.57 |10.250    4.34 |16.333    2.17 | 22.42    1.45
 4.250    1.57 |10.333    5.55 |16.417    2.17 | 22.50    1.45
 4.333    1.93 |10.417    5.55 |16.500    2.17 | 22.58    1.45
 4.417    1.93 |10.500    5.55 |16.583    2.17 | 22.67    1.45
 4.500    1.93 |10.583    5.55 |16.667    2.17 | 22.75    1.45
 4.583    1.93 |10.667    5.55 |16.750    2.17 | 22.83    1.45
 4.667    1.93 |10.750    5.55 |16.833    2.17 | 22.92    1.45
 4.750    1.93 |10.833    7.48 |16.917    2.17 | 23.00    1.45
 4.833    1.93 |10.917    7.48 |17.000    2.17 | 23.08    1.45
 4.917    1.93 |11.000    7.48 |17.083    2.17 | 23.17    1.45
 5.000    1.93 |11.083    7.48 |17.167    2.17 | 23.25    1.45
 5.083    1.93 |11.167    7.48 |17.250    2.17 | 23.33    1.45
 5.167    1.93 |11.250    7.48 |17.333    2.17 | 23.42    1.45
 5.250    1.93 |11.333   11.58 |17.417    2.17 | 23.50    1.45
 5.333    1.93 |11.417   11.58 |17.500    2.17 | 23.58    1.45
 5.417    1.93 |11.500   11.58 |17.583    2.17 | 23.67    1.45
 5.500    1.93 |11.583   11.58 |17.667    2.17 | 23.75    1.45
 5.583    1.93 |11.667   11.58 |17.750    2.17 | 23.83    1.45
 5.667    1.93 |11.750   11.58 |17.833    2.17 | 23.92    1.45
 5.750    1.93 |11.833   50.17 |17.917    2.17 | 24.00    1.45
 5.833    1.93 |11.917   50.17 |18.000    2.17 | 24.08    1.45
 5.917    1.93 |12.000   50.17 |18.083    2.17 | 24.17    1.45
 6.000    1.93 |12.083  133.13 |18.167    2.17 | 24.25    1.45
 6.083    1.93 |12.167  133.14 |18.250    2.17 |

     Max.Eff.Inten.(mm/hr)=     133.14       138.59
               over (min)          5.00        15.00
     Storage Coeff.  (min)=        4.96 (ii)   11.15 (ii)
     Unit Hyd. Tpeak (min)=        5.00        15.00
     Unit Hyd. peak  (cms)=        0.22         0.09
                                                          *TOTALS*
     PEAK FLOW       (cms)=        4.03         1.73        5.601 (iii)
     TIME TO PEAK    (hrs)=       12.25        12.33         12.25
     RUNOFF VOLUME    (mm)=      119.60        78.58        101.55
     TOTAL RAINFALL   (mm)=      120.60       120.60        120.60
     RUNOFF COEFFICIENT   =        0.99         0.65          0.84

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  77.0    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  (  0018)|
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|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0017):    15.53    4.243    12.25    99.97
     + ID2= 2 (  0002):    20.06    5.601    12.25   101.55
       ================================================
       ID = 3 (  0018):    35.59    9.844    12.25   100.86

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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| RESERVOIR(  0008)|     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   |   0.4480     1.7011
                         0.0360     0.7282   |   0.7160     2.0238
                         0.0600     1.1698   |   0.9550     2.2595
                         0.2380     1.4871   |   1.1940     2.5034

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0018)     35.590     9.844     12.25     100.86
   OUTFLOW: ID= 1 (  0008)     35.590     0.955     13.08      97.99

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.70
                  TIME SHIFT OF PEAK FLOW         (min)= 50.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  2.2595

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| CALIB            |
| STANDHYD (  0037)|   Area    (ha)=   2.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  59.00
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                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.58         0.42
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     115.47        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 | 6.167    1.93 |12.250  133.14 | 18.33    2.17
              0.167    0.00 | 6.250    1.93 |12.333   17.38 | 18.42    2.17
              0.250    0.00 | 6.333    2.41 |12.417   17.37 | 18.50    2.17
              0.333    1.21 | 6.417    2.41 |12.500   17.37 | 18.58    2.17
              0.417    1.21 | 6.500    2.41 |12.583   17.37 | 18.67    2.17
              0.500    1.21 | 6.583    2.41 |12.667   17.37 | 18.75    2.17
              0.583    1.21 | 6.667    2.41 |12.750   17.37 | 18.83    2.17
              0.667    1.21 | 6.750    2.41 |12.833    8.93 | 18.92    2.17
              0.750    1.21 | 6.833    2.41 |12.917    8.92 | 19.00    2.17
              0.833    1.21 | 6.917    2.41 |13.000    8.92 | 19.08    2.17
              0.917    1.21 | 7.000    2.41 |13.083    8.92 | 19.17    2.17
              1.000    1.21 | 7.083    2.41 |13.167    8.92 | 19.25    2.17
              1.083    1.21 | 7.167    2.41 |13.250    8.92 | 19.33    2.17
              1.167    1.21 | 7.250    2.41 |13.333    1.69 | 19.42    2.17
              1.250    1.21 | 7.333    2.41 |13.417    1.69 | 19.50    2.17
              1.333    1.21 | 7.417    2.41 |13.500    1.69 | 19.58    2.17
              1.417    1.21 | 7.500    2.41 |13.583    1.69 | 19.67    2.17
              1.500    1.21 | 7.583    2.41 |13.667    1.69 | 19.75    2.17
              1.583    1.21 | 7.667    2.41 |13.750    1.69 | 19.83    2.17
              1.667    1.21 | 7.750    2.41 |13.833    9.89 | 19.92    2.17
              1.750    1.21 | 7.833    2.41 |13.917    9.89 | 20.00    2.17
              1.833    1.21 | 7.917    2.41 |14.000    9.89 | 20.08    2.17
              1.917    1.21 | 8.000    2.41 |14.083    9.89 | 20.17    2.17
              2.000    1.21 | 8.083    2.41 |14.167    9.89 | 20.25    2.17
              2.083    2.17 | 8.167    2.41 |14.250    9.89 | 20.33    1.45
              2.167    2.17 | 8.250    2.41 |14.333    3.62 | 20.42    1.45
              2.250    2.17 | 8.333    3.26 |14.417    3.62 | 20.50    1.45
              2.333    1.57 | 8.417    3.26 |14.500    3.62 | 20.58    1.45
              2.417    1.57 | 8.500    3.26 |14.583    3.62 | 20.67    1.45
              2.500    1.57 | 8.583    3.26 |14.667    3.62 | 20.75    1.45
              2.583    1.57 | 8.667    3.26 |14.750    3.62 | 20.83    1.45
              2.667    1.57 | 8.750    3.26 |14.833    3.62 | 20.92    1.45
              2.750    1.57 | 8.833    3.26 |14.917    3.62 | 21.00    1.45
              2.833    1.57 | 8.917    3.26 |15.000    3.62 | 21.08    1.45
              2.917    1.57 | 9.000    3.26 |15.083    3.62 | 21.17    1.45
              3.000    1.57 | 9.083    3.26 |15.167    3.62 | 21.25    1.45
              3.083    1.57 | 9.167    3.26 |15.250    3.62 | 21.33    1.45
              3.167    1.57 | 9.250    3.26 |15.333    3.62 | 21.42    1.45
              3.250    1.57 | 9.333    3.86 |15.417    3.62 | 21.50    1.45
              3.333    1.57 | 9.417    3.86 |15.500    3.62 | 21.58    1.45
              3.417    1.57 | 9.500    3.86 |15.583    3.62 | 21.67    1.45
              3.500    1.57 | 9.583    3.86 |15.667    3.62 | 21.75    1.45
              3.583    1.57 | 9.667    3.86 |15.750    3.62 | 21.83    1.45
              3.667    1.57 | 9.750    3.86 |15.833    3.62 | 21.92    1.45
              3.750    1.57 | 9.833    4.34 |15.917    3.62 | 22.00    1.45
              3.833    1.57 | 9.917    4.34 |16.000    3.62 | 22.08    1.45
              3.917    1.57 |10.000    4.34 |16.083    3.62 | 22.17    1.45
              4.000    1.57 |10.083    4.34 |16.167    3.62 | 22.25    1.45
              4.083    1.57 |10.167    4.34 |16.250    3.62 | 22.33    1.45
              4.167    1.57 |10.250    4.34 |16.333    2.17 | 22.42    1.45
              4.250    1.57 |10.333    5.55 |16.417    2.17 | 22.50    1.45
              4.333    1.93 |10.417    5.55 |16.500    2.17 | 22.58    1.45
              4.417    1.93 |10.500    5.55 |16.583    2.17 | 22.67    1.45
              4.500    1.93 |10.583    5.55 |16.667    2.17 | 22.75    1.45
              4.583    1.93 |10.667    5.55 |16.750    2.17 | 22.83    1.45
              4.667    1.93 |10.750    5.55 |16.833    2.17 | 22.92    1.45
              4.750    1.93 |10.833    7.48 |16.917    2.17 | 23.00    1.45
              4.833    1.93 |10.917    7.48 |17.000    2.17 | 23.08    1.45
              4.917    1.93 |11.000    7.48 |17.083    2.17 | 23.17    1.45
              5.000    1.93 |11.083    7.48 |17.167    2.17 | 23.25    1.45
              5.083    1.93 |11.167    7.48 |17.250    2.17 | 23.33    1.45
              5.167    1.93 |11.250    7.48 |17.333    2.17 | 23.42    1.45
              5.250    1.93 |11.333   11.58 |17.417    2.17 | 23.50    1.45
              5.333    1.93 |11.417   11.58 |17.500    2.17 | 23.58    1.45
              5.417    1.93 |11.500   11.58 |17.583    2.17 | 23.67    1.45
              5.500    1.93 |11.583   11.58 |17.667    2.17 | 23.75    1.45
              5.583    1.93 |11.667   11.58 |17.750    2.17 | 23.83    1.45
              5.667    1.93 |11.750   11.58 |17.833    2.17 | 23.92    1.45
              5.750    1.93 |11.833   50.17 |17.917    2.17 | 24.00    1.45
              5.833    1.93 |11.917   50.17 |18.000    2.17 | 24.08    1.45
              5.917    1.93 |12.000   50.17 |18.083    2.17 | 24.17    1.45
              6.000    1.93 |12.083  133.13 |18.167    2.17 | 24.25    1.45
              6.083    1.93 |12.167  133.14 |18.250    2.17 |

Max.Eff.Inten.(mm/hr)=     133.14       224.05
```

```
              over (min)        5.00        10.00
     Storage Coeff.  (min)=      2.48 (ii)    6.65 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.29         0.14
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.44         0.23          0.661 (iii)
     TIME TO PEAK    (hrs)=     12.25        12.25          12.25
     RUNOFF VOLUME    (mm)=    119.60        88.80         106.97
     TOTAL RAINFALL   (mm)=    120.60       120.60         120.60
     RUNOFF COEFFICIENT   =      0.99         0.74           0.89

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0033)|     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   |   0.0250     0.1054
                          0.0020     0.0490   |   0.0410     0.1239
                          0.0030     0.0750   |   0.0540     0.1381
                          0.0130     0.0932   |   0.0670     0.1527

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0037)     2.000     0.661     12.25     106.97
   OUTFLOW: ID= 1 (  0033)     2.000     0.054     12.92     101.84

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  8.17
                  TIME SHIFT OF PEAK FLOW          (min)= 40.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1381

--------------------------------------------------------------------------------
================================================================================
======================

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

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

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\82697a3e-9303-4125-9c08-de2bd6179d62\scen
  Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\82697a3e-9303-4125-9c08-de2bd6179d62\scen


DATE: 05-01-2024                          TIME: 02:27:00

USER:


COMMENTS: _____

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  ********************************************
  ** SIMULATION : 06. 100-Year-24-Hour-SCS-Type **
  ********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              d7ebc3fa-4e57-492f-bbed-8129d1e23af0\04046152
| Ptotal=133.60 mm |    Comments: 100-Year-24-Hour-SCS-Type-II
--------------------
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                 0.00    0.00 |  6.25    2.67 | 12.50   19.24 | 18.75    2.40
                 0.25    1.34 |  6.50    2.67 | 12.75    9.89 | 19.00    2.40
                 0.50    1.34 |  6.75    2.67 | 13.00    9.89 | 19.25    2.40
                 0.75    1.34 |  7.00    2.67 | 13.25    1.87 | 19.50    2.40
                 1.00    1.34 |  7.25    2.67 | 13.50    1.87 | 19.75    2.40
                 1.25    1.34 |  7.50    2.67 | 13.75   10.96 | 20.00    2.40
                 1.50    1.34 |  7.75    2.67 | 14.00   10.96 | 20.25    1.60
                 1.75    1.34 |  8.00    2.67 | 14.25    4.01 | 20.50    1.60
                 2.00    2.40 |  8.25    3.61 | 14.50    4.01 | 20.75    1.60
                 2.25    1.74 |  8.50    3.61 | 14.75    4.01 | 21.00    1.60
                 2.50    1.74 |  8.75    3.61 | 15.00    4.01 | 21.25    1.60
                 2.75    1.74 |  9.00    3.61 | 15.25    4.01 | 21.50    1.60
                 3.00    1.74 |  9.25    4.28 | 15.50    4.01 | 21.75    1.60
                 3.25    1.74 |  9.50    4.28 | 15.75    4.01 | 22.00    1.60
                 3.50    1.74 |  9.75    4.81 | 16.00    4.01 | 22.25    1.60
                 3.75    1.74 | 10.00    4.81 | 16.25    2.40 | 22.50    1.60
                 4.00    1.74 | 10.25    6.15 | 16.50    2.40 | 22.75    1.60
                 4.25    2.14 | 10.50    6.15 | 16.75    2.40 | 23.00    1.60
                 4.50    2.14 | 10.75    8.28 | 17.00    2.40 | 23.25    1.60
                 4.75    2.14 | 11.00    8.28 | 17.25    2.40 | 23.50    1.60
                 5.00    2.14 | 11.25   12.83 | 17.50    2.40 | 23.75    1.60
                 5.25    2.14 | 11.50   12.83 | 17.75    2.40 | 24.00    1.60
                 5.50    2.14 | 11.75   55.58 | 18.00    2.40 |
                 5.75    2.14 | 12.00  147.49 | 18.25    2.40 |
                 6.00    2.14 | 12.25   19.24 | 18.50    2.40 |

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| CALIB            |
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```
| STANDHYD (  0006)|   Area     (ha)=  29.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  66.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      19.18         9.88
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     440.15        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	6.167	2.14	12.250	147.49	18.33	2.40
0.167	0.00	6.250	2.14	12.333	19.25	18.42	2.40
0.250	0.00	6.333	2.67	12.417	19.24	18.50	2.40
0.333	1.34	6.417	2.67	12.500	19.24	18.58	2.40
0.417	1.34	6.500	2.67	12.583	19.24	18.67	2.40
0.500	1.34	6.583	2.67	12.667	19.24	18.75	2.40
0.583	1.34	6.667	2.67	12.750	19.24	18.83	2.40
0.667	1.34	6.750	2.67	12.833	9.89	18.92	2.40
0.750	1.34	6.833	2.67	12.917	9.89	19.00	2.40
0.833	1.34	6.917	2.67	13.000	9.89	19.08	2.40
0.917	1.34	7.000	2.67	13.083	9.89	19.17	2.40
1.000	1.34	7.083	2.67	13.167	9.89	19.25	2.40
1.083	1.34	7.167	2.67	13.250	9.89	19.33	2.40
1.167	1.34	7.250	2.67	13.333	1.87	19.42	2.40
1.250	1.34	7.333	2.67	13.417	1.87	19.50	2.40
1.333	1.34	7.417	2.67	13.500	1.87	19.58	2.40
1.417	1.34	7.500	2.67	13.583	1.87	19.67	2.40
1.500	1.34	7.583	2.67	13.667	1.87	19.75	2.40
1.583	1.34	7.667	2.67	13.750	1.87	19.83	2.40
1.667	1.34	7.750	2.67	13.833	10.95	19.92	2.40
1.750	1.34	7.833	2.67	13.917	10.96	20.00	2.40
1.833	1.34	7.917	2.67	14.000	10.96	20.08	2.40
1.917	1.34	8.000	2.67	14.083	10.96	20.17	2.40
2.000	1.34	8.083	2.67	14.167	10.96	20.25	2.40
2.083	2.40	8.167	2.67	14.250	10.96	20.33	1.60
2.167	2.40	8.250	2.67	14.333	4.01	20.42	1.60
2.250	2.40	8.333	3.61	14.417	4.01	20.50	1.60
2.333	1.74	8.417	3.61	14.500	4.01	20.58	1.60
2.417	1.74	8.500	3.61	14.583	4.01	20.67	1.60
2.500	1.74	8.583	3.61	14.667	4.01	20.75	1.60
2.583	1.74	8.667	3.61	14.750	4.01	20.83	1.60
2.667	1.74	8.750	3.61	14.833	4.01	20.92	1.60
2.750	1.74	8.833	3.61	14.917	4.01	21.00	1.60
2.833	1.74	8.917	3.61	15.000	4.01	21.08	1.60
2.917	1.74	9.000	3.61	15.083	4.01	21.17	1.60
3.000	1.74	9.083	3.61	15.167	4.01	21.25	1.60
3.083	1.74	9.167	3.61	15.250	4.01	21.33	1.60
3.167	1.74	9.250	3.61	15.333	4.01	21.42	1.60
3.250	1.74	9.333	4.28	15.417	4.01	21.50	1.60
3.333	1.74	9.417	4.28	15.500	4.01	21.58	1.60
3.417	1.74	9.500	4.28	15.583	4.01	21.67	1.60
3.500	1.74	9.583	4.28	15.667	4.01	21.75	1.60
3.583	1.74	9.667	4.28	15.750	4.01	21.83	1.60
3.667	1.74	9.750	4.28	15.833	4.01	21.92	1.60
3.750	1.74	9.833	4.81	15.917	4.01	22.00	1.60
3.833	1.74	9.917	4.81	16.000	4.01	22.08	1.60
3.917	1.74	10.000	4.81	16.083	4.01	22.17	1.60
4.000	1.74	10.083	4.81	16.167	4.01	22.25	1.60
4.083	1.74	10.167	4.81	16.250	4.01	22.33	1.60
4.167	1.74	10.250	4.81	16.333	2.41	22.42	1.60
4.250	1.74	10.333	6.15	16.417	2.40	22.50	1.60
4.333	2.14	10.417	6.15	16.500	2.40	22.58	1.60
4.417	2.14	10.500	6.15	16.583	2.40	22.67	1.60
4.500	2.14	10.583	6.15	16.667	2.40	22.75	1.60
4.583	2.14	10.667	6.15	16.750	2.40	22.83	1.60
4.667	2.14	10.750	6.15	16.833	2.40	22.92	1.60
4.750	2.14	10.833	8.28	16.917	2.40	23.00	1.60
4.833	2.14	10.917	8.28	17.000	2.40	23.08	1.60
4.917	2.14	11.000	8.28	17.083	2.40	23.17	1.60
5.000	2.14	11.083	8.28	17.167	2.40	23.25	1.60
5.083	2.14	11.167	8.28	17.250	2.40	23.33	1.60
5.167	2.14	11.250	8.28	17.333	2.40	23.42	1.60
5.250	2.14	11.333	12.83	17.417	2.40	23.50	1.60
5.333	2.14	11.417	12.83	17.500	2.40	23.58	1.60
5.417	2.14	11.500	12.83	17.583	2.40	23.67	1.60
5.500	2.14	11.583	12.83	17.667	2.40	23.75	1.60
5.583	2.14	11.667	12.83	17.750	2.40	23.83	1.60
5.667	2.14	11.750	12.83	17.833	2.40	23.92	1.60
5.750	2.14	11.833	55.57	17.917	2.40	24.00	1.60
5.833	2.14	11.917	55.58	18.000	2.40	24.08	1.60
5.917	2.14	12.000	55.58	18.083	2.40	24.17	1.60
6.000	2.14	12.083	147.48	18.167	2.40	24.25	1.60
6.083	2.14	12.167	147.49	18.250	2.40		

```
     Max.Eff.Inten.(mm/hr)=     147.49       156.81
               over (min)          5.00        15.00
     Storage Coeff.  (min)=       5.32 (ii)   10.31 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.21         0.09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       6.30         3.01         9.064 (iii)
     TIME TO PEAK    (hrs)=      12.25        12.33         12.25
     RUNOFF VOLUME    (mm)=     132.60        90.06        113.46
     TOTAL RAINFALL   (mm)=     133.60       133.60        133.60
     RUNOFF COEFFICIENT   =       0.99         0.67          0.85


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0020)|   Area     (ha)=   3.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  60.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.04         0.76
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     159.16        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	6.167	2.14	12.250	147.49	18.33	2.40
0.167	0.00	6.250	2.14	12.333	19.25	18.42	2.40
0.250	0.00	6.333	2.67	12.417	19.24	18.50	2.40
0.333	1.34	6.417	2.67	12.500	19.24	18.58	2.40
0.417	1.34	6.500	2.67	12.583	19.24	18.67	2.40
0.500	1.34	6.583	2.67	12.667	19.24	18.75	2.40
0.583	1.34	6.667	2.67	12.750	19.24	18.83	2.40
0.667	1.34	6.750	2.67	12.833	9.89	18.92	2.40
0.750	1.34	6.833	2.67	12.917	9.89	19.00	2.40
0.833	1.34	6.917	2.67	13.000	9.89	19.08	2.40
0.917	1.34	7.000	2.67	13.083	9.89	19.17	2.40
1.000	1.34	7.083	2.67	13.167	9.89	19.25	2.40
1.083	1.34	7.167	2.67	13.250	9.89	19.33	2.40
1.167	1.34	7.250	2.67	13.333	1.87	19.42	2.40
1.250	1.34	7.333	2.67	13.417	1.87	19.50	2.40
1.333	1.34	7.417	2.67	13.500	1.87	19.58	2.40
1.417	1.34	7.500	2.67	13.583	1.87	19.67	2.40
1.500	1.34	7.583	2.67	13.667	1.87	19.75	2.40
1.583	1.34	7.667	2.67	13.750	1.87	19.83	2.40
1.667	1.34	7.750	2.67	13.833	10.95	19.92	2.40
1.750	1.34	7.833	2.67	13.917	10.96	20.00	2.40
1.833	1.34	7.917	2.67	14.000	10.96	20.08	2.40
1.917	1.34	8.000	2.67	14.083	10.96	20.17	2.40
2.000	1.34	8.083	2.67	14.167	10.96	20.25	2.40
2.083	2.40	8.167	2.67	14.250	10.96	20.33	1.60
2.167	2.40	8.250	2.67	14.333	4.01	20.42	1.60
2.250	2.40	8.333	3.61	14.417	4.01	20.50	1.60
2.333	1.74	8.417	3.61	14.500	4.01	20.58	1.60
2.417	1.74	8.500	3.61	14.583	4.01	20.67	1.60
2.500	1.74	8.583	3.61	14.667	4.01	20.75	1.60
2.583	1.74	8.667	3.61	14.750	4.01	20.83	1.60
2.667	1.74	8.750	3.61	14.833	4.01	20.92	1.60
2.750	1.74	8.833	3.61	14.917	4.01	21.00	1.60
2.833	1.74	8.917	3.61	15.000	4.01	21.08	1.60
2.917	1.74	9.000	3.61	15.083	4.01	21.17	1.60
3.000	1.74	9.083	3.61	15.167	4.01	21.25	1.60
3.083	1.74	9.167	3.61	15.250	4.01	21.33	1.60
3.167	1.74	9.250	3.61	15.333	4.01	21.42	1.60
3.250	1.74	9.333	4.28	15.417	4.01	21.50	1.60
3.333	1.74	9.417	4.28	15.500	4.01	21.58	1.60
3.417	1.74	9.500	4.28	15.583	4.01	21.67	1.60
3.500	1.74	9.583	4.28	15.667	4.01	21.75	1.60
3.583	1.74	9.667	4.28	15.750	4.01	21.83	1.60
3.667	1.74	9.750	4.28	15.833	4.01	21.92	1.60
3.750	1.74	9.833	4.81	15.917	4.01	22.00	1.60
3.833	1.74	9.917	4.81	16.000	4.01	22.08	1.60
3.917	1.74	10.000	4.81	16.083	4.01	22.17	1.60
4.000	1.74	10.083	4.81	16.167	4.01	22.25	1.60
4.083	1.74	10.167	4.81	16.250	4.01	22.33	1.60
4.167	1.74	10.250	4.81	16.333	2.41	22.42	1.60
4.250	1.74	10.333	6.15	16.417	2.40	22.50	1.60
4.333	2.14	10.417	6.15	16.500	2.40	22.58	1.60
4.417	2.14	10.500	6.15	16.583	2.40	22.67	1.60
4.500	2.14	10.583	6.15	16.667	2.40	22.75	1.60
4.583	2.14	10.667	6.15	16.750	2.40	22.83	1.60
4.667	2.14	10.750	6.15	16.833	2.40	22.92	1.60
4.750	2.14	10.833	8.28	16.917	2.40	23.00	1.60
4.833	2.14	10.917	8.28	17.000	2.40	23.08	1.60
4.917	2.14	11.000	8.28	17.083	2.40	23.17	1.60
5.000	2.14	11.083	8.28	17.167	2.40	23.25	1.60
5.083	2.14	11.167	8.28	17.250	2.40	23.33	1.60
5.167	2.14	11.250	8.28	17.333	2.40	23.42	1.60
5.250	2.14	11.333	12.83	17.417	2.40	23.50	1.60
5.333	2.14	11.417	12.83	17.500	2.40	23.58	1.60
5.417	2.14	11.500	12.83	17.583	2.40	23.67	1.60
5.500	2.14	11.583	12.83	17.667	2.40	23.75	1.60
5.583	2.14	11.667	12.83	17.750	2.40	23.83	1.60
5.667	2.14	11.750	12.83	17.833	2.40	23.92	1.60
5.750	2.14	11.833	55.57	17.917	2.40	24.00	1.60
5.833	2.14	11.917	55.58	18.000	2.40	24.08	1.60
5.917	2.14	12.000	55.58	18.083	2.40	24.17	1.60
6.000	2.14	12.083	147.48	18.167	2.40	24.25	1.60
6.083	2.14	12.167	147.49	18.250	2.40		

			TOTALS
Max.Eff.Inten.(mm/hr)=	147.49	260.56	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.89 (ii)	6.78 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.28	0.14	
PEAK FLOW (cms)=	0.93	0.47	1.404 (iii)
TIME TO PEAK (hrs)=	12.25	12.25	12.25
RUNOFF VOLUME (mm)=	132.60	101.68	120.23
TOTAL RAINFALL (mm)=	133.60	133.60	133.60
RUNOFF COEFFICIENT =	0.99	0.76	0.90

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0023)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0020):		3.80	1.404	12.25	120.23
+ ID2= 2 (0006):		29.06	9.064	12.25	113.46
ID = 3 (0023):		32.86	10.468	12.25	114.24

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0012)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.4930	1.5666
	0.0360	0.7150	0.7890	1.8478
	0.0660	1.0737	1.0520	2.0613
	0.2630	1.3645	1.3140	2.2797

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0023)	32.860	10.468	12.25	114.24
OUTFLOW: ID= 1 (0012)	32.860	1.313	12.92	111.66

PEAK FLOW REDUCTION [Qout/Qin](%)= 12.54
TIME SHIFT OF PEAK FLOW (min)= 40.00
MAXIMUM STORAGE USED (ha.m.)= 2.2797

CALIB
STANDHYD (0017) | Area (ha)= 15.53
ID= 1 DT= 5.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 49.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	10.09	5.44
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	321.77	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	6.167	2.14	12.250	147.49	18.33	2.40
0.167	0.00	6.250	2.14	12.333	19.25	18.42	2.40
0.250	0.00	6.333	2.67	12.417	19.24	18.50	2.40
0.333	1.34	6.417	2.67	12.500	19.24	18.58	2.40
0.417	1.34	6.500	2.67	12.583	19.24	18.67	2.40
0.500	1.34	6.583	2.67	12.667	19.24	18.75	2.40
0.583	1.34	6.667	2.67	12.750	19.24	18.83	2.40
0.667	1.34	6.750	2.67	12.833	9.89	18.92	2.40
0.750	1.34	6.833	2.67	12.917	9.89	19.00	2.40
0.833	1.34	6.917	2.67	13.000	9.89	19.08	2.40
0.917	1.34	7.000	2.67	13.083	9.89	19.17	2.40
1.000	1.34	7.083	2.67	13.167	9.89	19.25	2.40
1.083	1.34	7.167	2.67	13.250	9.89	19.33	2.40
1.167	1.34	7.250	2.67	13.333	1.87	19.42	2.40
1.250	1.34	7.333	2.67	13.417	1.87	19.50	2.40
1.333	1.34	7.417	2.67	13.500	1.87	19.58	2.40
1.417	1.34	7.500	2.67	13.583	1.87	19.67	2.40
1.500	1.34	7.583	2.67	13.667	1.87	19.75	2.40
1.583	1.34	7.667	2.67	13.750	1.87	19.83	2.40
1.667	1.34	7.750	2.67	13.833	10.95	19.92	2.40
1.750	1.34	7.833	2.67	13.917	10.96	20.00	2.40
1.833	1.34	7.917	2.67	14.000	10.96	20.08	2.40
1.917	1.34	8.000	2.67	14.083	10.96	20.17	2.40
2.000	1.34	8.083	2.67	14.167	10.96	20.25	2.40
2.083	2.40	8.167	2.67	14.250	10.96	20.33	1.60
2.167	2.40	8.250	2.67	14.333	4.01	20.42	1.60
2.250	2.40	8.333	3.61	14.417	4.01	20.50	1.60
2.333	1.74	8.417	3.61	14.500	4.01	20.58	1.60
2.417	1.74	8.500	3.61	14.583	4.01	20.67	1.60
2.500	1.74	8.583	3.61	14.667	4.01	20.75	1.60
2.583	1.74	8.667	3.61	14.750	4.01	20.83	1.60
2.667	1.74	8.750	3.61	14.833	4.01	20.92	1.60
2.750	1.74	8.833	3.61	14.917	4.01	21.00	1.60
2.833	1.74	8.917	3.61	15.000	4.01	21.08	1.60
2.917	1.74	9.000	3.61	15.083	4.01	21.17	1.60
3.000	1.74	9.083	3.61	15.167	4.01	21.25	1.60
3.083	1.74	9.167	3.61	15.250	4.01	21.33	1.60
3.167	1.74	9.250	3.61	15.333	4.01	21.42	1.60
3.250	1.74	9.333	4.28	15.417	4.01	21.50	1.60
3.333	1.74	9.417	4.28	15.500	4.01	21.58	1.60
3.417	1.74	9.500	4.28	15.583	4.01	21.67	1.60
3.500	1.74	9.583	4.28	15.667	4.01	21.75	1.60
3.583	1.74	9.667	4.28	15.750	4.01	21.83	1.60
3.667	1.74	9.750	4.28	15.833	4.01	21.92	1.60
3.750	1.74	9.833	4.81	15.917	4.01	22.00	1.60
3.833	1.74	9.917	4.81	16.000	4.01	22.08	1.60
3.917	1.74	10.000	4.81	16.083	4.01	22.17	1.60
4.000	1.74	10.083	4.81	16.167	4.01	22.25	1.60
4.083	1.74	10.167	4.81	16.250	4.01	22.33	1.60
4.167	1.74	10.250	4.81	16.333	2.41	22.42	1.60
4.250	1.74	10.333	6.15	16.417	2.40	22.50	1.60
4.333	2.14	10.417	6.15	16.500	2.40	22.58	1.60
4.417	2.14	10.500	6.15	16.583	2.40	22.67	1.60
4.500	2.14	10.583	6.15	16.667	2.40	22.75	1.60
4.583	2.14	10.667	6.15	16.750	2.40	22.83	1.60
4.667	2.14	10.750	6.15	16.833	2.40	22.92	1.60
4.750	2.14	10.833	8.28	16.917	2.40	23.00	1.60
4.833	2.14	10.917	8.28	17.000	2.40	23.08	1.60
4.917	2.14	11.000	8.28	17.083	2.40	23.17	1.60
5.000	2.14	11.083	8.28	17.167	2.40	23.25	1.60
5.083	2.14	11.167	8.28	17.250	2.40	23.33	1.60
5.167	2.14	11.250	8.28	17.333	2.40	23.42	1.60
5.250	2.14	11.333	12.83	17.417	2.40	23.50	1.60
5.333	2.14	11.417	12.83	17.500	2.40	23.58	1.60
5.417	2.14	11.500	12.83	17.583	2.40	23.67	1.60
5.500	2.14	11.583	12.83	17.667	2.40	23.75	1.60
5.583	2.14	11.667	12.83	17.750	2.40	23.83	1.60
5.667	2.14	11.750	12.83	17.833	2.40	23.92	1.60
5.750	2.14	11.833	55.57	17.917	2.40	24.00	1.60
5.833	2.14	11.917	55.58	18.000	2.40	24.08	1.60
5.917	2.14	12.000	55.58	18.083	2.40	24.17	1.60
6.000	2.14	12.083	147.48	18.167	2.40	24.25	1.60
6.083	2.14	12.167	147.49	18.250	2.40		

				TOTALS
Max.Eff.Inten.(mm/hr)=	147.49	177.22		
over (min)	5.00	15.00		
Storage Coeff. (min)=	4.41 (ii)	10.02 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	0.23	0.10		
PEAK FLOW (cms)=	3.05	1.89	4.802 (iii)	
TIME TO PEAK (hrs)=	12.25	12.33	12.25	
RUNOFF VOLUME (mm)=	132.60	92.98	112.39	
TOTAL RAINFALL (mm)=	133.60	133.60	133.60	
RUNOFF COEFFICIENT =	0.99	0.70	0.84	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
| STANDHYD (  0002)|   Area     (ha)=  20.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  56.00
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                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      13.44          6.62
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     365.70         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 | 6.167    2.14 |12.250  147.49 | 18.33    2.40
 0.167    0.00 | 6.250    2.14 |12.333   19.25 | 18.42    2.40
 0.250    0.00 | 6.333    2.67 |12.417   19.24 | 18.50    2.40
 0.333    1.34 | 6.417    2.67 |12.500   19.24 | 18.58    2.40
 0.417    1.34 | 6.500    2.67 |12.583   19.24 | 18.67    2.40
 0.500    1.34 | 6.583    2.67 |12.667   19.24 | 18.75    2.40
 0.583    1.34 | 6.667    2.67 |12.750   19.24 | 18.83    2.40
 0.667    1.34 | 6.750    2.67 |12.833    9.89 | 18.92    2.40
 0.750    1.34 | 6.833    2.67 |12.917    9.89 | 19.00    2.40
 0.833    1.34 | 6.917    2.67 |13.000    9.89 | 19.08    2.40
 0.917    1.34 | 7.000    2.67 |13.083    9.89 | 19.17    2.40
 1.000    1.34 | 7.083    2.67 |13.167    9.89 | 19.25    2.40
 1.083    1.34 | 7.167    2.67 |13.250    9.89 | 19.33    2.40
 1.167    1.34 | 7.250    2.67 |13.333    1.87 | 19.42    2.40
 1.250    1.34 | 7.333    2.67 |13.417    1.87 | 19.50    2.40
 1.333    1.34 | 7.417    2.67 |13.500    1.87 | 19.58    2.40
 1.417    1.34 | 7.500    2.67 |13.583    1.87 | 19.67    2.40
 1.500    1.34 | 7.583    2.67 |13.667    1.87 | 19.75    2.40
 1.583    1.34 | 7.667    2.67 |13.750    1.87 | 19.83    2.40
 1.667    1.34 | 7.750    2.67 |13.833   10.95 | 19.92    2.40
 1.750    1.34 | 7.833    2.67 |13.917   10.96 | 20.00    2.40
 1.833    1.34 | 7.917    2.67 |14.000   10.96 | 20.08    2.40
 1.917    1.34 | 8.000    2.67 |14.083   10.96 | 20.17    2.40
 2.000    1.34 | 8.083    2.67 |14.167   10.96 | 20.25    2.40
 2.083    2.40 | 8.167    2.67 |14.250   10.96 | 20.33    1.60
 2.167    2.40 | 8.250    2.67 |14.333    4.01 | 20.42    1.60
 2.250    2.40 | 8.333    3.61 |14.417    4.01 | 20.50    1.60
 2.333    1.74 | 8.417    3.61 |14.500    4.01 | 20.58    1.60
 2.417    1.74 | 8.500    3.61 |14.583    4.01 | 20.67    1.60
 2.500    1.74 | 8.583    3.61 |14.667    4.01 | 20.75    1.60
 2.583    1.74 | 8.667    3.61 |14.750    4.01 | 20.83    1.60
 2.667    1.74 | 8.750    3.61 |14.833    4.01 | 20.92    1.60
 2.750    1.74 | 8.833    3.61 |14.917    4.01 | 21.00    1.60
 2.833    1.74 | 8.917    3.61 |15.000    4.01 | 21.08    1.60
 2.917    1.74 | 9.000    3.61 |15.083    4.01 | 21.17    1.60
 3.000    1.74 | 9.083    3.61 |15.167    4.01 | 21.25    1.60
 3.083    1.74 | 9.167    3.61 |15.250    4.01 | 21.33    1.60
 3.167    1.74 | 9.250    3.61 |15.333    4.01 | 21.42    1.60
 3.250    1.74 | 9.333    4.28 |15.417    4.01 | 21.50    1.60
 3.333    1.74 | 9.417    4.28 |15.500    4.01 | 21.58    1.60
 3.417    1.74 | 9.500    4.28 |15.583    4.01 | 21.67    1.60
 3.500    1.74 | 9.583    4.28 |15.667    4.01 | 21.75    1.60
 3.583    1.74 | 9.667    4.28 |15.750    4.01 | 21.83    1.60
 3.667    1.74 | 9.750    4.28 |15.833    4.01 | 21.92    1.60
 3.750    1.74 | 9.833    4.81 |15.917    4.01 | 22.00    1.60
 3.833    1.74 | 9.917    4.81 |16.000    4.01 | 22.08    1.60
 3.917    1.74 |10.000    4.81 |16.083    4.01 | 22.17    1.60
 4.000    1.74 |10.083    4.81 |16.167    4.01 | 22.25    1.60
 4.083    1.74 |10.167    4.81 |16.250    4.01 | 22.33    1.60
 4.167    1.74 |10.250    4.81 |16.333    2.41 | 22.42    1.60
 4.250    1.74 |10.333    6.15 |16.417    2.40 | 22.50    1.60
 4.333    2.14 |10.417    6.15 |16.500    2.40 | 22.58    1.60
 4.417    2.14 |10.500    6.15 |16.583    2.40 | 22.67    1.60
 4.500    2.14 |10.583    6.15 |16.667    2.40 | 22.75    1.60
 4.583    2.14 |10.667    6.15 |16.750    2.40 | 22.83    1.60
 4.667    2.14 |10.750    6.15 |16.833    2.40 | 22.92    1.60
 4.750    2.14 |10.833    8.28 |16.917    2.40 | 23.00    1.60
 4.833    2.14 |10.917    8.28 |17.000    2.40 | 23.08    1.60
 4.917    2.14 |11.000    8.28 |17.083    2.40 | 23.17    1.60
 5.000    2.14 |11.083    8.28 |17.167    2.40 | 23.25    1.60
 5.083    2.14 |11.167    8.28 |17.250    2.40 | 23.33    1.60
 5.167    2.14 |11.250    8.28 |17.333    2.40 | 23.42    1.60
 5.250    2.14 |11.333   12.83 |17.417    2.40 | 23.50    1.60
 5.333    2.14 |11.417   12.83 |17.500    2.40 | 23.58    1.60
 5.417    2.14 |11.500   12.83 |17.583    2.40 | 23.67    1.60
 5.500    2.14 |11.583   12.83 |17.667    2.40 | 23.75    1.60
 5.583    2.14 |11.667   12.83 |17.750    2.40 | 23.83    1.60
 5.667    2.14 |11.750   12.83 |17.833    2.40 | 23.92    1.60
 5.750    2.14 |11.833   55.57 |17.917    2.40 | 24.00    1.60
 5.833    2.14 |11.917   55.58 |18.000    2.40 | 24.08    1.60
 5.917    2.14 |12.000   55.58 |18.083    2.40 | 24.17    1.60
 6.000    2.14 |12.083  147.48 |18.167    2.40 | 24.25    1.60
 6.083    2.14 |12.167  147.49 |18.250    2.40 |

     Max.Eff.Inten.(mm/hr)=     147.49       158.31
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       4.76 (ii)    9.65 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.22         0.11
                                                          *TOTALS*
     PEAK FLOW       (cms)=       4.48         2.22          6.692 (iii)
     TIME TO PEAK    (hrs)=      12.25        12.25          12.25
     RUNOFF VOLUME    (mm)=     132.60        90.29         113.98
     TOTAL RAINFALL   (mm)=     133.60       133.60         133.60
     RUNOFF COEFFICIENT   =       0.99         0.68           0.85

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    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  (  0018)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0017):    15.53    4.802    12.25   112.39
     + ID2= 2 (  0002):    20.06    6.692    12.25   113.98
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       ================================================
       ID = 3 (  0018):    35.59  11.494    12.25   113.29

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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| RESERVOIR(  0008)|     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   |   0.4480     1.7011
                           0.0360     0.7282   |   0.7160     2.0238
                           0.0600     1.1698   |   0.9550     2.2595
                           0.2380     1.4871   |   1.1940     2.5034

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0018)     35.590     11.494     12.25     113.29
   OUTFLOW: ID= 1 (  0008)     35.590      1.193     13.00     110.39

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 10.38
                  TIME SHIFT OF PEAK FLOW         (min)= 45.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  2.5034

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0037)|   Area     (ha)=   2.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  59.00
--------------------

                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.58         0.42
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     115.47        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 | 6.167    2.14 |12.250  147.49 | 18.33    2.40
     0.167    0.00 | 6.250    2.14 |12.333   19.25 | 18.42    2.40
     0.250    0.00 | 6.333    2.67 |12.417   19.24 | 18.50    2.40
     0.333    1.34 | 6.417    2.67 |12.500   19.24 | 18.58    2.40
     0.417    1.34 | 6.500    2.67 |12.583   19.24 | 18.67    2.40
     0.500    1.34 | 6.583    2.67 |12.667   19.24 | 18.75    2.40
     0.583    1.34 | 6.667    2.67 |12.750   19.24 | 18.83    2.40
     0.667    1.34 | 6.750    2.67 |12.833    9.89 | 18.92    2.40
     0.750    1.34 | 6.833    2.67 |12.917    9.89 | 19.00    2.40
     0.833    1.34 | 6.917    2.67 |13.000    9.89 | 19.08    2.40
     0.917    1.34 | 7.000    2.67 |13.083    9.89 | 19.17    2.40
     1.000    1.34 | 7.083    2.67 |13.167    9.89 | 19.25    2.40
     1.083    1.34 | 7.167    2.67 |13.250    9.89 | 19.33    2.40
     1.167    1.34 | 7.250    2.67 |13.333    1.87 | 19.42    2.40
     1.250    1.34 | 7.333    2.67 |13.417    1.87 | 19.50    2.40
     1.333    1.34 | 7.417    2.67 |13.500    1.87 | 19.58    2.40
     1.417    1.34 | 7.500    2.67 |13.583    1.87 | 19.67    2.40
     1.500    1.34 | 7.583    2.67 |13.667    1.87 | 19.75    2.40
     1.583    1.34 | 7.667    2.67 |13.750    1.87 | 19.83    2.40
     1.667    1.34 | 7.750    2.67 |13.833   10.95 | 19.92    2.40
     1.750    1.34 | 7.833    2.67 |13.917   10.96 | 20.00    2.40
     1.833    1.34 | 7.917    2.67 |14.000   10.96 | 20.08    2.40
     1.917    1.34 | 8.000    2.67 |14.083   10.96 | 20.17    2.40
     2.000    1.34 | 8.083    2.67 |14.167   10.96 | 20.25    2.40
     2.083    2.40 | 8.167    2.67 |14.250   10.96 | 20.33    1.60
     2.167    2.40 | 8.250    2.67 |14.333    4.01 | 20.42    1.60
     2.250    2.40 | 8.333    3.61 |14.417    4.01 | 20.50    1.60
     2.333    1.74 | 8.417    3.61 |14.500    4.01 | 20.58    1.60
     2.417    1.74 | 8.500    3.61 |14.583    4.01 | 20.67    1.60
     2.500    1.74 | 8.583    3.61 |14.667    4.01 | 20.75    1.60
     2.583    1.74 | 8.667    3.61 |14.750    4.01 | 20.83    1.60
     2.667    1.74 | 8.750    3.61 |14.833    4.01 | 20.92    1.60
     2.750    1.74 | 8.833    3.61 |14.917    4.01 | 21.00    1.60
     2.833    1.74 | 8.917    3.61 |15.000    4.01 | 21.08    1.60
     2.917    1.74 | 9.000    3.61 |15.083    4.01 | 21.17    1.60
     3.000    1.74 | 9.083    3.61 |15.167    4.01 | 21.25    1.60
     3.083    1.74 | 9.167    3.61 |15.250    4.01 | 21.33    1.60
     3.167    1.74 | 9.250    3.61 |15.333    4.01 | 21.42    1.60
     3.250    1.74 | 9.333    4.28 |15.417    4.01 | 21.50    1.60
     3.333    1.74 | 9.417    4.28 |15.500    4.01 | 21.58    1.60
     3.417    1.74 | 9.500    4.28 |15.583    4.01 | 21.67    1.60
     3.500    1.74 | 9.583    4.28 |15.667    4.01 | 21.75    1.60
     3.583    1.74 | 9.667    4.28 |15.750    4.01 | 21.83    1.60
     3.667    1.74 | 9.750    4.28 |15.833    4.01 | 21.92    1.60
     3.750    1.74 | 9.833    4.81 |15.917    4.01 | 22.00    1.60
     3.833    1.74 | 9.917    4.81 |16.000    4.01 | 22.08    1.60
     3.917    1.74 |10.000    4.81 |16.083    4.01 | 22.17    1.60
     4.000    1.74 |10.083    4.81 |16.167    4.01 | 22.25    1.60
     4.083    1.74 |10.167    4.81 |16.250    4.01 | 22.33    1.60
     4.167    1.74 |10.250    4.81 |16.333    2.41 | 22.42    1.60
     4.250    1.74 |10.333    6.15 |16.417    2.40 | 22.50    1.60
     4.333    2.14 |10.417    6.15 |16.500    2.40 | 22.58    1.60
     4.417    2.14 |10.500    6.15 |16.583    2.40 | 22.67    1.60
     4.500    2.14 |10.583    6.15 |16.667    2.40 | 22.75    1.60
     4.583    2.14 |10.667    6.15 |16.750    2.40 | 22.83    1.60
     4.667    2.14 |10.750    6.15 |16.833    2.40 | 22.92    1.60
     4.750    2.14 |10.833    8.28 |16.917    2.40 | 23.00    1.60
     4.833    2.14 |10.917    8.28 |17.000    2.40 | 23.08    1.60
     4.917    2.14 |11.000    8.28 |17.083    2.40 | 23.17    1.60
     5.000    2.14 |11.083    8.28 |17.167    2.40 | 23.25    1.60
     5.083    2.14 |11.167    8.28 |17.250    2.40 | 23.33    1.60
     5.167    2.14 |11.250    8.28 |17.333    2.40 | 23.42    1.60
     5.250    2.14 |11.333   12.83 |17.417    2.40 | 23.50    1.60
     5.333    2.14 |11.417   12.83 |17.500    2.40 | 23.58    1.60
     5.417    2.14 |11.500   12.83 |17.583    2.40 | 23.67    1.60
     5.500    2.14 |11.583   12.83 |17.667    2.40 | 23.75    1.60
     5.583    2.14 |11.667   12.83 |17.750    2.40 | 23.83    1.60
     5.667    2.14 |11.750   12.83 |17.833    2.40 | 23.92    1.60
     5.750    2.14 |11.833   55.57 |17.917    2.40 | 24.00    1.60
     5.833    2.14 |11.917   55.58 |18.000    2.40 | 24.08    1.60
     5.917    2.14 |12.000   55.58 |18.083    2.40 | 24.17    1.60
     6.000    2.14 |12.083  147.48 |18.167    2.40 | 24.25    1.60
     6.083    2.14 |12.167  147.49 |18.250    2.40 |

Max.Eff.Inten.(mm/hr)=     147.49       253.24
          over (min)          5.00        10.00
Storage Coeff.  (min)=       2.38 (ii)    6.38 (ii)
Unit Hyd. Tpeak (min)=       5.00        10.00
Unit Hyd. peak  (cms)=       0.30         0.15
```

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                                                                  *TOTALS*
     PEAK FLOW       (cms)=       0.48         0.26          0.741 (iii)
     TIME TO PEAK    (hrs)=      12.25        12.25          12.25
     RUNOFF VOLUME    (mm)=     132.60       101.07         119.67
     TOTAL RAINFALL   (mm)=     133.60       133.60         133.60
     RUNOFF COEFFICIENT   =       0.99         0.76           0.90

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| RESERVOIR(  0033)|     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   |   0.0250     0.1054
                          0.0020     0.0490   |   0.0410     0.1239
                          0.0030     0.0750   |   0.0540     0.1381
                          0.0130     0.0932   |   0.0670     0.1527

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0037)      2.000     0.741     12.25     119.67
   OUTFLOW: ID= 1 (  0033)      2.000     0.067     12.92     114.50

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.03
                  TIME SHIFT OF PEAK FLOW          (min)= 40.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1527

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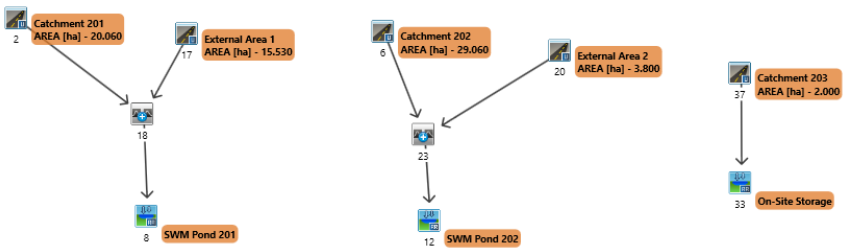

SCHAEFFERS
CONSULTING ENGINEERS

Visual OTTHYMO™ Schematic

POST- DEVELOPMENT
2-100yr, Chicago

Job #: 5170	**Date: April 2024**

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

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


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DATE: 05-01-2024                          TIME: 03:19:11

USER:


COMMENTS: _____________________________________________________________

--------------------------------------------------------------------------------
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  ************************************************
  ** SIMULATION : 19. 2yr 4hr 10min Chicago     **
  ************************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 675.586
| Ptotal= 37.02 mm |                          B=   4.681
--------------------                          C=   0.780
                       used in:   INTENSITY =  A / (t + B)^C

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

      TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
       hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
      0.00     2.48 |  1.00    18.80 |'  2.00     5.75 |  3.00     2.94
      0.17     2.83 |  1.17    83.10 |'  2.17     4.91 |  3.17     2.74
      0.33     3.33 |  1.33    24.59 |'  2.33     4.30 |  3.33     2.56
      0.50     4.07 |  1.50    13.04 |'  2.50     3.84 |  3.50     2.41
      0.67     5.33 |  1.67     9.04 |'  2.67     3.48 |  3.67     2.28
      0.83     8.01 |  1.83     7.00 |'  2.83     3.18 |  3.83     2.16
```

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--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0006)|   Area    (ha)=  29.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  66.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      19.18         9.88
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     440.15        40.00
     Mannings n           =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    2.48 | 1.083   18.80 | 2.083    5.75 |  3.08    2.94
              0.167    2.48 | 1.167   18.80 | 2.167    5.75 |  3.17    2.94
              0.250    2.83 | 1.250   83.10 | 2.250    4.91 |  3.25    2.74
              0.333    2.83 | 1.333   83.10 | 2.333    4.91 |  3.33    2.74
              0.417    3.33 | 1.417   24.59 | 2.417    4.30 |  3.42    2.56
              0.500    3.33 | 1.500   24.59 | 2.500    4.30 |  3.50    2.56
              0.583    4.07 | 1.583   13.04 | 2.583    3.84 |  3.58    2.41
              0.667    4.07 | 1.667   13.04 | 2.667    3.84 |  3.67    2.41
              0.750    5.33 | 1.750    9.04 | 2.750    3.48 |  3.75    2.28
              0.833    5.33 | 1.833    9.04 | 2.833    3.48 |  3.83    2.28
              0.917    8.01 | 1.917    7.00 | 2.917    3.18 |  3.92    2.16
              1.000    8.01 | 2.000    7.00 | 3.000    3.18 |  4.00    2.16

     Max.Eff.Inten.(mm/hr)=      83.10        25.24
               over (min)        5.00        20.00
     Storage Coeff.  (min)=      6.69 (ii)   18.93 (ii)
     Unit Hyd. Tpeak (min)=      5.00        20.00
     Unit Hyd. peak  (cms)=      0.18         0.06
                                                      *TOTALS*
     PEAK FLOW       (cms)=      3.02         0.37        3.137 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.58         1.33
     RUNOFF VOLUME    (mm)=     36.02        12.20        25.30
     TOTAL RAINFALL   (mm)=     37.02        37.02        37.02
     RUNOFF COEFFICIENT   =      0.97         0.33         0.68


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0020)|   Area    (ha)=   3.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  60.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.04         0.76
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     159.16        40.00
     Mannings n           =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    2.48 | 1.083   18.80 | 2.083    5.75 |  3.08    2.94
              0.167    2.48 | 1.167   18.80 | 2.167    5.75 |  3.17    2.94
              0.250    2.83 | 1.250   83.10 | 2.250    4.91 |  3.25    2.74
              0.333    2.83 | 1.333   83.10 | 2.333    4.91 |  3.33    2.74
              0.417    3.33 | 1.417   24.59 | 2.417    4.30 |  3.42    2.56
              0.500    3.33 | 1.500   24.59 | 2.500    4.30 |  3.50    2.56
              0.583    4.07 | 1.583   13.04 | 2.583    3.84 |  3.58    2.41
              0.667    4.07 | 1.667   13.04 | 2.667    3.84 |  3.67    2.41
              0.750    5.33 | 1.750    9.04 | 2.750    3.48 |  3.75    2.28
              0.833    5.33 | 1.833    9.04 | 2.833    3.48 |  3.83    2.28
              0.917    8.01 | 1.917    7.00 | 2.917    3.18 |  3.92    2.16
              1.000    8.01 | 2.000    7.00 | 3.000    3.18 |  4.00    2.16

     Max.Eff.Inten.(mm/hr)=      83.10        68.00
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      3.64 (ii)    8.53 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.25         0.12
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.50         0.10         0.577 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.42         1.33
     RUNOFF VOLUME    (mm)=     36.02        16.45        28.19
     TOTAL RAINFALL   (mm)=     37.02        37.02        37.02
     RUNOFF COEFFICIENT   =      0.97         0.44         0.76

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    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  (  0023)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0020):     3.80   0.577     1.33    28.19
      + ID2= 2 (  0006):    29.06   3.137     1.33    25.30
        ==========================================================
        ID = 3 (  0023):    32.86   3.714     1.33    25.64

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0012)|     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		0.4930	1.5666
	0.0360	0.7150		0.7890	1.8478
	0.0660	1.0737		1.0520	2.0613
	0.2630	1.3645		1.3140	2.2797

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0023)	32.860	3.714	1.33	25.64
OUTFLOW: ID= 1 (0012)	32.860	0.043	4.25	24.35

PEAK FLOW REDUCTION [Qout/Qin](%)= 1.16
TIME SHIFT OF PEAK FLOW (min)=175.00
MAXIMUM STORAGE USED (ha.m.)= 0.8004

CALIB	
STANDHYD (0017)	Area (ha)= 15.53
ID= 1 DT= 5.0 min	Total Imp(%)= 65.00 Dir. Conn.(%)= 49.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	10.09	5.44
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	321.77	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.48	1.083	18.80	2.083	5.75	3.08	2.94
0.167	2.48	1.167	18.80	2.167	5.75	3.17	2.94
0.250	2.83	1.250	83.10	2.250	4.91	3.25	2.74
0.333	2.83	1.333	83.10	2.333	4.91	3.33	2.74
0.417	3.33	1.417	24.59	2.417	4.30	3.42	2.56
0.500	3.33	1.500	24.59	2.500	4.30	3.50	2.56
0.583	4.07	1.583	13.04	2.583	3.84	3.58	2.41
0.667	4.07	1.667	13.04	2.667	3.84	3.67	2.41
0.750	5.33	1.750	9.04	2.750	3.48	3.75	2.28
0.833	5.33	1.833	9.04	2.833	3.48	3.83	2.28
0.917	8.01	1.917	7.00	2.917	3.18	3.92	2.16
1.000	8.01	2.000	7.00	3.000	3.18	4.00	2.16

Max.Eff.Inten.(mm/hr)=		83.10	30.49	
over (min)		5.00	20.00	
Storage Coeff. (min)=		5.55 (ii)	16.90 (ii)	
Unit Hyd. Tpeak (min)=		5.00	20.00	
Unit Hyd. peak (cms)=		0.20	0.06	
				TOTALS
PEAK FLOW	(cms)=	1.53	0.26	1.610 (iii)
TIME TO PEAK	(hrs)=	1.33	1.58	1.33
RUNOFF VOLUME	(mm)=	36.02	13.17	24.37
TOTAL RAINFALL	(mm)=	37.02	37.02	37.02
RUNOFF COEFFICIENT	=	0.97	0.36	0.66

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0002)	Area (ha)= 20.06
ID= 1 DT= 5.0 min	Total Imp(%)= 67.00 Dir. Conn.(%)= 56.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	13.44	6.62
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	365.70	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.48	1.083	18.80	2.083	5.75	3.08	2.94
0.167	2.48	1.167	18.80	2.167	5.75	3.17	2.94
0.250	2.83	1.250	83.10	2.250	4.91	3.25	2.74
0.333	2.83	1.333	83.10	2.333	4.91	3.33	2.74
0.417	3.33	1.417	24.59	2.417	4.30	3.42	2.56
0.500	3.33	1.500	24.59	2.500	4.30	3.50	2.56
0.583	4.07	1.583	13.04	2.583	3.84	3.58	2.41
0.667	4.07	1.667	13.04	2.667	3.84	3.67	2.41
0.750	5.33	1.750	9.04	2.750	3.48	3.75	2.28
0.833	5.33	1.833	9.04	2.833	3.48	3.83	2.28
0.917	8.01	1.917	7.00	2.917	3.18	3.92	2.16
1.000	8.01	2.000	7.00	3.000	3.18	4.00	2.16

Max.Eff.Inten.(mm/hr)=		83.10	25.62	
over (min)		5.00	20.00	
Storage Coeff. (min)=		5.99 (ii)	18.16 (ii)	
Unit Hyd. Tpeak (min)=		5.00	20.00	
Unit Hyd. peak (cms)=		0.19	0.06	
				TOTALS
PEAK FLOW	(cms)=	2.20	0.26	2.282 (iii)
TIME TO PEAK	(hrs)=	1.33	1.58	1.33
RUNOFF VOLUME	(mm)=	36.02	12.28	25.58
TOTAL RAINFALL	(mm)=	37.02	37.02	37.02
RUNOFF COEFFICIENT	=	0.97	0.33	0.69

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0018)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.

```
--------------------          (ha)     (cms)     (hrs)      (mm)
       ID1= 1 (  0017):    15.53   1.610     1.33    24.37
     + ID2= 2 (  0002):    20.06   2.282     1.33    25.58
       ================================================
       ID = 3 (  0018):    35.59   3.893     1.33    25.05

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0008)|     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   |  0.4480      1.7011
                           0.0360     0.7282   |  0.7160      2.0238
                           0.0600     1.1698   |  0.9550      2.2595
                           0.2380     1.4871   |  1.1940      2.5034

                                 AREA     QPEAK     TPEAK       R.V.
                                 (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0018)     35.590     3.893      1.33      25.05
   OUTFLOW: ID= 1 (  0008)     35.590     0.043      4.33      23.72

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.09
                  TIME SHIFT OF PEAK FLOW          (min)=180.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.8484

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0037)|   Area    (ha)=   2.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  59.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.58         0.42
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     115.47        40.00
     Mannings n           =      0.013        0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    2.48 | 1.083   18.80 | 2.083    5.75 |  3.08    2.94
              0.167    2.48 | 1.167   18.80 | 2.167    5.75 |  3.17    2.94
              0.250    2.83 | 1.250   83.10 | 2.250    4.91 |  3.25    2.74
              0.333    2.83 | 1.333   83.10 | 2.333    4.91 |  3.33    2.74
              0.417    3.33 | 1.417   24.59 | 2.417    4.30 |  3.42    2.56
              0.500    3.33 | 1.500   24.59 | 2.500    4.30 |  3.50    2.56
              0.583    4.07 | 1.583   13.04 | 2.583    3.84 |  3.58    2.41
              0.667    4.07 | 1.667   13.04 | 2.667    3.84 |  3.67    2.41
              0.750    5.33 | 1.750    9.04 | 2.750    3.48 |  3.75    2.28
              0.833    5.33 | 1.833    9.04 | 2.833    3.48 |  3.83    2.28
              0.917    8.01 | 1.917    7.00 | 2.917    3.18 |  3.92    2.16
              1.000    8.01 | 2.000    7.00 | 3.000    3.18 |  4.00    2.16

     Max.Eff.Inten.(mm/hr)=      83.10        65.11
               over (min)         5.00        15.00

     Storage Coeff.  (min)=       3.00 (ii)   11.38 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.28         0.09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.26         0.04          0.287 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.50           1.33
     RUNOFF VOLUME    (mm)=      36.02        16.20          27.89
     TOTAL RAINFALL   (mm)=      37.02        37.02          37.02
     RUNOFF COEFFICIENT   =       0.97         0.44           0.75

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0033)|     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   |  0.0250      0.1054
                           0.0020     0.0490   |  0.0410      0.1239
                           0.0030     0.0750   |  0.0540      0.1381
                           0.0130     0.0932   |  0.0670      0.1527

                                 AREA     QPEAK     TPEAK       R.V.
                                 (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0037)      2.000     0.287      1.33      27.89
   OUTFLOW: ID= 1 (  0033)      2.000     0.002      4.25      24.77

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.76
                  TIME SHIFT OF PEAK FLOW          (min)=175.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0537

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

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


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

Output filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\6d691680-5490-4713-883c-442accbccafd\scen
Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\6d691680-5490-4713-883c-442accbccafd\scen

DATE: 05-01-2024 TIME: 03:19:11

USER:

COMMENTS: _____

** SIMULATION : 20. 5yr 4hr 10min Chicago **

CHICAGO STORM
Ptotal= 50.74 mm

IDF curve parameters: A= 843.019
B= 4.582
C= 0.763
used in: INTENSITY = A / (t + B)^C

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	3.62	1.00	25.63	2.00	8.19	3.00	4.27
0.17	4.12	1.17	109.11	2.17	7.03	3.17	3.98
0.33	4.82	1.33	33.27	2.33	6.18	3.33	3.74
0.50	5.85	1.50	18.03	2.50	5.54	3.50	3.52
0.67	7.60	1.67	12.66	2.67	5.03	3.67	3.33
0.83	11.26	1.83	9.89	2.83	4.62	3.83	3.16

CALIB
STANDHYD (0006)
ID= 1 DT= 5.0 min

Area (ha)= 29.06
Total Imp(%)= 66.00 Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.62	1.083	25.63	2.083	8.19	3.08	4.27
0.167	3.62	1.167	25.63	2.167	8.19	3.17	4.27
0.250	4.12	1.250	109.10	2.250	7.03	3.25	3.98
0.333	4.12	1.333	109.11	2.333	7.03	3.33	3.98
0.417	4.82	1.417	33.27	2.417	6.18	3.42	3.74
0.500	4.82	1.500	33.27	2.500	6.18	3.50	3.74
0.583	5.85	1.583	18.03	2.583	5.54	3.58	3.52
0.667	5.85	1.667	18.03	2.667	5.54	3.67	3.52
0.750	7.60	1.750	12.66	2.750	5.03	3.75	3.33
0.833	7.60	1.833	12.66	2.833	5.03	3.83	3.33
0.917	11.26	1.917	9.89	2.917	4.62	3.92	3.16
1.000	11.26	2.000	9.89	3.000	4.62	4.00	3.16

				TOTALS
Max.Eff.Inten.	(mm/hr)=	109.11	54.27	
over	(min)	5.00	20.00	
Storage Coeff.	(min)=	6.00 (ii)	15.02 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	20.00	
Unit Hyd. peak	(cms)=	0.19	0.07	
PEAK FLOW	(cms)=	4.12	0.73	4.376 (iii)
TIME TO PEAK	(hrs)=	1.33	1.58	1.33
RUNOFF VOLUME	(mm)=	49.74	21.15	36.88
TOTAL RAINFALL	(mm)=	50.74	50.74	50.74
RUNOFF COEFFICIENT	=	0.98	0.42	0.73

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0020)
ID= 1 DT= 5.0 min

Area (ha)= 3.80
Total Imp(%)= 80.00 Dir. Conn.(%)= 60.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.62	1.083	25.63	2.083	8.19	3.08	4.27
0.167	3.62	1.167	25.63	2.167	8.19	3.17	4.27
0.250	4.12	1.250	109.10	2.250	7.03	3.25	3.98
0.333	4.12	1.333	109.11	2.333	7.03	3.33	3.98
0.417	4.82	1.417	33.27	2.417	6.18	3.42	3.74
0.500	4.82	1.500	33.27	2.500	6.18	3.50	3.74
0.583	5.85	1.583	18.03	2.583	5.54	3.58	3.52
0.667	5.85	1.667	18.03	2.667	5.54	3.67	3.52
0.750	7.60	1.750	12.66	2.750	5.03	3.75	3.33
0.833	7.60	1.833	12.66	2.833	5.03	3.83	3.33
0.917	11.26	1.917	9.89	2.917	4.62	3.92	3.16

```
               1.000   11.26 | 2.000    9.89 | 3.000    4.62 |  4.00    3.16

     Max.Eff.Inten.(mm/hr)=     109.11       111.54
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       3.26 (ii)    7.65 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.27         0.13
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.67         0.17          0.805 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42           1.33
     RUNOFF VOLUME    (mm)=      49.74        27.01          40.65
     TOTAL RAINFALL   (mm)=      50.74        50.74          50.74
     RUNOFF COEFFICIENT   =       0.98         0.53           0.80

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    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  (  0023)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0020):     3.80   0.805     1.33    40.65
      + ID2= 2 (  0006):    29.06   4.376     1.33    36.88
        ==================================================
        ID = 3 (  0023):    32.86   5.181     1.33    37.31

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0012)|     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   |   0.4930     1.5666
                          0.0360     0.7150   |   0.7890     1.8478
                          0.0660     1.0737   |   1.0520     2.0613
                          0.2630     1.3645   |   1.3140     2.2797

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0023)     32.860     5.181      1.33      37.31
   OUTFLOW: ID= 1 (  0012)     32.860     0.116      4.17      35.59

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  2.24
                  TIME SHIFT OF PEAK FLOW         (min)=170.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.1474

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0017)|   Area    (ha)=  15.53
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  49.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.09         5.44
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     321.77        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    3.62 | 1.083   25.63 | 2.083    8.19 |  3.08    4.27
             0.167    3.62 | 1.167   25.63 | 2.167    8.19 |  3.17    4.27
             0.250    4.12 | 1.250  109.10 | 2.250    7.03 |  3.25    3.98
             0.333    4.12 | 1.333  109.11 | 2.333    7.03 |  3.33    3.98
             0.417    4.82 | 1.417   33.27 | 2.417    6.18 |  3.42    3.74
             0.500    4.82 | 1.500   33.27 | 2.500    6.18 |  3.50    3.74
             0.583    5.85 | 1.583   18.03 | 2.583    5.54 |  3.58    3.52
             0.667    5.85 | 1.667   18.03 | 2.667    5.54 |  3.67    3.52
             0.750    7.60 | 1.750   12.66 | 2.750    5.03 |  3.75    3.33
             0.833    7.60 | 1.833   12.66 | 2.833    5.03 |  3.83    3.33
             0.917   11.26 | 1.917    9.89 | 2.917    4.62 |  3.92    3.16
             1.000   11.26 | 2.000    9.89 | 3.000    4.62 |  4.00    3.16

     Max.Eff.Inten.(mm/hr)=     109.11        64.68
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.97 (ii)   13.38 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.22         0.08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       2.06         0.53          2.323 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.50           1.33
     RUNOFF VOLUME    (mm)=      49.74        22.52          35.86
     TOTAL RAINFALL   (mm)=      50.74        50.74          50.74
     RUNOFF COEFFICIENT   =       0.98         0.44           0.71

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0002)|   Area    (ha)=  20.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  56.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      13.44         6.62
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     365.70        40.00
     Mannings n           =      0.013        0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.62	1.083	25.63	2.083	8.19	3.08	4.27
0.167	3.62	1.167	25.63	2.167	8.19	3.17	4.27
0.250	4.12	1.250	109.10	2.250	7.03	3.25	3.98
0.333	4.12	1.333	109.11	2.333	7.03	3.33	3.98
0.417	4.82	1.417	33.27	2.417	6.18	3.42	3.74
0.500	4.82	1.500	33.27	2.500	6.18	3.50	3.74
0.583	5.85	1.583	18.03	2.583	5.54	3.58	3.52
0.667	5.85	1.667	18.03	2.667	5.54	3.67	3.52
0.750	7.60	1.750	12.66	2.750	5.03	3.75	3.33
0.833	7.60	1.833	12.66	2.833	5.03	3.83	3.33
0.917	11.26	1.917	9.89	2.917	4.62	3.92	3.16
1.000	11.26	2.000	9.89	3.000	4.62	4.00	3.16

Max.Eff.Inten.(mm/hr)=		109.11	55.01	
over (min)		5.00	15.00	
Storage Coeff. (min)=		5.37 (ii)	14.33 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.21	0.08	
				TOTALS
PEAK FLOW	(cms)=	2.99	0.53	3.242 (iii)
TIME TO PEAK	(hrs)=	1.33	1.50	1.33
RUNOFF VOLUME	(mm)=	49.74	21.26	37.21
TOTAL RAINFALL	(mm)=	50.74	50.74	50.74
RUNOFF COEFFICIENT	=	0.98	0.42	0.73

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0018)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0017):		15.53	2.323	1.33	35.86
+ ID2= 2 (0002):		20.06	3.242	1.33	37.21
ID = 3 (0018):		35.59	5.565	1.33	36.62

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0008)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.4480	1.7011
	0.0360	0.7282	0.7160	2.0238
	0.0600	1.1698	0.9550	2.2595
	0.2380	1.4871	1.1940	2.5034

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0018)	35.590	5.565	1.33	36.62
OUTFLOW: ID= 1 (0008)	35.590	0.096	4.17	34.73

PEAK FLOW REDUCTION [Qout/Qin](%)= 1.73
TIME SHIFT OF PEAK FLOW (min)=170.00
MAXIMUM STORAGE USED (ha.m.)= 1.2346

CALIB	
STANDHYD (0037)	Area (ha)= 2.00
ID= 1 DT= 5.0 min	Total Imp(%)= 79.00 Dir. Conn.(%)= 59.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.58	0.42
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	115.47	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.62	1.083	25.63	2.083	8.19	3.08	4.27
0.167	3.62	1.167	25.63	2.167	8.19	3.17	4.27
0.250	4.12	1.250	109.10	2.250	7.03	3.25	3.98
0.333	4.12	1.333	109.11	2.333	7.03	3.33	3.98
0.417	4.82	1.417	33.27	2.417	6.18	3.42	3.74
0.500	4.82	1.500	33.27	2.500	6.18	3.50	3.74
0.583	5.85	1.583	18.03	2.583	5.54	3.58	3.52
0.667	5.85	1.667	18.03	2.667	5.54	3.67	3.52
0.750	7.60	1.750	12.66	2.750	5.03	3.75	3.33
0.833	7.60	1.833	12.66	2.833	5.03	3.83	3.33
0.917	11.26	1.917	9.89	2.917	4.62	3.92	3.16
1.000	11.26	2.000	9.89	3.000	4.62	4.00	3.16

Max.Eff.Inten.(mm/hr)=		109.11	107.18	
over (min)		5.00	10.00	
Storage Coeff. (min)=		2.69 (ii)	7.20 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.29	0.14	
				TOTALS
PEAK FLOW	(cms)=	0.35	0.09	0.427 (iii)
TIME TO PEAK	(hrs)=	1.33	1.42	1.33
RUNOFF VOLUME	(mm)=	49.74	26.67	40.28
TOTAL RAINFALL	(mm)=	50.74	50.74	50.74
RUNOFF COEFFICIENT	=	0.98	0.53	0.79

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0033)	OVERFLOW IS OFF

IN= 2---> OUT= 1					
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)	
	0.0000	0.0000	0.0250	0.1054	
	0.0020	0.0490	0.0410	0.1239	
	0.0030	0.0750	0.0540	0.1381	
	0.0130	0.0932	0.0670	0.1527	

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0037)	2.000	0.427	1.33	40.28
OUTFLOW: ID= 1 (0033)	2.000	0.004	4.17	36.72

PEAK FLOW REDUCTION [Qout/Qin](%)= 1.02
TIME SHIFT OF PEAK FLOW (min)=170.00
MAXIMUM STORAGE USED (ha.m.)= 0.0775

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

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

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DATE: 05-01-2024 TIME: 03:19:11

USER:

COMMENTS: _____

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  ************************************************
  ** SIMULATION : 21. 10yr 4hr 10min Chicago    **
  ************************************************
```

CHICAGO STORM	IDF curve parameters: A= 976.898
Ptotal= 59.75 mm	B= 4.745
	C= 0.760

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	4.32	1.00	30.34	2.00	9.74	3.00	5.10
0.17	4.92	1.17	126.38	2.17	8.37	3.17	4.75
0.33	5.74	1.33	39.32	2.33	7.37	3.33	4.46
0.50	6.98	1.50	21.40	2.50	6.60	3.50	4.20
0.67	9.05	1.67	15.05	2.67	6.00	3.67	3.98
0.83	13.39	1.83	11.76	2.83	5.50	3.83	3.78

CALIB	
STANDHYD (0006)	Area (ha)= 29.06
ID= 1 DT= 5.0 min	Total Imp(%)= 66.00 Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	4.32	1.083	30.34	2.083	9.74	3.08	5.10
0.167	4.32	1.167	30.34	2.167	9.74	3.17	5.10
0.250	4.92	1.250	126.38	2.250	8.37	3.25	4.75
0.333	4.92	1.333	126.38	2.333	8.37	3.33	4.75
0.417	5.74	1.417	39.32	2.417	7.37	3.42	4.46
0.500	5.74	1.500	39.32	2.500	7.37	3.50	4.46
0.583	6.98	1.583	21.40	2.583	6.60	3.58	4.20
0.667	6.98	1.667	21.40	2.667	6.60	3.67	4.20
0.750	9.05	1.750	15.05	2.750	6.00	3.75	3.98
0.833	9.05	1.833	15.05	2.833	6.00	3.83	3.98
0.917	13.39	1.917	11.76	2.917	5.50	3.92	3.78
1.000	13.39	2.000	11.76	3.000	5.50	4.00	3.78

Max.Eff.Inten.	(mm/hr)=	126.38	71.62	
over	(min)	5.00	15.00	
Storage Coeff.	(min)=	5.66 (ii)	13.73 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	15.00	
Unit Hyd. peak	(cms)=	0.20	0.08	
				TOTALS
PEAK FLOW	(cms)=	4.86	1.05	5.382 (iii)
TIME TO PEAK	(hrs)=	1.33	1.50	1.33
RUNOFF VOLUME	(mm)=	58.75	27.65	44.75

```
     TOTAL RAINFALL   (mm)=      59.75        59.75          59.75
     RUNOFF COEFFICIENT   =       0.98         0.46           0.75


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0020)|   Area    (ha)=   3.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  60.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.04         0.76
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     159.16        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    4.32 | 1.083   30.34 | 2.083    9.74 |  3.08    5.10
             0.167    4.32 | 1.167   30.34 | 2.167    9.74 |  3.17    5.10
             0.250    4.92 | 1.250  126.38 | 2.250    8.37 |  3.25    4.75
             0.333    4.92 | 1.333  126.38 | 2.333    8.37 |  3.33    4.75
             0.417    5.74 | 1.417   39.32 | 2.417    7.37 |  3.42    4.46
             0.500    5.74 | 1.500   39.32 | 2.500    7.37 |  3.50    4.46
             0.583    6.98 | 1.583   21.40 | 2.583    6.60 |  3.58    4.20
             0.667    6.98 | 1.667   21.40 | 2.667    6.60 |  3.67    4.20
             0.750    9.05 | 1.750   15.05 | 2.750    6.00 |  3.75    3.98
             0.833    9.05 | 1.833   15.05 | 2.833    6.00 |  3.83    3.98
             0.917   13.39 | 1.917   11.76 | 2.917    5.50 |  3.92    3.78
             1.000   13.39 | 2.000   11.76 | 3.000    5.50 |  4.00    3.78

     Max.Eff.Inten.(mm/hr)=     126.38       142.62
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       3.07 (ii)    7.22 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.27         0.14
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.78         0.22          0.962 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42           1.33
     RUNOFF VOLUME    (mm)=      58.75        34.43          49.02
     TOTAL RAINFALL   (mm)=      59.75        59.75          59.75
     RUNOFF COEFFICIENT   =       0.98         0.58           0.82

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    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  (  0023)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0020):     3.80    0.962     1.33    49.02
     + ID2= 2 (  0006):    29.06    5.382     1.33    44.75
       ================================================
       ID = 3 (  0023):    32.86    6.344     1.33    45.25

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0012)|     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   |   0.4930      1.5666
                          0.0360     0.7150   |   0.7890      1.8478
                          0.0660     1.0737   |   1.0520      2.0613
                          0.2630     1.3645   |   1.3140      2.2797

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0023)     32.860     6.344      1.33      45.25
   OUTFLOW: ID= 1 (  0012)     32.860     0.235      4.08      43.43

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  3.71
                  TIME SHIFT OF PEAK FLOW         (min)=165.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.3246

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--------------------
| CALIB            |
| STANDHYD (  0017)|   Area    (ha)=  15.53
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  49.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.09         5.44
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     321.77        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    4.32 | 1.083   30.34 | 2.083    9.74 |  3.08    5.10
             0.167    4.32 | 1.167   30.34 | 2.167    9.74 |  3.17    5.10
             0.250    4.92 | 1.250  126.38 | 2.250    8.37 |  3.25    4.75
             0.333    4.92 | 1.333  126.38 | 2.333    8.37 |  3.33    4.75
             0.417    5.74 | 1.417   39.32 | 2.417    7.37 |  3.42    4.46
             0.500    5.74 | 1.500   39.32 | 2.500    7.37 |  3.50    4.46
             0.583    6.98 | 1.583   21.40 | 2.583    6.60 |  3.58    4.20
             0.667    6.98 | 1.667   21.40 | 2.667    6.60 |  3.67    4.20
             0.750    9.05 | 1.750   15.05 | 2.750    6.00 |  3.75    3.98
```

0.833	9.05	1.833	15.05	2.833	6.00	3.83	3.98
0.917	13.39	1.917	11.76	2.917	5.50	3.92	3.78
1.000	13.39	2.000	11.76	3.000	5.50	4.00	3.78

Max.Eff.Inten.(mm/hr)=	126.38	84.69		
over (min)	5.00	15.00		
Storage Coeff. (min)=	4.69 (ii)	12.23 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	0.22	0.09		
			TOTALS	
PEAK FLOW (cms)=	2.43	0.72	2.795 (iii)	
TIME TO PEAK (hrs)=	1.33	1.50	1.33	
RUNOFF VOLUME (mm)=	58.75	29.26	43.71	
TOTAL RAINFALL (mm)=	59.75	59.75	59.75	
RUNOFF COEFFICIENT =	0.98	0.49	0.73	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0002)	Area (ha)= 20.06		
ID= 1 DT= 5.0 min	Total Imp(%)= 67.00	Dir. Conn.(%)= 56.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	13.44	6.62
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	365.70	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	4.32	1.083	30.34	2.083	9.74	3.08	5.10
0.167	4.32	1.167	30.34	2.167	9.74	3.17	5.10
0.250	4.92	1.250	126.38	2.250	8.37	3.25	4.75
0.333	4.92	1.333	126.38	2.333	8.37	3.33	4.75
0.417	5.74	1.417	39.32	2.417	7.37	3.42	4.46
0.500	5.74	1.500	39.32	2.500	7.37	3.50	4.46
0.583	6.98	1.583	21.40	2.583	6.60	3.58	4.20
0.667	6.98	1.667	21.40	2.667	6.60	3.67	4.20
0.750	9.05	1.750	15.05	2.750	6.00	3.75	3.98
0.833	9.05	1.833	15.05	2.833	6.00	3.83	3.98
0.917	13.39	1.917	11.76	2.917	5.50	3.92	3.78
1.000	13.39	2.000	11.76	3.000	5.50	4.00	3.78

Max.Eff.Inten.(mm/hr)=	126.38	72.56		
over (min)	5.00	15.00		
Storage Coeff. (min)=	5.06 (ii)	13.09 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	0.21	0.08		
			TOTALS	
PEAK FLOW (cms)=	3.52	0.73	3.882 (iii)	
TIME TO PEAK (hrs)=	1.33	1.50	1.33	
RUNOFF VOLUME (mm)=	58.75	27.78	45.12	
TOTAL RAINFALL (mm)=	59.75	59.75	59.75	
RUNOFF COEFFICIENT =	0.98	0.46	0.76	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0018)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0017):	15.53	2.795	1.33	43.71
+ ID2= 2 (0002):	20.06	3.882	1.33	45.12
ID = 3 (0018):	35.59	6.677	1.33	44.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0008)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.4480	1.7011
	0.0360	0.7282	0.7160	2.0238
	0.0600	1.1698	0.9550	2.2595
	0.2380	1.4871	1.1940	2.5034

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0018)	35.590	6.677	1.33	44.51
OUTFLOW: ID= 1 (0008)	35.590	0.212	4.08	42.48

PEAK FLOW REDUCTION [Qout/Qin](%)= 3.17
TIME SHIFT OF PEAK FLOW (min)=165.00
MAXIMUM STORAGE USED (ha.m.)= 1.4405

CALIB			
STANDHYD (0037)	Area (ha)= 2.00		
ID= 1 DT= 5.0 min	Total Imp(%)= 79.00	Dir. Conn.(%)= 59.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.58	0.42
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	115.47	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	4.32	1.083	30.34	2.083	9.74	3.08	5.10
0.167	4.32	1.167	30.34	2.167	9.74	3.17	5.10
0.250	4.92	1.250	126.38	2.250	8.37	3.25	4.75
0.333	4.92	1.333	126.38	2.333	8.37	3.33	4.75
0.417	5.74	1.417	39.32	2.417	7.37	3.42	4.46
0.500	5.74	1.500	39.32	2.500	7.37	3.50	4.46
0.583	6.98	1.583	21.40	2.583	6.60	3.58	4.20
0.667	6.98	1.667	21.40	2.667	6.60	3.67	4.20
0.750	9.05	1.750	15.05	2.750	6.00	3.75	3.98
0.833	9.05	1.833	15.05	2.833	6.00	3.83	3.98
0.917	13.39	1.917	11.76	2.917	5.50	3.92	3.78
1.000	13.39	2.000	11.76	3.000	5.50	4.00	3.78

Max.Eff.Inten.(mm/hr)=	126.38	137.28	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.54 (ii)	6.79 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.29	0.14	
			TOTALS
PEAK FLOW (cms)=	0.41	0.12	0.509 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	58.75	34.05	48.62
TOTAL RAINFALL (mm)=	59.75	59.75	59.75
RUNOFF COEFFICIENT =	0.98	0.57	0.81

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0033)	OVERFLOW IS OFF
IN= 2---> OUT= 1	
DT= 5.0 min	

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0250	0.1054
0.0020	0.0490	0.0410	0.1239
0.0030	0.0750	0.0540	0.1381
0.0130	0.0932	0.0670	0.1527

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0037)	2.000	0.509	1.33	48.62
OUTFLOW: ID= 1 (0033)	2.000	0.011	4.08	44.80

PEAK FLOW REDUCTION [Qout/Qin](%)= 2.22
TIME SHIFT OF PEAK FLOW (min)=165.00
MAXIMUM STORAGE USED (ha.m.)= 0.0902

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

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\30c83cf2-00d8-41c5-bd90-8773652199d5\scen
Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\30c83cf2-00d8-41c5-bd90-8773652199d5\scen

DATE: 05-01-2024 TIME: 03:19:11

USER:

COMMENTS: _____

** SIMULATION : 22. 25yr 4hr 10min Chicago **

CHICAGO STORM	IDF curve parameters: A=1133.123
Ptotal= 70.85 mm	B= 4.734
	C= 0.756

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	5.20	1.00	35.94	2.00	11.65	3.00	6.12
0.17	5.91	1.17	148.26	2.17	10.02	3.17	5.71
0.33	6.90	1.33	46.49	2.33	8.83	3.33	5.36
0.50	8.36	1.50	25.43	2.50	7.92	3.50	5.05
0.67	10.82	1.67	17.93	2.67	7.20	3.67	4.79
0.83	15.97	1.83	14.05	2.83	6.61	3.83	4.55

```
--------------------
| CALIB            |
| STANDHYD (  0006)|   Area    (ha)=  29.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  66.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      19.18         9.88
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     440.15        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    5.20 | 1.083   35.94 | 2.083   11.65 |  3.08    6.12
              0.167    5.20 | 1.167   35.94 | 2.167   11.65 |  3.17    6.12
              0.250    5.91 | 1.250  148.26 | 2.250   10.02 |  3.25    5.71
              0.333    5.91 | 1.333  148.26 | 2.333   10.02 |  3.33    5.71
              0.417    6.90 | 1.417   46.49 | 2.417    8.83 |  3.42    5.36
              0.500    6.90 | 1.500   46.49 | 2.500    8.83 |  3.50    5.36
              0.583    8.36 | 1.583   25.43 | 2.583    7.92 |  3.58    5.05
              0.667    8.36 | 1.667   25.43 | 2.667    7.92 |  3.67    5.05
              0.750   10.82 | 1.750   17.93 | 2.750    7.20 |  3.75    4.79
              0.833   10.82 | 1.833   17.93 | 2.833    7.20 |  3.83    4.79
              0.917   15.97 | 1.917   14.05 | 2.917    6.61 |  3.92    4.55
              1.000   15.97 | 2.000   14.05 | 3.000    6.61 |  4.00    4.55

     Max.Eff.Inten.(mm/hr)=     148.26        94.98
               over (min)         5.00        15.00
     Storage Coeff.  (min)=       5.31 (ii)   10.28 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.21         0.09
                                                        *TOTALS*
     PEAK FLOW       (cms)=       5.80         1.58       6.641 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.50        1.33
     RUNOFF VOLUME    (mm)=      69.85        36.16       54.69
     TOTAL RAINFALL   (mm)=      70.85        70.85       70.85
     RUNOFF COEFFICIENT   =       0.99         0.51        0.77


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0020)|   Area    (ha)=   3.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  60.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.04         0.76
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     159.16        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    5.20 | 1.083   35.94 | 2.083   11.65 |  3.08    6.12
              0.167    5.20 | 1.167   35.94 | 2.167   11.65 |  3.17    6.12
              0.250    5.91 | 1.250  148.26 | 2.250   10.02 |  3.25    5.71
              0.333    5.91 | 1.333  148.26 | 2.333   10.02 |  3.33    5.71
              0.417    6.90 | 1.417   46.49 | 2.417    8.83 |  3.42    5.36
              0.500    6.90 | 1.500   46.49 | 2.500    8.83 |  3.50    5.36
              0.583    8.36 | 1.583   25.43 | 2.583    7.92 |  3.58    5.05
              0.667    8.36 | 1.667   25.43 | 2.667    7.92 |  3.67    5.05
              0.750   10.82 | 1.750   17.93 | 2.750    7.20 |  3.75    4.79
              0.833   10.82 | 1.833   17.93 | 2.833    7.20 |  3.83    4.79
              0.917   15.97 | 1.917   14.05 | 2.917    6.61 |  3.92    4.55
              1.000   15.97 | 2.000   14.05 | 3.000    6.61 |  4.00    4.55

     Max.Eff.Inten.(mm/hr)=     148.26       183.38
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       2.88 (ii)    6.77 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.28         0.14
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.92         0.29       1.165 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42        1.33
     RUNOFF VOLUME    (mm)=      69.85        43.95       59.49
     TOTAL RAINFALL   (mm)=      70.85        70.85       70.85
     RUNOFF COEFFICIENT   =       0.99         0.62        0.84

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    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  (  0023)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0020):     3.80   1.165     1.33    59.49
     + ID2= 2 (  0006):    29.06   6.641     1.33    54.69
       ================================================
       ID = 3 (  0023):    32.86   7.806     1.33    55.24

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0012)|     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    |   0.4930     1.5666
                        0.0360     0.7150    |   0.7890     1.8478
```

```
                        0.0660     1.0737   |   1.0520      2.0613
                        0.2630     1.3645   |   1.3140      2.2797

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0023)     32.860      7.806      1.33      55.24
   OUTFLOW: ID= 1 (  0012)     32.860      0.419      3.75      53.38

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  5.37
                  TIME SHIFT OF PEAK FLOW         (min)=145.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.5016

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--------------------
| CALIB            |
| STANDHYD (  0017)|   Area    (ha)=  15.53
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  49.00
--------------------

                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.09         5.44
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     321.77        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    5.20 | 1.083   35.94 | 2.083   11.65 |  3.08    6.12
              0.167    5.20 | 1.167   35.94 | 2.167   11.65 |  3.17    6.12
              0.250    5.91 | 1.250  148.26 | 2.250   10.02 |  3.25    5.71
              0.333    5.91 | 1.333  148.26 | 2.333   10.02 |  3.33    5.71
              0.417    6.90 | 1.417   46.49 | 2.417    8.83 |  3.42    5.36
              0.500    6.90 | 1.500   46.49 | 2.500    8.83 |  3.50    5.36
              0.583    8.36 | 1.583   25.43 | 2.583    7.92 |  3.58    5.05
              0.667    8.36 | 1.667   25.43 | 2.667    7.92 |  3.67    5.05
              0.750   10.82 | 1.750   17.93 | 2.750    7.20 |  3.75    4.79
              0.833   10.82 | 1.833   17.93 | 2.833    7.20 |  3.83    4.79
              0.917   15.97 | 1.917   14.05 | 2.917    6.61 |  3.92    4.55
              1.000   15.97 | 2.000   14.05 | 3.000    6.61 |  4.00    4.55

     Max.Eff.Inten.(mm/hr)=     148.26       111.44
               over (min)          5.00        15.00
     Storage Coeff.  (min)=       4.40 (ii)   11.16 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.23         0.09
                                                      *TOTALS*
     PEAK FLOW       (cms)=       2.88         0.98      3.410 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.50       1.33
     RUNOFF VOLUME    (mm)=      69.85        38.04      53.62
     TOTAL RAINFALL   (mm)=      70.85        70.85      70.85
     RUNOFF COEFFICIENT   =       0.99         0.54       0.76

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0002)|   Area    (ha)=  20.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  56.00
--------------------

                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      13.44         6.62
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     365.70        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    5.20 | 1.083   35.94 | 2.083   11.65 |  3.08    6.12
              0.167    5.20 | 1.167   35.94 | 2.167   11.65 |  3.17    6.12
              0.250    5.91 | 1.250  148.26 | 2.250   10.02 |  3.25    5.71
              0.333    5.91 | 1.333  148.26 | 2.333   10.02 |  3.33    5.71
              0.417    6.90 | 1.417   46.49 | 2.417    8.83 |  3.42    5.36
              0.500    6.90 | 1.500   46.49 | 2.500    8.83 |  3.50    5.36
              0.583    8.36 | 1.583   25.43 | 2.583    7.92 |  3.58    5.05
              0.667    8.36 | 1.667   25.43 | 2.667    7.92 |  3.67    5.05
              0.750   10.82 | 1.750   17.93 | 2.750    7.20 |  3.75    4.79
              0.833   10.82 | 1.833   17.93 | 2.833    7.20 |  3.83    4.79
              0.917   15.97 | 1.917   14.05 | 2.917    6.61 |  3.92    4.55
              1.000   15.97 | 2.000   14.05 | 3.000    6.61 |  4.00    4.55

     Max.Eff.Inten.(mm/hr)=     148.26        96.16
               over (min)          5.00        10.00
     Storage Coeff.  (min)=       4.75 (ii)    9.63 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.22         0.11
                                                      *TOTALS*
     PEAK FLOW       (cms)=       4.19         1.16       5.109 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42        1.33
     RUNOFF VOLUME    (mm)=      69.85        36.31       55.09
     TOTAL RAINFALL   (mm)=      70.85        70.85       70.85
     RUNOFF COEFFICIENT   =       0.99         0.51        0.78

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    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  (  0018)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
```

```
       ID1= 1 (  0017):    15.53   3.410     1.33    53.62
     + ID2= 2 (  0002):    20.06   5.109     1.33    55.09
       ================================================
       ID = 3 (  0018):    35.59   8.519     1.33    54.45

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0008)|     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   |  0.4480      1.7011
                           0.0360     0.7282   |  0.7160      2.0238
                           0.0600     1.1698   |  0.9550      2.2595
                           0.2380     1.4871   |  1.1940      2.5034

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0018)     35.590     8.519      1.33      54.45
   OUTFLOW: ID= 1 (  0008)     35.590     0.399      4.00      52.36

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  4.68
                  TIME SHIFT OF PEAK FLOW          (min)=160.00
                  MAXIMUM  STORAGE   USED        (ha.m.)=  1.6512

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0037)|   Area    (ha)=   2.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  59.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.58         0.42
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     115.47        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    5.20 | 1.083   35.94 | 2.083   11.65 |  3.08    6.12
             0.167    5.20 | 1.167   35.94 | 2.167   11.65 |  3.17    6.12
             0.250    5.91 | 1.250  148.26 | 2.250   10.02 |  3.25    5.71
             0.333    5.91 | 1.333  148.26 | 2.333   10.02 |  3.33    5.71
             0.417    6.90 | 1.417   46.49 | 2.417    8.83 |  3.42    5.36
             0.500    6.90 | 1.500   46.49 | 2.500    8.83 |  3.50    5.36
             0.583    8.36 | 1.583   25.43 | 2.583    7.92 |  3.58    5.05
             0.667    8.36 | 1.667   25.43 | 2.667    7.92 |  3.67    5.05
             0.750   10.82 | 1.750   17.93 | 2.750    7.20 |  3.75    4.79
             0.833   10.82 | 1.833   17.93 | 2.833    7.20 |  3.83    4.79
             0.917   15.97 | 1.917   14.05 | 2.917    6.61 |  3.92    4.55
             1.000   15.97 | 2.000   14.05 | 3.000    6.61 |  4.00    4.55

     Max.Eff.Inten.(mm/hr)=     148.26       176.81
               over (min)          5.00        10.00
     Storage Coeff.  (min)=       2.38 (ii)    6.37 (ii)

     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.30         0.15
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.48         0.16         0.616 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42          1.33
     RUNOFF VOLUME    (mm)=      69.85        43.52         59.05
     TOTAL RAINFALL   (mm)=      70.85        70.85         70.85
     RUNOFF COEFFICIENT   =       0.99         0.61          0.83

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0033)|     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   |  0.0250      0.1054
                           0.0020     0.0490   |  0.0410      0.1239
                           0.0030     0.0750   |  0.0540      0.1381
                           0.0130     0.0932   |  0.0670      0.1527

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0037)     2.000     0.616      1.33      59.05
   OUTFLOW: ID= 1 (  0033)     2.000     0.022      4.00      55.11

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  3.62
                  TIME SHIFT OF PEAK FLOW          (min)=160.00
                  MAXIMUM  STORAGE   USED        (ha.m.)=  0.1027

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
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Output filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\b7ad9366-7649-470d-a798-940b2905f995\scen
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DATE: 05-01-2024 TIME: 03:19:11

USER:

COMMENTS: _____

**** SIMULATION : 23. 50yr 4hr 10min Chicago ****

CHICAGO STORM	IDF curve parameters: A=1251.473
Ptotal= 79.52 mm	B= 4.847
	C= 0.753

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

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	5.91	1.00	40.47	2.00	13.20	3.00	6.95
0.17	6.71	1.17	164.13	2.17	11.36	3.17	6.49
0.33	7.83	1.33	52.28	2.33	10.01	3.33	6.09
0.50	9.48	1.50	28.71	2.50	8.98	3.50	5.74
0.67	12.26	1.67	20.28	2.67	8.17	3.67	5.44
0.83	18.07	1.83	15.90	2.83	7.50	3.83	5.17

CALIB	
STANDHYD (0006)	Area (ha)= 29.06
ID= 1 DT= 5.0 min	Total Imp(%)= 66.00 Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	5.91	1.083	40.47	2.083	13.20	3.08	6.95
0.167	5.91	1.167	40.47	2.167	13.20	3.17	6.95
0.250	6.71	1.250	164.13	2.250	11.36	3.25	6.49
0.333	6.71	1.333	164.13	2.333	11.36	3.33	6.49
0.417	7.83	1.417	52.28	2.417	10.01	3.42	6.09
0.500	7.83	1.500	52.28	2.500	10.01	3.50	6.09
0.583	9.48	1.583	28.71	2.583	8.98	3.58	5.74
0.667	9.48	1.667	28.71	2.667	8.98	3.67	5.74
0.750	12.26	1.750	20.28	2.750	8.17	3.75	5.44
0.833	12.26	1.833	20.28	2.833	8.17	3.83	5.44
0.917	18.07	1.917	15.90	2.917	7.50	3.92	5.17
1.000	18.07	2.000	15.90	3.000	7.50	4.00	5.17

				TOTALS
Max.Eff.Inten.	(mm/hr)=	164.13	113.34	
over	(min)	5.00	10.00	
Storage Coeff.	(min)=	5.10 (ii)	9.87 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	10.00	
Unit Hyd. peak	(cms)=	0.21	0.11	
PEAK FLOW	(cms)=	6.49	2.01	8.106 (iii)
TIME TO PEAK	(hrs)=	1.33	1.42	1.33
RUNOFF VOLUME	(mm)=	78.52	43.11	62.59
TOTAL RAINFALL	(mm)=	79.52	79.52	79.52
RUNOFF COEFFICIENT	=	0.99	0.54	0.79

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0020)	Area (ha)= 3.80
ID= 1 DT= 5.0 min	Total Imp(%)= 80.00 Dir. Conn.(%)= 60.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	5.91	1.083	40.47	2.083	13.20	3.08	6.95
0.167	5.91	1.167	40.47	2.167	13.20	3.17	6.95
0.250	6.71	1.250	164.13	2.250	11.36	3.25	6.49
0.333	6.71	1.333	164.13	2.333	11.36	3.33	6.49
0.417	7.83	1.417	52.28	2.417	10.01	3.42	6.09
0.500	7.83	1.500	52.28	2.500	10.01	3.50	6.09
0.583	9.48	1.583	28.71	2.583	8.98	3.58	5.74
0.667	9.48	1.667	28.71	2.667	8.98	3.67	5.74
0.750	12.26	1.750	20.28	2.750	8.17	3.75	5.44
0.833	12.26	1.833	20.28	2.833	8.17	3.83	5.44
0.917	18.07	1.917	15.90	2.917	7.50	3.92	5.17

```
                1.000   18.07 | 2.000   15.90 | 3.000    7.50 |  4.00    5.17

     Max.Eff.Inten.(mm/hr)=     164.13       214.59
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.77 (ii)    6.50 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.28         0.14
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.02         0.34          1.317 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42           1.33
     RUNOFF VOLUME    (mm)=      78.52        51.61          67.75
     TOTAL RAINFALL   (mm)=      79.52        79.52          79.52
     RUNOFF COEFFICIENT   =       0.99         0.65           0.85

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  77.0    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  (  0023)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0020):     3.80   1.317     1.33    67.75
      + ID2= 2 (  0006):    29.06   8.106     1.33    62.59
        ================================================
        ID = 3 (  0023):    32.86   9.423     1.33    63.19

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0012)|     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   |   0.4930     1.5666
                          0.0360     0.7150   |   0.7890     1.8478
                          0.0660     1.0737   |   1.0520     2.0613
                          0.2630     1.3645   |   1.3140     2.2797

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0023)     32.860     9.423      1.33      63.19
   OUTFLOW: ID= 1 (  0012)     32.860     0.566      3.25      61.30

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  6.01
                  TIME SHIFT OF PEAK FLOW         (min)=115.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.6360

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--------------------
| CALIB            |
| STANDHYD (  0017)|   Area    (ha)=  15.53
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  49.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.09         5.44
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     321.77        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    5.91 | 1.083   40.47 | 2.083   13.20 |  3.08    6.95
             0.167    5.91 | 1.167   40.47 | 2.167   13.20 |  3.17    6.95
             0.250    6.71 | 1.250  164.13 | 2.250   11.36 |  3.25    6.49
             0.333    6.71 | 1.333  164.13 | 2.333   11.36 |  3.33    6.49
             0.417    7.83 | 1.417   52.28 | 2.417   10.01 |  3.42    6.09
             0.500    7.83 | 1.500   52.28 | 2.500   10.01 |  3.50    6.09
             0.583    9.48 | 1.583   28.71 | 2.583    8.98 |  3.58    5.74
             0.667    9.48 | 1.667   28.71 | 2.667    8.98 |  3.67    5.74
             0.750   12.26 | 1.750   20.28 | 2.750    8.17 |  3.75    5.44
             0.833   12.26 | 1.833   20.28 | 2.833    8.17 |  3.83    5.44
             0.917   18.07 | 1.917   15.90 | 2.917    7.50 |  3.92    5.17
             1.000   18.07 | 2.000   15.90 | 3.000    7.50 |  4.00    5.17

     Max.Eff.Inten.(mm/hr)=     164.13       132.35
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.22 (ii)   10.53 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.24         0.09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       3.22         1.19          3.876 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.50           1.33
     RUNOFF VOLUME    (mm)=      78.52        45.18          61.52
     TOTAL RAINFALL   (mm)=      79.52        79.52          79.52
     RUNOFF COEFFICIENT   =       0.99         0.57           0.77

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0002)|   Area    (ha)=  20.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  56.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      13.44         6.62
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     365.70        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	5.91	1.083	40.47	2.083	13.20	3.08	6.95
0.167	5.91	1.167	40.47	2.167	13.20	3.17	6.95
0.250	6.71	1.250	164.13	2.250	11.36	3.25	6.49
0.333	6.71	1.333	164.13	2.333	11.36	3.33	6.49
0.417	7.83	1.417	52.28	2.417	10.01	3.42	6.09
0.500	7.83	1.500	52.28	2.500	10.01	3.50	6.09
0.583	9.48	1.583	28.71	2.583	8.98	3.58	5.74
0.667	9.48	1.667	28.71	2.667	8.98	3.67	5.74
0.750	12.26	1.750	20.28	2.750	8.17	3.75	5.44
0.833	12.26	1.833	20.28	2.833	8.17	3.83	5.44
0.917	18.07	1.917	15.90	2.917	7.50	3.92	5.17
1.000	18.07	2.000	15.90	3.000	7.50	4.00	5.17

			TOTALS
Max.Eff.Inten.(mm/hr)=	164.13	114.71	
over (min)	5.00	10.00	
Storage Coeff. (min)=	4.56 (ii)	9.25 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.23	0.12	
PEAK FLOW (cms)=	4.68	1.40	5.817 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	78.52	43.27	63.01
TOTAL RAINFALL (mm)=	79.52	79.52	79.52
RUNOFF COEFFICIENT =	0.99	0.54	0.79

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0018) | 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0017):	15.53	3.876	1.33	61.52
+ ID2= 2 (0002):	20.06	5.817	1.33	63.01
ID = 3 (0018):	35.59	9.693	1.33	62.36

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0008) \| 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	0.4480	1.7011
0.0360	0.7282	0.7160	2.0238
0.0600	1.1698	0.9550	2.2595
0.2380	1.4871	1.1940	2.5034

AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0018)	35.590	9.693	1.33	62.36
OUTFLOW: ID= 1 (0008)	35.590	0.533	3.67	60.23

PEAK FLOW REDUCTION [Qout/Qin](%)= 5.50
TIME SHIFT OF PEAK FLOW (min)=140.00
MAXIMUM STORAGE USED (ha.m.)= 1.8031

CALIB \| STANDHYD (0037) \| ID= 1 DT= 5.0 min — Area (ha)= 2.00 Total Imp(%)= 79.00 Dir. Conn.(%)= 59.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.58	0.42
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	115.47	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	5.91	1.083	40.47	2.083	13.20	3.08	6.95
0.167	5.91	1.167	40.47	2.167	13.20	3.17	6.95
0.250	6.71	1.250	164.13	2.250	11.36	3.25	6.49
0.333	6.71	1.333	164.13	2.333	11.36	3.33	6.49
0.417	7.83	1.417	52.28	2.417	10.01	3.42	6.09
0.500	7.83	1.500	52.28	2.500	10.01	3.50	6.09
0.583	9.48	1.583	28.71	2.583	8.98	3.58	5.74
0.667	9.48	1.667	28.71	2.667	8.98	3.67	5.74
0.750	12.26	1.750	20.28	2.750	8.17	3.75	5.44
0.833	12.26	1.833	20.28	2.833	8.17	3.83	5.44
0.917	18.07	1.917	15.90	2.917	7.50	3.92	5.17
1.000	18.07	2.000	15.90	3.000	7.50	4.00	5.17

			TOTALS
Max.Eff.Inten.(mm/hr)=	164.13	207.13	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.28 (ii)	6.11 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.30	0.15	
PEAK FLOW (cms)=	0.53	0.18	0.696 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	78.52	51.14	67.29
TOTAL RAINFALL (mm)=	79.52	79.52	79.52
RUNOFF COEFFICIENT =	0.99	0.64	0.85

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
| RESERVOIR(  0033)|     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   |  0.0250      0.1054
                         0.0020     0.0490   |  0.0410      0.1239
                         0.0030     0.0750   |  0.0540      0.1381
                         0.0130     0.0932   |  0.0670      0.1527

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0037)     2.000     0.696      1.33      67.29
   OUTFLOW: ID= 1 (  0033)     2.000     0.030      3.67      63.30

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  4.34
                  TIME SHIFT OF PEAK FLOW         (min)=140.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1114

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

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


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DATE: 05-01-2024                          TIME: 03:19:11

USER:


COMMENTS: _____________________________________________________________
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  ********************************************
  ** SIMULATION : 24. 100yr 4hr 10min Chicago   **
  ********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1383.628
| Ptotal= 87.42 mm |                          B=   4.905
--------------------                          C=   0.754
                         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    6.48 |  1.00   44.58 |  2.00   14.50 |  3.00    7.63
                0.17    7.36 |  1.17  180.44 |  2.17   12.47 |  3.17    7.11
                0.33    8.59 |  1.33   57.61 |  2.33   10.99 |  3.33    6.68
                0.50   10.41 |  1.50   31.60 |  2.50    9.86 |  3.50    6.29
                0.67   13.47 |  1.67   22.30 |  2.67    8.96 |  3.67    5.96
                0.83   19.87 |  1.83   17.48 |  2.83    8.23 |  3.83    5.67

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0006)|   Area    (ha)=  29.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  66.00   Dir. Conn.(%)=  55.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      19.18          9.88
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     440.15         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    6.48 | 1.083   44.58 | 2.083   14.50 |  3.08    7.63
               0.167    6.48 | 1.167   44.58 | 2.167   14.50 |  3.17    7.63
               0.250    7.36 | 1.250  180.44 | 2.250   12.47 |  3.25    7.11
               0.333    7.36 | 1.333  180.44 | 2.333   12.47 |  3.33    7.11
               0.417    8.59 | 1.417   57.61 | 2.417   10.99 |  3.42    6.68
               0.500    8.59 | 1.500   57.61 | 2.500   10.99 |  3.50    6.68
               0.583   10.41 | 1.583   31.60 | 2.583    9.86 |  3.58    6.29
               0.667   10.41 | 1.667   31.60 | 2.667    9.86 |  3.67    6.29
               0.750   13.47 | 1.750   22.30 | 2.750    8.96 |  3.75    5.96
               0.833   13.47 | 1.833   22.30 | 2.833    8.96 |  3.83    5.96
               0.917   19.87 | 1.917   17.48 | 2.917    8.23 |  3.92    5.67
               1.000   19.87 | 2.000   17.48 | 3.000    8.23 |  4.00    5.67

     Max.Eff.Inten.(mm/hr)=     180.44       132.05
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       4.91 (ii)    9.51 (ii)
```

```
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.22         0.12
                                                      *TOTALS*
     PEAK FLOW       (cms)=       7.21         2.38         9.138 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42          1.33
     RUNOFF VOLUME    (mm)=      86.42        49.63         69.87
     TOTAL RAINFALL   (mm)=      87.42        87.42         87.42
     RUNOFF COEFFICIENT   =       0.99         0.57          0.80

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0020)|   Area    (ha)=   3.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  60.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.04         0.76
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     159.16        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    6.48 | 1.083   44.58 | 2.083   14.50 |  3.08    7.63
              0.167    6.48 | 1.167   44.58 | 2.167   14.50 |  3.17    7.63
              0.250    7.36 | 1.250  180.44 | 2.250   12.47 |  3.25    7.11
              0.333    7.36 | 1.333  180.44 | 2.333   12.47 |  3.33    7.11
              0.417    8.59 | 1.417   57.61 | 2.417   10.99 |  3.42    6.68
              0.500    8.59 | 1.500   57.61 | 2.500   10.99 |  3.50    6.68
              0.583   10.41 | 1.583   31.60 | 2.583    9.86 |  3.58    6.29
              0.667   10.41 | 1.667   31.60 | 2.667    9.86 |  3.67    6.29
              0.750   13.47 | 1.750   22.30 | 2.750    8.96 |  3.75    5.96
              0.833   13.47 | 1.833   22.30 | 2.833    8.96 |  3.83    5.96
              0.917   19.87 | 1.917   17.48 | 2.917    8.23 |  3.92    5.67
              1.000   19.87 | 2.000   17.48 | 3.000    8.23 |  4.00    5.67

     Max.Eff.Inten.(mm/hr)=     180.44       246.12
               over (min)          5.00        10.00
     Storage Coeff.  (min)=       2.67 (ii)    6.26 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.29         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.12         0.39         1.472 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42          1.33
     RUNOFF VOLUME    (mm)=      86.42        58.70         75.33
     TOTAL RAINFALL   (mm)=      87.42        87.42         87.42
     RUNOFF COEFFICIENT   =       0.99         0.67          0.86

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    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  (  0023)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0020):      3.80   1.472     1.33    75.33
     + ID2= 2 (  0006):     29.06   9.138     1.33    69.87
       ================================================
       ID = 3 (  0023):     32.86  10.610     1.33    70.50

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0012)|     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   |   0.4930      1.5666
                          0.0360     0.7150   |   0.7890      1.8478
                          0.0660     1.0737   |   1.0520      2.0613
                          0.2630     1.3645   |   1.3140      2.2797

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0023)     32.860    10.610      1.33      70.50
   OUTFLOW: ID= 1 (  0012)     32.860     0.704      3.00      68.59

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  6.64
                  TIME SHIFT OF PEAK FLOW          (min)=100.00
                  MAXIMUM  STORAGE   USED        (ha.m.)=  1.7672

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--------------------
| CALIB            |
| STANDHYD (  0017)|   Area    (ha)=  15.53
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  49.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.09         5.44
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     321.77        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    6.48 | 1.083   44.58 | 2.083   14.50 |  3.08    7.63
              0.167    6.48 | 1.167   44.58 | 2.167   14.50 |  3.17    7.63
```

0.250	7.36	1.250	180.44	2.250	12.47	3.25	7.11
0.333	7.36	1.333	180.44	2.333	12.47	3.33	7.11
0.417	8.59	1.417	57.61	2.417	10.99	3.42	6.68
0.500	8.59	1.500	57.61	2.500	10.99	3.50	6.68
0.583	10.41	1.583	31.60	2.583	9.86	3.58	6.29
0.667	10.41	1.667	31.60	2.667	9.86	3.67	6.29
0.750	13.47	1.750	22.30	2.750	8.96	3.75	5.96
0.833	13.47	1.833	22.30	2.833	8.96	3.83	5.96
0.917	19.87	1.917	17.48	2.917	8.23	3.92	5.67
1.000	19.87	2.000	17.48	3.000	8.23	4.00	5.67

Max.Eff.Inten.(mm/hr)=	180.44	153.59	
over (min)	5.00	10.00	
Storage Coeff. (min)=	4.07 (ii)	8.94 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.24	0.12	
			TOTALS
PEAK FLOW (cms)=	3.56	1.56	4.853 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	86.42	51.85	68.79
TOTAL RAINFALL (mm)=	87.42	87.42	87.42
RUNOFF COEFFICIENT =	0.99	0.59	0.79

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0002)	Area (ha)= 20.06
ID= 1 DT= 5.0 min	Total Imp(%)= 67.00 Dir. Conn.(%)= 56.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	13.44	6.62
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	365.70	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	6.48	1.083	44.58	2.083	14.50	3.08	7.63
0.167	6.48	1.167	44.58	2.167	14.50	3.17	7.63
0.250	7.36	1.250	180.44	2.250	12.47	3.25	7.11
0.333	7.36	1.333	180.44	2.333	12.47	3.33	7.11
0.417	8.59	1.417	57.61	2.417	10.99	3.42	6.68
0.500	8.59	1.500	57.61	2.500	10.99	3.50	6.68
0.583	10.41	1.583	31.60	2.583	9.86	3.58	6.29
0.667	10.41	1.667	31.60	2.667	9.86	3.67	6.29
0.750	13.47	1.750	22.30	2.750	8.96	3.75	5.96
0.833	13.47	1.833	22.30	2.833	8.96	3.83	5.96
0.917	19.87	1.917	17.48	2.917	8.23	3.92	5.67
1.000	19.87	2.000	17.48	3.000	8.23	4.00	5.67

Max.Eff.Inten.(mm/hr)=	180.44	133.61	
over (min)	5.00	10.00	
Storage Coeff. (min)=	4.39 (ii)	8.90 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.23	0.12	
			TOTALS
PEAK FLOW (cms)=	5.19	1.66	6.546 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	86.42	49.80	70.31
TOTAL RAINFALL (mm)=	87.42	87.42	87.42
RUNOFF COEFFICIENT =	0.99	0.57	0.80

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0018)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0017):	15.53	4.853	1.33	68.79
+ ID2= 2 (0002):	20.06	6.546	1.33	70.31
ID = 3 (0018):	35.59	11.399	1.33	69.65

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0008)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.4480	1.7011
	0.0360	0.7282	0.7160	2.0238
	0.0600	1.1698	0.9550	2.2595
	0.2380	1.4871	1.1940	2.5034

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0018)	35.590	11.399	1.33	69.65
OUTFLOW: ID= 1 (0008)	35.590	0.656	3.33	67.49

PEAK FLOW REDUCTION [Qout/Qin](%)= 5.76
TIME SHIFT OF PEAK FLOW (min)=120.00
MAXIMUM STORAGE USED (ha.m.)= 1.9519

CALIB	
STANDHYD (0037)	Area (ha)= 2.00
ID= 1 DT= 5.0 min	Total Imp(%)= 79.00 Dir. Conn.(%)= 59.00

IMPERVIOUS PERVIOUS (i)

Surface Area	(ha)=	1.58	0.42
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	115.47	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	6.48	1.083	44.58	2.083	14.50	3.08	7.63
0.167	6.48	1.167	44.58	2.167	14.50	3.17	7.63
0.250	7.36	1.250	180.44	2.250	12.47	3.25	7.11
0.333	7.36	1.333	180.44	2.333	12.47	3.33	7.11
0.417	8.59	1.417	57.61	2.417	10.99	3.42	6.68
0.500	8.59	1.500	57.61	2.500	10.99	3.50	6.68
0.583	10.41	1.583	31.60	2.583	9.86	3.58	6.29
0.667	10.41	1.667	31.60	2.667	9.86	3.67	6.29
0.750	13.47	1.750	22.30	2.750	8.96	3.75	5.96
0.833	13.47	1.833	22.30	2.833	8.96	3.83	5.96
0.917	19.87	1.917	17.48	2.917	8.23	3.92	5.67
1.000	19.87	2.000	17.48	3.000	8.23	4.00	5.67

Max.Eff.Inten.(mm/hr)=	180.44	237.76		
over (min)	5.00	10.00		
Storage Coeff. (min)=	2.20 (ii)	5.89 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.30	0.15		
			TOTALS	
PEAK FLOW (cms)=	0.59	0.21	0.778 (iii)	
TIME TO PEAK (hrs)=	1.33	1.42	1.33	
RUNOFF VOLUME (mm)=	86.42	58.21	74.85	
TOTAL RAINFALL (mm)=	87.42	87.42	87.42	
RUNOFF COEFFICIENT =	0.99	0.67	0.86	

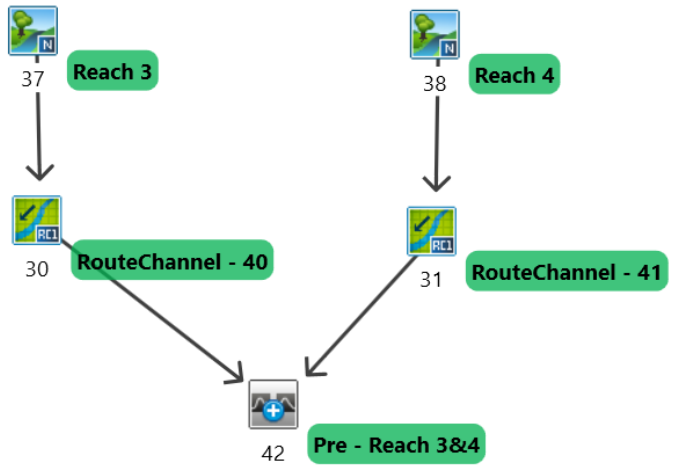
***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0033) / 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	0.0250	0.1054
	0.0020	0.0490	0.0410	0.1239
	0.0030	0.0750	0.0540	0.1381
	0.0130	0.0932	0.0670	0.1527

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0037)	2.000	0.778	1.33	74.85
OUTFLOW: ID= 1 (0033)	2.000	0.037	3.33	70.82

PEAK FLOW REDUCTION [Qout/Qin](%)= 4.82
TIME SHIFT OF PEAK FLOW (min)=120.00
MAXIMUM STORAGE USED (ha.m.)= 0.1199



SCHAEFFERS
CONSULTING ENGINEERS

Visual OTTHYMO™ Schematic

PRE-DEVELOPMENT – REACH 3/4
2-100YR, 6HR SCS

Job #: 5170	**Date: April 2024**

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

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


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DATE: 05-01-2024                          TIME: 04:02:34

USER:


COMMENTS: _____________________________________________________________

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  ***********************************************
  ** SIMULATION : 13. 2-Year-6-Hour-SCS-Type-II **
  ***********************************************


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|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              4a17e6b0-7824-445d-80cd-6acb50f9cad2\3038ab57
| Ptotal= 42.30 mm |    Comments: 2-Year-6-Hour-SCS-Type-II
--------------------
                TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                 hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
                0.00     0.00 |  1.75     4.23 |  3.50     9.31 |  5.25     1.69
                0.25     1.69 |  2.00     4.23 |  3.75     4.23 |  5.50     1.69
                0.50     1.69 |  2.25     5.08 |  4.00     4.23 |  5.75     1.69
                0.75     2.54 |  2.50     5.08 |  4.25     3.38 |  6.00     1.69
                1.00     2.54 |  2.75    25.38 |  4.50     3.38 |
                1.25     2.54 |  3.00    65.99 |  4.75     2.54 |
                1.50     2.54 |  3.25     9.31 |  5.00     2.54 |

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--------------------
| CALIB            |
| NASHYD   (  0037)|   Area     (ha)=  26.06   Curve Number    (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.98

        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	1.667	2.54	3.250	65.99	4.83	2.54
0.167	0.00	1.750	2.54	3.333	9.31	4.92	2.54
0.250	0.00	1.833	4.23	3.417	9.31	5.00	2.54
0.333	1.69	1.917	4.23	3.500	9.31	5.08	2.54
0.417	1.69	2.000	4.23	3.583	9.31	5.17	2.54
0.500	1.69	2.083	4.23	3.667	9.31	5.25	2.54
0.583	1.69	2.167	4.23	3.750	9.31	5.33	1.69
0.667	1.69	2.250	4.23	3.833	4.23	5.42	1.69
0.750	1.69	2.333	5.08	3.917	4.23	5.50	1.69
0.833	2.54	2.417	5.08	4.000	4.23	5.58	1.69
0.917	2.54	2.500	5.08	4.083	4.23	5.67	1.69
1.000	2.54	2.583	5.08	4.167	4.23	5.75	1.69
1.083	2.54	2.667	5.08	4.250	4.23	5.83	1.69
1.167	2.54	2.750	5.08	4.333	3.38	5.92	1.69
1.250	2.54	2.833	25.38	4.417	3.38	6.00	1.69
1.333	2.54	2.917	25.38	4.500	3.38	6.08	1.69
1.417	2.54	3.000	25.38	4.583	3.38	6.17	1.69
1.500	2.54	3.083	65.99	4.667	3.38	6.25	1.69
1.583	2.54	3.167	65.99	4.750	3.38		

```
     Unit Hyd Qpeak  (cms)=   1.016

     PEAK FLOW       (cms)=   0.174 (i)
     TIME TO PEAK    (hrs)=   4.333
     RUNOFF VOLUME    (mm)=   6.412
     TOTAL RAINFALL   (mm)=  42.300
     RUNOFF COEFFICIENT   =   0.152

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

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--------------------
| ROUTE CHN(  0030)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
```

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0037)	26.06	0.17	4.33	6.41	0.01	0.63
OUTFLOW: ID= 1 (0030)	26.06	0.15	4.92	6.41	0.01	0.63

```
--------------------
| CALIB            |
| NASHYD   (  0038)|   Area     (ha)=  58.08   Curve Number    (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.13

        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	1.667	2.54	3.250	65.99	4.83	2.54
0.167	0.00	1.750	2.54	3.333	9.31	4.92	2.54
0.250	0.00	1.833	4.23	3.417	9.31	5.00	2.54
0.333	1.69	1.917	4.23	3.500	9.31	5.08	2.54
0.417	1.69	2.000	4.23	3.583	9.31	5.17	2.54
0.500	1.69	2.083	4.23	3.667	9.31	5.25	2.54
0.583	1.69	2.167	4.23	3.750	9.31	5.33	1.69
0.667	1.69	2.250	4.23	3.833	4.23	5.42	1.69
0.750	1.69	2.333	5.08	3.917	4.23	5.50	1.69
0.833	2.54	2.417	5.08	4.000	4.23	5.58	1.69
0.917	2.54	2.500	5.08	4.083	4.23	5.67	1.69
1.000	2.54	2.583	5.08	4.167	4.23	5.75	1.69
1.083	2.54	2.667	5.08	4.250	4.23	5.83	1.69
1.167	2.54	2.750	5.08	4.333	3.38	5.92	1.69
1.250	2.54	2.833	25.38	4.417	3.38	6.00	1.69

```
              1.333    2.54 | 2.917   25.38 | 4.500    3.38 |  6.08    1.69
              1.417    2.54 | 3.000   25.38 | 4.583    3.38 |  6.17    1.69
              1.500    2.54 | 3.083   65.99 | 4.667    3.38 |  6.25    1.69
              1.583    2.54 | 3.167   65.99 | 4.750    3.38 |

     Unit Hyd Qpeak  (cms)=   1.963

     PEAK FLOW       (cms)=   0.349 (i)
     TIME TO PEAK    (hrs)=   4.583
     RUNOFF VOLUME    (mm)=   6.412
     TOTAL RAINFALL   (mm)=  42.300
     RUNOFF COEFFICIENT   =   0.152

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

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0031)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00         253.97        0.0800
                  44.18         253.34        0.0800
                  72.75         252.34    0.0800 /0.0300  Main Channel
                  94.18         252.35        0.0300      Main Channel
                 117.64         252.31        0.0300      Main Channel
                 131.62         252.33    0.0300 /0.0800  Main Channel
                 138.41         252.72        0.0800
                 150.91         253.00        0.0800
                 172.41         253.50        0.0800
                 180.51         253.60        0.0800

      <---------------------- TRAVEL TIME TABLE ----------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        0.02   252.33    .386E+03       0.0         0.17     149.17
        0.09   252.40    .580E+04       2.2         0.57      44.29
        0.15   252.47    .122E+05       7.3         0.90      27.96
        0.22   252.53    .189E+05      14.6         1.17      21.61
        0.29   252.60    .259E+05      23.9         1.40      18.12
        0.35   252.67    .333E+05      35.0         1.59      15.86
        0.42   252.73    .409E+05      47.8         1.77      14.27
        0.49   252.80    .490E+05      62.2         1.93      13.13
        0.55   252.87    .576E+05      78.3         2.06      12.25
        0.62   252.93    .667E+05      96.1         2.19      11.57
        0.69   253.00    .762E+05     115.4         2.30      11.01
        0.75   253.07    .863E+05     136.5         2.40      10.54
        0.82   253.13    .969E+05     159.1         2.49      10.15
        0.89   253.20    .108E+06     183.3         2.58       9.81
        0.95   253.27    .119E+06     209.2         2.66       9.51
        1.02   253.33    .131E+06     236.7         2.73       9.26
        1.09   253.40    .144E+06     265.1         2.79       9.06
        1.15   253.47    .157E+06     295.3         2.85       8.88
        1.22   253.54    .172E+06     327.0         2.89       8.75

                                  <---- hydrograph ---->   <-pipe / channel->
                               AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                               (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0038)    58.08     0.35    4.58   6.41      0.03      0.19
   OUTFLOW: ID= 1 (  0031)    58.08     0.19    6.25   6.40      0.02      0.18

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

--------------------
| ADD HYD  (  0042)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0030):    26.06   0.153     4.92      6.41
     + ID2= 2 (  0031):    58.08   0.191     6.25      6.40
       ================================================
       ID = 3 (  0042):    84.14   0.317     5.50      6.40

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\3c4584b8-49e6-4eb5-b944-6f5d000ff6a0\scen
  Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\3c4584b8-49e6-4eb5-b944-6f5d000ff6a0\scen


DATE: 05-01-2024                          TIME: 04:02:34

USER:



COMMENTS: _____________________________________________________

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  ***********************************************
  ** SIMULATION : 14. 5-Year-6-Hour-SCS-Type-II **
  ***********************************************


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|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              4a17e6b0-7824-445d-80cd-6acb50f9cad2\d811bc74
| Ptotal= 59.50 mm |    Comments: 5-Year-6-Hour-SCS-Type-II
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	1.75	5.95	3.50	13.09	5.25	2.38
0.25	2.38	2.00	5.95	3.75	5.95	5.50	2.38
0.50	2.38	2.25	7.14	4.00	5.95	5.75	2.38
0.75	3.57	2.50	7.14	4.25	4.76	6.00	2.38
1.00	3.57	2.75	35.70	4.50	4.76		
1.25	3.57	3.00	92.82	4.75	3.57		
1.50	3.57	3.25	13.09	5.00	3.57		

```
--------------------
| CALIB            |
| NASHYD   (  0037)|   Area    (ha)=  26.06   Curve Number   (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.98

        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	1.667	3.57	3.250	92.82	4.83	3.57
0.167	0.00	1.750	3.57	3.333	13.09	4.92	3.57
0.250	0.00	1.833	5.95	3.417	13.09	5.00	3.57
0.333	2.38	1.917	5.95	3.500	13.09	5.08	3.57
0.417	2.38	2.000	5.95	3.583	13.09	5.17	3.57
0.500	2.38	2.083	5.95	3.667	13.09	5.25	3.57
0.583	2.38	2.167	5.95	3.750	13.09	5.33	2.38
0.667	2.38	2.250	5.95	3.833	5.95	5.42	2.38
0.750	2.38	2.333	7.14	3.917	5.95	5.50	2.38
0.833	3.57	2.417	7.14	4.000	5.95	5.58	2.38
0.917	3.57	2.500	7.14	4.083	5.95	5.67	2.38
1.000	3.57	2.583	7.14	4.167	5.95	5.75	2.38
1.083	3.57	2.667	7.14	4.250	5.95	5.83	2.38
1.167	3.57	2.750	7.14	4.333	4.76	5.92	2.38
1.250	3.57	2.833	35.70	4.417	4.76	6.00	2.38
1.333	3.57	2.917	35.70	4.500	4.76	6.08	2.38
1.417	3.57	3.000	35.70	4.583	4.76	6.17	2.38
1.500	3.57	3.083	92.82	4.667	4.76	6.25	2.38
1.583	3.57	3.167	92.82	4.750	4.76		

```
     Unit Hyd Qpeak  (cms)=   1.016

     PEAK FLOW       (cms)=   0.367 (i)
     TIME TO PEAK    (hrs)=   4.333
     RUNOFF VOLUME    (mm)=  13.217
     TOTAL RAINFALL   (mm)=  59.500
     RUNOFF COEFFICIENT   =   0.222

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

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```

```
| ROUTE CHN(  0030)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
```

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0037)	26.06	0.37	4.33	13.22	0.02	0.63
OUTFLOW: ID= 1 (0030)	26.06	0.32	4.92	13.22	0.02	0.63

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--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0038)|   Area    (ha)=  58.08   Curve Number   (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.13

        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	1.667	3.57	3.250	92.82	4.83	3.57
0.167	0.00	1.750	3.57	3.333	13.09	4.92	3.57
0.250	0.00	1.833	5.95	3.417	13.09	5.00	3.57
0.333	2.38	1.917	5.95	3.500	13.09	5.08	3.57
0.417	2.38	2.000	5.95	3.583	13.09	5.17	3.57
0.500	2.38	2.083	5.95	3.667	13.09	5.25	3.57
0.583	2.38	2.167	5.95	3.750	13.09	5.33	2.38
0.667	2.38	2.250	5.95	3.833	5.95	5.42	2.38
0.750	2.38	2.333	7.14	3.917	5.95	5.50	2.38
0.833	3.57	2.417	7.14	4.000	5.95	5.58	2.38
0.917	3.57	2.500	7.14	4.083	5.95	5.67	2.38
1.000	3.57	2.583	7.14	4.167	5.95	5.75	2.38
1.083	3.57	2.667	7.14	4.250	5.95	5.83	2.38
1.167	3.57	2.750	7.14	4.333	4.76	5.92	2.38
1.250	3.57	2.833	35.70	4.417	4.76	6.00	2.38
1.333	3.57	2.917	35.70	4.500	4.76	6.08	2.38
1.417	3.57	3.000	35.70	4.583	4.76	6.17	2.38
1.500	3.57	3.083	92.82	4.667	4.76	6.25	2.38
1.583	3.57	3.167	92.82	4.750	4.76		

Unit Hyd Qpeak (cms)= 1.963

PEAK FLOW (cms)= 0.736 (i)
TIME TO PEAK (hrs)= 4.500
RUNOFF VOLUME (mm)= 13.217
TOTAL RAINFALL (mm)= 59.500
RUNOFF COEFFICIENT = 0.222

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

ROUTE CHN(0031)
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

		<---- hydrograph ---->			<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (| 0038)	58.08	0.74	4.50	13.22	0.04	0.22
OUTFLOW: ID= 1 (| 0031)	58.08	0.41	5.92	13.20	0.03	0.19

ADD HYD (0042)|
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0030):	26.06	0.321	4.92	13.22
+ ID2= 2 (0031):	58.08	0.411	5.92	13.20
ID = 3 (0042):	84.14	0.685	5.33	13.21

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\ca3c9063-ad1a-47a4-9d44-a0dd725d4089\scen
Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\ca3c9063-ad1a-47a4-9d44-a0dd725d4089\scen

DATE: 05-01-2024 TIME: 04:02:34

USER:

COMMENTS: _____

**** SIMULATION : 15. 10-Year-6-Hour-SCS-Type-I ****

READ STORM	Filename: C:\Users\mmsingh\AppData\Local\Temp\4a17e6b0-7824-445d-80cd-6acb50f9cad2\9434984f
Ptotal= 70.80 mm	Comments: 10-Year-6-Hour-SCS-Type-II

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	1.75	7.08	3.50	15.58	5.25	2.83
0.25	2.83	2.00	7.08	3.75	7.08	5.50	2.83
0.50	2.83	2.25	8.50	4.00	7.08	5.75	2.83
0.75	4.25	2.50	8.50	4.25	5.66	6.00	2.83
1.00	4.25	2.75	42.48	4.50	5.66		
1.25	4.25	3.00	110.45	4.75	4.25		
1.50	4.25	3.25	15.58	5.00	4.25		

CALIB NASHYD (0037) ID= 1 DT= 5.0 min	Area (ha)= 26.06	Curve Number (CN)= 63.0
	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.98	

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	1.667	4.25	3.250	110.45	4.83	4.25
0.167	0.00	1.750	4.25	3.333	15.58	4.92	4.25
0.250	0.00	1.833	7.08	3.417	15.58	5.00	4.25
0.333	2.83	1.917	7.08	3.500	15.58	5.08	4.25
0.417	2.83	2.000	7.08	3.583	15.58	5.17	4.25
0.500	2.83	2.083	7.08	3.667	15.58	5.25	4.25
0.583	2.83	2.167	7.08	3.750	15.58	5.33	2.83
0.667	2.83	2.250	7.08	3.833	7.08	5.42	2.83
0.750	2.83	2.333	8.50	3.917	7.08	5.50	2.83
0.833	4.25	2.417	8.50	4.000	7.08	5.58	2.83
0.917	4.25	2.500	8.50	4.083	7.08	5.67	2.83
1.000	4.25	2.583	8.50	4.167	7.08	5.75	2.83
1.083	4.25	2.667	8.50	4.250	7.08	5.83	2.83
1.167	4.25	2.750	8.50	4.333	5.66	5.92	2.83
1.250	4.25	2.833	42.48	4.417	5.66	6.00	2.83
1.333	4.25	2.917	42.48	4.500	5.66	6.08	2.83
1.417	4.25	3.000	42.48	4.583	5.66	6.17	2.83
1.500	4.25	3.083	110.45	4.667	5.66	6.25	2.83
1.583	4.25	3.167	110.45	4.750	5.66		

Unit Hyd Qpeak (cms)= 1.016

PEAK FLOW (cms)= 0.522 (i)
TIME TO PEAK (hrs)= 4.333
RUNOFF VOLUME (mm)= 18.605
TOTAL RAINFALL (mm)= 70.800
RUNOFF COEFFICIENT = 0.263

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

ROUTE CHN(0030) IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0037)	26.06	0.52	4.33	18.61	0.03	0.63

```
   OUTFLOW: ID= 1 (  0030)   26.06     0.46    4.83  18.60      0.02      0.63
```

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0038)|   Area    (ha)=  58.08   Curve Number   (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.13

        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	1.667	4.25	3.250	110.45	4.83	4.25
0.167	0.00	1.750	4.25	3.333	15.58	4.92	4.25
0.250	0.00	1.833	7.08	3.417	15.58	5.00	4.25
0.333	2.83	1.917	7.08	3.500	15.58	5.08	4.25
0.417	2.83	2.000	7.08	3.583	15.58	5.17	4.25
0.500	2.83	2.083	7.08	3.667	15.58	5.25	4.25
0.583	2.83	2.167	7.08	3.750	15.58	5.33	2.83
0.667	2.83	2.250	7.08	3.833	7.08	5.42	2.83
0.750	2.83	2.333	8.50	3.917	7.08	5.50	2.83
0.833	4.25	2.417	8.50	4.000	7.08	5.58	2.83
0.917	4.25	2.500	8.50	4.083	7.08	5.67	2.83
1.000	4.25	2.583	8.50	4.167	7.08	5.75	2.83
1.083	4.25	2.667	8.50	4.250	7.08	5.83	2.83
1.167	4.25	2.750	8.50	4.333	5.66	5.92	2.83
1.250	4.25	2.833	42.48	4.417	5.66	6.00	2.83
1.333	4.25	2.917	42.48	4.500	5.66	6.08	2.83
1.417	4.25	3.000	42.48	4.583	5.66	6.17	2.83
1.500	4.25	3.083	110.45	4.667	5.66	6.25	2.83
1.583	4.25	3.167	110.45	4.750	5.66		

```
     Unit Hyd Qpeak  (cms)=   1.963

     PEAK FLOW       (cms)=   1.045 (i)
     TIME TO PEAK    (hrs)=   4.500
     RUNOFF VOLUME    (mm)=  18.605
     TOTAL RAINFALL   (mm)=  70.800
     RUNOFF COEFFICIENT   =   0.263

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

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--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0031)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00         253.97        0.0800
                  44.18         253.34        0.0800
                  72.75         252.34    0.0800 /0.0300  Main Channel
                  94.18         252.35        0.0300      Main Channel
                 117.64         252.31        0.0300      Main Channel
                 131.62         252.33    0.0300 /0.0800  Main Channel
                 138.41         252.72        0.0800
                 150.91         253.00        0.0800
                 172.41         253.50        0.0800
                 180.51         253.60        0.0800
```

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0038)	58.08	1.05	4.50	18.61	0.05	0.25
OUTFLOW: ID= 1 (0031)	58.08	0.60	5.75	18.59	0.04	0.21

```
--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0042)|
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
--------------------          (ha)      (cms)     (hrs)      (mm)
        ID1= 1 (  0030):     26.06    0.456      4.83     18.60
      + ID2= 2 (  0031):     58.08    0.602      5.75     18.59
        ================================================
        ID = 3 (  0042):     84.14    1.002      5.33     18.59

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

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

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\7b933fae-0993-45c0-a35f-2ef6378367b7\scen
Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\7b933fae-0993-45c0-a35f-2ef6378367b7\scen

DATE: 05-01-2024 TIME: 04:02:34

USER:

COMMENTS: _____

** SIMULATION : 16. 25-Year-6-Hour-SCS-Type-I **

READ STORM	Filename: C:\Users\mmsingh\AppData\Local\Temp\4a17e6b0-7824-445d-80cd-6acb50f9cad2\edbfb811
Ptotal= 85.20 mm	Comments: 25-Year-6-Hour-SCS-Type-II

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	1.75	8.52	3.50	18.74	5.25	3.41
0.25	3.41	2.00	8.52	3.75	8.52	5.50	3.41
0.50	3.41	2.25	10.22	4.00	8.52	5.75	3.41
0.75	5.11	2.50	10.22	4.25	6.82	6.00	3.41
1.00	5.11	2.75	51.12	4.50	6.82		
1.25	5.11	3.00	132.91	4.75	5.11		
1.50	5.11	3.25	18.74	5.00	5.11		

CALIB NASHYD (0037) ID= 1 DT= 5.0 min	Area (ha)= 26.06	Curve Number (CN)= 63.0
	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.98	

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	1.667	5.11	3.250	132.91	4.83	5.11
0.167	0.00	1.750	5.11	3.333	18.75	4.92	5.11
0.250	0.00	1.833	8.52	3.417	18.74	5.00	5.11
0.333	3.41	1.917	8.52	3.500	18.74	5.08	5.11
0.417	3.41	2.000	8.52	3.583	18.74	5.17	5.11
0.500	3.41	2.083	8.52	3.667	18.74	5.25	5.11
0.583	3.41	2.167	8.52	3.750	18.74	5.33	3.41
0.667	3.41	2.250	8.52	3.833	8.52	5.42	3.41
0.750	3.41	2.333	10.22	3.917	8.52	5.50	3.41
0.833	5.11	2.417	10.22	4.000	8.52	5.58	3.41
0.917	5.11	2.500	10.22	4.083	8.52	5.67	3.41
1.000	5.11	2.583	10.22	4.167	8.52	5.75	3.41
1.083	5.11	2.667	10.22	4.250	8.52	5.83	3.41
1.167	5.11	2.750	10.22	4.333	6.82	5.92	3.41
1.250	5.11	2.833	51.12	4.417	6.82	6.00	3.41
1.333	5.11	2.917	51.12	4.500	6.82	6.08	3.41
1.417	5.11	3.000	51.12	4.583	6.82	6.17	3.41
1.500	5.11	3.083	132.91	4.667	6.82	6.25	3.41
1.583	5.11	3.167	132.91	4.750	6.82		

Unit Hyd Qpeak (cms)= 1.016

PEAK FLOW (cms)= 0.745 (i)
TIME TO PEAK (hrs)= 4.250
RUNOFF VOLUME (mm)= 26.327
TOTAL RAINFALL (mm)= 85.200
RUNOFF COEFFICIENT = 0.309

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

ROUTE CHN(0030)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56

0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

		<---- hydrograph ---->			<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0037)	26.06	0.75	4.25	26.33	0.04	0.63
OUTFLOW:	ID= 1 (0030)	26.06	0.65	4.83	26.33	0.03	0.63

CALIB					
NASHYD (0038)	Area	(ha)= 58.08	Curve Number	(CN)= 63.0	
ID= 1 DT= 5.0 min	Ia	(mm)= 8.00	# of Linear Res.(N)= 3.00		
	U.H. Tp(hrs)= 1.13				

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	1.667	5.11	3.250	132.91	4.83	5.11
0.167	0.00	1.750	5.11	3.333	18.75	4.92	5.11
0.250	0.00	1.833	8.52	3.417	18.74	5.00	5.11
0.333	3.41	1.917	8.52	3.500	18.74	5.08	5.11
0.417	3.41	2.000	8.52	3.583	18.74	5.17	5.11
0.500	3.41	2.083	8.52	3.667	18.74	5.25	5.11
0.583	3.41	2.167	8.52	3.750	18.74	5.33	3.41
0.667	3.41	2.250	8.52	3.833	8.52	5.42	3.41
0.750	3.41	2.333	10.22	3.917	8.52	5.50	3.41
0.833	5.11	2.417	10.22	4.000	8.52	5.58	3.41
0.917	5.11	2.500	10.22	4.083	8.52	5.67	3.41
1.000	5.11	2.583	10.22	4.167	8.52	5.75	3.41
1.083	5.11	2.667	10.22	4.250	8.52	5.83	3.41
1.167	5.11	2.750	10.22	4.333	6.82	5.92	3.41
1.250	5.11	2.833	51.12	4.417	6.82	6.00	3.41
1.333	5.11	2.917	51.12	4.500	6.82	6.08	3.41
1.417	5.11	3.000	51.12	4.583	6.82	6.17	3.41
1.500	5.11	3.083	132.91	4.667	6.82	6.25	3.41
1.583	5.11	3.167	132.91	4.750	6.82		

Unit Hyd Qpeak (cms)= 1.963

PEAK FLOW (cms)= 1.491 (i)
TIME TO PEAK (hrs)= 4.500
RUNOFF VOLUME (mm)= 26.327
TOTAL RAINFALL (mm)= 85.200
RUNOFF COEFFICIENT = 0.309

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

ROUTE CHN(0031)		
IN= 2---> OUT= 1	Routing time step (min)'= 5.00	

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

		<---- hydrograph ---->			<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0038)	58.08	1.49	4.50	26.33	0.07	0.32
OUTFLOW:	ID= 1 (0031)	58.08	0.91	5.50	26.31	0.05	0.24

ADD HYD (0042)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0030):	26.06	0.649	4.83	26.33
+ ID2= 2 (0031):	58.08	0.912	5.50	26.31
ID = 3 (0042):	84.14	1.510	5.17	26.32

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

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


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DATE: 05-01-2024                          TIME: 04:02:34

USER:


COMMENTS: _____________________________________________________________


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  ***********************************************
  ** SIMULATION : 17. 50-Year-6-Hour-SCS-Type-I **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              4a17e6b0-7824-445d-80cd-6acb50f9cad2\573d0df0
| Ptotal= 95.90 mm |    Comments: 50-Year-6-Hour-SCS-Type-II
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.00 |  1.75    9.59 |  3.50   21.10 |  5.25    3.84
                0.25    3.84 |  2.00    9.59 |  3.75    9.59 |  5.50    3.84
                0.50    3.84 |  2.25   11.51 |  4.00    9.59 |  5.75    3.84
                0.75    5.75 |  2.50   11.51 |  4.25    7.67 |  6.00    3.84
                1.00    5.75 |  2.75   57.54 |  4.50    7.67 |
                1.25    5.75 |  3.00  149.60 |  4.75    5.75 |
                1.50    5.75 |  3.25   21.10 |  5.00    5.75 |
--------------------------------------------------------------------------------

--------------------
| CALIB            |
| NASHYD   (  0037)|   Area     (ha)=  26.06   Curve Number    (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.98

        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 | 1.667    5.75 | 3.250  149.60 |  4.83    5.75
                0.167   0.00 | 1.750    5.75 | 3.333   21.10 |  4.92    5.75
                0.250   0.00 | 1.833    9.59 | 3.417   21.10 |  5.00    5.75
                0.333   3.84 | 1.917    9.59 | 3.500   21.10 |  5.08    5.75
                0.417   3.84 | 2.000    9.59 | 3.583   21.10 |  5.17    5.75
                0.500   3.84 | 2.083    9.59 | 3.667   21.10 |  5.25    5.75
                0.583   3.84 | 2.167    9.59 | 3.750   21.10 |  5.33    3.84
                0.667   3.84 | 2.250    9.59 | 3.833    9.59 |  5.42    3.84
                0.750   3.84 | 2.333   11.51 | 3.917    9.59 |  5.50    3.84
                0.833   5.75 | 2.417   11.51 | 4.000    9.59 |  5.58    3.84
                0.917   5.75 | 2.500   11.51 | 4.083    9.59 |  5.67    3.84
                1.000   5.75 | 2.583   11.51 | 4.167    9.59 |  5.75    3.84
                1.083   5.75 | 2.667   11.51 | 4.250    9.59 |  5.83    3.84
                1.167   5.75 | 2.750   11.51 | 4.333    7.67 |  5.92    3.84
                1.250   5.75 | 2.833   57.54 | 4.417    7.67 |  6.00    3.84
                1.333   5.75 | 2.917   57.54 | 4.500    7.67 |  6.08    3.84
                1.417   5.75 | 3.000   57.54 | 4.583    7.67 |  6.17    3.84
                1.500   5.75 | 3.083  149.60 | 4.667    7.67 |  6.25    3.84
                1.583   5.75 | 3.167  149.60 | 4.750    7.67 |

    Unit Hyd Qpeak  (cms)=   1.016

    PEAK FLOW       (cms)=   0.928 (i)
    TIME TO PEAK    (hrs)=   4.250
    RUNOFF VOLUME    (mm)=  32.590
    TOTAL RAINFALL   (mm)=  95.900
    RUNOFF COEFFICIENT   =   0.340

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

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0030)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
              <------ DATA FOR SECTION (   1.1) ------>
              Distance      Elevation       Manning
                 0.00         253.33        0.0800
                 4.07         253.22        0.0800
                31.67         252.50        0.0800
                80.33         251.02        0.0800
               112.54         250.38    0.0800 /0.0300  Main Channel
               147.82         250.41    0.0300 /0.0800  Main Channel
               227.35         251.81        0.0800
               234.22         251.93        0.0800
```

240.16	252.02	0.0800
245.25	252.11	0.0800
250.86	252.20	0.0800
254.81	252.26	0.0800

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

		<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2	(0037)	26.06	0.93	4.25	32.59	0.04	0.63
OUTFLOW: ID= 1	(0030)	26.06	0.81	4.83	32.59	0.04	0.63

CALIB					
NASHYD	(0038)	Area (ha)= 58.08	Curve Number (CN)= 63.0		
ID= 1 DT= 5.0 min		Ia (mm)= 8.00	# of Linear Res.(N)= 3.00		
		U.H. Tp(hrs)= 1.13			

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	1.667	5.75	3.250	149.60	4.83	5.75
0.167	0.00	1.750	5.75	3.333	21.10	4.92	5.75
0.250	0.00	1.833	9.59	3.417	21.10	5.00	5.75
0.333	3.84	1.917	9.59	3.500	21.10	5.08	5.75
0.417	3.84	2.000	9.59	3.583	21.10	5.17	5.75
0.500	3.84	2.083	9.59	3.667	21.10	5.25	5.75
0.583	3.84	2.167	9.59	3.750	21.10	5.33	3.84
0.667	3.84	2.250	9.59	3.833	9.59	5.42	3.84
0.750	3.84	2.333	11.51	3.917	9.59	5.50	3.84
0.833	5.75	2.417	11.51	4.000	9.59	5.58	3.84
0.917	5.75	2.500	11.51	4.083	9.59	5.67	3.84
1.000	5.75	2.583	11.51	4.167	9.59	5.75	3.84
1.083	5.75	2.667	11.51	4.250	9.59	5.83	3.84
1.167	5.75	2.750	11.51	4.333	7.67	5.92	3.84
1.250	5.75	2.833	57.54	4.417	7.67	6.00	3.84
1.333	5.75	2.917	57.54	4.500	7.67	6.08	3.84
1.417	5.75	3.000	57.54	4.583	7.67	6.17	3.84
1.500	5.75	3.083	149.60	4.667	7.67	6.25	3.84
1.583	5.75	3.167	149.60	4.750	7.67		

Unit Hyd Qpeak (cms)= 1.963

PEAK FLOW (cms)= 1.854 (i)
TIME TO PEAK (hrs)= 4.500
RUNOFF VOLUME (mm)= 32.591
TOTAL RAINFALL (mm)= 95.900
RUNOFF COEFFICIENT = 0.340

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

ROUTE CHN(0031)		
IN= 2---> OUT= 1	Routing time step (min)'= 5.00	

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

<---- hydrograph ----> <-pipe / channel->

AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL

```
                              (ha)     (cms)    (hrs)    (mm)       (m)       (m/s)
   INFLOW : ID= 2 (  0038)    58.08     1.85     4.50   32.59      0.08       0.42
   OUTFLOW: ID= 1 (  0031)    58.08     1.22     5.25   32.58      0.06       0.28


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

--------------------
| ADD HYD  (  0042)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
        ID1= 1 (  0030):    26.06   0.807     4.83     32.59
      + ID2= 2 (  0031):    58.08   1.224     5.25     32.58
        ====================================================
        ID = 3 (  0042):    84.14   1.999     5.08     32.58

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

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


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DATE: 05-01-2024                          TIME: 04:02:34

USER:


COMMENTS: _____________________________________________________________
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  ***********************************************
  ** SIMULATION : 18. 100-Year-6-Hour-SCS-Type- **
  ***********************************************


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| Ptotal=106.50 mm |    Comments: 100-Year-6-Hour-SCS-Type-II
--------------------
                TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                 hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
                0.00     0.00 |  1.75    10.65 |  3.50    23.43 |  5.25     4.26
                0.25     4.26 |  2.00    10.65 |  3.75    10.65 |  5.50     4.26
                0.50     4.26 |  2.25    12.78 |  4.00    10.65 |  5.75     4.26
                0.75     6.39 |  2.50    12.78 |  4.25     8.52 |  6.00     4.26
                1.00     6.39 |  2.75    63.90 |  4.50     8.52 |
                1.25     6.39 |  3.00   166.14 |  4.75     6.39 |
                1.50     6.39 |  3.25    23.43 |  5.00     6.39 |

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--------------------
| CALIB            |
| NASHYD   (  0037)|   Area     (ha)=  26.06   Curve Number    (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.98

        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 | 1.667     6.39 | 3.250   166.14 |  4.83     6.39
               0.167     0.00 | 1.750     6.39 | 3.333    23.43 |  4.92     6.39
               0.250     0.00 | 1.833    10.65 | 3.417    23.43 |  5.00     6.39
               0.333     4.26 | 1.917    10.65 | 3.500    23.43 |  5.08     6.39
               0.417     4.26 | 2.000    10.65 | 3.583    23.43 |  5.17     6.39
               0.500     4.26 | 2.083    10.65 | 3.667    23.43 |  5.25     6.39
               0.583     4.26 | 2.167    10.65 | 3.750    23.43 |  5.33     4.26
               0.667     4.26 | 2.250    10.65 | 3.833    10.65 |  5.42     4.26
               0.750     4.26 | 2.333    12.78 | 3.917    10.65 |  5.50     4.26
               0.833     6.39 | 2.417    12.78 | 4.000    10.65 |  5.58     4.26
               0.917     6.39 | 2.500    12.78 | 4.083    10.65 |  5.67     4.26
               1.000     6.39 | 2.583    12.78 | 4.167    10.65 |  5.75     4.26
               1.083     6.39 | 2.667    12.78 | 4.250    10.65 |  5.83     4.26
               1.167     6.39 | 2.750    12.78 | 4.333     8.52 |  5.92     4.26
               1.250     6.39 | 2.833    63.90 | 4.417     8.52 |  6.00     4.26
               1.333     6.39 | 2.917    63.90 | 4.500     8.52 |  6.08     4.26
               1.417     6.39 | 3.000    63.90 | 4.583     8.52 |  6.17     4.26
               1.500     6.39 | 3.083   166.14 | 4.667     8.52 |  6.25     4.26
               1.583     6.39 | 3.167   166.14 | 4.750     8.52 |

    Unit Hyd Qpeak  (cms)=   1.016

    PEAK FLOW       (cms)=   1.120 (i)
    TIME TO PEAK    (hrs)=   4.250
```

```
     RUNOFF VOLUME     (mm)=  39.173
     TOTAL RAINFALL    (mm)= 106.500
     RUNOFF COEFFICIENT    =   0.368

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

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--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0030)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00         253.33        0.0800
                   4.07         253.22        0.0800
                  31.67         252.50        0.0800
                  80.33         251.02        0.0800
                 112.54         250.38    0.0800 /0.0300  Main Channel
                 147.82         250.41    0.0300 /0.0800  Main Channel
                 227.35         251.81        0.0800
                 234.22         251.93        0.0800
                 240.16         252.02        0.0800
                 245.25         252.11        0.0800
                 250.86         252.20        0.0800
                 254.81         252.26        0.0800

     <---------------------- TRAVEL TIME TABLE ----------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.10   250.48    .379E+04       2.1         0.63       30.46
       0.20   250.58    .945E+04       8.0         0.98       19.68
       0.30   250.68    .163E+05      17.1         1.21       15.91
       0.40   250.77    .244E+05      29.2         1.38       13.93
       0.50   250.87    .338E+05      44.4         1.52       12.68
       0.60   250.97    .443E+05      62.6         1.63       11.80
       0.70   251.07    .560E+05      84.0         1.73       11.12
       0.79   251.17    .688E+05     108.6         1.82       10.56
       0.89   251.27    .826E+05     136.4         1.91       10.10
       0.99   251.37    .975E+05     167.3         1.99        9.71
       1.09   251.47    .113E+06     201.6         2.06        9.37
       1.19   251.57    .130E+06     239.1         2.12        9.08
       1.29   251.67    .148E+06     280.0         2.19        8.82
       1.39   251.77    .167E+06     324.3         2.24        8.58
       1.49   251.87    .187E+06     372.0         2.30        8.38
       1.59   251.97    .208E+06     423.3         2.35        8.19
       1.69   252.07    .230E+06     478.2         2.40        8.02
       1.79   252.17    .253E+06     536.8         2.45        7.86
       1.89   252.26    .277E+06     599.1         2.50        7.72

                                  <---- hydrograph ---->   <-pipe / channel->
                            AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                            (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0037)   26.06     1.12    4.25  39.17      0.05      0.63
   OUTFLOW: ID= 1 (  0030)   26.06     0.97    4.83  39.17      0.05      0.63
```

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--------------------------------------------------------------------------------
--------------------
| CALIB              |
| NASHYD   (  0038)|   Area    (ha)=  58.08   Curve Number   (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.13

        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 | 1.667    6.39 | 3.250  166.14 |  4.83    6.39
 0.167    0.00 | 1.750    6.39 | 3.333   23.43 |  4.92    6.39
 0.250    0.00 | 1.833   10.65 | 3.417   23.43 |  5.00    6.39
 0.333    4.26 | 1.917   10.65 | 3.500   23.43 |  5.08    6.39
 0.417    4.26 | 2.000   10.65 | 3.583   23.43 |  5.17    6.39
 0.500    4.26 | 2.083   10.65 | 3.667   23.43 |  5.25    6.39
 0.583    4.26 | 2.167   10.65 | 3.750   23.43 |  5.33    4.26
 0.667    4.26 | 2.250   10.65 | 3.833   10.65 |  5.42    4.26
 0.750    4.26 | 2.333   12.78 | 3.917   10.65 |  5.50    4.26
 0.833    6.39 | 2.417   12.78 | 4.000   10.65 |  5.58    4.26
 0.917    6.39 | 2.500   12.78 | 4.083   10.65 |  5.67    4.26
 1.000    6.39 | 2.583   12.78 | 4.167   10.65 |  5.75    4.26
 1.083    6.39 | 2.667   12.78 | 4.250   10.65 |  5.83    4.26
 1.167    6.39 | 2.750   12.78 | 4.333    8.52 |  5.92    4.26
 1.250    6.39 | 2.833   63.90 | 4.417    8.52 |  6.00    4.26
 1.333    6.39 | 2.917   63.90 | 4.500    8.52 |  6.08    4.26
 1.417    6.39 | 3.000   63.90 | 4.583    8.52 |  6.17    4.26
 1.500    6.39 | 3.083  166.14 | 4.667    8.52 |  6.25    4.26
 1.583    6.39 | 3.167  166.14 | 4.750    8.52 |

     Unit Hyd Qpeak  (cms)=   1.963

     PEAK FLOW       (cms)=   2.237 (i)
     TIME TO PEAK    (hrs)=   4.417
     RUNOFF VOLUME    (mm)=  39.173
     TOTAL RAINFALL   (mm)= 106.500
     RUNOFF COEFFICIENT   =   0.368

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

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--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0031)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00         253.97        0.0800
                  44.18         253.34        0.0800
                  72.75         252.34    0.0800 /0.0300  Main Channel
                  94.18         252.35        0.0300      Main Channel
                 117.64         252.31        0.0300      Main Channel
                 131.62         252.33    0.0300 /0.0800  Main Channel
                 138.41         252.72        0.0800
                 150.91         253.00        0.0800
                 172.41         253.50        0.0800
                 180.51         253.60        0.0800

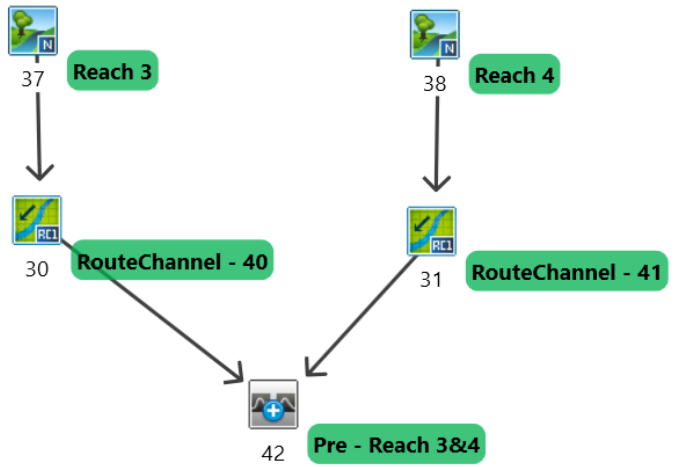
     <---------------------- TRAVEL TIME TABLE ----------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.02   252.33    .386E+03       0.0         0.17      149.17
```

0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

		<---- hydrograph ---->			<-pipe / channel->	
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0038)	58.08	2.24	4.42	39.17	0.09	0.57
OUTFLOW: ID= 1 (0031)	58.08	1.78	4.92	39.16	0.07	0.39

ADD HYD (0042)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0030):	26.06	0.973	4.83	39.17
+ ID2= 2 (0031):	58.08	1.782	4.92	39.16
ID = 3 (0042):	84.14	2.751	4.92	39.16

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.



SCHAEFFERS
CONSULTING ENGINEERS

Visual OTTHYMO™ Schematic

PRE-DEVELOPMENT – REACH 3/4
2-100YR, 12HR SCS

Job #: 5170	**Date: April 2024**

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

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


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DATE: 05-01-2024                          TIME: 03:53:45

USER:


COMMENTS: _____________________________________________________________

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  ***********************************************
  ** SIMULATION : 07. 2-Year-12-Hour-SCS-Type-I **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
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| Ptotal= 46.70 mm |    Comments: 2-Year-12-Hour-SCS-Type-II
--------------------
                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     1.87 |  6.50     8.41 |  9.75     1.63
                0.25     1.17 |  3.50     1.87 |  6.75     3.74 | 10.00     1.63
                0.50     1.17 |  3.75     1.87 |  7.00     3.74 | 10.25     0.93
                0.75     1.17 |  4.00     1.87 |  7.25     2.80 | 10.50     0.93
                1.00     1.17 |  4.25     2.80 |  7.50     2.80 | 10.75     0.93
                1.25     1.17 |  4.50     2.80 |  7.75     2.80 | 11.00     0.93
                1.50     1.17 |  4.75     3.74 |  8.00     2.80 | 11.25     0.93
                1.75     1.17 |  5.00     3.74 |  8.25     1.63 | 11.50     0.93
                2.00     1.17 |  5.25     5.60 |  8.50     1.63 | 11.75     0.93
```

2.25	1.40	5.50	5.60	8.75	1.63	12.00	0.93
2.50	1.40	5.75	22.42	9.00	1.63		
2.75	1.40	6.00	61.64	9.25	1.63		
3.00	1.40	6.25	8.41	9.50	1.63		

CALIB			
NASHYD (0037)	Area (ha)= 26.06	Curve Number (CN)= 63.0	
ID= 1 DT= 5.0 min	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.98		

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	1.40	6.250	61.64	9.33	1.63
0.167	0.00	3.250	1.40	6.333	8.41	9.42	1.63
0.250	0.00	3.333	1.87	6.417	8.41	9.50	1.63
0.333	1.17	3.417	1.87	6.500	8.41	9.58	1.63
0.417	1.17	3.500	1.87	6.583	8.41	9.67	1.63
0.500	1.17	3.583	1.87	6.667	8.41	9.75	1.63
0.583	1.17	3.667	1.87	6.750	8.41	9.83	1.63
0.667	1.17	3.750	1.87	6.833	3.74	9.92	1.63
0.750	1.17	3.833	1.87	6.917	3.74	10.00	1.63
0.833	1.17	3.917	1.87	7.000	3.74	10.08	1.63
0.917	1.17	4.000	1.87	7.083	3.74	10.17	1.63
1.000	1.17	4.083	1.87	7.167	3.74	10.25	1.63
1.083	1.17	4.167	1.87	7.250	3.74	10.33	0.93
1.167	1.17	4.250	1.87	7.333	2.80	10.42	0.93
1.250	1.17	4.333	2.80	7.417	2.80	10.50	0.93
1.333	1.17	4.417	2.80	7.500	2.80	10.58	0.93
1.417	1.17	4.500	2.80	7.583	2.80	10.67	0.93
1.500	1.17	4.583	2.80	7.667	2.80	10.75	0.93
1.583	1.17	4.667	2.80	7.750	2.80	10.83	0.93
1.667	1.17	4.750	2.80	7.833	2.80	10.92	0.93
1.750	1.17	4.833	3.74	7.917	2.80	11.00	0.93
1.833	1.17	4.917	3.74	8.000	2.80	11.08	0.93
1.917	1.17	5.000	3.74	8.083	2.80	11.17	0.93
2.000	1.17	5.083	3.74	8.167	2.80	11.25	0.93
2.083	1.17	5.167	3.74	8.250	2.80	11.33	0.93
2.167	1.17	5.250	3.74	8.333	1.63	11.42	0.93
2.250	1.17	5.333	5.60	8.417	1.63	11.50	0.93
2.333	1.40	5.417	5.60	8.500	1.63	11.58	0.93
2.417	1.40	5.500	5.60	8.583	1.63	11.67	0.93
2.500	1.40	5.583	5.60	8.667	1.63	11.75	0.93
2.583	1.40	5.667	5.60	8.750	1.63	11.83	0.93
2.667	1.40	5.750	5.60	8.833	1.63	11.92	0.93
2.750	1.40	5.833	22.42	8.917	1.63	12.00	0.93
2.833	1.40	5.917	22.42	9.000	1.63	12.08	0.93
2.917	1.40	6.000	22.42	9.083	1.63	12.17	0.93
3.000	1.40	6.083	61.64	9.167	1.63	12.25	0.93
3.083	1.40	6.167	61.64	9.250	1.63		

Unit Hyd Qpeak (cms)= 1.016

PEAK FLOW (cms)= 0.185 (i)
TIME TO PEAK (hrs)= 7.333

RUNOFF VOLUME (mm)= 7.972
TOTAL RAINFALL (mm)= 46.700
RUNOFF COEFFICIENT = 0.171

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

ROUTE CHN(0030)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0037)	26.06	0.19	7.33	7.97	0.01	0.63
OUTFLOW: ID= 1 (0030)	26.06	0.16	7.83	7.97	0.01	0.63

CALIB			
NASHYD (0038)	Area (ha)= 58.08	Curve Number (CN)= 63.0	

```
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.13

        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	1.40	6.250	61.64	9.33	1.63
0.167	0.00	3.250	1.40	6.333	8.41	9.42	1.63
0.250	0.00	3.333	1.87	6.417	8.41	9.50	1.63
0.333	1.17	3.417	1.87	6.500	8.41	9.58	1.63
0.417	1.17	3.500	1.87	6.583	8.41	9.67	1.63
0.500	1.17	3.583	1.87	6.667	8.41	9.75	1.63
0.583	1.17	3.667	1.87	6.750	8.41	9.83	1.63
0.667	1.17	3.750	1.87	6.833	3.74	9.92	1.63
0.750	1.17	3.833	1.87	6.917	3.74	10.00	1.63
0.833	1.17	3.917	1.87	7.000	3.74	10.08	1.63
0.917	1.17	4.000	1.87	7.083	3.74	10.17	1.63
1.000	1.17	4.083	1.87	7.167	3.74	10.25	1.63
1.083	1.17	4.167	1.87	7.250	3.74	10.33	0.93
1.167	1.17	4.250	1.87	7.333	2.80	10.42	0.93
1.250	1.17	4.333	2.80	7.417	2.80	10.50	0.93
1.333	1.17	4.417	2.80	7.500	2.80	10.58	0.93
1.417	1.17	4.500	2.80	7.583	2.80	10.67	0.93
1.500	1.17	4.583	2.80	7.667	2.80	10.75	0.93
1.583	1.17	4.667	2.80	7.750	2.80	10.83	0.93
1.667	1.17	4.750	2.80	7.833	2.80	10.92	0.93
1.750	1.17	4.833	3.74	7.917	2.80	11.00	0.93
1.833	1.17	4.917	3.74	8.000	2.80	11.08	0.93
1.917	1.17	5.000	3.74	8.083	2.80	11.17	0.93
2.000	1.17	5.083	3.74	8.167	2.80	11.25	0.93
2.083	1.17	5.167	3.74	8.250	2.80	11.33	0.93
2.167	1.17	5.250	3.74	8.333	1.63	11.42	0.93
2.250	1.17	5.333	5.60	8.417	1.63	11.50	0.93
2.333	1.40	5.417	5.60	8.500	1.63	11.58	0.93
2.417	1.40	5.500	5.60	8.583	1.63	11.67	0.93
2.500	1.40	5.583	5.60	8.667	1.63	11.75	0.93
2.583	1.40	5.667	5.60	8.750	1.63	11.83	0.93
2.667	1.40	5.750	5.60	8.833	1.63	11.92	0.93
2.750	1.40	5.833	22.42	8.917	1.63	12.00	0.93
2.833	1.40	5.917	22.42	9.000	1.63	12.08	0.93
2.917	1.40	6.000	22.42	9.083	1.63	12.17	0.93
3.000	1.40	6.083	61.64	9.167	1.63	12.25	0.93
3.083	1.40	6.167	61.64	9.250	1.63		

```
     Unit Hyd Qpeak  (cms)=   1.963

     PEAK FLOW       (cms)=   0.371 (i)
     TIME TO PEAK    (hrs)=   7.500
     RUNOFF VOLUME    (mm)=   7.972
     TOTAL RAINFALL   (mm)=  46.700
     RUNOFF COEFFICIENT   =   0.171

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

```
--------------------
| ROUTE CHN(  0031)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
```

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0038)	58.08	0.37	7.50	7.97	0.03	0.19
OUTFLOW: ID= 1 (0031)	58.08	0.20	9.17	7.96	0.02	0.18

```
--------------------
| ADD HYD  (  0042)|
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0030):	26.06	0.161	7.83	7.97
+ ID2= 2 (0031):	58.08	0.200	9.17	7.96
ID = 3 (0042):	84.14	0.332	8.42	7.96

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

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

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\5b5a559e-12a1-41b0-aa08-e78131f5def6\scen
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DATE: 05-01-2024 TIME: 03:53:45

USER:

COMMENTS: _____

** SIMULATION : 08. 5-Year-12-Hour-SCS-Type-I **

READ STORM	Filename: C:\Users\mmsingh\AppData\Local\Temp\05a222f9-4b88-4aa2-be28-beb02f308406\8c2f7a62
Ptotal= 64.30 mm	Comments: 5-Year-12-Hour-SCS-Type-II

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	2.57	6.50	11.57	9.75	2.25
0.25	1.61	3.50	2.57	6.75	5.14	10.00	2.25
0.50	1.61	3.75	2.57	7.00	5.14	10.25	1.29
0.75	1.61	4.00	2.57	7.25	3.86	10.50	1.29
1.00	1.61	4.25	3.86	7.50	3.86	10.75	1.29
1.25	1.61	4.50	3.86	7.75	3.86	11.00	1.29
1.50	1.61	4.75	5.14	8.00	3.86	11.25	1.29
1.75	1.61	5.00	5.14	8.25	2.25	11.50	1.29
2.00	1.61	5.25	7.72	8.50	2.25	11.75	1.29
2.25	1.93	5.50	7.72	8.75	2.25	12.00	1.29
2.50	1.93	5.75	30.86	9.00	2.25		
2.75	1.93	6.00	84.88	9.25	2.25		
3.00	1.93	6.25	11.57	9.50	2.25		

CALIB			
NASHYD (0037)	Area (ha)= 26.06	Curve Number (CN)= 63.0	
ID= 1 DT= 5.0 min	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.98		

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	1.93	6.250	84.87	9.33	2.25
0.167	0.00	3.250	1.93	6.333	11.57	9.42	2.25
0.250	0.00	3.333	2.57	6.417	11.57	9.50	2.25
0.333	1.61	3.417	2.57	6.500	11.57	9.58	2.25
0.417	1.61	3.500	2.57	6.583	11.57	9.67	2.25
0.500	1.61	3.583	2.57	6.667	11.57	9.75	2.25
0.583	1.61	3.667	2.57	6.750	11.57	9.83	2.25
0.667	1.61	3.750	2.57	6.833	5.14	9.92	2.25
0.750	1.61	3.833	2.57	6.917	5.14	10.00	2.25
0.833	1.61	3.917	2.57	7.000	5.14	10.08	2.25
0.917	1.61	4.000	2.57	7.083	5.14	10.17	2.25
1.000	1.61	4.083	2.57	7.167	5.14	10.25	2.25
1.083	1.61	4.167	2.57	7.250	5.14	10.33	1.29
1.167	1.61	4.250	2.57	7.333	3.86	10.42	1.29
1.250	1.61	4.333	3.86	7.417	3.86	10.50	1.29
1.333	1.61	4.417	3.86	7.500	3.86	10.58	1.29
1.417	1.61	4.500	3.86	7.583	3.86	10.67	1.29
1.500	1.61	4.583	3.86	7.667	3.86	10.75	1.29
1.583	1.61	4.667	3.86	7.750	3.86	10.83	1.29
1.667	1.61	4.750	3.86	7.833	3.86	10.92	1.29
1.750	1.61	4.833	5.14	7.917	3.86	11.00	1.29
1.833	1.61	4.917	5.14	8.000	3.86	11.08	1.29
1.917	1.61	5.000	5.14	8.083	3.86	11.17	1.29
2.000	1.61	5.083	5.14	8.167	3.86	11.25	1.29
2.083	1.61	5.167	5.14	8.250	3.86	11.33	1.29
2.167	1.61	5.250	5.14	8.333	2.25	11.42	1.29
2.250	1.61	5.333	7.72	8.417	2.25	11.50	1.29
2.333	1.93	5.417	7.72	8.500	2.25	11.58	1.29
2.417	1.93	5.500	7.72	8.583	2.25	11.67	1.29
2.500	1.93	5.583	7.72	8.667	2.25	11.75	1.29
2.583	1.93	5.667	7.72	8.750	2.25	11.83	1.29
2.667	1.93	5.750	7.72	8.833	2.25	11.92	1.29
2.750	1.93	5.833	30.86	8.917	2.25	12.00	1.29
2.833	1.93	5.917	30.86	9.000	2.25	12.08	1.29
2.917	1.93	6.000	30.87	9.083	2.25	12.17	1.29
3.000	1.93	6.083	84.88	9.167	2.25	12.25	1.29
3.083	1.93	6.167	84.88	9.250	2.25		

Unit Hyd Qpeak (cms)= 1.016

PEAK FLOW (cms)= 0.370 (i)
TIME TO PEAK (hrs)= 7.250
RUNOFF VOLUME (mm)= 15.426
TOTAL RAINFALL (mm)= 64.300
RUNOFF COEFFICIENT = 0.240

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

ROUTE CHN(0030)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

		<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2	(0037)	26.06	0.37	7.25	15.43	0.02	0.63
OUTFLOW: ID= 1	(0030)	26.06	0.32	7.83	15.43	0.02	0.63

CALIB				
NASHYD (0038)	Area (ha)= 58.08	Curve Number (CN)= 63.0		
ID= 1 DT= 5.0 min	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00		
	U.H. Tp(hrs)= 1.13			

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	1.93	6.250	84.87	9.33	2.25
0.167	0.00	3.250	1.93	6.333	11.57	9.42	2.25
0.250	0.00	3.333	2.57	6.417	11.57	9.50	2.25
0.333	1.61	3.417	2.57	6.500	11.57	9.58	2.25
0.417	1.61	3.500	2.57	6.583	11.57	9.67	2.25
0.500	1.61	3.583	2.57	6.667	11.57	9.75	2.25
0.583	1.61	3.667	2.57	6.750	11.57	9.83	2.25
0.667	1.61	3.750	2.57	6.833	5.14	9.92	2.25
0.750	1.61	3.833	2.57	6.917	5.14	10.00	2.25
0.833	1.61	3.917	2.57	7.000	5.14	10.08	2.25
0.917	1.61	4.000	2.57	7.083	5.14	10.17	2.25
1.000	1.61	4.083	2.57	7.167	5.14	10.25	2.25
1.083	1.61	4.167	2.57	7.250	5.14	10.33	1.29
1.167	1.61	4.250	2.57	7.333	3.86	10.42	1.29
1.250	1.61	4.333	3.86	7.417	3.86	10.50	1.29
1.333	1.61	4.417	3.86	7.500	3.86	10.58	1.29
1.417	1.61	4.500	3.86	7.583	3.86	10.67	1.29
1.500	1.61	4.583	3.86	7.667	3.86	10.75	1.29
1.583	1.61	4.667	3.86	7.750	3.86	10.83	1.29
1.667	1.61	4.750	3.86	7.833	3.86	10.92	1.29
1.750	1.61	4.833	5.14	7.917	3.86	11.00	1.29
1.833	1.61	4.917	5.14	8.000	3.86	11.08	1.29
1.917	1.61	5.000	5.14	8.083	3.86	11.17	1.29
2.000	1.61	5.083	5.14	8.167	3.86	11.25	1.29
2.083	1.61	5.167	5.14	8.250	3.86	11.33	1.29
2.167	1.61	5.250	5.14	8.333	2.25	11.42	1.29
2.250	1.61	5.333	7.72	8.417	2.25	11.50	1.29
2.333	1.93	5.417	7.72	8.500	2.25	11.58	1.29
2.417	1.93	5.500	7.72	8.583	2.25	11.67	1.29
2.500	1.93	5.583	7.72	8.667	2.25	11.75	1.29
2.583	1.93	5.667	7.72	8.750	2.25	11.83	1.29
2.667	1.93	5.750	7.72	8.833	2.25	11.92	1.29
2.750	1.93	5.833	30.86	8.917	2.25	12.00	1.29
2.833	1.93	5.917	30.86	9.000	2.25	12.08	1.29
2.917	1.93	6.000	30.87	9.083	2.25	12.17	1.29
3.000	1.93	6.083	84.88	9.167	2.25	12.25	1.29
3.083	1.93	6.167	84.88	9.250	2.25		

Unit Hyd Qpeak (cms)= 1.963

PEAK FLOW (cms)= 0.739 (i)
TIME TO PEAK (hrs)= 7.417
RUNOFF VOLUME (mm)= 15.426
TOTAL RAINFALL (mm)= 64.300
RUNOFF COEFFICIENT = 0.240

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

ROUTE CHN(0031)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning

```
                0.00        253.97        0.0800
               44.18        253.34        0.0800
               72.75        252.34    0.0800 /0.0300  Main Channel
               94.18        252.35        0.0300      Main Channel
              117.64        252.31        0.0300      Main Channel
              131.62        252.33    0.0300 /0.0800  Main Channel
              138.41        252.72        0.0800
              150.91        253.00        0.0800
              172.41        253.50        0.0800
              180.51        253.60        0.0800
```

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

		<---- hydrograph ---->			<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0038)	58.08	0.74	7.42	15.43	0.04	0.22
OUTFLOW:	ID= 1 (0031)	58.08	0.41	8.83	15.41	0.03	0.19

ADD HYD (0042)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0030):	26.06	0.321	7.83	15.43
	+ ID2= 2 (0031):	58.08	0.409	8.83	15.41
	ID = 3 (0042):	84.14	0.682	8.25	15.42

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

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

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  Output  filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\9a75e60a-690b-4054-965b-ddd2c8d9f6d2\scen
  Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\9a75e60a-690b-4054-965b-ddd2c8d9f6d2\scen

DATE: 05-01-2024                          TIME: 03:53:45

USER:

COMMENTS: _____________________________________________________________
```

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  **********************************************
  ** SIMULATION : 09. 10-Year-12-Hour-SCS-Type- **
  **********************************************
```

```
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|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              05a222f9-4b88-4aa2-be28-beb02f308406\6041a8cc
| Ptotal= 76.00 mm |    Comments: 10-Year-12-Hour-SCS-Type-II
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	3.04	6.50	13.68	9.75	2.66
0.25	1.90	3.50	3.04	6.75	6.08	10.00	2.66
0.50	1.90	3.75	3.04	7.00	6.08	10.25	1.52
0.75	1.90	4.00	3.04	7.25	4.56	10.50	1.52
1.00	1.90	4.25	4.56	7.50	4.56	10.75	1.52
1.25	1.90	4.50	4.56	7.75	4.56	11.00	1.52
1.50	1.90	4.75	6.08	8.00	4.56	11.25	1.52
1.75	1.90	5.00	6.08	8.25	2.66	11.50	1.52
2.00	1.90	5.25	9.12	8.50	2.66	11.75	1.52
2.25	2.28	5.50	9.12	8.75	2.66	12.00	1.52
2.50	2.28	5.75	36.48	9.00	2.66		
2.75	2.28	6.00	100.32	9.25	2.66		
3.00	2.28	6.25	13.68	9.50	2.66		

```
--------------------
| CALIB            |
| NASHYD   (  0037)|   Area     (ha)=  26.06   Curve Number    (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.98

        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	2.28	6.250	100.32	9.33	2.66
0.167	0.00	3.250	2.28	6.333	13.68	9.42	2.66
0.250	0.00	3.333	3.04	6.417	13.68	9.50	2.66
0.333	1.90	3.417	3.04	6.500	13.68	9.58	2.66
0.417	1.90	3.500	3.04	6.583	13.68	9.67	2.66
0.500	1.90	3.583	3.04	6.667	13.68	9.75	2.66
0.583	1.90	3.667	3.04	6.750	13.68	9.83	2.66
0.667	1.90	3.750	3.04	6.833	6.08	9.92	2.66
0.750	1.90	3.833	3.04	6.917	6.08	10.00	2.66
0.833	1.90	3.917	3.04	7.000	6.08	10.08	2.66
0.917	1.90	4.000	3.04	7.083	6.08	10.17	2.66
1.000	1.90	4.083	3.04	7.167	6.08	10.25	2.66
1.083	1.90	4.167	3.04	7.250	6.08	10.33	1.52
1.167	1.90	4.250	3.04	7.333	4.56	10.42	1.52
1.250	1.90	4.333	4.56	7.417	4.56	10.50	1.52
1.333	1.90	4.417	4.56	7.500	4.56	10.58	1.52
1.417	1.90	4.500	4.56	7.583	4.56	10.67	1.52
1.500	1.90	4.583	4.56	7.667	4.56	10.75	1.52
1.583	1.90	4.667	4.56	7.750	4.56	10.83	1.52
1.667	1.90	4.750	4.56	7.833	4.56	10.92	1.52
1.750	1.90	4.833	6.08	7.917	4.56	11.00	1.52
1.833	1.90	4.917	6.08	8.000	4.56	11.08	1.52
1.917	1.90	5.000	6.08	8.083	4.56	11.17	1.52
2.000	1.90	5.083	6.08	8.167	4.56	11.25	1.52
2.083	1.90	5.167	6.08	8.250	4.56	11.33	1.52
2.167	1.90	5.250	6.08	8.333	2.66	11.42	1.52
2.250	1.90	5.333	9.12	8.417	2.66	11.50	1.52
2.333	2.28	5.417	9.12	8.500	2.66	11.58	1.52
2.417	2.28	5.500	9.12	8.583	2.66	11.67	1.52
2.500	2.28	5.583	9.12	8.667	2.66	11.75	1.52
2.583	2.28	5.667	9.12	8.750	2.66	11.83	1.52
2.667	2.28	5.750	9.12	8.833	2.66	11.92	1.52
2.750	2.28	5.833	36.48	8.917	2.66	12.00	1.52
2.833	2.28	5.917	36.48	9.000	2.66	12.08	1.52
2.917	2.28	6.000	36.48	9.083	2.66	12.17	1.52
3.000	2.28	6.083	100.32	9.167	2.66	12.25	1.52
3.083	2.28	6.167	100.32	9.250	2.66		

```
Unit Hyd Qpeak  (cms)=   1.016

PEAK FLOW       (cms)=   0.517 (i)
TIME TO PEAK    (hrs)=   7.250
RUNOFF VOLUME    (mm)=  21.291
TOTAL RAINFALL   (mm)=  76.000
RUNOFF COEFFICIENT   =   0.280

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

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| ROUTE CHN(  0030)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
```

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0037)	26.06	0.52	7.25	21.29	0.02	0.63
OUTFLOW: ID= 1 (0030)	26.06	0.45	7.75	21.29	0.02	0.63

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--------------------
| CALIB            |
| NASHYD   (  0038)|   Area     (ha)=  58.08   Curve Number    (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.13

        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	2.28	6.250	100.32	9.33	2.66
0.167	0.00	3.250	2.28	6.333	13.68	9.42	2.66
0.250	0.00	3.333	3.04	6.417	13.68	9.50	2.66
0.333	1.90	3.417	3.04	6.500	13.68	9.58	2.66
0.417	1.90	3.500	3.04	6.583	13.68	9.67	2.66
0.500	1.90	3.583	3.04	6.667	13.68	9.75	2.66
0.583	1.90	3.667	3.04	6.750	13.68	9.83	2.66
0.667	1.90	3.750	3.04	6.833	6.08	9.92	2.66
0.750	1.90	3.833	3.04	6.917	6.08	10.00	2.66
0.833	1.90	3.917	3.04	7.000	6.08	10.08	2.66
0.917	1.90	4.000	3.04	7.083	6.08	10.17	2.66
1.000	1.90	4.083	3.04	7.167	6.08	10.25	2.66
1.083	1.90	4.167	3.04	7.250	6.08	10.33	1.52
1.167	1.90	4.250	3.04	7.333	4.56	10.42	1.52
1.250	1.90	4.333	4.56	7.417	4.56	10.50	1.52
1.333	1.90	4.417	4.56	7.500	4.56	10.58	1.52
1.417	1.90	4.500	4.56	7.583	4.56	10.67	1.52
1.500	1.90	4.583	4.56	7.667	4.56	10.75	1.52
1.583	1.90	4.667	4.56	7.750	4.56	10.83	1.52
1.667	1.90	4.750	4.56	7.833	4.56	10.92	1.52
1.750	1.90	4.833	6.08	7.917	4.56	11.00	1.52
1.833	1.90	4.917	6.08	8.000	4.56	11.08	1.52
1.917	1.90	5.000	6.08	8.083	4.56	11.17	1.52
2.000	1.90	5.083	6.08	8.167	4.56	11.25	1.52
2.083	1.90	5.167	6.08	8.250	4.56	11.33	1.52
2.167	1.90	5.250	6.08	8.333	2.66	11.42	1.52
2.250	1.90	5.333	9.12	8.417	2.66	11.50	1.52
2.333	2.28	5.417	9.12	8.500	2.66	11.58	1.52
2.417	2.28	5.500	9.12	8.583	2.66	11.67	1.52
2.500	2.28	5.583	9.12	8.667	2.66	11.75	1.52
2.583	2.28	5.667	9.12	8.750	2.66	11.83	1.52
2.667	2.28	5.750	9.12	8.833	2.66	11.92	1.52
2.750	2.28	5.833	36.48	8.917	2.66	12.00	1.52
2.833	2.28	5.917	36.48	9.000	2.66	12.08	1.52
2.917	2.28	6.000	36.48	9.083	2.66	12.17	1.52
3.000	2.28	6.083	100.32	9.167	2.66	12.25	1.52
3.083	2.28	6.167	100.32	9.250	2.66		

Unit Hyd Qpeak (cms)= 1.963

PEAK FLOW (cms)= 1.032 (i)
TIME TO PEAK (hrs)= 7.417
RUNOFF VOLUME (mm)= 21.291
TOTAL RAINFALL (mm)= 76.000
RUNOFF COEFFICIENT = 0.280

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

| ROUTE CHN(0031)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0038)	58.08	1.03	7.42	21.29	0.05	0.25
OUTFLOW: ID= 1 (0031)	58.08	0.59	8.67	21.28	0.04	0.21

ADD HYD (0042)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0030):	26.06	0.448	7.75	21.29
+ ID2= 2 (0031):	58.08	0.588	8.67	21.28
ID = 3 (0042):	84.14	0.981	8.25	21.28

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
V    V   I    SS     U   U   A A   L
 V  V    I     SS    U   U  AAAAA  L
 V  V    I      SS   U   U  A   A  L
  VV     I    SSSSS  UUUUU  A   A  LLLLL
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        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\dace2fc3-34fb-4f86-a977-e69ef2cd1a0c\scen
  Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\dace2fc3-34fb-4f86-a977-e69ef2cd1a0c\scen


DATE: 05-01-2024                          TIME: 03:53:45

USER:



COMMENTS: _____________________________________________________________

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  ***********************************************
  ** SIMULATION : 10. 25-Year-12-Hour-SCS-Type- **
  ***********************************************


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|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              05a222f9-4b88-4aa2-be28-beb02f308406\5eef7ed8
| Ptotal= 90.70 mm |    Comments: 25-Year-12-Hour-SCS-Type-II
--------------------
                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    3.63 |  6.50   16.33 |  9.75    3.17
                0.25    2.27 |  3.50    3.63 |  6.75    7.26 | 10.00    3.17
                0.50    2.27 |  3.75    3.63 |  7.00    7.26 | 10.25    1.81
                0.75    2.27 |  4.00    3.63 |  7.25    5.44 | 10.50    1.81
                1.00    2.27 |  4.25    5.44 |  7.50    5.44 | 10.75    1.81
                1.25    2.27 |  4.50    5.44 |  7.75    5.44 | 11.00    1.81
                1.50    2.27 |  4.75    7.26 |  8.00    5.44 | 11.25    1.81
                1.75    2.27 |  5.00    7.26 |  8.25    3.17 | 11.50    1.81
                2.00    2.27 |  5.25   10.88 |  8.50    3.17 | 11.75    1.81
                2.25    2.72 |  5.50   10.88 |  8.75    3.17 | 12.00    1.81
                2.50    2.72 |  5.75   43.54 |  9.00    3.17 |
                2.75    2.72 |  6.00  119.72 |  9.25    3.17 |
                3.00    2.72 |  6.25   16.33 |  9.50    3.17 |

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| CALIB            |
| NASHYD   (  0037)|   Area     (ha)=  26.06   Curve Number    (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.98

        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    2.72 | 6.250  119.72 |  9.33    3.17
                0.167    0.00 | 3.250    2.72 | 6.333   16.33 |  9.42    3.17
                0.250    0.00 | 3.333    3.63 | 6.417   16.33 |  9.50    3.17
                0.333    2.27 | 3.417    3.63 | 6.500   16.33 |  9.58    3.17
                0.417    2.27 | 3.500    3.63 | 6.583   16.33 |  9.67    3.17
                0.500    2.27 | 3.583    3.63 | 6.667   16.33 |  9.75    3.17
                0.583    2.27 | 3.667    3.63 | 6.750   16.33 |  9.83    3.17
                0.667    2.27 | 3.750    3.63 | 6.833    7.26 |  9.92    3.17
                0.750    2.27 | 3.833    3.63 | 6.917    7.26 | 10.00    3.17
                0.833    2.27 | 3.917    3.63 | 7.000    7.26 | 10.08    3.17
                0.917    2.27 | 4.000    3.63 | 7.083    7.26 | 10.17    3.17
                1.000    2.27 | 4.083    3.63 | 7.167    7.26 | 10.25    3.17
                1.083    2.27 | 4.167    3.63 | 7.250    7.26 | 10.33    1.81
                1.167    2.27 | 4.250    3.63 | 7.333    5.44 | 10.42    1.81
                1.250    2.27 | 4.333    5.44 | 7.417    5.44 | 10.50    1.81
                1.333    2.27 | 4.417    5.44 | 7.500    5.44 | 10.58    1.81
                1.417    2.27 | 4.500    5.44 | 7.583    5.44 | 10.67    1.81
                1.500    2.27 | 4.583    5.44 | 7.667    5.44 | 10.75    1.81
                1.583    2.27 | 4.667    5.44 | 7.750    5.44 | 10.83    1.81
                1.667    2.27 | 4.750    5.44 | 7.833    5.44 | 10.92    1.81
                1.750    2.27 | 4.833    7.26 | 7.917    5.44 | 11.00    1.81
                1.833    2.27 | 4.917    7.26 | 8.000    5.44 | 11.08    1.81
                1.917    2.27 | 5.000    7.26 | 8.083    5.44 | 11.17    1.81
                2.000    2.27 | 5.083    7.26 | 8.167    5.44 | 11.25    1.81
                2.083    2.27 | 5.167    7.26 | 8.250    5.44 | 11.33    1.81
                2.167    2.27 | 5.250    7.26 | 8.333    3.17 | 11.42    1.81
                2.250    2.27 | 5.333   10.88 | 8.417    3.17 | 11.50    1.81
                2.333    2.72 | 5.417   10.88 | 8.500    3.17 | 11.58    1.81
                2.417    2.72 | 5.500   10.88 | 8.583    3.17 | 11.67    1.81
                2.500    2.72 | 5.583   10.88 | 8.667    3.17 | 11.75    1.81
                2.583    2.72 | 5.667   10.88 | 8.750    3.17 | 11.83    1.81
                2.667    2.72 | 5.750   10.88 | 8.833    3.17 | 11.92    1.81
                2.750    2.72 | 5.833   43.54 | 8.917    3.17 | 12.00    1.81
                2.833    2.72 | 5.917   43.54 | 9.000    3.17 | 12.08    1.81
                2.917    2.72 | 6.000   43.54 | 9.083    3.17 | 12.17    1.81
                3.000    2.72 | 6.083  119.72 | 9.167    3.17 | 12.25    1.81
                3.083    2.72 | 6.167  119.72 | 9.250    3.17 |

     Unit Hyd Qpeak  (cms)=   1.016

     PEAK FLOW       (cms)=   0.723 (i)
     TIME TO PEAK    (hrs)=   7.250
     RUNOFF VOLUME    (mm)=  29.495
     TOTAL RAINFALL   (mm)=  90.700
     RUNOFF COEFFICIENT   =   0.325

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

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| ROUTE CHN(  0030)|
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| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0037)	26.06	0.72	7.25	29.50	0.03	0.63
OUTFLOW: ID= 1 (0030)	26.06	0.63	7.75	29.50	0.03	0.63

CALIB			
NASHYD (0038)	Area (ha)= 58.08	Curve Number (CN)= 63.0	
ID= 1 DT= 5.0 min	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.13		

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	2.72	6.250	119.72	9.33	3.17
0.167	0.00	3.250	2.72	6.333	16.33	9.42	3.17
0.250	0.00	3.333	3.63	6.417	16.33	9.50	3.17
0.333	2.27	3.417	3.63	6.500	16.33	9.58	3.17
0.417	2.27	3.500	3.63	6.583	16.33	9.67	3.17
0.500	2.27	3.583	3.63	6.667	16.33	9.75	3.17
0.583	2.27	3.667	3.63	6.750	16.33	9.83	3.17
0.667	2.27	3.750	3.63	6.833	7.26	9.92	3.17
0.750	2.27	3.833	3.63	6.917	7.26	10.00	3.17
0.833	2.27	3.917	3.63	7.000	7.26	10.08	3.17
0.917	2.27	4.000	3.63	7.083	7.26	10.17	3.17
1.000	2.27	4.083	3.63	7.167	7.26	10.25	3.17
1.083	2.27	4.167	3.63	7.250	7.26	10.33	1.81
1.167	2.27	4.250	3.63	7.333	5.44	10.42	1.81
1.250	2.27	4.333	5.44	7.417	5.44	10.50	1.81
1.333	2.27	4.417	5.44	7.500	5.44	10.58	1.81
1.417	2.27	4.500	5.44	7.583	5.44	10.67	1.81
1.500	2.27	4.583	5.44	7.667	5.44	10.75	1.81
1.583	2.27	4.667	5.44	7.750	5.44	10.83	1.81
1.667	2.27	4.750	5.44	7.833	5.44	10.92	1.81
1.750	2.27	4.833	7.26	7.917	5.44	11.00	1.81
1.833	2.27	4.917	7.26	8.000	5.44	11.08	1.81
1.917	2.27	5.000	7.26	8.083	5.44	11.17	1.81
2.000	2.27	5.083	7.26	8.167	5.44	11.25	1.81
2.083	2.27	5.167	7.26	8.250	5.44	11.33	1.81
2.167	2.27	5.250	7.26	8.333	3.17	11.42	1.81
2.250	2.27	5.333	10.88	8.417	3.17	11.50	1.81
2.333	2.72	5.417	10.88	8.500	3.17	11.58	1.81
2.417	2.72	5.500	10.88	8.583	3.17	11.67	1.81
2.500	2.72	5.583	10.88	8.667	3.17	11.75	1.81
2.583	2.72	5.667	10.88	8.750	3.17	11.83	1.81
2.667	2.72	5.750	10.88	8.833	3.17	11.92	1.81
2.750	2.72	5.833	43.54	8.917	3.17	12.00	1.81
2.833	2.72	5.917	43.54	9.000	3.17	12.08	1.81
2.917	2.72	6.000	43.54	9.083	3.17	12.17	1.81
3.000	2.72	6.083	119.72	9.167	3.17	12.25	1.81
3.083	2.72	6.167	119.72	9.250	3.17		

Unit Hyd Qpeak (cms)= 1.963

PEAK FLOW (cms)= 1.445 (i)
TIME TO PEAK (hrs)= 7.417
RUNOFF VOLUME (mm)= 29.496
TOTAL RAINFALL (mm)= 90.700
RUNOFF COEFFICIENT = 0.325

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

ROUTE CHN(0031)
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel

138.41	252.72	0.0800
150.91	253.00	0.0800
172.41	253.50	0.0800
180.51	253.60	0.0800

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0038)	58.08	1.45	7.42	29.50	0.06	0.31
OUTFLOW: ID= 1 (0031)	58.08	0.87	8.42	29.48	0.05	0.23

ADD HYD (0042)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0030):	26.06	0.628	7.75	29.50
+ ID2= 2 (0031):	58.08	0.870	8.42	29.48
ID = 3 (0042):	84.14	1.446	8.08	29.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

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

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DATE: 05-01-2024                          TIME: 03:53:45

USER:


COMMENTS: _____________________________________________________________
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  ************************************************
  ** SIMULATION : 11. 50-Year-12-Hour-SCS-Type- **
  ************************************************
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READ STORM	Filename: C:\Users\mmsingh\AppData\Local\Temp\05a222f9-4b88-4aa2-be28-beb02f308406\69aab664
Ptotal=101.70 mm	Comments: 50-Year-12-Hour-SCS-Type-II

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	4.07	6.50	18.31	9.75	3.56
0.25	2.54	3.50	4.07	6.75	8.14	10.00	3.56
0.50	2.54	3.75	4.07	7.00	8.14	10.25	2.03
0.75	2.54	4.00	4.07	7.25	6.10	10.50	2.03
1.00	2.54	4.25	6.10	7.50	6.10	10.75	2.03
1.25	2.54	4.50	6.10	7.75	6.10	11.00	2.03
1.50	2.54	4.75	8.14	8.00	6.10	11.25	2.03
1.75	2.54	5.00	8.14	8.25	3.56	11.50	2.03
2.00	2.54	5.25	12.20	8.50	3.56	11.75	2.03
2.25	3.05	5.50	12.20	8.75	3.56	12.00	2.03
2.50	3.05	5.75	48.82	9.00	3.56		
2.75	3.05	6.00	134.24	9.25	3.56		
3.00	3.05	6.25	18.31	9.50	3.56		

CALIB			
NASHYD (0037)	Area (ha)= 26.06	Curve Number (CN)= 63.0	
ID= 1 DT= 5.0 min	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.98		

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	3.05	6.250	134.24	9.33	3.56
0.167	0.00	3.250	3.05	6.333	18.31	9.42	3.56
0.250	0.00	3.333	4.07	6.417	18.31	9.50	3.56
0.333	2.54	3.417	4.07	6.500	18.31	9.58	3.56
0.417	2.54	3.500	4.07	6.583	18.31	9.67	3.56
0.500	2.54	3.583	4.07	6.667	18.31	9.75	3.56
0.583	2.54	3.667	4.07	6.750	18.31	9.83	3.56
0.667	2.54	3.750	4.07	6.833	8.14	9.92	3.56
0.750	2.54	3.833	4.07	6.917	8.14	10.00	3.56
0.833	2.54	3.917	4.07	7.000	8.14	10.08	3.56
0.917	2.54	4.000	4.07	7.083	8.14	10.17	3.56
1.000	2.54	4.083	4.07	7.167	8.14	10.25	3.56
1.083	2.54	4.167	4.07	7.250	8.14	10.33	2.03
1.167	2.54	4.250	4.07	7.333	6.10	10.42	2.03
1.250	2.54	4.333	6.10	7.417	6.10	10.50	2.03
1.333	2.54	4.417	6.10	7.500	6.10	10.58	2.03
1.417	2.54	4.500	6.10	7.583	6.10	10.67	2.03
1.500	2.54	4.583	6.10	7.667	6.10	10.75	2.03
1.583	2.54	4.667	6.10	7.750	6.10	10.83	2.03
1.667	2.54	4.750	6.10	7.833	6.10	10.92	2.03
1.750	2.54	4.833	8.14	7.917	6.10	11.00	2.03
1.833	2.54	4.917	8.14	8.000	6.10	11.08	2.03
1.917	2.54	5.000	8.14	8.083	6.10	11.17	2.03
2.000	2.54	5.083	8.14	8.167	6.10	11.25	2.03
2.083	2.54	5.167	8.14	8.250	6.10	11.33	2.03
2.167	2.54	5.250	8.14	8.333	3.56	11.42	2.03
2.250	2.54	5.333	12.20	8.417	3.56	11.50	2.03
2.333	3.05	5.417	12.20	8.500	3.56	11.58	2.03
2.417	3.05	5.500	12.20	8.583	3.56	11.67	2.03
2.500	3.05	5.583	12.20	8.667	3.56	11.75	2.03
2.583	3.05	5.667	12.20	8.750	3.56	11.83	2.03
2.667	3.05	5.750	12.20	8.833	3.56	11.92	2.03
2.750	3.05	5.833	48.82	8.917	3.56	12.00	2.03
2.833	3.05	5.917	48.82	9.000	3.56	12.08	2.03
2.917	3.05	6.000	48.82	9.083	3.56	12.17	2.03
3.000	3.05	6.083	134.24	9.167	3.56	12.25	2.03
3.083	3.05	6.167	134.24	9.250	3.56		

Unit Hyd Qpeak (cms)= 1.016

PEAK FLOW (cms)= 0.892 (i)
TIME TO PEAK (hrs)= 7.250
RUNOFF VOLUME (mm)= 36.149
TOTAL RAINFALL (mm)= 101.700
RUNOFF COEFFICIENT = 0.355

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

ROUTE CHN(0030)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

		AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (	0037)	26.06	0.89	7.25	36.15	0.04	0.63
OUTFLOW: ID= 1 (	0030)	26.06	0.77	7.75	36.15	0.04	0.63

CALIB			
NASHYD (0038)	Area (ha)= 58.08	Curve Number (CN)= 63.0	
ID= 1 DT= 5.0 min	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.13		

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	3.05	6.250	134.24	9.33	3.56
0.167	0.00	3.250	3.05	6.333	18.31	9.42	3.56
0.250	0.00	3.333	4.07	6.417	18.31	9.50	3.56

0.333	2.54	3.417	4.07	6.500	18.31	9.58	3.56
0.417	2.54	3.500	4.07	6.583	18.31	9.67	3.56
0.500	2.54	3.583	4.07	6.667	18.31	9.75	3.56
0.583	2.54	3.667	4.07	6.750	18.31	9.83	3.56
0.667	2.54	3.750	4.07	6.833	8.14	9.92	3.56
0.750	2.54	3.833	4.07	6.917	8.14	10.00	3.56
0.833	2.54	3.917	4.07	7.000	8.14	10.08	3.56
0.917	2.54	4.000	4.07	7.083	8.14	10.17	3.56
1.000	2.54	4.083	4.07	7.167	8.14	10.25	3.56
1.083	2.54	4.167	4.07	7.250	8.14	10.33	2.03
1.167	2.54	4.250	4.07	7.333	6.10	10.42	2.03
1.250	2.54	4.333	6.10	7.417	6.10	10.50	2.03
1.333	2.54	4.417	6.10	7.500	6.10	10.58	2.03
1.417	2.54	4.500	6.10	7.583	6.10	10.67	2.03
1.500	2.54	4.583	6.10	7.667	6.10	10.75	2.03
1.583	2.54	4.667	6.10	7.750	6.10	10.83	2.03
1.667	2.54	4.750	6.10	7.833	6.10	10.92	2.03
1.750	2.54	4.833	8.14	7.917	6.10	11.00	2.03
1.833	2.54	4.917	8.14	8.000	6.10	11.08	2.03
1.917	2.54	5.000	8.14	8.083	6.10	11.17	2.03
2.000	2.54	5.083	8.14	8.167	6.10	11.25	2.03
2.083	2.54	5.167	8.14	8.250	6.10	11.33	2.03
2.167	2.54	5.250	8.14	8.333	3.56	11.42	2.03
2.250	2.54	5.333	12.20	8.417	3.56	11.50	2.03
2.333	3.05	5.417	12.20	8.500	3.56	11.58	2.03
2.417	3.05	5.500	12.20	8.583	3.56	11.67	2.03
2.500	3.05	5.583	12.20	8.667	3.56	11.75	2.03
2.583	3.05	5.667	12.20	8.750	3.56	11.83	2.03
2.667	3.05	5.750	12.20	8.833	3.56	11.92	2.03
2.750	3.05	5.833	48.82	8.917	3.56	12.00	2.03
2.833	3.05	5.917	48.82	9.000	3.56	12.08	2.03
2.917	3.05	6.000	48.82	9.083	3.56	12.17	2.03
3.000	3.05	6.083	134.24	9.167	3.56	12.25	2.03
3.083	3.05	6.167	134.24	9.250	3.56		

Unit Hyd Qpeak (cms)= 1.963

PEAK FLOW (cms)= 1.782 (i)
TIME TO PEAK (hrs)= 7.417
RUNOFF VOLUME (mm)= 36.149
TOTAL RAINFALL (mm)= 101.700
RUNOFF COEFFICIENT = 0.355

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

ROUTE CHN(0031)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0038)	58.08	1.78	7.42	36.15	0.07	0.40
OUTFLOW: ID= 1 (0031)	58.08	1.15	8.17	36.13	0.05	0.27

ADD HYD (0042)|
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0030):	26.06	0.773	7.75	36.15
+ ID2= 2 (0031):	58.08	1.148	8.17	36.13
ID = 3 (0042):	84.14	1.886	8.00	36.14

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\fc5d75dc-7189-4562-ab6e-b6708bcb4a33\scen
Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\fc5d75dc-7189-4562-ab6e-b6708bcb4a33\scen

DATE: 05-01-2024 TIME: 03:53:45

USER:

COMMENTS: _____

** SIMULATION : 12. 100-Year-12-Hour-SCS-Type **

READ STORM	Filename: C:\Users\mmsingh\AppData\Local\Temp\05a222f9-4b88-4aa2-be28-beb02f308406\9f01baed
Ptotal=112.50 mm	Comments: 100-Year-12-Hour-SCS-Type-II

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	4.50	6.50	20.25	9.75	3.94
0.25	2.81	3.50	4.50	6.75	9.00	10.00	3.94
0.50	2.81	3.75	4.50	7.00	9.00	10.25	2.25
0.75	2.81	4.00	4.50	7.25	6.75	10.50	2.25
1.00	2.81	4.25	6.75	7.50	6.75	10.75	2.25
1.25	2.81	4.50	6.75	7.75	6.75	11.00	2.25
1.50	2.81	4.75	9.00	8.00	6.75	11.25	2.25
1.75	2.81	5.00	9.00	8.25	3.94	11.50	2.25
2.00	2.81	5.25	13.50	8.50	3.94	11.75	2.25
2.25	3.38	5.50	13.50	8.75	3.94	12.00	2.25
2.50	3.37	5.75	54.00	9.00	3.94		
2.75	3.38	6.00	148.50	9.25	3.94		
3.00	3.38	6.25	20.25	9.50	3.94		

CALIB			
NASHYD (0037)	Area (ha)= 26.06	Curve Number (CN)= 63.0	
ID= 1 DT= 5.0 min	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.98		

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	3.38	6.250	148.50	9.33	3.94
0.167	0.00	3.250	3.38	6.333	20.25	9.42	3.94
0.250	0.00	3.333	4.50	6.417	20.25	9.50	3.94
0.333	2.81	3.417	4.50	6.500	20.25	9.58	3.94
0.417	2.81	3.500	4.50	6.583	20.25	9.67	3.94
0.500	2.81	3.583	4.50	6.667	20.25	9.75	3.94
0.583	2.81	3.667	4.50	6.750	20.25	9.83	3.94
0.667	2.81	3.750	4.50	6.833	9.00	9.92	3.94
0.750	2.81	3.833	4.50	6.917	9.00	10.00	3.94
0.833	2.81	3.917	4.50	7.000	9.00	10.08	3.94
0.917	2.81	4.000	4.50	7.083	9.00	10.17	3.94
1.000	2.81	4.083	4.50	7.167	9.00	10.25	3.94
1.083	2.81	4.167	4.50	7.250	9.00	10.33	2.25
1.167	2.81	4.250	4.50	7.333	6.75	10.42	2.25
1.250	2.81	4.333	6.75	7.417	6.75	10.50	2.25
1.333	2.81	4.417	6.75	7.500	6.75	10.58	2.25
1.417	2.81	4.500	6.75	7.583	6.75	10.67	2.25
1.500	2.81	4.583	6.75	7.667	6.75	10.75	2.25
1.583	2.81	4.667	6.75	7.750	6.75	10.83	2.25
1.667	2.81	4.750	6.75	7.833	6.75	10.92	2.25
1.750	2.81	4.833	9.00	7.917	6.75	11.00	2.25
1.833	2.81	4.917	9.00	8.000	6.75	11.08	2.25
1.917	2.81	5.000	9.00	8.083	6.75	11.17	2.25
2.000	2.81	5.083	9.00	8.167	6.75	11.25	2.25
2.083	2.81	5.167	9.00	8.250	6.75	11.33	2.25
2.167	2.81	5.250	9.00	8.333	3.94	11.42	2.25
2.250	2.81	5.333	13.50	8.417	3.94	11.50	2.25
2.333	3.37	5.417	13.50	8.500	3.94	11.58	2.25
2.417	3.38	5.500	13.50	8.583	3.94	11.67	2.25
2.500	3.38	5.583	13.50	8.667	3.94	11.75	2.25
2.583	3.37	5.667	13.50	8.750	3.94	11.83	2.25
2.667	3.37	5.750	13.50	8.833	3.94	11.92	2.25
2.750	3.37	5.833	54.00	8.917	3.94	12.00	2.25
2.833	3.37	5.917	54.00	9.000	3.94	12.08	2.25
2.917	3.38	6.000	54.00	9.083	3.94	12.17	2.25
3.000	3.38	6.083	148.50	9.167	3.94	12.25	2.25
3.083	3.37	6.167	148.50	9.250	3.94		

Unit Hyd Qpeak (cms)= 1.016

PEAK FLOW (cms)= 1.067 (i)
TIME TO PEAK (hrs)= 7.250
RUNOFF VOLUME (mm)= 43.048
TOTAL RAINFALL (mm)= 112.500
RUNOFF COEFFICIENT = 0.383

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

ROUTE CHN(0030)		
IN= 2---> OUT= 1	Routing time step (min)'= 5.00	

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

Distance	Elevation	Manning
0.00	253.33	0.0800
4.07	253.22	0.0800

31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0037)	26.06	1.07	7.25	43.05	0.05	0.63
OUTFLOW: ID= 1 (0030)	26.06	0.93	7.75	43.05	0.04	0.63

CALIB NASHYD (0038) | ID= 1 DT= 5.0 min				
	Area (ha)=	58.08	Curve Number (CN)=	63.0
	Ia (mm)=	8.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	1.13		

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	3.38	6.250	148.50	9.33	3.94
0.167	0.00	3.250	3.38	6.333	20.25	9.42	3.94
0.250	0.00	3.333	4.50	6.417	20.25	9.50	3.94
0.333	2.81	3.417	4.50	6.500	20.25	9.58	3.94
0.417	2.81	3.500	4.50	6.583	20.25	9.67	3.94
0.500	2.81	3.583	4.50	6.667	20.25	9.75	3.94
0.583	2.81	3.667	4.50	6.750	20.25	9.83	3.94
0.667	2.81	3.750	4.50	6.833	9.00	9.92	3.94
0.750	2.81	3.833	4.50	6.917	9.00	10.00	3.94
0.833	2.81	3.917	4.50	7.000	9.00	10.08	3.94
0.917	2.81	4.000	4.50	7.083	9.00	10.17	3.94
1.000	2.81	4.083	4.50	7.167	9.00	10.25	3.94
1.083	2.81	4.167	4.50	7.250	9.00	10.33	2.25
1.167	2.81	4.250	4.50	7.333	6.75	10.42	2.25
1.250	2.81	4.333	6.75	7.417	6.75	10.50	2.25
1.333	2.81	4.417	6.75	7.500	6.75	10.58	2.25
1.417	2.81	4.500	6.75	7.583	6.75	10.67	2.25
1.500	2.81	4.583	6.75	7.667	6.75	10.75	2.25
1.583	2.81	4.667	6.75	7.750	6.75	10.83	2.25
1.667	2.81	4.750	6.75	7.833	6.75	10.92	2.25
1.750	2.81	4.833	9.00	7.917	6.75	11.00	2.25
1.833	2.81	4.917	9.00	8.000	6.75	11.08	2.25
1.917	2.81	5.000	9.00	8.083	6.75	11.17	2.25
2.000	2.81	5.083	9.00	8.167	6.75	11.25	2.25
2.083	2.81	5.167	9.00	8.250	6.75	11.33	2.25
2.167	2.81	5.250	9.00	8.333	3.94	11.42	2.25
2.250	2.81	5.333	13.50	8.417	3.94	11.50	2.25
2.333	3.37	5.417	13.50	8.500	3.94	11.58	2.25
2.417	3.38	5.500	13.50	8.583	3.94	11.67	2.25
2.500	3.38	5.583	13.50	8.667	3.94	11.75	2.25
2.583	3.37	5.667	13.50	8.750	3.94	11.83	2.25
2.667	3.37	5.750	13.50	8.833	3.94	11.92	2.25
2.750	3.37	5.833	54.00	8.917	3.94	12.00	2.25
2.833	3.37	5.917	54.00	9.000	3.94	12.08	2.25
2.917	3.38	6.000	54.00	9.083	3.94	12.17	2.25
3.000	3.38	6.083	148.50	9.167	3.94	12.25	2.25
3.083	3.37	6.167	148.50	9.250	3.94		

Unit Hyd Qpeak (cms)= 1.963

PEAK FLOW (cms)= 2.132 (i)
TIME TO PEAK (hrs)= 7.417
RUNOFF VOLUME (mm)= 43.048
TOTAL RAINFALL (mm)= 112.500
RUNOFF COEFFICIENT = 0.383

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

ROUTE CHN(0031) | IN= 2---> OUT= 1 |		
	Routing time step (min)'=	5.00

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0038)	58.08	2.13	7.42	43.05	0.09	0.54
OUTFLOW: ID= 1 (0031)	58.08	1.56	7.92	43.03	0.07	0.34

ADD HYD (0042)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0030):	26.06	0.925	7.75	43.05
+ ID2= 2 (0031):	58.08	1.556	7.92	43.03
ID = 3 (0042):	84.14	2.470	7.92	43.04

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

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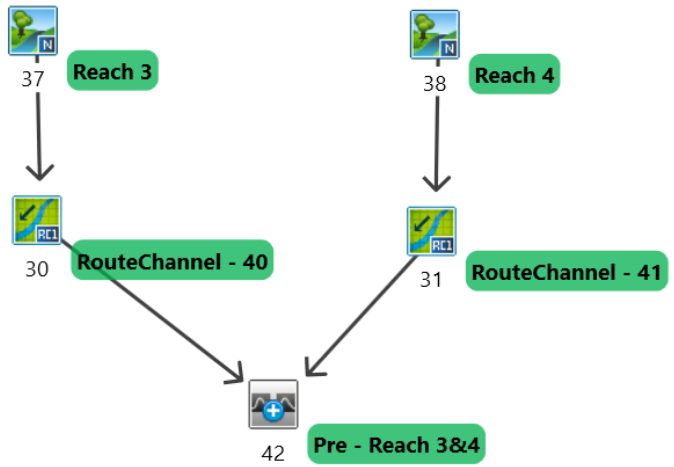

SCHAEFFERS
CONSULTING ENGINEERS

Visual OTTHYMO™ Schematic

PRE-DEVELOPMENT – REACH 3/4
2-100YR, 24HR SCS

Job #: 5170	**Date: April 2024**

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
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DATE: 05-01-2024                          TIME: 03:35:12

USER:


COMMENTS: _____________________________________________________________

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  ***********************************************
  ** SIMULATION : 01. 2-Year-24-Hour-SCS-Type-I **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              a3c66b7a-4039-49fc-a032-24b748c3ad03\4d3f0190
| Ptotal= 55.00 mm |    Comments: 2-Year-24-Hour-SCS-Type-II
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.10	12.50	7.92	18.75	0.99
0.25	0.55	6.50	1.10	12.75	4.07	19.00	0.99
0.50	0.55	6.75	1.10	13.00	4.07	19.25	0.99
0.75	0.55	7.00	1.10	13.25	0.77	19.50	0.99
1.00	0.55	7.25	1.10	13.50	0.77	19.75	0.99
1.25	0.55	7.50	1.10	13.75	4.51	20.00	0.99
1.50	0.55	7.75	1.10	14.00	4.51	20.25	0.66
1.75	0.55	8.00	1.10	14.25	1.65	20.50	0.66
2.00	0.99	8.25	1.49	14.50	1.65	20.75	0.66

2.25	0.72	8.50	1.48	14.75	1.65	21.00	0.66
2.50	0.71	8.75	1.49	15.00	1.65	21.25	0.66
2.75	0.72	9.00	1.49	15.25	1.65	21.50	0.66
3.00	0.71	9.25	1.76	15.50	1.65	21.75	0.66
3.25	0.71	9.50	1.76	15.75	1.65	22.00	0.66
3.50	0.71	9.75	1.98	16.00	1.65	22.25	0.66
3.75	0.72	10.00	1.98	16.25	0.99	22.50	0.66
4.00	0.71	10.25	2.53	16.50	0.99	22.75	0.66
4.25	0.88	10.50	2.53	16.75	0.99	23.00	0.66
4.50	0.88	10.75	3.41	17.00	0.99	23.25	0.66
4.75	0.88	11.00	3.41	17.25	0.99	23.50	0.66
5.00	0.88	11.25	5.28	17.50	0.99	23.75	0.66
5.25	0.88	11.50	5.28	17.75	0.99	24.00	0.66
5.50	0.88	11.75	22.88	18.00	0.99		
5.75	0.88	12.00	60.72	18.25	0.99		
6.00	0.88	12.25	7.92	18.50	0.99		

CALIB			
NASHYD (0037)	Area (ha)= 26.06	Curve Number (CN)= 63.0	
ID= 1 DT= 5.0 min	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.98		

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	6.167	0.88	12.250	60.72	18.33	0.99
0.167	0.00	6.250	0.88	12.333	7.93	18.42	0.99
0.250	0.00	6.333	1.10	12.417	7.92	18.50	0.99
0.333	0.55	6.417	1.10	12.500	7.92	18.58	0.99
0.417	0.55	6.500	1.10	12.583	7.92	18.67	0.99
0.500	0.55	6.583	1.10	12.667	7.92	18.75	0.99
0.583	0.55	6.667	1.10	12.750	7.92	18.83	0.99
0.667	0.55	6.750	1.10	12.833	4.07	18.92	0.99
0.750	0.55	6.833	1.10	12.917	4.07	19.00	0.99
0.833	0.55	6.917	1.10	13.000	4.07	19.08	0.99
0.917	0.55	7.000	1.10	13.083	4.07	19.17	0.99
1.000	0.55	7.083	1.10	13.167	4.07	19.25	0.99
1.083	0.55	7.167	1.10	13.250	4.07	19.33	0.99
1.167	0.55	7.250	1.10	13.333	0.77	19.42	0.99
1.250	0.55	7.333	1.10	13.417	0.77	19.50	0.99
1.333	0.55	7.417	1.10	13.500	0.77	19.58	0.99
1.417	0.55	7.500	1.10	13.583	0.77	19.67	0.99
1.500	0.55	7.583	1.10	13.667	0.77	19.75	0.99
1.583	0.55	7.667	1.10	13.750	0.77	19.83	0.99
1.667	0.55	7.750	1.10	13.833	4.51	19.92	0.99
1.750	0.55	7.833	1.10	13.917	4.51	20.00	0.99
1.833	0.55	7.917	1.10	14.000	4.51	20.08	0.99
1.917	0.55	8.000	1.10	14.083	4.51	20.17	0.99
2.000	0.55	8.083	1.10	14.167	4.51	20.25	0.99
2.083	0.99	8.167	1.10	14.250	4.51	20.33	0.66
2.167	0.99	8.250	1.10	14.333	1.65	20.42	0.66
2.250	0.99	8.333	1.49	14.417	1.65	20.50	0.66
2.333	0.71	8.417	1.49	14.500	1.65	20.58	0.66
2.417	0.72	8.500	1.48	14.583	1.65	20.67	0.66
2.500	0.72	8.583	1.48	14.667	1.65	20.75	0.66
2.583	0.71	8.667	1.48	14.750	1.65	20.83	0.66
2.667	0.71	8.750	1.48	14.833	1.65	20.92	0.66
2.750	0.71	8.833	1.49	14.917	1.65	21.00	0.66
2.833	0.71	8.917	1.49	15.000	1.65	21.08	0.66
2.917	0.72	9.000	1.48	15.083	1.65	21.17	0.66
3.000	0.72	9.083	1.49	15.167	1.65	21.25	0.66
3.083	0.71	9.167	1.49	15.250	1.65	21.33	0.66
3.167	0.71	9.250	1.48	15.333	1.65	21.42	0.66
3.250	0.71	9.333	1.76	15.417	1.65	21.50	0.66
3.333	0.71	9.417	1.76	15.500	1.65	21.58	0.66
3.417	0.71	9.500	1.76	15.583	1.65	21.67	0.66
3.500	0.71	9.583	1.76	15.667	1.65	21.75	0.66
3.583	0.71	9.667	1.76	15.750	1.65	21.83	0.66
3.667	0.71	9.750	1.76	15.833	1.65	21.92	0.66
3.750	0.71	9.833	1.98	15.917	1.65	22.00	0.66
3.833	0.71	9.917	1.98	16.000	1.65	22.08	0.66
3.917	0.72	10.000	1.98	16.083	1.65	22.17	0.66
4.000	0.72	10.083	1.98	16.167	1.65	22.25	0.66
4.083	0.71	10.167	1.98	16.250	1.65	22.33	0.66
4.167	0.71	10.250	1.98	16.333	0.99	22.42	0.66
4.250	0.71	10.333	2.53	16.417	0.99	22.50	0.66
4.333	0.88	10.417	2.53	16.500	0.99	22.58	0.66
4.417	0.88	10.500	2.53	16.583	0.99	22.67	0.66
4.500	0.88	10.583	2.53	16.667	0.99	22.75	0.66
4.583	0.88	10.667	2.53	16.750	0.99	22.83	0.66
4.667	0.88	10.750	2.53	16.833	0.99	22.92	0.66
4.750	0.88	10.833	3.41	16.917	0.99	23.00	0.66
4.833	0.88	10.917	3.41	17.000	0.99	23.08	0.66
4.917	0.88	11.000	3.41	17.083	0.99	23.17	0.66
5.000	0.88	11.083	3.41	17.167	0.99	23.25	0.66
5.083	0.88	11.167	3.41	17.250	0.99	23.33	0.66
5.167	0.88	11.250	3.41	17.333	0.99	23.42	0.66
5.250	0.88	11.333	5.28	17.417	0.99	23.50	0.66
5.333	0.88	11.417	5.28	17.500	0.99	23.58	0.66
5.417	0.88	11.500	5.28	17.583	0.99	23.67	0.66
5.500	0.88	11.583	5.28	17.667	0.99	23.75	0.66
5.583	0.88	11.667	5.28	17.750	0.99	23.83	0.66
5.667	0.88	11.750	5.28	17.833	0.99	23.92	0.66
5.750	0.88	11.833	22.88	17.917	0.99	24.00	0.66
5.833	0.88	11.917	22.88	18.000	0.99	24.08	0.66
5.917	0.88	12.000	22.88	18.083	0.99	24.17	0.66
6.000	0.88	12.083	60.72	18.167	0.99	24.25	0.66
6.083	0.88	12.167	60.72	18.250	0.99		

Unit Hyd Qpeak (cms)= 1.016

PEAK FLOW (cms)= 0.222 (i)
TIME TO PEAK (hrs)= 13.250
RUNOFF VOLUME (mm)= 11.260
TOTAL RAINFALL (mm)= 55.000
RUNOFF COEFFICIENT = 0.205

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

ROUTE CHN(0030)		
IN= 2---> OUT= 1	Routing time step (min)'= 5.00	

<------ DATA FOR SECTION (1.1) ------>
Distance Elevation Manning

0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0037)	26.06	0.22	13.25	11.26	0.01	0.63
OUTFLOW: ID= 1 (0030)	26.06	0.19	13.75	11.26	0.01	0.63

| CALIB |		
| NASHYD (0038)|	Area (ha)= 58.08	Curve Number (CN)= 63.0
|ID= 1 DT= 5.0 min |	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 1.13	

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	6.167	0.88	12.250	60.72	18.33	0.99
0.167	0.00	6.250	0.88	12.333	7.93	18.42	0.99
0.250	0.00	6.333	1.10	12.417	7.92	18.50	0.99
0.333	0.55	6.417	1.10	12.500	7.92	18.58	0.99
0.417	0.55	6.500	1.10	12.583	7.92	18.67	0.99
0.500	0.55	6.583	1.10	12.667	7.92	18.75	0.99
0.583	0.55	6.667	1.10	12.750	7.92	18.83	0.99
0.667	0.55	6.750	1.10	12.833	4.07	18.92	0.99
0.750	0.55	6.833	1.10	12.917	4.07	19.00	0.99
0.833	0.55	6.917	1.10	13.000	4.07	19.08	0.99
0.917	0.55	7.000	1.10	13.083	4.07	19.17	0.99
1.000	0.55	7.083	1.10	13.167	4.07	19.25	0.99
1.083	0.55	7.167	1.10	13.250	4.07	19.33	0.99
1.167	0.55	7.250	1.10	13.333	0.77	19.42	0.99
1.250	0.55	7.333	1.10	13.417	0.77	19.50	0.99
1.333	0.55	7.417	1.10	13.500	0.77	19.58	0.99
1.417	0.55	7.500	1.10	13.583	0.77	19.67	0.99
1.500	0.55	7.583	1.10	13.667	0.77	19.75	0.99
1.583	0.55	7.667	1.10	13.750	0.77	19.83	0.99
1.667	0.55	7.750	1.10	13.833	4.51	19.92	0.99
1.750	0.55	7.833	1.10	13.917	4.51	20.00	0.99
1.833	0.55	7.917	1.10	14.000	4.51	20.08	0.99
1.917	0.55	8.000	1.10	14.083	4.51	20.17	0.99
2.000	0.55	8.083	1.10	14.167	4.51	20.25	0.99
2.083	0.99	8.167	1.10	14.250	4.51	20.33	0.66
2.167	0.99	8.250	1.10	14.333	1.65	20.42	0.66
2.250	0.99	8.333	1.49	14.417	1.65	20.50	0.66
2.333	0.71	8.417	1.49	14.500	1.65	20.58	0.66
2.417	0.72	8.500	1.48	14.583	1.65	20.67	0.66
2.500	0.72	8.583	1.48	14.667	1.65	20.75	0.66
2.583	0.71	8.667	1.48	14.750	1.65	20.83	0.66
2.667	0.71	8.750	1.48	14.833	1.65	20.92	0.66
2.750	0.71	8.833	1.49	14.917	1.65	21.00	0.66
2.833	0.71	8.917	1.49	15.000	1.65	21.08	0.66
2.917	0.72	9.000	1.48	15.083	1.65	21.17	0.66
3.000	0.72	9.083	1.49	15.167	1.65	21.25	0.66
3.083	0.71	9.167	1.49	15.250	1.65	21.33	0.66
3.167	0.71	9.250	1.48	15.333	1.65	21.42	0.66
3.250	0.71	9.333	1.76	15.417	1.65	21.50	0.66
3.333	0.71	9.417	1.76	15.500	1.65	21.58	0.66
3.417	0.71	9.500	1.76	15.583	1.65	21.67	0.66
3.500	0.71	9.583	1.76	15.667	1.65	21.75	0.66
3.583	0.71	9.667	1.76	15.750	1.65	21.83	0.66
3.667	0.71	9.750	1.76	15.833	1.65	21.92	0.66
3.750	0.71	9.833	1.98	15.917	1.65	22.00	0.66
3.833	0.71	9.917	1.98	16.000	1.65	22.08	0.66
3.917	0.72	10.000	1.98	16.083	1.65	22.17	0.66
4.000	0.72	10.083	1.98	16.167	1.65	22.25	0.66
4.083	0.71	10.167	1.98	16.250	1.65	22.33	0.66
4.167	0.71	10.250	1.98	16.333	0.99	22.42	0.66
4.250	0.71	10.333	2.53	16.417	0.99	22.50	0.66
4.333	0.88	10.417	2.53	16.500	0.99	22.58	0.66
4.417	0.88	10.500	2.53	16.583	0.99	22.67	0.66
4.500	0.88	10.583	2.53	16.667	0.99	22.75	0.66
4.583	0.88	10.667	2.53	16.750	0.99	22.83	0.66
4.667	0.88	10.750	2.53	16.833	0.99	22.92	0.66
4.750	0.88	10.833	3.41	16.917	0.99	23.00	0.66
4.833	0.88	10.917	3.41	17.000	0.99	23.08	0.66
4.917	0.88	11.000	3.41	17.083	0.99	23.17	0.66
5.000	0.88	11.083	3.41	17.167	0.99	23.25	0.66
5.083	0.88	11.167	3.41	17.250	0.99	23.33	0.66
5.167	0.88	11.250	3.41	17.333	0.99	23.42	0.66
5.250	0.88	11.333	5.28	17.417	0.99	23.50	0.66
5.333	0.88	11.417	5.28	17.500	0.99	23.58	0.66
5.417	0.88	11.500	5.28	17.583	0.99	23.67	0.66

```
                5.500    0.88 |11.583    5.28 |17.667    0.99 | 23.75    0.66
                5.583    0.88 |11.667    5.28 |17.750    0.99 | 23.83    0.66
                5.667    0.88 |11.750    5.28 |17.833    0.99 | 23.92    0.66
                5.750    0.88 |11.833   22.88 |17.917    0.99 | 24.00    0.66
                5.833    0.88 |11.917   22.88 |18.000    0.99 | 24.08    0.66
                5.917    0.88 |12.000   22.88 |18.083    0.99 | 24.17    0.66
                6.000    0.88 |12.083   60.72 |18.167    0.99 | 24.25    0.66
                6.083    0.88 |12.167   60.72 |18.250    0.99 |

     Unit Hyd Qpeak  (cms)=   1.963

     PEAK FLOW       (cms)=   0.444 (i)
     TIME TO PEAK    (hrs)=  13.417
     RUNOFF VOLUME    (mm)=  11.260
     TOTAL RAINFALL   (mm)=  55.000
     RUNOFF COEFFICIENT   =   0.205

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

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0031)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00         253.97        0.0800
                  44.18         253.34        0.0800
                  72.75         252.34    0.0800 /0.0300  Main Channel
                  94.18         252.35        0.0300      Main Channel
                 117.64         252.31        0.0300      Main Channel
                 131.62         252.33    0.0300 /0.0800  Main Channel
                 138.41         252.72        0.0800
                 150.91         253.00        0.0800
                 172.41         253.50        0.0800
                 180.51         253.60        0.0800

      <---------------------- TRAVEL TIME TABLE ----------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY    TRAV.TIME
         (m)      (m)     (cu.m.)      (cms)        (m/s)       (min)
        0.02   252.33    .386E+03        0.0         0.17      149.17
        0.09   252.40    .580E+04        2.2         0.57       44.29
        0.15   252.47    .122E+05        7.3         0.90       27.96
        0.22   252.53    .189E+05       14.6         1.17       21.61
        0.29   252.60    .259E+05       23.9         1.40       18.12
        0.35   252.67    .333E+05       35.0         1.59       15.86
        0.42   252.73    .409E+05       47.8         1.77       14.27
        0.49   252.80    .490E+05       62.2         1.93       13.13
        0.55   252.87    .576E+05       78.3         2.06       12.25
        0.62   252.93    .667E+05       96.1         2.19       11.57
        0.69   253.00    .762E+05      115.4         2.30       11.01
        0.75   253.07    .863E+05      136.5         2.40       10.54
        0.82   253.13    .969E+05      159.1         2.49       10.15
        0.89   253.20    .108E+06      183.3         2.58        9.81
        0.95   253.27    .119E+06      209.2         2.66        9.51
        1.02   253.33    .131E+06      236.7         2.73        9.26
        1.09   253.40    .144E+06      265.1         2.79        9.06
        1.15   253.47    .157E+06      295.3         2.85        8.88
        1.22   253.54    .172E+06      327.0         2.89        8.75

                                  <---- hydrograph ---->   <-pipe / channel->
```

```
                                    AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                    (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0038)   58.08     0.44   13.42  11.26      0.03      0.20
   OUTFLOW: ID= 1 (  0031)   58.08     0.24   15.00  11.25      0.03      0.18


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

--------------------
| ADD HYD  (  0042)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0030):    26.06   0.192    13.75    11.26
     + ID2= 2 (  0031):    58.08   0.236    15.00    11.25
       ================================================
       ID = 3 (  0042):    84.14   0.392    14.25    11.25

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\da47d3a1-a468-4731-910e-0690d026b02a\scen
  Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\da47d3a1-a468-4731-910e-0690d026b02a\scen


DATE: 05-01-2024                          TIME: 03:35:12

USER:



COMMENTS: _____________________________________________________________

--------------------------------------------------------------------------------
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  ***********************************************
  ** SIMULATION : 02. 5-Year-24-Hour-SCS-Type-I **
```

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  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              a3c66b7a-4039-49fc-a032-24b748c3ad03\361a8f55
| Ptotal= 76.00 mm |    Comments: 5-Year-24-Hour-SCS-Type-II
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.52	12.50	10.94	18.75	1.37
0.25	0.76	6.50	1.52	12.75	5.62	19.00	1.37
0.50	0.76	6.75	1.52	13.00	5.62	19.25	1.37
0.75	0.76	7.00	1.52	13.25	1.06	19.50	1.37
1.00	0.76	7.25	1.52	13.50	1.06	19.75	1.37
1.25	0.76	7.50	1.52	13.75	6.23	20.00	1.37
1.50	0.76	7.75	1.52	14.00	6.23	20.25	0.91
1.75	0.76	8.00	1.52	14.25	2.28	20.50	0.91
2.00	1.37	8.25	2.05	14.50	2.28	20.75	0.91
2.25	0.99	8.50	2.05	14.75	2.28	21.00	0.91
2.50	0.99	8.75	2.05	15.00	2.28	21.25	0.91
2.75	0.99	9.00	2.05	15.25	2.28	21.50	0.91
3.00	0.99	9.25	2.43	15.50	2.28	21.75	0.91
3.25	0.99	9.50	2.43	15.75	2.28	22.00	0.91
3.50	0.99	9.75	2.74	16.00	2.28	22.25	0.91
3.75	0.99	10.00	2.74	16.25	1.37	22.50	0.91
4.00	0.99	10.25	3.50	16.50	1.37	22.75	0.91
4.25	1.22	10.50	3.50	16.75	1.37	23.00	0.91
4.50	1.22	10.75	4.71	17.00	1.37	23.25	0.91
4.75	1.22	11.00	4.71	17.25	1.37	23.50	0.91
5.00	1.22	11.25	7.30	17.50	1.37	23.75	0.91
5.25	1.22	11.50	7.30	17.75	1.37	24.00	0.91
5.50	1.22	11.75	31.62	18.00	1.37		
5.75	1.22	12.00	83.90	18.25	1.37		
6.00	1.22	12.25	10.94	18.50	1.37		

```
--------------------
| CALIB            |
| NASHYD   (  0037)|   Area     (ha)=  26.06   Curve Number    (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.98

        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	6.167	1.22	12.250	83.90	18.33	1.37
0.167	0.00	6.250	1.22	12.333	10.95	18.42	1.37
0.250	0.00	6.333	1.52	12.417	10.94	18.50	1.37
0.333	0.76	6.417	1.52	12.500	10.94	18.58	1.37
0.417	0.76	6.500	1.52	12.583	10.94	18.67	1.37
0.500	0.76	6.583	1.52	12.667	10.94	18.75	1.37
0.583	0.76	6.667	1.52	12.750	10.94	18.83	1.37
0.667	0.76	6.750	1.52	12.833	5.62	18.92	1.37
0.750	0.76	6.833	1.52	12.917	5.62	19.00	1.37
0.833	0.76	6.917	1.52	13.000	5.62	19.08	1.37
0.917	0.76	7.000	1.52	13.083	5.62	19.17	1.37
1.000	0.76	7.083	1.52	13.167	5.62	19.25	1.37
1.083	0.76	7.167	1.52	13.250	5.62	19.33	1.37
1.167	0.76	7.250	1.52	13.333	1.06	19.42	1.37
1.250	0.76	7.333	1.52	13.417	1.06	19.50	1.37
1.333	0.76	7.417	1.52	13.500	1.06	19.58	1.37
1.417	0.76	7.500	1.52	13.583	1.06	19.67	1.37
1.500	0.76	7.583	1.52	13.667	1.06	19.75	1.37
1.583	0.76	7.667	1.52	13.750	1.06	19.83	1.37
1.667	0.76	7.750	1.52	13.833	6.23	19.92	1.37
1.750	0.76	7.833	1.52	13.917	6.23	20.00	1.37
1.833	0.76	7.917	1.52	14.000	6.23	20.08	1.37
1.917	0.76	8.000	1.52	14.083	6.23	20.17	1.37
2.000	0.76	8.083	1.52	14.167	6.23	20.25	1.37
2.083	1.37	8.167	1.52	14.250	6.23	20.33	0.91
2.167	1.37	8.250	1.52	14.333	2.28	20.42	0.91
2.250	1.37	8.333	2.05	14.417	2.28	20.50	0.91
2.333	0.99	8.417	2.05	14.500	2.28	20.58	0.91
2.417	0.99	8.500	2.05	14.583	2.28	20.67	0.91
2.500	0.99	8.583	2.05	14.667	2.28	20.75	0.91
2.583	0.99	8.667	2.05	14.750	2.28	20.83	0.91
2.667	0.99	8.750	2.05	14.833	2.28	20.92	0.91
2.750	0.99	8.833	2.05	14.917	2.28	21.00	0.91
2.833	0.99	8.917	2.05	15.000	2.28	21.08	0.91
2.917	0.99	9.000	2.05	15.083	2.28	21.17	0.91
3.000	0.99	9.083	2.05	15.167	2.28	21.25	0.91
3.083	0.99	9.167	2.05	15.250	2.28	21.33	0.91
3.167	0.99	9.250	2.05	15.333	2.28	21.42	0.91
3.250	0.99	9.333	2.43	15.417	2.28	21.50	0.91
3.333	0.99	9.417	2.43	15.500	2.28	21.58	0.91
3.417	0.99	9.500	2.43	15.583	2.28	21.67	0.91
3.500	0.99	9.583	2.43	15.667	2.28	21.75	0.91
3.583	0.99	9.667	2.43	15.750	2.28	21.83	0.91
3.667	0.99	9.750	2.43	15.833	2.28	21.92	0.91
3.750	0.99	9.833	2.74	15.917	2.28	22.00	0.91
3.833	0.99	9.917	2.74	16.000	2.28	22.08	0.91
3.917	0.99	10.000	2.74	16.083	2.28	22.17	0.91
4.000	0.99	10.083	2.74	16.167	2.28	22.25	0.91
4.083	0.99	10.167	2.74	16.250	2.28	22.33	0.91
4.167	0.99	10.250	2.74	16.333	1.37	22.42	0.91
4.250	0.99	10.333	3.50	16.417	1.37	22.50	0.91
4.333	1.22	10.417	3.50	16.500	1.37	22.58	0.91
4.417	1.22	10.500	3.50	16.583	1.37	22.67	0.91
4.500	1.22	10.583	3.50	16.667	1.37	22.75	0.91
4.583	1.22	10.667	3.50	16.750	1.37	22.83	0.91
4.667	1.22	10.750	3.50	16.833	1.37	22.92	0.91
4.750	1.22	10.833	4.71	16.917	1.37	23.00	0.91
4.833	1.22	10.917	4.71	17.000	1.37	23.08	0.91
4.917	1.22	11.000	4.71	17.083	1.37	23.17	0.91
5.000	1.22	11.083	4.71	17.167	1.37	23.25	0.91
5.083	1.22	11.167	4.71	17.250	1.37	23.33	0.91
5.167	1.22	11.250	4.71	17.333	1.37	23.42	0.91
5.250	1.22	11.333	7.30	17.417	1.37	23.50	0.91
5.333	1.22	11.417	7.30	17.500	1.37	23.58	0.91
5.417	1.22	11.500	7.30	17.583	1.37	23.67	0.91
5.500	1.22	11.583	7.30	17.667	1.37	23.75	0.91
5.583	1.22	11.667	7.30	17.750	1.37	23.83	0.91
5.667	1.22	11.750	7.30	17.833	1.37	23.92	0.91
5.750	1.22	11.833	31.61	17.917	1.37	24.00	0.91
5.833	1.22	11.917	31.62	18.000	1.37	24.08	0.91
5.917	1.22	12.000	31.62	18.083	1.37	24.17	0.91

	6.000	1.22	12.083	83.90	18.167	1.37	24.25	0.91
	6.083	1.22	12.167	83.90	18.250	1.37		

Unit Hyd Qpeak (cms)= 1.016

PEAK FLOW (cms)= 0.433 (i)
TIME TO PEAK (hrs)= 13.250
RUNOFF VOLUME (mm)= 21.292
TOTAL RAINFALL (mm)= 76.000
RUNOFF COEFFICIENT = 0.280

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

CALIB			
NASHYD (0038)	Area (ha)= 58.08	Curve Number (CN)= 63.0	
ID= 1 DT= 5.0 min	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.13		

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

ROUTE CHN(0030)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0037)	26.06	0.43	13.25	21.29	0.02	0.63
OUTFLOW: ID= 1 (0030)	26.06	0.37	13.75	21.29	0.02	0.63

---- 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	6.167	1.22	12.250	83.90	18.33	1.37
0.167	0.00	6.250	1.22	12.333	10.95	18.42	1.37
0.250	0.00	6.333	1.52	12.417	10.94	18.50	1.37
0.333	0.76	6.417	1.52	12.500	10.94	18.58	1.37
0.417	0.76	6.500	1.52	12.583	10.94	18.67	1.37
0.500	0.76	6.583	1.52	12.667	10.94	18.75	1.37
0.583	0.76	6.667	1.52	12.750	10.94	18.83	1.37
0.667	0.76	6.750	1.52	12.833	5.62	18.92	1.37
0.750	0.76	6.833	1.52	12.917	5.62	19.00	1.37
0.833	0.76	6.917	1.52	13.000	5.62	19.08	1.37
0.917	0.76	7.000	1.52	13.083	5.62	19.17	1.37
1.000	0.76	7.083	1.52	13.167	5.62	19.25	1.37
1.083	0.76	7.167	1.52	13.250	5.62	19.33	1.37
1.167	0.76	7.250	1.52	13.333	1.06	19.42	1.37
1.250	0.76	7.333	1.52	13.417	1.06	19.50	1.37
1.333	0.76	7.417	1.52	13.500	1.06	19.58	1.37
1.417	0.76	7.500	1.52	13.583	1.06	19.67	1.37
1.500	0.76	7.583	1.52	13.667	1.06	19.75	1.37
1.583	0.76	7.667	1.52	13.750	1.06	19.83	1.37
1.667	0.76	7.750	1.52	13.833	6.23	19.92	1.37
1.750	0.76	7.833	1.52	13.917	6.23	20.00	1.37
1.833	0.76	7.917	1.52	14.000	6.23	20.08	1.37
1.917	0.76	8.000	1.52	14.083	6.23	20.17	1.37
2.000	0.76	8.083	1.52	14.167	6.23	20.25	1.37
2.083	1.37	8.167	1.52	14.250	6.23	20.33	0.91
2.167	1.37	8.250	1.52	14.333	2.28	20.42	0.91
2.250	1.37	8.333	2.05	14.417	2.28	20.50	0.91
2.333	0.99	8.417	2.05	14.500	2.28	20.58	0.91
2.417	0.99	8.500	2.05	14.583	2.28	20.67	0.91
2.500	0.99	8.583	2.05	14.667	2.28	20.75	0.91
2.583	0.99	8.667	2.05	14.750	2.28	20.83	0.91
2.667	0.99	8.750	2.05	14.833	2.28	20.92	0.91
2.750	0.99	8.833	2.05	14.917	2.28	21.00	0.91
2.833	0.99	8.917	2.05	15.000	2.28	21.08	0.91
2.917	0.99	9.000	2.05	15.083	2.28	21.17	0.91
3.000	0.99	9.083	2.05	15.167	2.28	21.25	0.91
3.083	0.99	9.167	2.05	15.250	2.28	21.33	0.91
3.167	0.99	9.250	2.05	15.333	2.28	21.42	0.91
3.250	0.99	9.333	2.43	15.417	2.28	21.50	0.91
3.333	0.99	9.417	2.43	15.500	2.28	21.58	0.91
3.417	0.99	9.500	2.43	15.583	2.28	21.67	0.91
3.500	0.99	9.583	2.43	15.667	2.28	21.75	0.91
3.583	0.99	9.667	2.43	15.750	2.28	21.83	0.91
3.667	0.99	9.750	2.43	15.833	2.28	21.92	0.91
3.750	0.99	9.833	2.74	15.917	2.28	22.00	0.91

3.833	0.99	9.917	2.74	16.000	2.28	22.08	0.91
3.917	0.99	10.000	2.74	16.083	2.28	22.17	0.91
4.000	0.99	10.083	2.74	16.167	2.28	22.25	0.91
4.083	0.99	10.167	2.74	16.250	2.28	22.33	0.91
4.167	0.99	10.250	2.74	16.333	1.37	22.42	0.91
4.250	0.99	10.333	3.50	16.417	1.37	22.50	0.91
4.333	1.22	10.417	3.50	16.500	1.37	22.58	0.91
4.417	1.22	10.500	3.50	16.583	1.37	22.67	0.91
4.500	1.22	10.583	3.50	16.667	1.37	22.75	0.91
4.583	1.22	10.667	3.50	16.750	1.37	22.83	0.91
4.667	1.22	10.750	3.50	16.833	1.37	22.92	0.91
4.750	1.22	10.833	4.71	16.917	1.37	23.00	0.91
4.833	1.22	10.917	4.71	17.000	1.37	23.08	0.91
4.917	1.22	11.000	4.71	17.083	1.37	23.17	0.91
5.000	1.22	11.083	4.71	17.167	1.37	23.25	0.91
5.083	1.22	11.167	4.71	17.250	1.37	23.33	0.91
5.167	1.22	11.250	4.71	17.333	1.37	23.42	0.91
5.250	1.22	11.333	7.30	17.417	1.37	23.50	0.91
5.333	1.22	11.417	7.30	17.500	1.37	23.58	0.91
5.417	1.22	11.500	7.30	17.583	1.37	23.67	0.91
5.500	1.22	11.583	7.30	17.667	1.37	23.75	0.91
5.583	1.22	11.667	7.30	17.750	1.37	23.83	0.91
5.667	1.22	11.750	7.30	17.833	1.37	23.92	0.91
5.750	1.22	11.833	31.61	17.917	1.37	24.00	0.91
5.833	1.22	11.917	31.62	18.000	1.37	24.08	0.91
5.917	1.22	12.000	31.62	18.083	1.37	24.17	0.91
6.000	1.22	12.083	83.90	18.167	1.37	24.25	0.91
6.083	1.22	12.167	83.90	18.250	1.37		

Unit Hyd Qpeak (cms)= 1.963

PEAK FLOW (cms)= 0.866 (i)
TIME TO PEAK (hrs)= 13.417
RUNOFF VOLUME (mm)= 21.292
TOTAL RAINFALL (mm)= 76.000
RUNOFF COEFFICIENT = 0.280

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

ROUTE CHN(0031)
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0038)	58.08	0.87	13.42	21.29	0.05	0.23
OUTFLOW: ID= 1 (0031)	58.08	0.48	14.75	21.28	0.03	0.20

ADD HYD (0042)|		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0030):	26.06	0.375	13.75	21.29
	+ ID2= 2 (0031):	58.08	0.478	14.75	21.28
	ID = 3 (0042):	84.14	0.798	14.08	21.28

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\cd380508-3b11-4f9d-a99e-b67677c9d0b7\scen
Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\cd380508-3b11-4f9d-a99e-b67677c9d0b7\scen

DATE: 05-01-2024 TIME: 03:35:12

USER:

COMMENTS: _____

** SIMULATION : 03. 10-Year-24-Hour-SCS-Type- **

READ STORM	Filename: C:\Users\mmsingh\AppData\Local\Temp\a3c66b7a-4039-49fc-a032-24b748c3ad03\efc9bd42
Ptotal= 89.90 mm	Comments: New DesignStormManualInput

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.80	12.50	12.95	18.75	1.62
0.25	0.90	6.50	1.80	12.75	6.65	19.00	1.62
0.50	0.90	6.75	1.80	13.00	6.65	19.25	1.62
0.75	0.90	7.00	1.80	13.25	1.26	19.50	1.62
1.00	0.90	7.25	1.80	13.50	1.26	19.75	1.62
1.25	0.90	7.50	1.80	13.75	7.37	20.00	1.62
1.50	0.90	7.75	1.80	14.00	7.37	20.25	1.08
1.75	0.90	8.00	1.80	14.25	2.70	20.50	1.08
2.00	1.62	8.25	2.43	14.50	2.70	20.75	1.08
2.25	1.17	8.50	2.43	14.75	2.70	21.00	1.08
2.50	1.17	8.75	2.43	15.00	2.70	21.25	1.08
2.75	1.17	9.00	2.43	15.25	2.70	21.50	1.08
3.00	1.17	9.25	2.88	15.50	2.70	21.75	1.08
3.25	1.17	9.50	2.88	15.75	2.70	22.00	1.08
3.50	1.17	9.75	3.24	16.00	2.70	22.25	1.08
3.75	1.17	10.00	3.24	16.25	1.62	22.50	1.08
4.00	1.17	10.25	4.14	16.50	1.62	22.75	1.08
4.25	1.44	10.50	4.14	16.75	1.62	23.00	1.08
4.50	1.44	10.75	5.57	17.00	1.62	23.25	1.08
4.75	1.44	11.00	5.57	17.25	1.62	23.50	1.08
5.00	1.44	11.25	8.63	17.50	1.62	23.75	1.08
5.25	1.44	11.50	8.63	17.75	1.62	24.00	1.08
5.50	1.44	11.75	37.40	18.00	1.62		
5.75	1.44	12.00	99.25	18.25	1.62		
6.00	1.44	12.25	12.95	18.50	1.62		

CALIB				
NASHYD (0037)	Area (ha)= 26.06	Curve Number (CN)= 63.0
ID= 1 DT= 5.0 min	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.98	

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	6.167	1.44	12.250	99.25	18.33	1.62
0.167	0.00	6.250	1.44	12.333	12.96	18.42	1.62
0.250	0.00	6.333	1.80	12.417	12.95	18.50	1.62
0.333	0.90	6.417	1.80	12.500	12.95	18.58	1.62
0.417	0.90	6.500	1.80	12.583	12.95	18.67	1.62
0.500	0.90	6.583	1.80	12.667	12.95	18.75	1.62
0.583	0.90	6.667	1.80	12.750	12.95	18.83	1.62
0.667	0.90	6.750	1.80	12.833	6.65	18.92	1.62
0.750	0.90	6.833	1.80	12.917	6.65	19.00	1.62
0.833	0.90	6.917	1.80	13.000	6.65	19.08	1.62
0.917	0.90	7.000	1.80	13.083	6.65	19.17	1.62
1.000	0.90	7.083	1.80	13.167	6.65	19.25	1.62
1.083	0.90	7.167	1.80	13.250	6.65	19.33	1.62
1.167	0.90	7.250	1.80	13.333	1.26	19.42	1.62
1.250	0.90	7.333	1.80	13.417	1.26	19.50	1.62
1.333	0.90	7.417	1.80	13.500	1.26	19.58	1.62
1.417	0.90	7.500	1.80	13.583	1.26	19.67	1.62
1.500	0.90	7.583	1.80	13.667	1.26	19.75	1.62
1.583	0.90	7.667	1.80	13.750	1.26	19.83	1.62
1.667	0.90	7.750	1.80	13.833	7.37	19.92	1.62
1.750	0.90	7.833	1.80	13.917	7.37	20.00	1.62
1.833	0.90	7.917	1.80	14.000	7.37	20.08	1.62
1.917	0.90	8.000	1.80	14.083	7.37	20.17	1.62
2.000	0.90	8.083	1.80	14.167	7.37	20.25	1.62
2.083	1.62	8.167	1.80	14.250	7.37	20.33	1.08
2.167	1.62	8.250	1.80	14.333	2.70	20.42	1.08
2.250	1.62	8.333	2.43	14.417	2.70	20.50	1.08
2.333	1.17	8.417	2.43	14.500	2.70	20.58	1.08
2.417	1.17	8.500	2.43	14.583	2.70	20.67	1.08
2.500	1.17	8.583	2.43	14.667	2.70	20.75	1.08
2.583	1.17	8.667	2.43	14.750	2.70	20.83	1.08
2.667	1.17	8.750	2.43	14.833	2.70	20.92	1.08
2.750	1.17	8.833	2.43	14.917	2.70	21.00	1.08
2.833	1.17	8.917	2.43	15.000	2.70	21.08	1.08
2.917	1.17	9.000	2.43	15.083	2.70	21.17	1.08
3.000	1.17	9.083	2.43	15.167	2.70	21.25	1.08
3.083	1.17	9.167	2.43	15.250	2.70	21.33	1.08
3.167	1.17	9.250	2.43	15.333	2.70	21.42	1.08
3.250	1.17	9.333	2.88	15.417	2.70	21.50	1.08
3.333	1.17	9.417	2.88	15.500	2.70	21.58	1.08
3.417	1.17	9.500	2.88	15.583	2.70	21.67	1.08
3.500	1.17	9.583	2.88	15.667	2.70	21.75	1.08
3.583	1.17	9.667	2.88	15.750	2.70	21.83	1.08
3.667	1.17	9.750	2.88	15.833	2.70	21.92	1.08
3.750	1.17	9.833	3.24	15.917	2.70	22.00	1.08
3.833	1.17	9.917	3.24	16.000	2.70	22.08	1.08

3.917	1.17	10.000	3.24	16.083	2.70	22.17	1.08
4.000	1.17	10.083	3.24	16.167	2.70	22.25	1.08
4.083	1.17	10.167	3.24	16.250	2.70	22.33	1.08
4.167	1.17	10.250	3.24	16.333	1.62	22.42	1.08
4.250	1.17	10.333	4.14	16.417	1.62	22.50	1.08
4.333	1.44	10.417	4.14	16.500	1.62	22.58	1.08
4.417	1.44	10.500	4.14	16.583	1.62	22.67	1.08
4.500	1.44	10.583	4.14	16.667	1.62	22.75	1.08
4.583	1.44	10.667	4.14	16.750	1.62	22.83	1.08
4.667	1.44	10.750	4.14	16.833	1.62	22.92	1.08
4.750	1.44	10.833	5.57	16.917	1.62	23.00	1.08
4.833	1.44	10.917	5.57	17.000	1.62	23.08	1.08
4.917	1.44	11.000	5.57	17.083	1.62	23.17	1.08
5.000	1.44	11.083	5.57	17.167	1.62	23.25	1.08
5.083	1.44	11.167	5.57	17.250	1.62	23.33	1.08
5.167	1.44	11.250	5.57	17.333	1.62	23.42	1.08
5.250	1.44	11.333	8.63	17.417	1.62	23.50	1.08
5.333	1.44	11.417	8.63	17.500	1.62	23.58	1.08
5.417	1.44	11.500	8.63	17.583	1.62	23.67	1.08
5.500	1.44	11.583	8.63	17.667	1.62	23.75	1.08
5.583	1.44	11.667	8.63	17.750	1.62	23.83	1.08
5.667	1.44	11.750	8.63	17.833	1.62	23.92	1.08
5.750	1.44	11.833	37.40	17.917	1.62	24.00	1.08
5.833	1.44	11.917	37.40	18.000	1.62	24.08	1.08
5.917	1.44	12.000	37.40	18.083	1.62	24.17	1.08
6.000	1.44	12.083	99.24	18.167	1.62	24.25	1.08
6.083	1.44	12.167	99.25	18.250	1.62		

Unit Hyd Qpeak (cms)= 1.016

PEAK FLOW (cms)= 0.597 (i)
TIME TO PEAK (hrs)= 13.250
RUNOFF VOLUME (mm)= 29.028
TOTAL RAINFALL (mm)= 89.900
RUNOFF COEFFICIENT = 0.323

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

ROUTE CHN(0030)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

		<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0037)		26.06	0.60	13.25	29.03	0.03	0.63
OUTFLOW: ID= 1 (0030)		26.06	0.52	13.75	29.03	0.02	0.63

CALIB					
NASHYD (0038)	Area (ha)= 58.08	Curve Number (CN)= 63.0			
ID= 1 DT= 5.0 min	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= 1.13				

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	6.167	1.44	12.250	99.25	18.33	1.62
0.167	0.00	6.250	1.44	12.333	12.96	18.42	1.62
0.250	0.00	6.333	1.80	12.417	12.95	18.50	1.62
0.333	0.90	6.417	1.80	12.500	12.95	18.58	1.62
0.417	0.90	6.500	1.80	12.583	12.95	18.67	1.62
0.500	0.90	6.583	1.80	12.667	12.95	18.75	1.62
0.583	0.90	6.667	1.80	12.750	12.95	18.83	1.62
0.667	0.90	6.750	1.80	12.833	6.65	18.92	1.62
0.750	0.90	6.833	1.80	12.917	6.65	19.00	1.62
0.833	0.90	6.917	1.80	13.000	6.65	19.08	1.62
0.917	0.90	7.000	1.80	13.083	6.65	19.17	1.62
1.000	0.90	7.083	1.80	13.167	6.65	19.25	1.62
1.083	0.90	7.167	1.80	13.250	6.65	19.33	1.62
1.167	0.90	7.250	1.80	13.333	1.26	19.42	1.62
1.250	0.90	7.333	1.80	13.417	1.26	19.50	1.62
1.333	0.90	7.417	1.80	13.500	1.26	19.58	1.62
1.417	0.90	7.500	1.80	13.583	1.26	19.67	1.62
1.500	0.90	7.583	1.80	13.667	1.26	19.75	1.62
1.583	0.90	7.667	1.80	13.750	1.26	19.83	1.62
1.667	0.90	7.750	1.80	13.833	7.37	19.92	1.62

1.750	0.90	7.833	1.80	13.917	7.37	20.00	1.62
1.833	0.90	7.917	1.80	14.000	7.37	20.08	1.62
1.917	0.90	8.000	1.80	14.083	7.37	20.17	1.62
2.000	0.90	8.083	1.80	14.167	7.37	20.25	1.62
2.083	1.62	8.167	1.80	14.250	7.37	20.33	1.08
2.167	1.62	8.250	1.80	14.333	2.70	20.42	1.08
2.250	1.62	8.333	2.43	14.417	2.70	20.50	1.08
2.333	1.17	8.417	2.43	14.500	2.70	20.58	1.08
2.417	1.17	8.500	2.43	14.583	2.70	20.67	1.08
2.500	1.17	8.583	2.43	14.667	2.70	20.75	1.08
2.583	1.17	8.667	2.43	14.750	2.70	20.83	1.08
2.667	1.17	8.750	2.43	14.833	2.70	20.92	1.08
2.750	1.17	8.833	2.43	14.917	2.70	21.00	1.08
2.833	1.17	8.917	2.43	15.000	2.70	21.08	1.08
2.917	1.17	9.000	2.43	15.083	2.70	21.17	1.08
3.000	1.17	9.083	2.43	15.167	2.70	21.25	1.08
3.083	1.17	9.167	2.43	15.250	2.70	21.33	1.08
3.167	1.17	9.250	2.43	15.333	2.70	21.42	1.08
3.250	1.17	9.333	2.88	15.417	2.70	21.50	1.08
3.333	1.17	9.417	2.88	15.500	2.70	21.58	1.08
3.417	1.17	9.500	2.88	15.583	2.70	21.67	1.08
3.500	1.17	9.583	2.88	15.667	2.70	21.75	1.08
3.583	1.17	9.667	2.88	15.750	2.70	21.83	1.08
3.667	1.17	9.750	2.88	15.833	2.70	21.92	1.08
3.750	1.17	9.833	3.24	15.917	2.70	22.00	1.08
3.833	1.17	9.917	3.24	16.000	2.70	22.08	1.08
3.917	1.17	10.000	3.24	16.083	2.70	22.17	1.08
4.000	1.17	10.083	3.24	16.167	2.70	22.25	1.08
4.083	1.17	10.167	3.24	16.250	2.70	22.33	1.08
4.167	1.17	10.250	3.24	16.333	1.62	22.42	1.08
4.250	1.17	10.333	4.14	16.417	1.62	22.50	1.08
4.333	1.44	10.417	4.14	16.500	1.62	22.58	1.08
4.417	1.44	10.500	4.14	16.583	1.62	22.67	1.08
4.500	1.44	10.583	4.14	16.667	1.62	22.75	1.08
4.583	1.44	10.667	4.14	16.750	1.62	22.83	1.08
4.667	1.44	10.750	4.14	16.833	1.62	22.92	1.08
4.750	1.44	10.833	5.57	16.917	1.62	23.00	1.08
4.833	1.44	10.917	5.57	17.000	1.62	23.08	1.08
4.917	1.44	11.000	5.57	17.083	1.62	23.17	1.08
5.000	1.44	11.083	5.57	17.167	1.62	23.25	1.08
5.083	1.44	11.167	5.57	17.250	1.62	23.33	1.08
5.167	1.44	11.250	5.57	17.333	1.62	23.42	1.08
5.250	1.44	11.333	8.63	17.417	1.62	23.50	1.08
5.333	1.44	11.417	8.63	17.500	1.62	23.58	1.08
5.417	1.44	11.500	8.63	17.583	1.62	23.67	1.08
5.500	1.44	11.583	8.63	17.667	1.62	23.75	1.08
5.583	1.44	11.667	8.63	17.750	1.62	23.83	1.08
5.667	1.44	11.750	8.63	17.833	1.62	23.92	1.08
5.750	1.44	11.833	37.40	17.917	1.62	24.00	1.08
5.833	1.44	11.917	37.40	18.000	1.62	24.08	1.08
5.917	1.44	12.000	37.40	18.083	1.62	24.17	1.08
6.000	1.44	12.083	99.24	18.167	1.62	24.25	1.08
6.083	1.44	12.167	99.25	18.250	1.62		

Unit Hyd Qpeak (cms)= 1.963

PEAK FLOW (cms)= 1.195 (i)
TIME TO PEAK (hrs)= 13.417
RUNOFF VOLUME (mm)= 29.028
TOTAL RAINFALL (mm)= 89.900
RUNOFF COEFFICIENT = 0.323

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

ROUTE CHN(0031)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0038)	58.08	1.19	13.42	29.03	0.06	0.27
OUTFLOW: ID= 1 (0031)	58.08	0.69	14.58	29.01	0.04	0.21

ADD HYD (0042)		
1 + 2 = 3		

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0030):	26.06	0.517	13.75	29.03
+ ID2= 2 (0031):	58.08	0.686	14.58	29.01

```
       ID = 3 (  0042):    84.14   1.146    14.08    29.02

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

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

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86e9-d1c81bbaf91e\23602133-5ba5-411e-9bde-b32f51649ef1\scen
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DATE: 05-01-2024                          TIME: 03:35:12

USER:


COMMENTS: _____________________________________________________________

-------------------------------------------------------------------------------
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  ***********************************************
  ** SIMULATION : 04. 25-Year-24-Hour-SCS-Type- **
  ***********************************************


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|                  |              ata\Local\Temp\
|                  |              a3c66b7a-4039-49fc-a032-24b748c3ad03\6b809c2e
| Ptotal=107.50 mm |    Comments: 25-Year-24-Hour-SCS-Type-II
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```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	2.15	12.50	15.48	18.75	1.93
0.25	1.07	6.50	2.15	12.75	7.95	19.00	1.94
0.50	1.07	6.75	2.15	13.00	7.96	19.25	1.93
0.75	1.07	7.00	2.15	13.25	1.50	19.50	1.94
1.00	1.07	7.25	2.15	13.50	1.50	19.75	1.93
1.25	1.08	7.50	2.15	13.75	8.82	20.00	1.94
1.50	1.07	7.75	2.15	14.00	8.82	20.25	1.29
1.75	1.08	8.00	2.15	14.25	3.22	20.50	1.29
2.00	1.93	8.25	2.90	14.50	3.22	20.75	1.29
2.25	1.40	8.50	2.90	14.75	3.22	21.00	1.29
2.50	1.40	8.75	2.90	15.00	3.23	21.25	1.29
2.75	1.40	9.00	2.90	15.25	3.22	21.50	1.29
3.00	1.40	9.25	3.44	15.50	3.22	21.75	1.29
3.25	1.40	9.50	3.44	15.75	3.22	22.00	1.29
3.50	1.40	9.75	3.87	16.00	3.22	22.25	1.29
3.75	1.40	10.00	3.87	16.25	1.94	22.50	1.29
4.00	1.40	10.25	4.95	16.50	1.93	22.75	1.29
4.25	1.72	10.50	4.95	16.75	1.93	23.00	1.29
4.50	1.72	10.75	6.67	17.00	1.94	23.25	1.29
4.75	1.72	11.00	6.66	17.25	1.93	23.50	1.29
5.00	1.72	11.25	10.32	17.50	1.94	23.75	1.29
5.25	1.72	11.50	10.32	17.75	1.93	24.00	1.29
5.50	1.72	11.75	44.72	18.00	1.94		
5.75	1.72	12.00	118.68	18.25	1.93		
6.00	1.72	12.25	15.48	18.50	1.94		

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| CALIB            |
| NASHYD   (  0037)|   Area     (ha)=  26.06   Curve Number    (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.98

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
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---- 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	6.167	1.72	12.250	118.68	18.33	1.94
0.167	0.00	6.250	1.72	12.333	15.49	18.42	1.93
0.250	0.00	6.333	2.15	12.417	15.48	18.50	1.93
0.333	1.08	6.417	2.15	12.500	15.48	18.58	1.94
0.417	1.07	6.500	2.15	12.583	15.48	18.67	1.94
0.500	1.07	6.583	2.15	12.667	15.48	18.75	1.94
0.583	1.08	6.667	2.15	12.750	15.48	18.83	1.94
0.667	1.07	6.750	2.15	12.833	7.96	18.92	1.93
0.750	1.07	6.833	2.15	12.917	7.95	19.00	1.93
0.833	1.07	6.917	2.15	13.000	7.95	19.08	1.94
0.917	1.07	7.000	2.15	13.083	7.95	19.17	1.94
1.000	1.07	7.083	2.15	13.167	7.96	19.25	1.94
1.083	1.07	7.167	2.15	13.250	7.96	19.33	1.94
1.167	1.07	7.250	2.15	13.333	1.51	19.42	1.93
1.250	1.07	7.333	2.15	13.417	1.50	19.50	1.94
1.333	1.08	7.417	2.15	13.500	1.50	19.58	1.94
1.417	1.08	7.500	2.15	13.583	1.50	19.67	1.94
1.500	1.08	7.583	2.15	13.667	1.50	19.75	1.94
1.583	1.07	7.667	2.15	13.750	1.50	19.83	1.93
1.667	1.07	7.750	2.15	13.833	8.81	19.92	1.93
1.750	1.08	7.833	2.15	13.917	8.82	20.00	1.94
1.833	1.08	7.917	2.15	14.000	8.82	20.08	1.94
1.917	1.08	8.000	2.15	14.083	8.81	20.17	1.94
2.000	1.08	8.083	2.15	14.167	8.82	20.25	1.93
2.083	1.93	8.167	2.15	14.250	8.82	20.33	1.29
2.167	1.93	8.250	2.15	14.333	3.23	20.42	1.29

2.250	1.93	8.333	2.90	14.417	3.22	20.50	1.29
2.333	1.40	8.417	2.90	14.500	3.22	20.58	1.29
2.417	1.40	8.500	2.90	14.583	3.22	20.67	1.29
2.500	1.40	8.583	2.90	14.667	3.22	20.75	1.29
2.583	1.40	8.667	2.90	14.750	3.22	20.83	1.29
2.667	1.40	8.750	2.90	14.833	3.22	20.92	1.29
2.750	1.40	8.833	2.90	14.917	3.22	21.00	1.29
2.833	1.40	8.917	2.90	15.000	3.22	21.08	1.29
2.917	1.40	9.000	2.90	15.083	3.23	21.17	1.29
3.000	1.40	9.083	2.90	15.167	3.23	21.25	1.29
3.083	1.40	9.167	2.90	15.250	3.23	21.33	1.29
3.167	1.40	9.250	2.90	15.333	3.22	21.42	1.29
3.250	1.40	9.333	3.44	15.417	3.22	21.50	1.29
3.333	1.40	9.417	3.44	15.500	3.22	21.58	1.29
3.417	1.40	9.500	3.44	15.583	3.22	21.67	1.29
3.500	1.40	9.583	3.44	15.667	3.22	21.75	1.29
3.583	1.40	9.667	3.44	15.750	3.22	21.83	1.29
3.667	1.40	9.750	3.44	15.833	3.22	21.92	1.29
3.750	1.40	9.833	3.87	15.917	3.22	22.00	1.29
3.833	1.40	9.917	3.87	16.000	3.22	22.08	1.29
3.917	1.40	10.000	3.87	16.083	3.22	22.17	1.29
4.000	1.40	10.083	3.87	16.167	3.22	22.25	1.29
4.083	1.40	10.167	3.87	16.250	3.22	22.33	1.29
4.167	1.40	10.250	3.87	16.333	1.94	22.42	1.29
4.250	1.40	10.333	4.94	16.417	1.94	22.50	1.29
4.333	1.72	10.417	4.95	16.500	1.94	22.58	1.29
4.417	1.72	10.500	4.95	16.583	1.94	22.67	1.29
4.500	1.72	10.583	4.94	16.667	1.93	22.75	1.29
4.583	1.72	10.667	4.95	16.750	1.93	22.83	1.29
4.667	1.72	10.750	4.95	16.833	1.94	22.92	1.29
4.750	1.72	10.833	6.66	16.917	1.93	23.00	1.29
4.833	1.72	10.917	6.67	17.000	1.93	23.08	1.29
4.917	1.72	11.000	6.67	17.083	1.94	23.17	1.29
5.000	1.72	11.083	6.66	17.167	1.94	23.25	1.29
5.083	1.72	11.167	6.66	17.250	1.94	23.33	1.29
5.167	1.72	11.250	6.66	17.333	1.94	23.42	1.29
5.250	1.72	11.333	10.32	17.417	1.93	23.50	1.29
5.333	1.72	11.417	10.32	17.500	1.93	23.58	1.29
5.417	1.72	11.500	10.32	17.583	1.94	23.67	1.29
5.500	1.72	11.583	10.32	17.667	1.94	23.75	1.29
5.583	1.72	11.667	10.32	17.750	1.94	23.83	1.29
5.667	1.72	11.750	10.32	17.833	1.94	23.92	1.29
5.750	1.72	11.833	44.72	17.917	1.93	24.00	1.29
5.833	1.72	11.917	44.72	18.000	1.93	24.08	1.29
5.917	1.72	12.000	44.72	18.083	1.94	24.17	1.29
6.000	1.72	12.083	118.67	18.167	1.94	24.25	1.29
6.083	1.72	12.167	118.68	18.250	1.94		

Unit Hyd Qpeak (cms)= 1.016

PEAK FLOW (cms)= 0.828 (i)
TIME TO PEAK (hrs)= 13.167
RUNOFF VOLUME (mm)= 39.812
TOTAL RAINFALL (mm)= 107.500
RUNOFF COEFFICIENT = 0.370

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

| ROUTE CHN(0030)|

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

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0037)	26.06	0.83	13.17	39.81	0.04	0.63
OUTFLOW: ID= 1 (0030)	26.06	0.72	13.67	39.81	0.03	0.63

CALIB	
NASHYD (0038)	Area (ha)= 58.08 Curve Number (CN)= 63.0
ID= 1 DT= 5.0 min	Ia (mm)= 8.00 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 1.13

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	6.167	1.72	12.250	118.68	18.33	1.94
0.167	0.00	6.250	1.72	12.333	15.49	18.42	1.93
0.250	0.00	6.333	2.15	12.417	15.48	18.50	1.93
0.333	1.08	6.417	2.15	12.500	15.48	18.58	1.94
0.417	1.07	6.500	2.15	12.583	15.48	18.67	1.94
0.500	1.07	6.583	2.15	12.667	15.48	18.75	1.94
0.583	1.08	6.667	2.15	12.750	15.48	18.83	1.94
0.667	1.07	6.750	2.15	12.833	7.96	18.92	1.93
0.750	1.07	6.833	2.15	12.917	7.95	19.00	1.93
0.833	1.07	6.917	2.15	13.000	7.95	19.08	1.94
0.917	1.07	7.000	2.15	13.083	7.95	19.17	1.94
1.000	1.07	7.083	2.15	13.167	7.96	19.25	1.94
1.083	1.07	7.167	2.15	13.250	7.96	19.33	1.94
1.167	1.07	7.250	2.15	13.333	1.51	19.42	1.93
1.250	1.07	7.333	2.15	13.417	1.50	19.50	1.94
1.333	1.08	7.417	2.15	13.500	1.50	19.58	1.94
1.417	1.08	7.500	2.15	13.583	1.50	19.67	1.94
1.500	1.08	7.583	2.15	13.667	1.50	19.75	1.94
1.583	1.07	7.667	2.15	13.750	1.50	19.83	1.93
1.667	1.07	7.750	2.15	13.833	8.81	19.92	1.93
1.750	1.08	7.833	2.15	13.917	8.82	20.00	1.94
1.833	1.08	7.917	2.15	14.000	8.82	20.08	1.94
1.917	1.08	8.000	2.15	14.083	8.81	20.17	1.94
2.000	1.08	8.083	2.15	14.167	8.82	20.25	1.93
2.083	1.93	8.167	2.15	14.250	8.82	20.33	1.29
2.167	1.93	8.250	2.15	14.333	3.23	20.42	1.29
2.250	1.93	8.333	2.90	14.417	3.22	20.50	1.29
2.333	1.40	8.417	2.90	14.500	3.22	20.58	1.29
2.417	1.40	8.500	2.90	14.583	3.22	20.67	1.29
2.500	1.40	8.583	2.90	14.667	3.22	20.75	1.29
2.583	1.40	8.667	2.90	14.750	3.22	20.83	1.29
2.667	1.40	8.750	2.90	14.833	3.22	20.92	1.29
2.750	1.40	8.833	2.90	14.917	3.22	21.00	1.29
2.833	1.40	8.917	2.90	15.000	3.22	21.08	1.29
2.917	1.40	9.000	2.90	15.083	3.23	21.17	1.29
3.000	1.40	9.083	2.90	15.167	3.23	21.25	1.29
3.083	1.40	9.167	2.90	15.250	3.23	21.33	1.29
3.167	1.40	9.250	2.90	15.333	3.22	21.42	1.29
3.250	1.40	9.333	3.44	15.417	3.22	21.50	1.29
3.333	1.40	9.417	3.44	15.500	3.22	21.58	1.29
3.417	1.40	9.500	3.44	15.583	3.22	21.67	1.29
3.500	1.40	9.583	3.44	15.667	3.22	21.75	1.29
3.583	1.40	9.667	3.44	15.750	3.22	21.83	1.29
3.667	1.40	9.750	3.44	15.833	3.22	21.92	1.29
3.750	1.40	9.833	3.87	15.917	3.22	22.00	1.29
3.833	1.40	9.917	3.87	16.000	3.22	22.08	1.29
3.917	1.40	10.000	3.87	16.083	3.22	22.17	1.29
4.000	1.40	10.083	3.87	16.167	3.22	22.25	1.29
4.083	1.40	10.167	3.87	16.250	3.22	22.33	1.29
4.167	1.40	10.250	3.87	16.333	1.94	22.42	1.29
4.250	1.40	10.333	4.94	16.417	1.94	22.50	1.29
4.333	1.72	10.417	4.95	16.500	1.94	22.58	1.29
4.417	1.72	10.500	4.95	16.583	1.94	22.67	1.29
4.500	1.72	10.583	4.94	16.667	1.93	22.75	1.29
4.583	1.72	10.667	4.95	16.750	1.93	22.83	1.29
4.667	1.72	10.750	4.95	16.833	1.94	22.92	1.29
4.750	1.72	10.833	6.66	16.917	1.93	23.00	1.29
4.833	1.72	10.917	6.67	17.000	1.93	23.08	1.29
4.917	1.72	11.000	6.67	17.083	1.94	23.17	1.29
5.000	1.72	11.083	6.66	17.167	1.94	23.25	1.29
5.083	1.72	11.167	6.66	17.250	1.94	23.33	1.29
5.167	1.72	11.250	6.66	17.333	1.94	23.42	1.29
5.250	1.72	11.333	10.32	17.417	1.93	23.50	1.29
5.333	1.72	11.417	10.32	17.500	1.93	23.58	1.29
5.417	1.72	11.500	10.32	17.583	1.94	23.67	1.29
5.500	1.72	11.583	10.32	17.667	1.94	23.75	1.29
5.583	1.72	11.667	10.32	17.750	1.94	23.83	1.29
5.667	1.72	11.750	10.32	17.833	1.94	23.92	1.29
5.750	1.72	11.833	44.72	17.917	1.93	24.00	1.29
5.833	1.72	11.917	44.72	18.000	1.93	24.08	1.29
5.917	1.72	12.000	44.72	18.083	1.94	24.17	1.29
6.000	1.72	12.083	118.67	18.167	1.94	24.25	1.29
6.083	1.72	12.167	118.68	18.250	1.94		

Unit Hyd Qpeak (cms)= 1.963

PEAK FLOW (cms)= 1.657 (i)
TIME TO PEAK (hrs)= 13.333
RUNOFF VOLUME (mm)= 39.812
TOTAL RAINFALL (mm)= 107.500
RUNOFF COEFFICIENT = 0.370

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

ROUTE CHN(0031)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06

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       1.15   253.47    .157E+06     295.3          2.85       8.88
       1.22   253.54    .172E+06     327.0          2.89       8.75

                                <---- hydrograph ---->   <-pipe / channel->
                             AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                             (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0038)   58.08     1.66   13.33  39.81      0.07      0.36
   OUTFLOW: ID= 1 (  0031)   58.08     1.02   14.17  39.80      0.05      0.25



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--------------------
| ADD HYD  (  0042)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0030):    26.06   0.717    13.67    39.81
     + ID2= 2 (  0031):    58.08   1.023    14.17    39.80
       ================================================
       ID = 3 (  0042):    84.14   1.704    13.92    39.80

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\1d33317d-a57f-4908-acae-b8a863ceb2d8\scen
  Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
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DATE: 05-01-2024                          TIME: 03:35:12

USER:



COMMENTS: _____________________________________________________________
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  ***********************************************
  ** SIMULATION : 05. 50-Year-24-Hour-SCS-Type- **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              a3c66b7a-4039-49fc-a032-24b748c3ad03\ada53171
| Ptotal=120.60 mm |    Comments: 50-Year-24-Hour-SCS-Type-II
--------------------
                TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                 hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
                0.00     0.00 |  6.25     2.41 | 12.50    17.37 | 18.75     2.17
                0.25     1.21 |  6.50     2.41 | 12.75     8.92 | 19.00     2.17
                0.50     1.21 |  6.75     2.41 | 13.00     8.92 | 19.25     2.17
                0.75     1.21 |  7.00     2.41 | 13.25     1.69 | 19.50     2.17
                1.00     1.21 |  7.25     2.41 | 13.50     1.69 | 19.75     2.17
                1.25     1.21 |  7.50     2.41 | 13.75     9.89 | 20.00     2.17
                1.50     1.21 |  7.75     2.41 | 14.00     9.89 | 20.25     1.45
                1.75     1.21 |  8.00     2.41 | 14.25     3.62 | 20.50     1.45
                2.00     2.17 |  8.25     3.26 | 14.50     3.62 | 20.75     1.45
                2.25     1.57 |  8.50     3.26 | 14.75     3.62 | 21.00     1.45
                2.50     1.57 |  8.75     3.26 | 15.00     3.62 | 21.25     1.45
                2.75     1.57 |  9.00     3.26 | 15.25     3.62 | 21.50     1.45
                3.00     1.57 |  9.25     3.86 | 15.50     3.62 | 21.75     1.45
                3.25     1.57 |  9.50     3.86 | 15.75     3.62 | 22.00     1.45
                3.50     1.57 |  9.75     4.34 | 16.00     3.62 | 22.25     1.45
                3.75     1.57 | 10.00     4.34 | 16.25     2.17 | 22.50     1.45
                4.00     1.57 | 10.25     5.55 | 16.50     2.17 | 22.75     1.45
                4.25     1.93 | 10.50     5.55 | 16.75     2.17 | 23.00     1.45
                4.50     1.93 | 10.75     7.48 | 17.00     2.17 | 23.25     1.45
                4.75     1.93 | 11.00     7.48 | 17.25     2.17 | 23.50     1.45
                5.00     1.93 | 11.25    11.58 | 17.50     2.17 | 23.75     1.45
                5.25     1.93 | 11.50    11.58 | 17.75     2.17 | 24.00     1.45
                5.50     1.93 | 11.75    50.17 | 18.00     2.17 |
                5.75     1.93 | 12.00   133.14 | 18.25     2.17 |
                6.00     1.93 | 12.25    17.37 | 18.50     2.17 |

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| CALIB            |
| NASHYD   (  0037)|   Area     (ha)=  26.06   Curve Number    (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.98

        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 | 6.167     1.93 |12.250   133.14 | 18.33     2.17
               0.167     0.00 | 6.250     1.93 |12.333    17.38 | 18.42     2.17
               0.250     0.00 | 6.333     2.41 |12.417    17.37 | 18.50     2.17
               0.333     1.21 | 6.417     2.41 |12.500    17.37 | 18.58     2.17
               0.417     1.21 | 6.500     2.41 |12.583    17.37 | 18.67     2.17
               0.500     1.21 | 6.583     2.41 |12.667    17.37 | 18.75     2.17
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0.583	1.21	6.667	2.41	12.750	17.37	18.83	2.17
0.667	1.21	6.750	2.41	12.833	8.93	18.92	2.17
0.750	1.21	6.833	2.41	12.917	8.92	19.00	2.17
0.833	1.21	6.917	2.41	13.000	8.92	19.08	2.17
0.917	1.21	7.000	2.41	13.083	8.92	19.17	2.17
1.000	1.21	7.083	2.41	13.167	8.92	19.25	2.17
1.083	1.21	7.167	2.41	13.250	8.92	19.33	2.17
1.167	1.21	7.250	2.41	13.333	1.69	19.42	2.17
1.250	1.21	7.333	2.41	13.417	1.69	19.50	2.17
1.333	1.21	7.417	2.41	13.500	1.69	19.58	2.17
1.417	1.21	7.500	2.41	13.583	1.69	19.67	2.17
1.500	1.21	7.583	2.41	13.667	1.69	19.75	2.17
1.583	1.21	7.667	2.41	13.750	1.69	19.83	2.17
1.667	1.21	7.750	2.41	13.833	9.89	19.92	2.17
1.750	1.21	7.833	2.41	13.917	9.89	20.00	2.17
1.833	1.21	7.917	2.41	14.000	9.89	20.08	2.17
1.917	1.21	8.000	2.41	14.083	9.89	20.17	2.17
2.000	1.21	8.083	2.41	14.167	9.89	20.25	2.17
2.083	2.17	8.167	2.41	14.250	9.89	20.33	1.45
2.167	2.17	8.250	2.41	14.333	3.62	20.42	1.45
2.250	2.17	8.333	3.26	14.417	3.62	20.50	1.45
2.333	1.57	8.417	3.26	14.500	3.62	20.58	1.45
2.417	1.57	8.500	3.26	14.583	3.62	20.67	1.45
2.500	1.57	8.583	3.26	14.667	3.62	20.75	1.45
2.583	1.57	8.667	3.26	14.750	3.62	20.83	1.45
2.667	1.57	8.750	3.26	14.833	3.62	20.92	1.45
2.750	1.57	8.833	3.26	14.917	3.62	21.00	1.45
2.833	1.57	8.917	3.26	15.000	3.62	21.08	1.45
2.917	1.57	9.000	3.26	15.083	3.62	21.17	1.45
3.000	1.57	9.083	3.26	15.167	3.62	21.25	1.45
3.083	1.57	9.167	3.26	15.250	3.62	21.33	1.45
3.167	1.57	9.250	3.26	15.333	3.62	21.42	1.45
3.250	1.57	9.333	3.86	15.417	3.62	21.50	1.45
3.333	1.57	9.417	3.86	15.500	3.62	21.58	1.45
3.417	1.57	9.500	3.86	15.583	3.62	21.67	1.45
3.500	1.57	9.583	3.86	15.667	3.62	21.75	1.45
3.583	1.57	9.667	3.86	15.750	3.62	21.83	1.45
3.667	1.57	9.750	3.86	15.833	3.62	21.92	1.45
3.750	1.57	9.833	4.34	15.917	3.62	22.00	1.45
3.833	1.57	9.917	4.34	16.000	3.62	22.08	1.45
3.917	1.57	10.000	4.34	16.083	3.62	22.17	1.45
4.000	1.57	10.083	4.34	16.167	3.62	22.25	1.45
4.083	1.57	10.167	4.34	16.250	3.62	22.33	1.45
4.167	1.57	10.250	4.34	16.333	2.17	22.42	1.45
4.250	1.57	10.333	5.55	16.417	2.17	22.50	1.45
4.333	1.93	10.417	5.55	16.500	2.17	22.58	1.45
4.417	1.93	10.500	5.55	16.583	2.17	22.67	1.45
4.500	1.93	10.583	5.55	16.667	2.17	22.75	1.45
4.583	1.93	10.667	5.55	16.750	2.17	22.83	1.45
4.667	1.93	10.750	5.55	16.833	2.17	22.92	1.45
4.750	1.93	10.833	7.48	16.917	2.17	23.00	1.45
4.833	1.93	10.917	7.48	17.000	2.17	23.08	1.45
4.917	1.93	11.000	7.48	17.083	2.17	23.17	1.45
5.000	1.93	11.083	7.48	17.167	2.17	23.25	1.45
5.083	1.93	11.167	7.48	17.250	2.17	23.33	1.45
5.167	1.93	11.250	7.48	17.333	2.17	23.42	1.45
5.250	1.93	11.333	11.58	17.417	2.17	23.50	1.45
5.333	1.93	11.417	11.58	17.500	2.17	23.58	1.45
5.417	1.93	11.500	11.58	17.583	2.17	23.67	1.45
5.500	1.93	11.583	11.58	17.667	2.17	23.75	1.45
5.583	1.93	11.667	11.58	17.750	2.17	23.83	1.45
5.667	1.93	11.750	11.58	17.833	2.17	23.92	1.45
5.750	1.93	11.833	50.17	17.917	2.17	24.00	1.45
5.833	1.93	11.917	50.17	18.000	2.17	24.08	1.45
5.917	1.93	12.000	50.17	18.083	2.17	24.17	1.45
6.000	1.93	12.083	133.13	18.167	2.17	24.25	1.45
6.083	1.93	12.167	133.14	18.250	2.17		

Unit Hyd Qpeak (cms)= 1.016

PEAK FLOW (cms)= 1.014 (i)
TIME TO PEAK (hrs)= 13.167
RUNOFF VOLUME (mm)= 48.434
TOTAL RAINFALL (mm)= 120.600
RUNOFF COEFFICIENT = 0.402

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

ROUTE CHN(0030)
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

<---- hydrograph ----> <-pipe / channel->

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0037)	26.06	1.01	13.17	48.43	0.05	0.63
OUTFLOW: ID= 1 (0030)	26.06	0.88	13.67	48.43	0.04	0.63

CALIB					
NASHYD (0038)	Area (ha)= 58.08	Curve Number (CN)= 63.0			
ID= 1 DT= 5.0 min	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= 1.13				

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	6.167	1.93	12.250	133.14	18.33	2.17
0.167	0.00	6.250	1.93	12.333	17.38	18.42	2.17
0.250	0.00	6.333	2.41	12.417	17.37	18.50	2.17
0.333	1.21	6.417	2.41	12.500	17.37	18.58	2.17
0.417	1.21	6.500	2.41	12.583	17.37	18.67	2.17
0.500	1.21	6.583	2.41	12.667	17.37	18.75	2.17
0.583	1.21	6.667	2.41	12.750	17.37	18.83	2.17
0.667	1.21	6.750	2.41	12.833	8.93	18.92	2.17
0.750	1.21	6.833	2.41	12.917	8.92	19.00	2.17
0.833	1.21	6.917	2.41	13.000	8.92	19.08	2.17
0.917	1.21	7.000	2.41	13.083	8.92	19.17	2.17
1.000	1.21	7.083	2.41	13.167	8.92	19.25	2.17
1.083	1.21	7.167	2.41	13.250	8.92	19.33	2.17
1.167	1.21	7.250	2.41	13.333	1.69	19.42	2.17
1.250	1.21	7.333	2.41	13.417	1.69	19.50	2.17
1.333	1.21	7.417	2.41	13.500	1.69	19.58	2.17
1.417	1.21	7.500	2.41	13.583	1.69	19.67	2.17
1.500	1.21	7.583	2.41	13.667	1.69	19.75	2.17
1.583	1.21	7.667	2.41	13.750	1.69	19.83	2.17
1.667	1.21	7.750	2.41	13.833	9.89	19.92	2.17
1.750	1.21	7.833	2.41	13.917	9.89	20.00	2.17
1.833	1.21	7.917	2.41	14.000	9.89	20.08	2.17
1.917	1.21	8.000	2.41	14.083	9.89	20.17	2.17
2.000	1.21	8.083	2.41	14.167	9.89	20.25	2.17
2.083	2.17	8.167	2.41	14.250	9.89	20.33	1.45
2.167	2.17	8.250	2.41	14.333	3.62	20.42	1.45
2.250	2.17	8.333	3.26	14.417	3.62	20.50	1.45
2.333	1.57	8.417	3.26	14.500	3.62	20.58	1.45
2.417	1.57	8.500	3.26	14.583	3.62	20.67	1.45
2.500	1.57	8.583	3.26	14.667	3.62	20.75	1.45
2.583	1.57	8.667	3.26	14.750	3.62	20.83	1.45
2.667	1.57	8.750	3.26	14.833	3.62	20.92	1.45
2.750	1.57	8.833	3.26	14.917	3.62	21.00	1.45
2.833	1.57	8.917	3.26	15.000	3.62	21.08	1.45
2.917	1.57	9.000	3.26	15.083	3.62	21.17	1.45
3.000	1.57	9.083	3.26	15.167	3.62	21.25	1.45
3.083	1.57	9.167	3.26	15.250	3.62	21.33	1.45
3.167	1.57	9.250	3.26	15.333	3.62	21.42	1.45
3.250	1.57	9.333	3.86	15.417	3.62	21.50	1.45
3.333	1.57	9.417	3.86	15.500	3.62	21.58	1.45
3.417	1.57	9.500	3.86	15.583	3.62	21.67	1.45
3.500	1.57	9.583	3.86	15.667	3.62	21.75	1.45
3.583	1.57	9.667	3.86	15.750	3.62	21.83	1.45
3.667	1.57	9.750	3.86	15.833	3.62	21.92	1.45
3.750	1.57	9.833	4.34	15.917	3.62	22.00	1.45
3.833	1.57	9.917	4.34	16.000	3.62	22.08	1.45
3.917	1.57	10.000	4.34	16.083	3.62	22.17	1.45
4.000	1.57	10.083	4.34	16.167	3.62	22.25	1.45
4.083	1.57	10.167	4.34	16.250	3.62	22.33	1.45
4.167	1.57	10.250	4.34	16.333	2.17	22.42	1.45
4.250	1.57	10.333	5.55	16.417	2.17	22.50	1.45
4.333	1.93	10.417	5.55	16.500	2.17	22.58	1.45
4.417	1.93	10.500	5.55	16.583	2.17	22.67	1.45
4.500	1.93	10.583	5.55	16.667	2.17	22.75	1.45
4.583	1.93	10.667	5.55	16.750	2.17	22.83	1.45
4.667	1.93	10.750	5.55	16.833	2.17	22.92	1.45
4.750	1.93	10.833	7.48	16.917	2.17	23.00	1.45
4.833	1.93	10.917	7.48	17.000	2.17	23.08	1.45
4.917	1.93	11.000	7.48	17.083	2.17	23.17	1.45
5.000	1.93	11.083	7.48	17.167	2.17	23.25	1.45
5.083	1.93	11.167	7.48	17.250	2.17	23.33	1.45
5.167	1.93	11.250	7.48	17.333	2.17	23.42	1.45
5.250	1.93	11.333	11.58	17.417	2.17	23.50	1.45
5.333	1.93	11.417	11.58	17.500	2.17	23.58	1.45
5.417	1.93	11.500	11.58	17.583	2.17	23.67	1.45
5.500	1.93	11.583	11.58	17.667	2.17	23.75	1.45
5.583	1.93	11.667	11.58	17.750	2.17	23.83	1.45
5.667	1.93	11.750	11.58	17.833	2.17	23.92	1.45
5.750	1.93	11.833	50.17	17.917	2.17	24.00	1.45
5.833	1.93	11.917	50.17	18.000	2.17	24.08	1.45
5.917	1.93	12.000	50.17	18.083	2.17	24.17	1.45
6.000	1.93	12.083	133.13	18.167	2.17	24.25	1.45
6.083	1.93	12.167	133.14	18.250	2.17		

Unit Hyd Qpeak (cms)= 1.963

PEAK FLOW (cms)= 2.029 (i)
TIME TO PEAK (hrs)= 13.333
RUNOFF VOLUME (mm)= 48.434
TOTAL RAINFALL (mm)= 120.600
RUNOFF COEFFICIENT = 0.402

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

ROUTE CHN(0031)				
IN= 2---> OUT= 1	Routing time step (min)'= 5.00			
	<------ DATA FOR SECTION (1.1) ------>			
	Distance	Elevation	Manning	
	0.00	253.97	0.0800	
	44.18	253.34	0.0800	
	72.75	252.34	0.0800 /0.0300	Main Channel
	94.18	252.35	0.0300	Main Channel
	117.64	252.31	0.0300	Main Channel
	131.62	252.33	0.0300 /0.0800	Main Channel
	138.41	252.72	0.0800	
	150.91	253.00	0.0800	
	172.41	253.50	0.0800	
	180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

		<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (	0038)	58.08	2.03	13.33	48.43	0.08	0.49
OUTFLOW: ID= 1 (	0031)	58.08	1.40	13.92	48.42	0.06	0.31

ADD HYD (0042)					
1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 1 (0030):	26.06	0.878	13.67	48.43
+	ID2= 2 (0031):	58.08	1.404	13.92	48.42
	ID = 3 (0042):	84.14	2.271	13.83	48.42

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

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

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DATE: 05-01-2024                          TIME: 03:35:12

USER:


COMMENTS: _____________________________________________________
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  ***********************************************
  ** SIMULATION : 06. 100-Year-24-Hour-SCS-Type **
  ***********************************************
```

READ STORM	Filename: C:\Users\mmsingh\AppData\Local\Temp\a3c66b7a-4039-49fc-a032-24b748c3ad03\04046152
Ptotal=133.60 mm	Comments: 100-Year-24-Hour-SCS-Type-II

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	2.67	12.50	19.24	18.75	2.40
0.25	1.34	6.50	2.67	12.75	9.89	19.00	2.40
0.50	1.34	6.75	2.67	13.00	9.89	19.25	2.40
0.75	1.34	7.00	2.67	13.25	1.87	19.50	2.40
1.00	1.34	7.25	2.67	13.50	1.87	19.75	2.40
1.25	1.34	7.50	2.67	13.75	10.96	20.00	2.40
1.50	1.34	7.75	2.67	14.00	10.96	20.25	1.60
1.75	1.34	8.00	2.67	14.25	4.01	20.50	1.60
2.00	2.40	8.25	3.61	14.50	4.01	20.75	1.60
2.25	1.74	8.50	3.61	14.75	4.01	21.00	1.60
2.50	1.74	8.75	3.61	15.00	4.01	21.25	1.60
2.75	1.74	9.00	3.61	15.25	4.01	21.50	1.60
3.00	1.74	9.25	4.28	15.50	4.01	21.75	1.60
3.25	1.74	9.50	4.28	15.75	4.01	22.00	1.60
3.50	1.74	9.75	4.81	16.00	4.01	22.25	1.60
3.75	1.74	10.00	4.81	16.25	2.40	22.50	1.60
4.00	1.74	10.25	6.15	16.50	2.40	22.75	1.60
4.25	2.14	10.50	6.15	16.75	2.40	23.00	1.60
4.50	2.14	10.75	8.28	17.00	2.40	23.25	1.60
4.75	2.14	11.00	8.28	17.25	2.40	23.50	1.60
5.00	2.14	11.25	12.83	17.50	2.40	23.75	1.60
5.25	2.14	11.50	12.83	17.75	2.40	24.00	1.60
5.50	2.14	11.75	55.58	18.00	2.40		
5.75	2.14	12.00	147.49	18.25	2.40		
6.00	2.14	12.25	19.24	18.50	2.40		

CALIB					
NASHYD (0037)	Area (ha)=	26.06	Curve Number (CN)=	63.0	
ID= 1 DT= 5.0 min	Ia (mm)=	8.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.98			

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	6.167	2.14	12.250	147.49	18.33	2.40
0.167	0.00	6.250	2.14	12.333	19.25	18.42	2.40
0.250	0.00	6.333	2.67	12.417	19.24	18.50	2.40
0.333	1.34	6.417	2.67	12.500	19.24	18.58	2.40
0.417	1.34	6.500	2.67	12.583	19.24	18.67	2.40
0.500	1.34	6.583	2.67	12.667	19.24	18.75	2.40
0.583	1.34	6.667	2.67	12.750	19.24	18.83	2.40
0.667	1.34	6.750	2.67	12.833	9.89	18.92	2.40
0.750	1.34	6.833	2.67	12.917	9.89	19.00	2.40
0.833	1.34	6.917	2.67	13.000	9.89	19.08	2.40
0.917	1.34	7.000	2.67	13.083	9.89	19.17	2.40
1.000	1.34	7.083	2.67	13.167	9.89	19.25	2.40
1.083	1.34	7.167	2.67	13.250	9.89	19.33	2.40
1.167	1.34	7.250	2.67	13.333	1.87	19.42	2.40
1.250	1.34	7.333	2.67	13.417	1.87	19.50	2.40
1.333	1.34	7.417	2.67	13.500	1.87	19.58	2.40
1.417	1.34	7.500	2.67	13.583	1.87	19.67	2.40
1.500	1.34	7.583	2.67	13.667	1.87	19.75	2.40
1.583	1.34	7.667	2.67	13.750	1.87	19.83	2.40
1.667	1.34	7.750	2.67	13.833	10.95	19.92	2.40
1.750	1.34	7.833	2.67	13.917	10.96	20.00	2.40
1.833	1.34	7.917	2.67	14.000	10.96	20.08	2.40
1.917	1.34	8.000	2.67	14.083	10.96	20.17	2.40
2.000	1.34	8.083	2.67	14.167	10.96	20.25	2.40
2.083	2.40	8.167	2.67	14.250	10.96	20.33	1.60
2.167	2.40	8.250	2.67	14.333	4.01	20.42	1.60
2.250	2.40	8.333	3.61	14.417	4.01	20.50	1.60
2.333	1.74	8.417	3.61	14.500	4.01	20.58	1.60
2.417	1.74	8.500	3.61	14.583	4.01	20.67	1.60
2.500	1.74	8.583	3.61	14.667	4.01	20.75	1.60
2.583	1.74	8.667	3.61	14.750	4.01	20.83	1.60
2.667	1.74	8.750	3.61	14.833	4.01	20.92	1.60
2.750	1.74	8.833	3.61	14.917	4.01	21.00	1.60
2.833	1.74	8.917	3.61	15.000	4.01	21.08	1.60
2.917	1.74	9.000	3.61	15.083	4.01	21.17	1.60
3.000	1.74	9.083	3.61	15.167	4.01	21.25	1.60
3.083	1.74	9.167	3.61	15.250	4.01	21.33	1.60
3.167	1.74	9.250	3.61	15.333	4.01	21.42	1.60
3.250	1.74	9.333	4.28	15.417	4.01	21.50	1.60
3.333	1.74	9.417	4.28	15.500	4.01	21.58	1.60
3.417	1.74	9.500	4.28	15.583	4.01	21.67	1.60
3.500	1.74	9.583	4.28	15.667	4.01	21.75	1.60
3.583	1.74	9.667	4.28	15.750	4.01	21.83	1.60
3.667	1.74	9.750	4.28	15.833	4.01	21.92	1.60
3.750	1.74	9.833	4.81	15.917	4.01	22.00	1.60
3.833	1.74	9.917	4.81	16.000	4.01	22.08	1.60
3.917	1.74	10.000	4.81	16.083	4.01	22.17	1.60
4.000	1.74	10.083	4.81	16.167	4.01	22.25	1.60
4.083	1.74	10.167	4.81	16.250	4.01	22.33	1.60
4.167	1.74	10.250	4.81	16.333	2.41	22.42	1.60
4.250	1.74	10.333	6.15	16.417	2.40	22.50	1.60
4.333	2.14	10.417	6.15	16.500	2.40	22.58	1.60
4.417	2.14	10.500	6.15	16.583	2.40	22.67	1.60
4.500	2.14	10.583	6.15	16.667	2.40	22.75	1.60
4.583	2.14	10.667	6.15	16.750	2.40	22.83	1.60
4.667	2.14	10.750	6.15	16.833	2.40	22.92	1.60
4.750	2.14	10.833	8.28	16.917	2.40	23.00	1.60
4.833	2.14	10.917	8.28	17.000	2.40	23.08	1.60
4.917	2.14	11.000	8.28	17.083	2.40	23.17	1.60
5.000	2.14	11.083	8.28	17.167	2.40	23.25	1.60
5.083	2.14	11.167	8.28	17.250	2.40	23.33	1.60
5.167	2.14	11.250	8.28	17.333	2.40	23.42	1.60
5.250	2.14	11.333	12.83	17.417	2.40	23.50	1.60
5.333	2.14	11.417	12.83	17.500	2.40	23.58	1.60
5.417	2.14	11.500	12.83	17.583	2.40	23.67	1.60
5.500	2.14	11.583	12.83	17.667	2.40	23.75	1.60
5.583	2.14	11.667	12.83	17.750	2.40	23.83	1.60
5.667	2.14	11.750	12.83	17.833	2.40	23.92	1.60
5.750	2.14	11.833	55.57	17.917	2.40	24.00	1.60
5.833	2.14	11.917	55.58	18.000	2.40	24.08	1.60
5.917	2.14	12.000	55.58	18.083	2.40	24.17	1.60
6.000	2.14	12.083	147.48	18.167	2.40	24.25	1.60
6.083	2.14	12.167	147.49	18.250	2.40		

Unit Hyd Qpeak (cms)= 1.016

PEAK FLOW (cms)= 1.208 (i)
TIME TO PEAK (hrs)= 13.167
RUNOFF VOLUME (mm)= 57.412
TOTAL RAINFALL (mm)= 133.600
RUNOFF COEFFICIENT = 0.430

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

ROUTE CHN(0030)				
IN= 2---> OUT= 1	Routing time step (min)'=	5.00		

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46

0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

		<---- hydrograph ---->			<-pipe / channel->	
		AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
		(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW :	ID= 2 (0037)	26.06	1.21	13.17	57.41	0.06	0.63
OUTFLOW:	ID= 1 (0030)	26.06	1.05	13.67	57.41	0.05	0.63

| CALIB	|				
| NASHYD (0038)|	Area	(ha)= 58.08	Curve Number	(CN)= 63.0	
|ID= 1 DT= 5.0 min |	Ia	(mm)= 8.00	# of Linear Res.(N)= 3.00		
	U.H. Tp(hrs)= 1.13				

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	6.167	2.14	12.250	147.49	18.33	2.40
0.167	0.00	6.250	2.14	12.333	19.25	18.42	2.40
0.250	0.00	6.333	2.67	12.417	19.24	18.50	2.40
0.333	1.34	6.417	2.67	12.500	19.24	18.58	2.40
0.417	1.34	6.500	2.67	12.583	19.24	18.67	2.40
0.500	1.34	6.583	2.67	12.667	19.24	18.75	2.40
0.583	1.34	6.667	2.67	12.750	19.24	18.83	2.40
0.667	1.34	6.750	2.67	12.833	9.89	18.92	2.40
0.750	1.34	6.833	2.67	12.917	9.89	19.00	2.40
0.833	1.34	6.917	2.67	13.000	9.89	19.08	2.40
0.917	1.34	7.000	2.67	13.083	9.89	19.17	2.40
1.000	1.34	7.083	2.67	13.167	9.89	19.25	2.40
1.083	1.34	7.167	2.67	13.250	9.89	19.33	2.40
1.167	1.34	7.250	2.67	13.333	1.87	19.42	2.40
1.250	1.34	7.333	2.67	13.417	1.87	19.50	2.40
1.333	1.34	7.417	2.67	13.500	1.87	19.58	2.40
1.417	1.34	7.500	2.67	13.583	1.87	19.67	2.40
1.500	1.34	7.583	2.67	13.667	1.87	19.75	2.40
1.583	1.34	7.667	2.67	13.750	1.87	19.83	2.40
1.667	1.34	7.750	2.67	13.833	10.95	19.92	2.40
1.750	1.34	7.833	2.67	13.917	10.96	20.00	2.40
1.833	1.34	7.917	2.67	14.000	10.96	20.08	2.40
1.917	1.34	8.000	2.67	14.083	10.96	20.17	2.40
2.000	1.34	8.083	2.67	14.167	10.96	20.25	2.40
2.083	2.40	8.167	2.67	14.250	10.96	20.33	1.60
2.167	2.40	8.250	2.67	14.333	4.01	20.42	1.60
2.250	2.40	8.333	3.61	14.417	4.01	20.50	1.60
2.333	1.74	8.417	3.61	14.500	4.01	20.58	1.60
2.417	1.74	8.500	3.61	14.583	4.01	20.67	1.60
2.500	1.74	8.583	3.61	14.667	4.01	20.75	1.60
2.583	1.74	8.667	3.61	14.750	4.01	20.83	1.60
2.667	1.74	8.750	3.61	14.833	4.01	20.92	1.60
2.750	1.74	8.833	3.61	14.917	4.01	21.00	1.60
2.833	1.74	8.917	3.61	15.000	4.01	21.08	1.60
2.917	1.74	9.000	3.61	15.083	4.01	21.17	1.60
3.000	1.74	9.083	3.61	15.167	4.01	21.25	1.60
3.083	1.74	9.167	3.61	15.250	4.01	21.33	1.60
3.167	1.74	9.250	3.61	15.333	4.01	21.42	1.60
3.250	1.74	9.333	4.28	15.417	4.01	21.50	1.60
3.333	1.74	9.417	4.28	15.500	4.01	21.58	1.60
3.417	1.74	9.500	4.28	15.583	4.01	21.67	1.60
3.500	1.74	9.583	4.28	15.667	4.01	21.75	1.60
3.583	1.74	9.667	4.28	15.750	4.01	21.83	1.60
3.667	1.74	9.750	4.28	15.833	4.01	21.92	1.60
3.750	1.74	9.833	4.81	15.917	4.01	22.00	1.60
3.833	1.74	9.917	4.81	16.000	4.01	22.08	1.60
3.917	1.74	10.000	4.81	16.083	4.01	22.17	1.60
4.000	1.74	10.083	4.81	16.167	4.01	22.25	1.60
4.083	1.74	10.167	4.81	16.250	4.01	22.33	1.60
4.167	1.74	10.250	4.81	16.333	2.41	22.42	1.60
4.250	1.74	10.333	6.15	16.417	2.40	22.50	1.60
4.333	2.14	10.417	6.15	16.500	2.40	22.58	1.60
4.417	2.14	10.500	6.15	16.583	2.40	22.67	1.60
4.500	2.14	10.583	6.15	16.667	2.40	22.75	1.60
4.583	2.14	10.667	6.15	16.750	2.40	22.83	1.60
4.667	2.14	10.750	6.15	16.833	2.40	22.92	1.60
4.750	2.14	10.833	8.28	16.917	2.40	23.00	1.60
4.833	2.14	10.917	8.28	17.000	2.40	23.08	1.60
4.917	2.14	11.000	8.28	17.083	2.40	23.17	1.60
5.000	2.14	11.083	8.28	17.167	2.40	23.25	1.60
5.083	2.14	11.167	8.28	17.250	2.40	23.33	1.60
5.167	2.14	11.250	8.28	17.333	2.40	23.42	1.60
5.250	2.14	11.333	12.83	17.417	2.40	23.50	1.60
5.333	2.14	11.417	12.83	17.500	2.40	23.58	1.60
5.417	2.14	11.500	12.83	17.583	2.40	23.67	1.60
5.500	2.14	11.583	12.83	17.667	2.40	23.75	1.60
5.583	2.14	11.667	12.83	17.750	2.40	23.83	1.60
5.667	2.14	11.750	12.83	17.833	2.40	23.92	1.60
5.750	2.14	11.833	55.57	17.917	2.40	24.00	1.60
5.833	2.14	11.917	55.58	18.000	2.40	24.08	1.60
5.917	2.14	12.000	55.58	18.083	2.40	24.17	1.60
6.000	2.14	12.083	147.48	18.167	2.40	24.25	1.60
6.083	2.14	12.167	147.49	18.250	2.40		

Unit Hyd Qpeak (cms)= 1.963

PEAK FLOW (cms)= 2.419 (i)
TIME TO PEAK (hrs)= 13.333
RUNOFF VOLUME (mm)= 57.412
TOTAL RAINFALL (mm)= 133.600
RUNOFF COEFFICIENT = 0.430

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

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0031)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

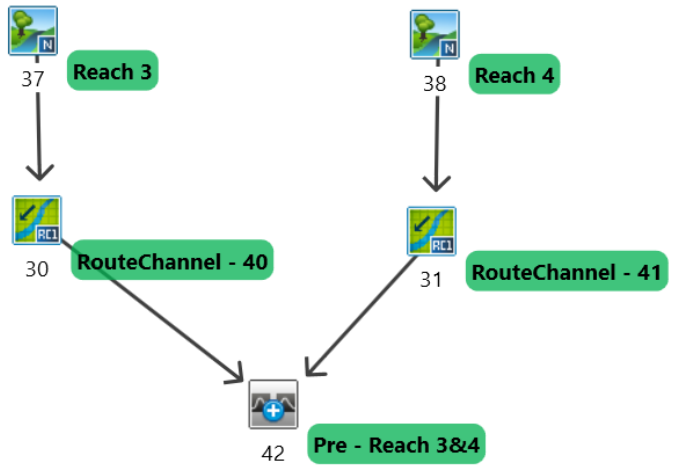
Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0038)	58.08	2.42	13.33	57.41	0.09	0.58
OUTFLOW: ID= 1 (0031)	58.08	2.35	13.75	57.40	0.09	0.58

ADD HYD (0042)|		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3					
ID1= 1 (0030):	26.06	1.046	13.67	57.41
+ ID2= 2 (0031):	58.08	2.355	13.75	57.40
ID = 3 (0042):	84.14	3.398	13.75	57.40



SCHAEFFERS
CONSULTING ENGINEERS

Visual OTTHYMO™ Schematic

PRE-DEVELOPMENT – REACH 3/4
2-100YR, CHICAGO

Job #: 5170 | **Date: April 2024**

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

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


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DATE: 05-01-2024                          TIME: 04:07:41

USER:


COMMENTS: _____________________________________________________________

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  ************************************************
  ** SIMULATION : 19. 2yr 4hr 10min Chicago     **
  ************************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 675.586
| Ptotal= 37.02 mm |                          B=   4.681
--------------------                          C=   0.780
                       used in:   INTENSITY =  A / (t + B)^C

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

      TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
       hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
      0.00     2.48 |  1.00    18.80 |'  2.00     5.75 |  3.00     2.94
      0.17     2.83 |  1.17    83.10 |'  2.17     4.91 |  3.17     2.74
      0.33     3.33 |  1.33    24.59 |'  2.33     4.30 |  3.33     2.56
      0.50     4.07 |  1.50    13.04 |'  2.50     3.84 |  3.50     2.41
      0.67     5.33 |  1.67     9.04 |'  2.67     3.48 |  3.67     2.28
      0.83     8.01 |  1.83     7.00 |'  2.83     3.18 |  3.83     2.16
```

CALIB					
NASHYD (0037)	Area (ha)= 26.06	Curve Number (CN)= 63.0			
ID= 1 DT= 5.0 min	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= 0.98				

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.48	1.083	18.80	2.083	5.75	3.08	2.94
0.167	2.48	1.167	18.80	2.167	5.75	3.17	2.94
0.250	2.83	1.250	83.10	2.250	4.91	3.25	2.74
0.333	2.83	1.333	83.10	2.333	4.91	3.33	2.74
0.417	3.33	1.417	24.59	2.417	4.30	3.42	2.56
0.500	3.33	1.500	24.59	2.500	4.30	3.50	2.56
0.583	4.07	1.583	13.04	2.583	3.84	3.58	2.41
0.667	4.07	1.667	13.04	2.667	3.84	3.67	2.41
0.750	5.33	1.750	9.04	2.750	3.48	3.75	2.28
0.833	5.33	1.833	9.04	2.833	3.48	3.83	2.28
0.917	8.01	1.917	7.00	2.917	3.18	3.92	2.16
1.000	8.01	2.000	7.00	3.000	3.18	4.00	2.16

Unit Hyd Qpeak (cms)= 1.016

PEAK FLOW (cms)= 0.122 (i)
TIME TO PEAK (hrs)= 2.750
RUNOFF VOLUME (mm)= 4.727
TOTAL RAINFALL (mm)= 37.024
RUNOFF COEFFICIENT = 0.128

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

ROUTE CHN(0030)		
IN= 2---> OUT= 1	Routing time step (min)'= 5.00	

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0037)	26.06	0.12	2.75	4.73	0.01	0.63
OUTFLOW: ID= 1 (0030)	26.06	0.11	3.33	4.73	0.01	0.63

CALIB					
NASHYD (0038)	Area (ha)= 58.08	Curve Number (CN)= 63.0			
ID= 1 DT= 5.0 min	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= 1.13				

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.48	1.083	18.80	2.083	5.75	3.08	2.94
0.167	2.48	1.167	18.80	2.167	5.75	3.17	2.94
0.250	2.83	1.250	83.10	2.250	4.91	3.25	2.74
0.333	2.83	1.333	83.10	2.333	4.91	3.33	2.74
0.417	3.33	1.417	24.59	2.417	4.30	3.42	2.56
0.500	3.33	1.500	24.59	2.500	4.30	3.50	2.56
0.583	4.07	1.583	13.04	2.583	3.84	3.58	2.41
0.667	4.07	1.667	13.04	2.667	3.84	3.67	2.41
0.750	5.33	1.750	9.04	2.750	3.48	3.75	2.28
0.833	5.33	1.833	9.04	2.833	3.48	3.83	2.28
0.917	8.01	1.917	7.00	2.917	3.18	3.92	2.16
1.000	8.01	2.000	7.00	3.000	3.18	4.00	2.16

Unit Hyd Qpeak (cms)= 1.963

PEAK FLOW (cms)= 0.250 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 4.727
TOTAL RAINFALL (mm)= 37.024
RUNOFF COEFFICIENT = 0.128

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

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--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0031)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
```

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

		<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0038)	58.08	0.25	3.00	4.73	0.03	0.18
OUTFLOW:	ID= 1 (0031)	58.08	0.14	4.67	4.71	0.02	0.18

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--------------------
| ADD HYD  (  0042)|
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0030):	26.06	0.110	3.33	4.73
+ ID2= 2 (0031):	58.08	0.143	4.67	4.71
	==========	==========	==========	==========

```
ID = 3 (  0042):    84.14   0.234     4.00     4.72

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

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


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DATE: 05-01-2024                          TIME: 04:07:40

USER:



COMMENTS: _____________________________________________________________


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  **********************************************
  ** SIMULATION : 20. 5yr 4hr 10min Chicago     **
  **********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 843.019
| Ptotal= 50.74 mm |                          B=   4.582
--------------------                          C=   0.763
                       used in:   INTENSITY =  A / (t + B)^C

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	3.62	1.00	25.63	2.00	8.19	3.00	4.27
0.17	4.12	1.17	109.11	2.17	7.03	3.17	3.98

0.33	4.82	1.33	33.27	2.33	6.18	3.33	3.74
0.50	5.85	1.50	18.03	2.50	5.54	3.50	3.52
0.67	7.60	1.67	12.66	2.67	5.03	3.67	3.33
0.83	11.26	1.83	9.89	2.83	4.62	3.83	3.16

CALIB					
NASHYD (0037)	Area	(ha)=	26.06	Curve Number	(CN)= 63.0
ID= 1 DT= 5.0 min	Ia	(mm)=	8.00	# of Linear Res.	(N)= 3.00
	U.H. Tp	(hrs)=	0.98		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.62	1.083	25.63	2.083	8.19	3.08	4.27
0.167	3.62	1.167	25.63	2.167	8.19	3.17	4.27
0.250	4.12	1.250	109.10	2.250	7.03	3.25	3.98
0.333	4.12	1.333	109.11	2.333	7.03	3.33	3.98
0.417	4.82	1.417	33.27	2.417	6.18	3.42	3.74
0.500	4.82	1.500	33.27	2.500	6.18	3.50	3.74
0.583	5.85	1.583	18.03	2.583	5.54	3.58	3.52
0.667	5.85	1.667	18.03	2.667	5.54	3.67	3.52
0.750	7.60	1.750	12.66	2.750	5.03	3.75	3.33
0.833	7.60	1.833	12.66	2.833	5.03	3.83	3.33
0.917	11.26	1.917	9.89	2.917	4.62	3.92	3.16
1.000	11.26	2.000	9.89	3.000	4.62	4.00	3.16

Unit Hyd Qpeak (cms)= 1.016

PEAK FLOW (cms)= 0.248 (i)
TIME TO PEAK (hrs)= 2.667
RUNOFF VOLUME (mm)= 9.519
TOTAL RAINFALL (mm)= 50.743
RUNOFF COEFFICIENT = 0.188

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

ROUTE CHN(0030)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

		<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2	(0037)	26.06	0.25	2.67	9.52	0.01	0.63
OUTFLOW: ID= 1	(0030)	26.06	0.22	3.25	9.52	0.01	0.63

CALIB					
NASHYD (0038)	Area	(ha)=	58.08	Curve Number	(CN)= 63.0
ID= 1 DT= 5.0 min	Ia	(mm)=	8.00	# of Linear Res.	(N)= 3.00
	U.H. Tp	(hrs)=	1.13		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.62	1.083	25.63	2.083	8.19	3.08	4.27
0.167	3.62	1.167	25.63	2.167	8.19	3.17	4.27
0.250	4.12	1.250	109.10	2.250	7.03	3.25	3.98
0.333	4.12	1.333	109.11	2.333	7.03	3.33	3.98
0.417	4.82	1.417	33.27	2.417	6.18	3.42	3.74
0.500	4.82	1.500	33.27	2.500	6.18	3.50	3.74
0.583	5.85	1.583	18.03	2.583	5.54	3.58	3.52
0.667	5.85	1.667	18.03	2.667	5.54	3.67	3.52
0.750	7.60	1.750	12.66	2.750	5.03	3.75	3.33
0.833	7.60	1.833	12.66	2.833	5.03	3.83	3.33
0.917	11.26	1.917	9.89	2.917	4.62	3.92	3.16
1.000	11.26	2.000	9.89	3.000	4.62	4.00	3.16

Unit Hyd Qpeak (cms)= 1.963

PEAK FLOW (cms)= 0.506 (i)

```
     TIME TO PEAK     (hrs)=   2.917
     RUNOFF VOLUME     (mm)=   9.519
     TOTAL RAINFALL    (mm)=  50.743
     RUNOFF COEFFICIENT   =   0.188

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

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0031)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00         253.97        0.0800
                  44.18         253.34        0.0800
                  72.75         252.34    0.0800 /0.0300  Main Channel
                  94.18         252.35        0.0300      Main Channel
                 117.64         252.31        0.0300      Main Channel
                 131.62         252.33    0.0300 /0.0800  Main Channel
                 138.41         252.72        0.0800
                 150.91         253.00        0.0800
                 172.41         253.50        0.0800
                 180.51         253.60        0.0800

      <---------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.02   252.33    .386E+03        0.0         0.17     149.17
       0.09   252.40    .580E+04        2.2         0.57      44.29
       0.15   252.47    .122E+05        7.3         0.90      27.96
       0.22   252.53    .189E+05       14.6         1.17      21.61
       0.29   252.60    .259E+05       23.9         1.40      18.12
       0.35   252.67    .333E+05       35.0         1.59      15.86
       0.42   252.73    .409E+05       47.8         1.77      14.27
       0.49   252.80    .490E+05       62.2         1.93      13.13
       0.55   252.87    .576E+05       78.3         2.06      12.25
       0.62   252.93    .667E+05       96.1         2.19      11.57
       0.69   253.00    .762E+05      115.4         2.30      11.01
       0.75   253.07    .863E+05      136.5         2.40      10.54
       0.82   253.13    .969E+05      159.1         2.49      10.15
       0.89   253.20    .108E+06      183.3         2.58       9.81
       0.95   253.27    .119E+06      209.2         2.66       9.51
       1.02   253.33    .131E+06      236.7         2.73       9.26
       1.09   253.40    .144E+06      265.1         2.79       9.06
       1.15   253.47    .157E+06      295.3         2.85       8.88
       1.22   253.54    .172E+06      327.0         2.89       8.75

                                  <---- hydrograph ---->   <-pipe / channel->
                            AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                            (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0038)   58.08     0.51    2.92   9.52      0.03      0.20
   OUTFLOW: ID= 1 (  0031)   58.08     0.30    4.50   9.50      0.03      0.18



--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0042)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0030):    26.06   0.223     3.25      9.52
     + ID2= 2 (  0031):    58.08   0.296     4.50      9.50
       ================================================
       ID = 3 (  0042):    84.14   0.482     3.92      9.51

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

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


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DATE: 05-01-2024                          TIME: 04:07:40

USER:



COMMENTS: _____

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  ***********************************************
  ** SIMULATION : 21. 10yr 4hr 10min Chicago    **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 976.898
| Ptotal= 59.75 mm |                          B=   4.745
--------------------                          C=   0.760
                         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	4.32	1.00	30.34	2.00	9.74	3.00	5.10
0.17	4.92	1.17	126.38	2.17	8.37	3.17	4.75
0.33	5.74	1.33	39.32	2.33	7.37	3.33	4.46
0.50	6.98	1.50	21.40	2.50	6.60	3.50	4.20
0.67	9.05	1.67	15.05	2.67	6.00	3.67	3.98
0.83	13.39	1.83	11.76	2.83	5.50	3.83	3.78

CALIB			
NASHYD (0037)	Area (ha)= 26.06	Curve Number (CN)= 63.0	
ID= 1 DT= 5.0 min	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.98		

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	4.32	1.083	30.34	2.083	9.74	3.08	5.10
0.167	4.32	1.167	30.34	2.167	9.74	3.17	5.10
0.250	4.92	1.250	126.38	2.250	8.37	3.25	4.75
0.333	4.92	1.333	126.38	2.333	8.37	3.33	4.75
0.417	5.74	1.417	39.32	2.417	7.37	3.42	4.46
0.500	5.74	1.500	39.32	2.500	7.37	3.50	4.46
0.583	6.98	1.583	21.40	2.583	6.60	3.58	4.20
0.667	6.98	1.667	21.40	2.667	6.60	3.67	4.20
0.750	9.05	1.750	15.05	2.750	6.00	3.75	3.98
0.833	9.05	1.833	15.05	2.833	6.00	3.83	3.98
0.917	13.39	1.917	11.76	2.917	5.50	3.92	3.78
1.000	13.39	2.000	11.76	3.000	5.50	4.00	3.78

Unit Hyd Qpeak (cms)= 1.016

PEAK FLOW (cms)= 0.351 (i)
TIME TO PEAK (hrs)= 2.667
RUNOFF VOLUME (mm)= 13.328
TOTAL RAINFALL (mm)= 59.749
RUNOFF COEFFICIENT = 0.223

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

ROUTE CHN(0030)		
IN= 2---> OUT= 1	Routing time step (min)'= 5.00	

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

		AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2	(0037)	26.06	0.35	2.67	13.33	0.02	0.63
OUTFLOW: ID= 1	(0030)	26.06	0.31	3.25	13.33	0.01	0.63

CALIB			
NASHYD (0038)	Area (ha)= 58.08	Curve Number (CN)= 63.0	
ID= 1 DT= 5.0 min	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.13		

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	4.32	1.083	30.34	2.083	9.74	3.08	5.10
0.167	4.32	1.167	30.34	2.167	9.74	3.17	5.10
0.250	4.92	1.250	126.38	2.250	8.37	3.25	4.75
0.333	4.92	1.333	126.38	2.333	8.37	3.33	4.75
0.417	5.74	1.417	39.32	2.417	7.37	3.42	4.46
0.500	5.74	1.500	39.32	2.500	7.37	3.50	4.46
0.583	6.98	1.583	21.40	2.583	6.60	3.58	4.20
0.667	6.98	1.667	21.40	2.667	6.60	3.67	4.20
0.750	9.05	1.750	15.05	2.750	6.00	3.75	3.98
0.833	9.05	1.833	15.05	2.833	6.00	3.83	3.98
0.917	13.39	1.917	11.76	2.917	5.50	3.92	3.78
1.000	13.39	2.000	11.76	3.000	5.50	4.00	3.78

```
     Unit Hyd Qpeak  (cms)=   1.963

     PEAK FLOW       (cms)=   0.712 (i)
     TIME TO PEAK    (hrs)=   2.917
     RUNOFF VOLUME    (mm)=  13.328
     TOTAL RAINFALL   (mm)=  59.749
     RUNOFF COEFFICIENT   =   0.223

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

```
--------------------
| ROUTE CHN(  0031)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00         253.97        0.0800
                  44.18         253.34        0.0800
                  72.75         252.34    0.0800 /0.0300  Main Channel
                  94.18         252.35        0.0300      Main Channel
                 117.64         252.31        0.0300      Main Channel
                 131.62         252.33    0.0300 /0.0800  Main Channel
                 138.41         252.72        0.0800
                 150.91         253.00        0.0800
                 172.41         253.50        0.0800
                 180.51         253.60        0.0800

      <---------------------- TRAVEL TIME TABLE ----------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        0.02   252.33    .386E+03       0.0         0.17     149.17
        0.09   252.40    .580E+04       2.2         0.57      44.29
        0.15   252.47    .122E+05       7.3         0.90      27.96
        0.22   252.53    .189E+05      14.6         1.17      21.61
        0.29   252.60    .259E+05      23.9         1.40      18.12
        0.35   252.67    .333E+05      35.0         1.59      15.86
        0.42   252.73    .409E+05      47.8         1.77      14.27
        0.49   252.80    .490E+05      62.2         1.93      13.13
        0.55   252.87    .576E+05      78.3         2.06      12.25
        0.62   252.93    .667E+05      96.1         2.19      11.57
        0.69   253.00    .762E+05     115.4         2.30      11.01
        0.75   253.07    .863E+05     136.5         2.40      10.54
        0.82   253.13    .969E+05     159.1         2.49      10.15
        0.89   253.20    .108E+06     183.3         2.58       9.81
        0.95   253.27    .119E+06     209.2         2.66       9.51
        1.02   253.33    .131E+06     236.7         2.73       9.26
        1.09   253.40    .144E+06     265.1         2.79       9.06
        1.15   253.47    .157E+06     295.3         2.85       8.88
        1.22   253.54    .172E+06     327.0         2.89       8.75

                                 <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0038)   58.08     0.71    2.92  13.33      0.04      0.22
   OUTFLOW: ID= 1 (  0031)   58.08     0.42    4.42  13.31      0.03      0.19
```

```
--------------------
| ADD HYD  (  0042)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0030):    26.06   0.313     3.25    13.33
     + ID2= 2 (  0031):    58.08   0.423     4.42    13.31
       ================================================
       ID = 3 (  0042):    84.14   0.689     3.83    13.32

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

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

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


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DATE: 05-01-2024                          TIME: 04:07:41

USER:



COMMENTS: _____________________________________________________________
```

```
  ************************************************
  ** SIMULATION : 22. 25yr 4hr 10min Chicago    **
  ************************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1133.123
| Ptotal= 70.85 mm |                          B=   4.734
--------------------                          C=   0.756
                          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	5.20	1.00	35.94	2.00	11.65	3.00	6.12
0.17	5.91	1.17	148.26	2.17	10.02	3.17	5.71
0.33	6.90	1.33	46.49	2.33	8.83	3.33	5.36
0.50	8.36	1.50	25.43	2.50	7.92	3.50	5.05
0.67	10.82	1.67	17.93	2.67	7.20	3.67	4.79
0.83	15.97	1.83	14.05	2.83	6.61	3.83	4.55

CALIB / NASHYD (0037) / ID= 1 DT= 5.0 min					
	Area	(ha)=	26.06	Curve Number (CN)=	63.0
	Ia	(mm)=	8.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=		0.98		

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	5.20	1.083	35.94	2.083	11.65	3.08	6.12
0.167	5.20	1.167	35.94	2.167	11.65	3.17	6.12
0.250	5.91	1.250	148.26	2.250	10.02	3.25	5.71
0.333	5.91	1.333	148.26	2.333	10.02	3.33	5.71
0.417	6.90	1.417	46.49	2.417	8.83	3.42	5.36
0.500	6.90	1.500	46.49	2.500	8.83	3.50	5.36
0.583	8.36	1.583	25.43	2.583	7.92	3.58	5.05
0.667	8.36	1.667	25.43	2.667	7.92	3.67	5.05
0.750	10.82	1.750	17.93	2.750	7.20	3.75	4.79
0.833	10.82	1.833	17.93	2.833	7.20	3.83	4.79
0.917	15.97	1.917	14.05	2.917	6.61	3.92	4.55
1.000	15.97	2.000	14.05	3.000	6.61	4.00	4.55

Unit Hyd Qpeak (cms)= 1.016

PEAK FLOW (cms)= 0.494 (i)
TIME TO PEAK (hrs)= 2.667
RUNOFF VOLUME (mm)= 18.629
TOTAL RAINFALL (mm)= 70.848
RUNOFF COEFFICIENT = 0.263

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

ROUTE CHN(0030) / IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning
0.00	253.33	0.0800
4.07	253.22	0.0800
31.67	252.50	0.0800
80.33	251.02	0.0800
112.54	250.38	0.0800 /0.0300 Main Channel
147.82	250.41	0.0300 /0.0800 Main Channel
227.35	251.81	0.0800
234.22	251.93	0.0800
240.16	252.02	0.0800
245.25	252.11	0.0800
250.86	252.20	0.0800
254.81	252.26	0.0800

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0037)	26.06	0.49	2.67	18.63	0.02	0.63
OUTFLOW: ID= 1 (0030)	26.06	0.44	3.25	18.63	0.02	0.63

CALIB / NASHYD (0038) / ID= 1 DT= 5.0 min					
	Area	(ha)=	58.08	Curve Number (CN)=	63.0
	Ia	(mm)=	8.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=		1.13		

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	5.20	1.083	35.94	2.083	11.65	3.08	6.12
0.167	5.20	1.167	35.94	2.167	11.65	3.17	6.12
0.250	5.91	1.250	148.26	2.250	10.02	3.25	5.71
0.333	5.91	1.333	148.26	2.333	10.02	3.33	5.71
0.417	6.90	1.417	46.49	2.417	8.83	3.42	5.36
0.500	6.90	1.500	46.49	2.500	8.83	3.50	5.36
0.583	8.36	1.583	25.43	2.583	7.92	3.58	5.05
0.667	8.36	1.667	25.43	2.667	7.92	3.67	5.05

```
              0.750   10.82 | 1.750   17.93 | 2.750    7.20 |  3.75    4.79
              0.833   10.82 | 1.833   17.93 | 2.833    7.20 |  3.83    4.79
              0.917   15.97 | 1.917   14.05 | 2.917    6.61 |  3.92    4.55
              1.000   15.97 | 2.000   14.05 | 3.000    6.61 |  4.00    4.55

     Unit Hyd Qpeak  (cms)=   1.963

     PEAK FLOW       (cms)=   1.002 (i)
     TIME TO PEAK    (hrs)=   2.833
     RUNOFF VOLUME    (mm)=  18.629
     TOTAL RAINFALL   (mm)=  70.848
     RUNOFF COEFFICIENT   =   0.263

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

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0031)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00         253.97        0.0800
                  44.18         253.34        0.0800
                  72.75         252.34    0.0800 /0.0300  Main Channel
                  94.18         252.35        0.0300      Main Channel
                 117.64         252.31        0.0300      Main Channel
                 131.62         252.33    0.0300 /0.0800  Main Channel
                 138.41         252.72        0.0800
                 150.91         253.00        0.0800
                 172.41         253.50        0.0800
                 180.51         253.60        0.0800

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        0.02   252.33    .386E+03       0.0         0.17     149.17
        0.09   252.40    .580E+04       2.2         0.57      44.29
        0.15   252.47    .122E+05       7.3         0.90      27.96
        0.22   252.53    .189E+05      14.6         1.17      21.61
        0.29   252.60    .259E+05      23.9         1.40      18.12
        0.35   252.67    .333E+05      35.0         1.59      15.86
        0.42   252.73    .409E+05      47.8         1.77      14.27
        0.49   252.80    .490E+05      62.2         1.93      13.13
        0.55   252.87    .576E+05      78.3         2.06      12.25
        0.62   252.93    .667E+05      96.1         2.19      11.57
        0.69   253.00    .762E+05     115.4         2.30      11.01
        0.75   253.07    .863E+05     136.5         2.40      10.54
        0.82   253.13    .969E+05     159.1         2.49      10.15
        0.89   253.20    .108E+06     183.3         2.58       9.81
        0.95   253.27    .119E+06     209.2         2.66       9.51
        1.02   253.33    .131E+06     236.7         2.73       9.26
        1.09   253.40    .144E+06     265.1         2.79       9.06
        1.15   253.47    .157E+06     295.3         2.85       8.88
        1.22   253.54    .172E+06     327.0         2.89       8.75

                                  <---- hydrograph ---->   <-pipe / channel->
                               AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                               (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0038)    58.08     1.00    2.83  18.63      0.05      0.25
   OUTFLOW: ID= 1 (  0031)    58.08     0.61    4.25  18.61      0.04      0.21

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

--------------------
| ADD HYD  (  0042)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0030):    26.06   0.440     3.25    18.63
     + ID2= 2 (  0031):    58.08   0.611     4.25    18.61
       ================================================
       ID = 3 (  0042):    84.14   0.995     3.75    18.62

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

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

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


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DATE: 05-01-2024                          TIME: 04:07:41

USER:



COMMENTS: _____

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------------------------
  ***********************************************
  ** SIMULATION : 23. 50yr 4hr 10min Chicago    **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1251.473
```

Ptotal= 79.52 mm	B= 4.847
C= 0.753

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	5.91	1.00	40.47	2.00	13.20	3.00	6.95
0.17	6.71	1.17	164.13	2.17	11.36	3.17	6.49
0.33	7.83	1.33	52.28	2.33	10.01	3.33	6.09
0.50	9.48	1.50	28.71	2.50	8.98	3.50	5.74
0.67	12.26	1.67	20.28	2.67	8.17	3.67	5.44
0.83	18.07	1.83	15.90	2.83	7.50	3.83	5.17

CALIB	
NASHYD (0037)	Area (ha)= 26.06 Curve Number (CN)= 63.0
ID= 1 DT= 5.0 min	Ia (mm)= 8.00 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.98

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	5.91	1.083	40.47	2.083	13.20	3.08	6.95
0.167	5.91	1.167	40.47	2.167	13.20	3.17	6.95
0.250	6.71	1.250	164.13	2.250	11.36	3.25	6.49
0.333	6.71	1.333	164.13	2.333	11.36	3.33	6.49
0.417	7.83	1.417	52.28	2.417	10.01	3.42	6.09
0.500	7.83	1.500	52.28	2.500	10.01	3.50	6.09
0.583	9.48	1.583	28.71	2.583	8.98	3.58	5.74
0.667	9.48	1.667	28.71	2.667	8.98	3.67	5.74
0.750	12.26	1.750	20.28	2.750	8.17	3.75	5.44
0.833	12.26	1.833	20.28	2.833	8.17	3.83	5.44
0.917	18.07	1.917	15.90	2.917	7.50	3.92	5.17
1.000	18.07	2.000	15.90	3.000	7.50	4.00	5.17

Unit Hyd Qpeak (cms)= 1.016

PEAK FLOW (cms)= 0.616 (i)
TIME TO PEAK (hrs)= 2.667
RUNOFF VOLUME (mm)= 23.178
TOTAL RAINFALL (mm)= 79.522
RUNOFF COEFFICIENT = 0.291

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

ROUTE CHN(0030)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0037)	26.06	0.62	2.67	23.18	0.03	0.63
OUTFLOW: ID= 1 (0030)	26.06	0.55	3.17	23.18	0.03	0.63

CALIB	
NASHYD (0038)	Area (ha)= 58.08 Curve Number (CN)= 63.0
ID= 1 DT= 5.0 min	Ia (mm)= 8.00 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 1.13

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	5.91	1.083	40.47	2.083	13.20	3.08	6.95
0.167	5.91	1.167	40.47	2.167	13.20	3.17	6.95
0.250	6.71	1.250	164.13	2.250	11.36	3.25	6.49
0.333	6.71	1.333	164.13	2.333	11.36	3.33	6.49

```
                0.417    7.83 | 1.417   52.28 | 2.417   10.01 |  3.42    6.09
                0.500    7.83 | 1.500   52.28 | 2.500   10.01 |  3.50    6.09
                0.583    9.48 | 1.583   28.71 | 2.583    8.98 |  3.58    5.74
                0.667    9.48 | 1.667   28.71 | 2.667    8.98 |  3.67    5.74
                0.750   12.26 | 1.750   20.28 | 2.750    8.17 |  3.75    5.44
                0.833   12.26 | 1.833   20.28 | 2.833    8.17 |  3.83    5.44
                0.917   18.07 | 1.917   15.90 | 2.917    7.50 |  3.92    5.17
                1.000   18.07 | 2.000   15.90 | 3.000    7.50 |  4.00    5.17

     Unit Hyd Qpeak  (cms)=   1.963

     PEAK FLOW       (cms)=   1.250 (i)
     TIME TO PEAK    (hrs)=   2.833
     RUNOFF VOLUME    (mm)=  23.178
     TOTAL RAINFALL   (mm)=  79.522
     RUNOFF COEFFICIENT   =   0.291

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

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0031)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00         253.97        0.0800
                  44.18         253.34        0.0800
                  72.75         252.34    0.0800 /0.0300  Main Channel
                  94.18         252.35        0.0300      Main Channel
                 117.64         252.31        0.0300      Main Channel
                 131.62         252.33    0.0300 /0.0800  Main Channel
                 138.41         252.72        0.0800
                 150.91         253.00        0.0800
                 172.41         253.50        0.0800
                 180.51         253.60        0.0800

     <---------------------- TRAVEL TIME TABLE ----------------------->
      DEPTH    ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)     (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.02  252.33    .386E+03       0.0         0.17     149.17
       0.09  252.40    .580E+04       2.2         0.57      44.29
       0.15  252.47    .122E+05       7.3         0.90      27.96
       0.22  252.53    .189E+05      14.6         1.17      21.61
       0.29  252.60    .259E+05      23.9         1.40      18.12
       0.35  252.67    .333E+05      35.0         1.59      15.86
       0.42  252.73    .409E+05      47.8         1.77      14.27
       0.49  252.80    .490E+05      62.2         1.93      13.13
       0.55  252.87    .576E+05      78.3         2.06      12.25
       0.62  252.93    .667E+05      96.1         2.19      11.57
       0.69  253.00    .762E+05     115.4         2.30      11.01
       0.75  253.07    .863E+05     136.5         2.40      10.54
       0.82  253.13    .969E+05     159.1         2.49      10.15
       0.89  253.20    .108E+06     183.3         2.58       9.81
       0.95  253.27    .119E+06     209.2         2.66       9.51
       1.02  253.33    .131E+06     236.7         2.73       9.26
       1.09  253.40    .144E+06     265.1         2.79       9.06
       1.15  253.47    .157E+06     295.3         2.85       8.88
       1.22  253.54    .172E+06     327.0         2.89       8.75

                                 <---- hydrograph ---->   <-pipe / channel->
```

```
                                  AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                  (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0038)   58.08     1.25    2.83  23.18      0.06      0.28
   OUTFLOW: ID= 1 (  0031)   58.08     0.79    4.08  23.16      0.04      0.22



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--------------------
| ADD HYD  (  0042)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0030):    26.06   0.549     3.17    23.18
     + ID2= 2 (  0031):    58.08   0.786     4.08    23.16
       ================================================
       ID = 3 (  0042):    84.14   1.277     3.67    23.17

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

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


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DATE: 05-01-2024                          TIME: 04:07:41

USER:



COMMENTS: _____________________________________________________________
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  ***********************************************
  ** SIMULATION : 24. 100yr 4hr 10min Chicago   **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1383.628
| Ptotal= 87.42 mm |                          B=   4.905
--------------------                          C=   0.754
                       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    6.48 |  1.00   44.58 |  2.00   14.50 |  3.00    7.63
               0.17    7.36 |  1.17  180.44 |  2.17   12.47 |  3.17    7.11
               0.33    8.59 |  1.33   57.61 |  2.33   10.99 |  3.33    6.68
               0.50   10.41 |  1.50   31.60 |  2.50    9.86 |  3.50    6.29
               0.67   13.47 |  1.67   22.30 |  2.67    8.96 |  3.67    5.96
               0.83   19.87 |  1.83   17.48 |  2.83    8.23 |  3.83    5.67


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0037)|   Area    (ha)=  26.06   Curve Number   (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.98

        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    6.48 | 1.083   44.58 | 2.083   14.50 |  3.08    7.63
              0.167    6.48 | 1.167   44.58 | 2.167   14.50 |  3.17    7.63
              0.250    7.36 | 1.250  180.44 | 2.250   12.47 |  3.25    7.11
              0.333    7.36 | 1.333  180.44 | 2.333   12.47 |  3.33    7.11
              0.417    8.59 | 1.417   57.61 | 2.417   10.99 |  3.42    6.68
              0.500    8.59 | 1.500   57.61 | 2.500   10.99 |  3.50    6.68
              0.583   10.41 | 1.583   31.60 | 2.583    9.86 |  3.58    6.29
              0.667   10.41 | 1.667   31.60 | 2.667    9.86 |  3.67    6.29
              0.750   13.47 | 1.750   22.30 | 2.750    8.96 |  3.75    5.96
              0.833   13.47 | 1.833   22.30 | 2.833    8.96 |  3.83    5.96
              0.917   19.87 | 1.917   17.48 | 2.917    8.23 |  3.92    5.67
              1.000   19.87 | 2.000   17.48 | 3.000    8.23 |  4.00    5.67

     Unit Hyd Qpeak  (cms)=   1.016

     PEAK FLOW       (cms)=   0.739 (i)
     TIME TO PEAK    (hrs)=   2.583
     RUNOFF VOLUME    (mm)=  27.593
     TOTAL RAINFALL   (mm)=  87.421
     RUNOFF COEFFICIENT   =   0.316

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

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0030)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------

                <------ DATA FOR SECTION (   1.1) ------>
                Distance      Elevation       Manning
                    0.00         253.33        0.0800
                    4.07         253.22        0.0800
                   31.67         252.50        0.0800
                   80.33         251.02        0.0800
                  112.54         250.38    0.0800 /0.0300  Main Channel
                  147.82         250.41    0.0300 /0.0800  Main Channel
                  227.35         251.81        0.0800
                  234.22         251.93        0.0800
                  240.16         252.02        0.0800
                  245.25         252.11        0.0800
                  250.86         252.20        0.0800
                  254.81         252.26        0.0800

      <---------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        0.10   250.48    .379E+04       2.1         0.63       30.46
        0.20   250.58    .945E+04       8.0         0.98       19.68
        0.30   250.68    .163E+05      17.1         1.21       15.91
        0.40   250.77    .244E+05      29.2         1.38       13.93
        0.50   250.87    .338E+05      44.4         1.52       12.68
        0.60   250.97    .443E+05      62.6         1.63       11.80
        0.70   251.07    .560E+05      84.0         1.73       11.12
        0.79   251.17    .688E+05     108.6         1.82       10.56
        0.89   251.27    .826E+05     136.4         1.91       10.10
        0.99   251.37    .975E+05     167.3         1.99        9.71
        1.09   251.47    .113E+06     201.6         2.06        9.37
        1.19   251.57    .130E+06     239.1         2.12        9.08
        1.29   251.67    .148E+06     280.0         2.19        8.82
        1.39   251.77    .167E+06     324.3         2.24        8.58
        1.49   251.87    .187E+06     372.0         2.30        8.38
        1.59   251.97    .208E+06     423.3         2.35        8.19
        1.69   252.07    .230E+06     478.2         2.40        8.02
        1.79   252.17    .253E+06     536.8         2.45        7.86
        1.89   252.26    .277E+06     599.1         2.50        7.72

                                     <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK    TPEAK    R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)    (hrs)    (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0037)    26.06     0.74     2.58   27.59      0.04       0.63
   OUTFLOW: ID= 1 (  0030)    26.06     0.66     3.17   27.59      0.03       0.63


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0038)|   Area    (ha)=  58.08   Curve Number   (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.13

        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	6.48	1.083	44.58	2.083	14.50	3.08	7.63
0.167	6.48	1.167	44.58	2.167	14.50	3.17	7.63
0.250	7.36	1.250	180.44	2.250	12.47	3.25	7.11
0.333	7.36	1.333	180.44	2.333	12.47	3.33	7.11
0.417	8.59	1.417	57.61	2.417	10.99	3.42	6.68
0.500	8.59	1.500	57.61	2.500	10.99	3.50	6.68
0.583	10.41	1.583	31.60	2.583	9.86	3.58	6.29
0.667	10.41	1.667	31.60	2.667	9.86	3.67	6.29
0.750	13.47	1.750	22.30	2.750	8.96	3.75	5.96
0.833	13.47	1.833	22.30	2.833	8.96	3.83	5.96
0.917	19.87	1.917	17.48	2.917	8.23	3.92	5.67
1.000	19.87	2.000	17.48	3.000	8.23	4.00	5.67

Unit Hyd Qpeak (cms)= 1.963

PEAK FLOW (cms)= 1.497 (i)
TIME TO PEAK (hrs)= 2.833
RUNOFF VOLUME (mm)= 27.593
TOTAL RAINFALL (mm)= 87.421
RUNOFF COEFFICIENT = 0.316

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

| ROUTE CHN(0031)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

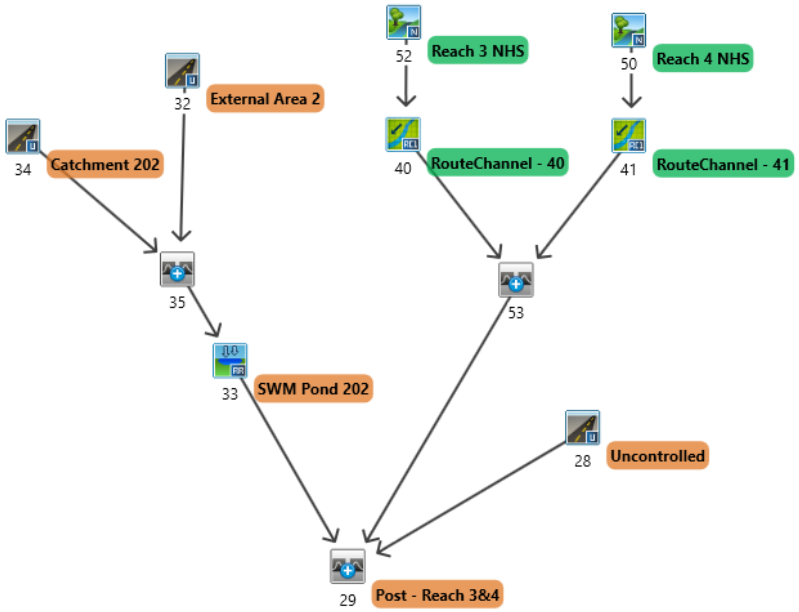
<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

		<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0038)		58.08	1.50	2.83	27.59	0.07	0.32
OUTFLOW: ID= 1 (0031)		58.08	0.97	3.92	27.58	0.05	0.24

ADD HYD (0042)|	1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0030):	26.06	0.657	3.17	27.59
+ ID2= 2 (0031):	58.08	0.973	3.92	27.58
ID = 3 (0042):	84.14	1.577	3.58	27.58

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.



SCHAEFFERS
CONSULTING ENGINEERS

Visual OTTHYMO™ Schematic

POST- DEVELOPMENT – REACH 3/4
2-100YR, 6HR SCS

Job #: 5170	**Date: April 2024**

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

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


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USER:


COMMENTS: _____________________________________________________________

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|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              3a0c766d-3ecf-4101-8ec5-64101323cb13\3038ab57
| Ptotal= 42.30 mm |    Comments: 2-Year-6-Hour-SCS-Type-II
--------------------
                TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                 hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
                0.00     0.00 |  1.75     4.23 |  3.50     9.31 |  5.25     1.69
                0.25     1.69 |  2.00     4.23 |  3.75     4.23 |  5.50     1.69
                0.50     1.69 |  2.25     5.08 |  4.00     4.23 |  5.75     1.69
                0.75     2.54 |  2.50     5.08 |  4.25     3.38 |  6.00     1.69
                1.00     2.54 |  2.75    25.38 |  4.50     3.38 |
                1.25     2.54 |  3.00    65.99 |  4.75     2.54 |
                1.50     2.54 |  3.25     9.31 |  5.00     2.54 |

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--------------------
| CALIB            |
| NASHYD   (  0052)|   Area     (ha)=  17.19   Curve Number    (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.98

        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	1.667	2.54	3.250	65.99	4.83	2.54
0.167	0.00	1.750	2.54	3.333	9.31	4.92	2.54
0.250	0.00	1.833	4.23	3.417	9.31	5.00	2.54
0.333	1.69	1.917	4.23	3.500	9.31	5.08	2.54
0.417	1.69	2.000	4.23	3.583	9.31	5.17	2.54
0.500	1.69	2.083	4.23	3.667	9.31	5.25	2.54
0.583	1.69	2.167	4.23	3.750	9.31	5.33	1.69
0.667	1.69	2.250	4.23	3.833	4.23	5.42	1.69
0.750	1.69	2.333	5.08	3.917	4.23	5.50	1.69
0.833	2.54	2.417	5.08	4.000	4.23	5.58	1.69
0.917	2.54	2.500	5.08	4.083	4.23	5.67	1.69
1.000	2.54	2.583	5.08	4.167	4.23	5.75	1.69
1.083	2.54	2.667	5.08	4.250	4.23	5.83	1.69
1.167	2.54	2.750	5.08	4.333	3.38	5.92	1.69
1.250	2.54	2.833	25.38	4.417	3.38	6.00	1.69
1.333	2.54	2.917	25.38	4.500	3.38	6.08	1.69
1.417	2.54	3.000	25.38	4.583	3.38	6.17	1.69
1.500	2.54	3.083	65.99	4.667	3.38	6.25	1.69
1.583	2.54	3.167	65.99	4.750	3.38		

```
     Unit Hyd Qpeak  (cms)=   0.670

     PEAK FLOW       (cms)=   0.115 (i)
     TIME TO PEAK    (hrs)=   4.333
     RUNOFF VOLUME    (mm)=   6.412
     TOTAL RAINFALL   (mm)=  42.300
     RUNOFF COEFFICIENT   =   0.152

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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| ROUTE CHN(  0040)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
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<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0052)	17.19	0.11	4.33	6.41	0.01	0.63
OUTFLOW: ID= 1 (0040)	17.19	0.10	4.92	6.41	0.00	0.63

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--------------------
| CALIB            |
| NASHYD   (  0050)|   Area     (ha)=  24.24   Curve Number    (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.13

        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	1.667	2.54	3.250	65.99	4.83	2.54
0.167	0.00	1.750	2.54	3.333	9.31	4.92	2.54
0.250	0.00	1.833	4.23	3.417	9.31	5.00	2.54
0.333	1.69	1.917	4.23	3.500	9.31	5.08	2.54
0.417	1.69	2.000	4.23	3.583	9.31	5.17	2.54
0.500	1.69	2.083	4.23	3.667	9.31	5.25	2.54
0.583	1.69	2.167	4.23	3.750	9.31	5.33	1.69
0.667	1.69	2.250	4.23	3.833	4.23	5.42	1.69
0.750	1.69	2.333	5.08	3.917	4.23	5.50	1.69
0.833	2.54	2.417	5.08	4.000	4.23	5.58	1.69
0.917	2.54	2.500	5.08	4.083	4.23	5.67	1.69
1.000	2.54	2.583	5.08	4.167	4.23	5.75	1.69
1.083	2.54	2.667	5.08	4.250	4.23	5.83	1.69
1.167	2.54	2.750	5.08	4.333	3.38	5.92	1.69
1.250	2.54	2.833	25.38	4.417	3.38	6.00	1.69

1.333	2.54	2.917	25.38	4.500	3.38	6.08	1.69
1.417	2.54	3.000	25.38	4.583	3.38	6.17	1.69
1.500	2.54	3.083	65.99	4.667	3.38	6.25	1.69
1.583	2.54	3.167	65.99	4.750	3.38		

Unit Hyd Qpeak (cms)= 0.819

PEAK FLOW (cms)= 0.146 (i)
TIME TO PEAK (hrs)= 4.583
RUNOFF VOLUME (mm)= 6.412
TOTAL RAINFALL (mm)= 42.300
RUNOFF COEFFICIENT = 0.152

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

ROUTE CHN(0041)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

		<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0050)		24.24	0.15	4.58	6.41	0.02	0.18
OUTFLOW: ID= 1 (0041)		24.24	0.08	6.33	6.38	0.02	0.17

ADD HYD (0053)|
1 + 2 = 3

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0040):		17.19	0.101	4.92	6.41
+ ID2= 2 (0041):		24.24	0.078	6.33	6.38
ID = 3 (0053):		41.43	0.165	5.33	6.39

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0028)|	Area (ha)= 1.13
ID= 1 DT= 5.0 min	Total Imp(%)= 70.00 Dir. Conn.(%)= 58.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.79	0.34
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	86.79	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	1.667	2.54	3.250	65.99	4.83	2.54
0.167	0.00	1.750	2.54	3.333	9.31	4.92	2.54
0.250	0.00	1.833	4.23	3.417	9.31	5.00	2.54
0.333	1.69	1.917	4.23	3.500	9.31	5.08	2.54
0.417	1.69	2.000	4.23	3.583	9.31	5.17	2.54
0.500	1.69	2.083	4.23	3.667	9.31	5.25	2.54
0.583	1.69	2.167	4.23	3.750	9.31	5.33	1.69
0.667	1.69	2.250	4.23	3.833	4.23	5.42	1.69
0.750	1.69	2.333	5.08	3.917	4.23	5.50	1.69
0.833	2.54	2.417	5.08	4.000	4.23	5.58	1.69
0.917	2.54	2.500	5.08	4.083	4.23	5.67	1.69
1.000	2.54	2.583	5.08	4.167	4.23	5.75	1.69
1.083	2.54	2.667	5.08	4.250	4.23	5.83	1.69
1.167	2.54	2.750	5.08	4.333	3.38	5.92	1.69
1.250	2.54	2.833	25.38	4.417	3.38	6.00	1.69
1.333	2.54	2.917	25.38	4.500	3.38	6.08	1.69
1.417	2.54	3.000	25.38	4.583	3.38	6.17	1.69
1.500	2.54	3.083	65.99	4.667	3.38	6.25	1.69
1.583	2.54	3.167	65.99	4.750	3.38		

Max.Eff.Inten.(mm/hr)=		65.99	45.16	
over (min)		5.00	15.00	
Storage Coeff. (min)=		2.77 (ii)	12.47 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.28	0.08	
				TOTALS
PEAK FLOW	(cms)=	0.12	0.03	0.141 (iii)

TIME TO PEAK (hrs)=	3.25	3.33	3.25
RUNOFF VOLUME (mm)=	41.30	16.14	30.73
TOTAL RAINFALL (mm)=	42.30	42.30	42.30
RUNOFF COEFFICIENT =	0.98	0.38	0.73

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0032)
ID= 1 DT= 5.0 min

Area (ha)= 3.80
Total Imp(%)= 80.00 Dir. Conn.(%)= 60.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	1.667	2.54	3.250	65.99	4.83	2.54
0.167	0.00	1.750	2.54	3.333	9.31	4.92	2.54
0.250	0.00	1.833	4.23	3.417	9.31	5.00	2.54
0.333	1.69	1.917	4.23	3.500	9.31	5.08	2.54
0.417	1.69	2.000	4.23	3.583	9.31	5.17	2.54
0.500	1.69	2.083	4.23	3.667	9.31	5.25	2.54
0.583	1.69	2.167	4.23	3.750	9.31	5.33	1.69
0.667	1.69	2.250	4.23	3.833	4.23	5.42	1.69
0.750	1.69	2.333	5.08	3.917	4.23	5.50	1.69
0.833	2.54	2.417	5.08	4.000	4.23	5.58	1.69
0.917	2.54	2.500	5.08	4.083	4.23	5.67	1.69
1.000	2.54	2.583	5.08	4.167	4.23	5.75	1.69
1.083	2.54	2.667	5.08	4.250	4.23	5.83	1.69
1.167	2.54	2.750	5.08	4.333	3.38	5.92	1.69
1.250	2.54	2.833	25.38	4.417	3.38	6.00	1.69
1.333	2.54	2.917	25.38	4.500	3.38	6.08	1.69
1.417	2.54	3.000	25.38	4.583	3.38	6.17	1.69
1.500	2.54	3.083	65.99	4.667	3.38	6.25	1.69
1.583	2.54	3.167	65.99	4.750	3.38		

Max.Eff.Inten.(mm/hr)=	65.99	80.20		
over (min)	5.00	15.00		
Storage Coeff. (min)=	3.99 (ii)	11.70 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	0.24	0.09		
			TOTALS	
PEAK FLOW (cms)=	0.41	0.11	0.503 (iii)	
TIME TO PEAK (hrs)=	3.25	3.33	3.25	
RUNOFF VOLUME (mm)=	41.30	20.38	32.93	
TOTAL RAINFALL (mm)=	42.30	42.30	42.30	
RUNOFF COEFFICIENT =	0.98	0.48	0.78	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0034)
ID= 1 DT= 5.0 min

Area (ha)= 29.06
Total Imp(%)= 66.00 Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	1.667	2.54	3.250	65.99	4.83	2.54
0.167	0.00	1.750	2.54	3.333	9.31	4.92	2.54
0.250	0.00	1.833	4.23	3.417	9.31	5.00	2.54
0.333	1.69	1.917	4.23	3.500	9.31	5.08	2.54
0.417	1.69	2.000	4.23	3.583	9.31	5.17	2.54
0.500	1.69	2.083	4.23	3.667	9.31	5.25	2.54
0.583	1.69	2.167	4.23	3.750	9.31	5.33	1.69
0.667	1.69	2.250	4.23	3.833	4.23	5.42	1.69
0.750	1.69	2.333	5.08	3.917	4.23	5.50	1.69
0.833	2.54	2.417	5.08	4.000	4.23	5.58	1.69
0.917	2.54	2.500	5.08	4.083	4.23	5.67	1.69
1.000	2.54	2.583	5.08	4.167	4.23	5.75	1.69
1.083	2.54	2.667	5.08	4.250	4.23	5.83	1.69
1.167	2.54	2.750	5.08	4.333	3.38	5.92	1.69
1.250	2.54	2.833	25.38	4.417	3.38	6.00	1.69
1.333	2.54	2.917	25.38	4.500	3.38	6.08	1.69
1.417	2.54	3.000	25.38	4.583	3.38	6.17	1.69
1.500	2.54	3.083	65.99	4.667	3.38	6.25	1.69
1.583	2.54	3.167	65.99	4.750	3.38		

Max.Eff.Inten.(mm/hr)=	65.99	37.29		
over (min)	5.00	20.00		
Storage Coeff. (min)=	7.34 (ii)	17.81 (ii)		
Unit Hyd. Tpeak (min)=	5.00	20.00		
Unit Hyd. peak (cms)=	0.17	0.06		
			TOTALS	
PEAK FLOW (cms)=	2.68	0.54	3.029 (iii)	
TIME TO PEAK (hrs)=	3.25	3.42	3.25	
RUNOFF VOLUME (mm)=	41.30	15.48	29.68	
TOTAL RAINFALL (mm)=	42.30	42.30	42.30	
RUNOFF COEFFICIENT =	0.98	0.37	0.70	

```
       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    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  (  0035)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0032):     3.80    0.503     3.25    32.93
      + ID2= 2 (  0034):    29.06    3.029     3.25    29.68
        ================================================
        ID = 3 (  0035):    32.86    3.532     3.25    30.06

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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| RESERVOIR(  0033)|     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    |  0.4930      1.5666
                          0.0360     0.7150    |  0.7890      1.8478
                          0.0660     1.0737    |  1.0520      2.0613
                          0.2630     1.3645    |  1.3140      2.2797

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0035)    32.860     3.532      3.25      30.06
   OUTFLOW: ID= 1 (  0033)    32.860     0.054      6.42      28.53

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.52
                  TIME SHIFT OF PEAK FLOW         (min)=190.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.9267
```

```
--------------------
| ADD HYD  (  0029)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0028):     1.13    0.141     3.25    30.73
      + ID2= 2 (  0033):    32.86    0.054     6.42    28.53
        ================================================
        ID = 3 (  0029):    33.99    0.163     3.25    28.61

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

```
--------------------
| ADD HYD  (  0029)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0029):    33.99    0.163     3.25    28.61
      + ID2= 2 (  0053):    41.43    0.165     5.33     6.39
        ================================================
        ID = 1 (  0029):    75.42    0.222     5.25    16.40

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\1bea660b-a505-4624-ab32-8adc876fc91d\scen
  Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\1bea660b-a505-4624-ab32-8adc876fc91d\scen


DATE: 05-03-2024                              TIME: 01:44:31

USER:


COMMENTS: _____________________________________________________
```

```
  ************************************************
  ** SIMULATION : 14. 5-Year-6-Hour-SCS-Type-II **
  ************************************************


--------------------
|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              3a0c766d-3ecf-4101-8ec5-64101323cb13\d811bc74
| Ptotal= 59.50 mm |    Comments: 5-Year-6-Hour-SCS-Type-II
--------------------

                TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00     0.00 |  1.75     5.95 |  3.50    13.09 |  5.25     2.38
                0.25     2.38 |  2.00     5.95 |  3.75     5.95 |  5.50     2.38
                0.50     2.38 |  2.25     7.14 |  4.00     5.95 |  5.75     2.38
                0.75     3.57 |  2.50     7.14 |  4.25     4.76 |  6.00     2.38
                1.00     3.57 |  2.75    35.70 |  4.50     4.76 |
```

1.25	3.57	3.00	92.82	4.75	3.57
1.50	3.57	3.25	13.09	5.00	3.57

CALIB					
NASHYD (0052)	Area	(ha)= 17.19	Curve Number	(CN)= 63.0	
ID= 1 DT= 5.0 min	Ia	(mm)= 8.00	# of Linear Res.(N)= 3.00		
	U.H. Tp(hrs)= 0.98				

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	1.667	3.57	3.250	92.82	4.83	3.57
0.167	0.00	1.750	3.57	3.333	13.09	4.92	3.57
0.250	0.00	1.833	5.95	3.417	13.09	5.00	3.57
0.333	2.38	1.917	5.95	3.500	13.09	5.08	3.57
0.417	2.38	2.000	5.95	3.583	13.09	5.17	3.57
0.500	2.38	2.083	5.95	3.667	13.09	5.25	3.57
0.583	2.38	2.167	5.95	3.750	13.09	5.33	2.38
0.667	2.38	2.250	5.95	3.833	5.95	5.42	2.38
0.750	2.38	2.333	7.14	3.917	5.95	5.50	2.38
0.833	3.57	2.417	7.14	4.000	5.95	5.58	2.38
0.917	3.57	2.500	7.14	4.083	5.95	5.67	2.38
1.000	3.57	2.583	7.14	4.167	5.95	5.75	2.38
1.083	3.57	2.667	7.14	4.250	5.95	5.83	2.38
1.167	3.57	2.750	7.14	4.333	4.76	5.92	2.38
1.250	3.57	2.833	35.70	4.417	4.76	6.00	2.38
1.333	3.57	2.917	35.70	4.500	4.76	6.08	2.38
1.417	3.57	3.000	35.70	4.583	4.76	6.17	2.38
1.500	3.57	3.083	92.82	4.667	4.76	6.25	2.38
1.583	3.57	3.167	92.82	4.750	4.76		

Unit Hyd Qpeak (cms)= 0.670

PEAK FLOW (cms)= 0.242 (i)
TIME TO PEAK (hrs)= 4.333
RUNOFF VOLUME (mm)= 13.217
TOTAL RAINFALL (mm)= 59.500
RUNOFF COEFFICIENT = 0.222

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

ROUTE CHN(0040)				
IN= 2---> OUT= 1	Routing time step (min)'= 5.00			

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0052)	17.19	0.24	4.33	13.22	0.01	0.63
OUTFLOW: ID= 1 (0040)	17.19	0.21	4.92	13.22	0.01	0.63

CALIB					
NASHYD (0050)	Area	(ha)= 24.24	Curve Number	(CN)= 63.0	
ID= 1 DT= 5.0 min	Ia	(mm)= 8.00	# of Linear Res.(N)= 3.00		
	U.H. Tp(hrs)= 1.13				

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	1.667	3.57	3.250	92.82	4.83	3.57
0.167	0.00	1.750	3.57	3.333	13.09	4.92	3.57
0.250	0.00	1.833	5.95	3.417	13.09	5.00	3.57
0.333	2.38	1.917	5.95	3.500	13.09	5.08	3.57
0.417	2.38	2.000	5.95	3.583	13.09	5.17	3.57
0.500	2.38	2.083	5.95	3.667	13.09	5.25	3.57
0.583	2.38	2.167	5.95	3.750	13.09	5.33	2.38
0.667	2.38	2.250	5.95	3.833	5.95	5.42	2.38
0.750	2.38	2.333	7.14	3.917	5.95	5.50	2.38
0.833	3.57	2.417	7.14	4.000	5.95	5.58	2.38
0.917	3.57	2.500	7.14	4.083	5.95	5.67	2.38

1.000	3.57	2.583	7.14	4.167	5.95	5.75	2.38
1.083	3.57	2.667	7.14	4.250	5.95	5.83	2.38
1.167	3.57	2.750	7.14	4.333	4.76	5.92	2.38
1.250	3.57	2.833	35.70	4.417	4.76	6.00	2.38
1.333	3.57	2.917	35.70	4.500	4.76	6.08	2.38
1.417	3.57	3.000	35.70	4.583	4.76	6.17	2.38
1.500	3.57	3.083	92.82	4.667	4.76	6.25	2.38
1.583	3.57	3.167	92.82	4.750	4.76		

Unit Hyd Qpeak (cms)= 0.819

PEAK FLOW (cms)= 0.307 (i)
TIME TO PEAK (hrs)= 4.500
RUNOFF VOLUME (mm)= 13.217
TOTAL RAINFALL (mm)= 59.500
RUNOFF COEFFICIENT = 0.222

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

ROUTE CHN(0041)
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

<---- hydrograph ----> <-pipe / channel->

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0050)	24.24	0.31	4.50	13.22	0.03	0.19
OUTFLOW: ID= 1 (0041)	24.24	0.16	6.17	13.18	0.02	0.18

ADD HYD (0053)|
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0040):	17.19	0.212	4.92	13.22
+ ID2= 2 (0041):	24.24	0.165	6.17	13.18
ID = 3 (0053):	41.43	0.348	5.25	13.20

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0028)| Area (ha)= 1.13
ID= 1 DT= 5.0 min	Total Imp(%)= 70.00 Dir. Conn.(%)= 58.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.79	0.34
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	86.79	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	1.667	3.57	3.250	92.82	4.83	3.57
0.167	0.00	1.750	3.57	3.333	13.09	4.92	3.57
0.250	0.00	1.833	5.95	3.417	13.09	5.00	3.57
0.333	2.38	1.917	5.95	3.500	13.09	5.08	3.57
0.417	2.38	2.000	5.95	3.583	13.09	5.17	3.57
0.500	2.38	2.083	5.95	3.667	13.09	5.25	3.57
0.583	2.38	2.167	5.95	3.750	13.09	5.33	2.38
0.667	2.38	2.250	5.95	3.833	5.95	5.42	2.38
0.750	2.38	2.333	7.14	3.917	5.95	5.50	2.38
0.833	3.57	2.417	7.14	4.000	5.95	5.58	2.38
0.917	3.57	2.500	7.14	4.083	5.95	5.67	2.38
1.000	3.57	2.583	7.14	4.167	5.95	5.75	2.38
1.083	3.57	2.667	7.14	4.250	5.95	5.83	2.38
1.167	3.57	2.750	7.14	4.333	4.76	5.92	2.38
1.250	3.57	2.833	35.70	4.417	4.76	6.00	2.38
1.333	3.57	2.917	35.70	4.500	4.76	6.08	2.38
1.417	3.57	3.000	35.70	4.583	4.76	6.17	2.38
1.500	3.57	3.083	92.82	4.667	4.76	6.25	2.38
1.583	3.57	3.167	92.82	4.750	4.76		

Max.Eff.Inten.(mm/hr)=	92.82		78.32
over (min)	5.00		15.00
Storage Coeff. (min)=	2.42	(ii)	10.20 (ii)

Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.30	0.09	
			TOTALS
PEAK FLOW (cms)=	0.17	0.05	0.211 (iii)
TIME TO PEAK (hrs)=	3.25	3.33	3.25
RUNOFF VOLUME (mm)=	58.50	28.41	45.85
TOTAL RAINFALL (mm)=	59.50	59.50	59.50
RUNOFF COEFFICIENT =	0.98	0.48	0.77

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0032)	Area (ha)= 3.80
ID= 1 DT= 5.0 min	Total Imp(%)= 80.00 Dir. Conn.(%)= 60.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	1.667	3.57	3.250	92.82	4.83	3.57
0.167	0.00	1.750	3.57	3.333	13.09	4.92	3.57
0.250	0.00	1.833	5.95	3.417	13.09	5.00	3.57
0.333	2.38	1.917	5.95	3.500	13.09	5.08	3.57
0.417	2.38	2.000	5.95	3.583	13.09	5.17	3.57
0.500	2.38	2.083	5.95	3.667	13.09	5.25	3.57
0.583	2.38	2.167	5.95	3.750	13.09	5.33	2.38
0.667	2.38	2.250	5.95	3.833	5.95	5.42	2.38
0.750	2.38	2.333	7.14	3.917	5.95	5.50	2.38
0.833	3.57	2.417	7.14	4.000	5.95	5.58	2.38
0.917	3.57	2.500	7.14	4.083	5.95	5.67	2.38
1.000	3.57	2.583	7.14	4.167	5.95	5.75	2.38
1.083	3.57	2.667	7.14	4.250	5.95	5.83	2.38
1.167	3.57	2.750	7.14	4.333	4.76	5.92	2.38
1.250	3.57	2.833	35.70	4.417	4.76	6.00	2.38
1.333	3.57	2.917	35.70	4.500	4.76	6.08	2.38
1.417	3.57	3.000	35.70	4.583	4.76	6.17	2.38
1.500	3.57	3.083	92.82	4.667	4.76	6.25	2.38
1.583	3.57	3.167	92.82	4.750	4.76		

Max.Eff.Inten.(mm/hr)=	92.82	132.21	
over (min)	5.00	10.00	
Storage Coeff. (min)=	3.48 (ii)	8.16 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.26	0.13	

			TOTALS
PEAK FLOW (cms)=	0.58	0.22	0.798 (iii)
TIME TO PEAK (hrs)=	3.25	3.25	3.25
RUNOFF VOLUME (mm)=	58.50	34.22	48.79
TOTAL RAINFALL (mm)=	59.50	59.50	59.50
RUNOFF COEFFICIENT =	0.98	0.58	0.82

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0034)	Area (ha)= 29.06
ID= 1 DT= 5.0 min	Total Imp(%)= 66.00 Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	1.667	3.57	3.250	92.82	4.83	3.57
0.167	0.00	1.750	3.57	3.333	13.09	4.92	3.57
0.250	0.00	1.833	5.95	3.417	13.09	5.00	3.57
0.333	2.38	1.917	5.95	3.500	13.09	5.08	3.57
0.417	2.38	2.000	5.95	3.583	13.09	5.17	3.57
0.500	2.38	2.083	5.95	3.667	13.09	5.25	3.57
0.583	2.38	2.167	5.95	3.750	13.09	5.33	2.38
0.667	2.38	2.250	5.95	3.833	5.95	5.42	2.38
0.750	2.38	2.333	7.14	3.917	5.95	5.50	2.38
0.833	3.57	2.417	7.14	4.000	5.95	5.58	2.38
0.917	3.57	2.500	7.14	4.083	5.95	5.67	2.38
1.000	3.57	2.583	7.14	4.167	5.95	5.75	2.38
1.083	3.57	2.667	7.14	4.250	5.95	5.83	2.38
1.167	3.57	2.750	7.14	4.333	4.76	5.92	2.38
1.250	3.57	2.833	35.70	4.417	4.76	6.00	2.38
1.333	3.57	2.917	35.70	4.500	4.76	6.08	2.38
1.417	3.57	3.000	35.70	4.583	4.76	6.17	2.38
1.500	3.57	3.083	92.82	4.667	4.76	6.25	2.38
1.583	3.57	3.167	92.82	4.750	4.76		

Max.Eff.Inten.(mm/hr)=	92.82	71.78	
over (min)	5.00	15.00	
Storage Coeff. (min)=	6.40 (ii)	14.46 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.18	0.08	
			TOTALS
PEAK FLOW (cms)=	3.87	1.11	4.806 (iii)

```
     TIME TO PEAK     (hrs)=       3.25         3.33          3.25
     RUNOFF VOLUME     (mm)=      58.50        27.47         44.53
     TOTAL RAINFALL    (mm)=      59.50        59.50         59.50
     RUNOFF COEFFICIENT   =       0.98         0.46          0.75


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    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  (  0035)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0032):     3.80   0.798     3.25    48.79
     + ID2= 2 (  0034):    29.06   4.806     3.25    44.53
       ================================================
       ID = 3 (  0035):    32.86   5.605     3.25    45.03

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0033)|     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   |   0.4930     1.5666
                         0.0360     0.7150   |   0.7890     1.8478
                         0.0660     1.0737   |   1.0520     2.0613
                         0.2630     1.3645   |   1.3140     2.2797

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0035)    32.860     5.605      3.25      45.03
   OUTFLOW: ID= 1 (  0033)    32.860     0.210      5.58      43.16

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  3.75
                  TIME SHIFT OF PEAK FLOW         (min)=140.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.2863

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

--------------------
| ADD HYD  (  0029)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0028):     1.13   0.211     3.25    45.85
     + ID2= 2 (  0033):    32.86   0.210     5.58    43.16
       ================================================
       ID = 3 (  0029):    33.99   0.245     3.25    43.24

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

--------------------
| ADD HYD  (  0029)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0029):    33.99   0.245     3.25    43.24
     + ID2= 2 (  0053):    41.43   0.348     5.25    13.20
       ================================================
       ID = 1 (  0029):    75.42   0.566     5.25    26.74

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


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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\8a2e5aa8-aadf-4718-9149-362798b2dfd0\scen
  Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\8a2e5aa8-aadf-4718-9149-362798b2dfd0\scen


DATE: 05-03-2024                          TIME: 01:44:31

USER:


COMMENTS: _____________________________________________________________

--------------------------------------------------------------------------------
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  ***********************************************
  ** SIMULATION : 15. 10-Year-6-Hour-SCS-Type-I **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              3a0c766d-3ecf-4101-8ec5-64101323cb13\9434984f
| Ptotal= 70.80 mm |    Comments: 10-Year-6-Hour-SCS-Type-II
--------------------
                TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                 hrs   mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
                0.00     0.00 |  1.75     7.08 |  3.50    15.58 |  5.25     2.83
```

0.25	2.83	2.00	7.08	3.75	7.08	5.50	2.83
0.50	2.83	2.25	8.50	4.00	7.08	5.75	2.83
0.75	4.25	2.50	8.50	4.25	5.66	6.00	2.83
1.00	4.25	2.75	42.48	4.50	5.66		
1.25	4.25	3.00	110.45	4.75	4.25		
1.50	4.25	3.25	15.58	5.00	4.25		

CALIB					
NASHYD (0052)	Area	(ha)= 17.19	Curve Number	(CN)= 63.0	
ID= 1 DT= 5.0 min	Ia	(mm)= 8.00	# of Linear Res.(N)= 3.00		
	U.H. Tp(hrs)= 0.98				

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	1.667	4.25	3.250	110.45	4.83	4.25
0.167	0.00	1.750	4.25	3.333	15.58	4.92	4.25
0.250	0.00	1.833	7.08	3.417	15.58	5.00	4.25
0.333	2.83	1.917	7.08	3.500	15.58	5.08	4.25
0.417	2.83	2.000	7.08	3.583	15.58	5.17	4.25
0.500	2.83	2.083	7.08	3.667	15.58	5.25	4.25
0.583	2.83	2.167	7.08	3.750	15.58	5.33	2.83
0.667	2.83	2.250	7.08	3.833	7.08	5.42	2.83
0.750	2.83	2.333	8.50	3.917	7.08	5.50	2.83
0.833	4.25	2.417	8.50	4.000	7.08	5.58	2.83
0.917	4.25	2.500	8.50	4.083	7.08	5.67	2.83
1.000	4.25	2.583	8.50	4.167	7.08	5.75	2.83
1.083	4.25	2.667	8.50	4.250	7.08	5.83	2.83
1.167	4.25	2.750	8.50	4.333	5.66	5.92	2.83
1.250	4.25	2.833	42.48	4.417	5.66	6.00	2.83
1.333	4.25	2.917	42.48	4.500	5.66	6.08	2.83
1.417	4.25	3.000	42.48	4.583	5.66	6.17	2.83
1.500	4.25	3.083	110.45	4.667	5.66	6.25	2.83
1.583	4.25	3.167	110.45	4.750	5.66		

Unit Hyd Qpeak (cms)= 0.670

PEAK FLOW (cms)= 0.344 (i)
TIME TO PEAK (hrs)= 4.333
RUNOFF VOLUME (mm)= 18.605
TOTAL RAINFALL (mm)= 70.800
RUNOFF COEFFICIENT = 0.263

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

ROUTE CHN(0040)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0052)	17.19	0.34	4.33	18.61	0.02	0.63
OUTFLOW: ID= 1 (0040)	17.19	0.30	4.83	18.60	0.01	0.63

CALIB					
NASHYD (0050)	Area	(ha)= 24.24	Curve Number	(CN)= 63.0	
ID= 1 DT= 5.0 min	Ia	(mm)= 8.00	# of Linear Res.(N)= 3.00		
	U.H. Tp(hrs)= 1.13				

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	1.667	4.25	3.250	110.45	4.83	4.25
0.167	0.00	1.750	4.25	3.333	15.58	4.92	4.25
0.250	0.00	1.833	7.08	3.417	15.58	5.00	4.25
0.333	2.83	1.917	7.08	3.500	15.58	5.08	4.25
0.417	2.83	2.000	7.08	3.583	15.58	5.17	4.25
0.500	2.83	2.083	7.08	3.667	15.58	5.25	4.25
0.583	2.83	2.167	7.08	3.750	15.58	5.33	2.83

0.667	2.83	2.250	7.08	3.833	7.08	5.42	2.83
0.750	2.83	2.333	8.50	3.917	7.08	5.50	2.83
0.833	4.25	2.417	8.50	4.000	7.08	5.58	2.83
0.917	4.25	2.500	8.50	4.083	7.08	5.67	2.83
1.000	4.25	2.583	8.50	4.167	7.08	5.75	2.83
1.083	4.25	2.667	8.50	4.250	7.08	5.83	2.83
1.167	4.25	2.750	8.50	4.333	5.66	5.92	2.83
1.250	4.25	2.833	42.48	4.417	5.66	6.00	2.83
1.333	4.25	2.917	42.48	4.500	5.66	6.08	2.83
1.417	4.25	3.000	42.48	4.583	5.66	6.17	2.83
1.500	4.25	3.083	110.45	4.667	5.66	6.25	2.83
1.583	4.25	3.167	110.45	4.750	5.66		

Unit Hyd Qpeak (cms)= 0.819

PEAK FLOW (cms)= 0.436 (i)
TIME TO PEAK (hrs)= 4.500
RUNOFF VOLUME (mm)= 18.605
TOTAL RAINFALL (mm)= 70.800
RUNOFF COEFFICIENT = 0.263

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

ROUTE CHN(0041)
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0050)	24.24	0.44	4.50	18.61	0.03	0.19
OUTFLOW: ID= 1 (0041)	24.24	0.24	6.00	18.57	0.03	0.18

ADD HYD (0053)|
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0040):	17.19	0.301	4.83	18.60
+ ID2= 2 (0041):	24.24	0.235	6.00	18.57
ID = 3 (0053):	41.43	0.497	5.25	18.58

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0028)| Area (ha)= 1.13
ID= 1 DT= 5.0 min	Total Imp(%)= 70.00 Dir. Conn.(%)= 58.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.79	0.34
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	86.79	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	1.667	4.25	3.250	110.45	4.83	4.25
0.167	0.00	1.750	4.25	3.333	15.58	4.92	4.25
0.250	0.00	1.833	7.08	3.417	15.58	5.00	4.25
0.333	2.83	1.917	7.08	3.500	15.58	5.08	4.25
0.417	2.83	2.000	7.08	3.583	15.58	5.17	4.25
0.500	2.83	2.083	7.08	3.667	15.58	5.25	4.25
0.583	2.83	2.167	7.08	3.750	15.58	5.33	2.83
0.667	2.83	2.250	7.08	3.833	7.08	5.42	2.83
0.750	2.83	2.333	8.50	3.917	7.08	5.50	2.83
0.833	4.25	2.417	8.50	4.000	7.08	5.58	2.83
0.917	4.25	2.500	8.50	4.083	7.08	5.67	2.83
1.000	4.25	2.583	8.50	4.167	7.08	5.75	2.83
1.083	4.25	2.667	8.50	4.250	7.08	5.83	2.83
1.167	4.25	2.750	8.50	4.333	5.66	5.92	2.83
1.250	4.25	2.833	42.48	4.417	5.66	6.00	2.83
1.333	4.25	2.917	42.48	4.500	5.66	6.08	2.83
1.417	4.25	3.000	42.48	4.583	5.66	6.17	2.83
1.500	4.25	3.083	110.45	4.667	5.66	6.25	2.83
1.583	4.25	3.167	110.45	4.750	5.66		

Max.Eff.Inten.(mm/hr)=	110.45	101.72	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.26 (ii)	9.26 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.30	0.12	
			TOTALS
PEAK FLOW (cms)=	0.20	0.07	0.271 (iii)
TIME TO PEAK (hrs)=	3.25	3.25	3.25
RUNOFF VOLUME (mm)=	69.80	37.22	56.11
TOTAL RAINFALL (mm)=	70.80	70.80	70.80
RUNOFF COEFFICIENT =	0.99	0.53	0.79

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0032)
ID= 1 DT= 5.0 min

Area (ha)= 3.80
Total Imp(%)= 80.00 Dir. Conn.(%)= 60.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	1.667	4.25	3.250	110.45	4.83	4.25
0.167	0.00	1.750	4.25	3.333	15.58	4.92	4.25
0.250	0.00	1.833	7.08	3.417	15.58	5.00	4.25
0.333	2.83	1.917	7.08	3.500	15.58	5.08	4.25
0.417	2.83	2.000	7.08	3.583	15.58	5.17	4.25
0.500	2.83	2.083	7.08	3.667	15.58	5.25	4.25
0.583	2.83	2.167	7.08	3.750	15.58	5.33	2.83
0.667	2.83	2.250	7.08	3.833	7.08	5.42	2.83
0.750	2.83	2.333	8.50	3.917	7.08	5.50	2.83
0.833	4.25	2.417	8.50	4.000	7.08	5.58	2.83
0.917	4.25	2.500	8.50	4.083	7.08	5.67	2.83
1.000	4.25	2.583	8.50	4.167	7.08	5.75	2.83
1.083	4.25	2.667	8.50	4.250	7.08	5.83	2.83
1.167	4.25	2.750	8.50	4.333	5.66	5.92	2.83
1.250	4.25	2.833	42.48	4.417	5.66	6.00	2.83
1.333	4.25	2.917	42.48	4.500	5.66	6.08	2.83
1.417	4.25	3.000	42.48	4.583	5.66	6.17	2.83
1.500	4.25	3.083	110.45	4.667	5.66	6.25	2.83
1.583	4.25	3.167	110.45	4.750	5.66		

Max.Eff.Inten.(mm/hr)=	110.45	167.79	
over (min)	5.00	10.00	
Storage Coeff. (min)=	3.24 (ii)	7.62 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.27	0.13	
			TOTALS
PEAK FLOW (cms)=	0.70	0.28	0.978 (iii)
TIME TO PEAK (hrs)=	3.25	3.25	3.25
RUNOFF VOLUME (mm)=	69.80	43.91	59.44
TOTAL RAINFALL (mm)=	70.80	70.80	70.80
RUNOFF COEFFICIENT =	0.99	0.62	0.84

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0034)
ID= 1 DT= 5.0 min

Area (ha)= 29.06
Total Imp(%)= 66.00 Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	1.667	4.25	3.250	110.45	4.83	4.25
0.167	0.00	1.750	4.25	3.333	15.58	4.92	4.25
0.250	0.00	1.833	7.08	3.417	15.58	5.00	4.25
0.333	2.83	1.917	7.08	3.500	15.58	5.08	4.25
0.417	2.83	2.000	7.08	3.583	15.58	5.17	4.25
0.500	2.83	2.083	7.08	3.667	15.58	5.25	4.25
0.583	2.83	2.167	7.08	3.750	15.58	5.33	2.83
0.667	2.83	2.250	7.08	3.833	7.08	5.42	2.83
0.750	2.83	2.333	8.50	3.917	7.08	5.50	2.83
0.833	4.25	2.417	8.50	4.000	7.08	5.58	2.83
0.917	4.25	2.500	8.50	4.083	7.08	5.67	2.83
1.000	4.25	2.583	8.50	4.167	7.08	5.75	2.83
1.083	4.25	2.667	8.50	4.250	7.08	5.83	2.83
1.167	4.25	2.750	8.50	4.333	5.66	5.92	2.83
1.250	4.25	2.833	42.48	4.417	5.66	6.00	2.83
1.333	4.25	2.917	42.48	4.500	5.66	6.08	2.83
1.417	4.25	3.000	42.48	4.583	5.66	6.17	2.83
1.500	4.25	3.083	110.45	4.667	5.66	6.25	2.83
1.583	4.25	3.167	110.45	4.750	5.66		

Max.Eff.Inten.(mm/hr)=	110.45	93.60	
over (min)	5.00	15.00	
Storage Coeff. (min)=	5.97 (ii)	13.22 (ii)	

```
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.19         0.08
                                                        *TOTALS*
     PEAK FLOW       (cms)=       4.65         1.53         5.966 (iii)
     TIME TO PEAK    (hrs)=       3.25         3.33          3.25
     RUNOFF VOLUME    (mm)=      69.80        36.12         54.65
     TOTAL RAINFALL   (mm)=      70.80        70.80         70.80
     RUNOFF COEFFICIENT   =       0.99         0.51          0.77


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    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  (  0035)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0032):      3.80   0.978     3.25    59.44
     + ID2= 2 (  0034):     29.06   5.966     3.25    54.65
       ================================================
       ID = 3 (  0035):     32.86   6.944     3.25    55.20

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

```
--------------------
| RESERVOIR(  0033)|     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    |   0.4930     1.5666
                          0.0360     0.7150    |   0.7890     1.8478
                          0.0660     1.0737    |   1.0520     2.0613
                          0.2630     1.3645    |   1.3140     2.2797

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0035)     32.860     6.944      3.25      55.20
   OUTFLOW: ID= 1 (  0033)     32.860     0.394      4.92      53.28

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  5.67
                  TIME SHIFT OF PEAK FLOW         (min)=100.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.4796
```

```
--------------------
| ADD HYD  (  0029)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0028):      1.13   0.271     3.25    56.11
     + ID2= 2 (  0033):     32.86   0.394     4.92    53.28
       ================================================
       ID = 3 (  0029):     33.99   0.407     4.75    53.37

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

```
--------------------
| ADD HYD  (  0029)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0029):     33.99   0.407     4.75    53.37
     + ID2= 2 (  0053):     41.43   0.497     5.25    18.58
       ================================================
       ID = 1 (  0029):     75.42   0.902     5.17    34.26

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

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

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

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\ed0e0d73-b62b-4d4d-be93-013536dbf26c\scen
  Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\ed0e0d73-b62b-4d4d-be93-013536dbf26c\scen

DATE: 05-03-2024                          TIME: 01:44:32

USER:


COMMENTS: _____
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```
  ********************************************
  ** SIMULATION : 16. 25-Year-6-Hour-SCS-Type-I **
  ********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              3a0c766d-3ecf-4101-8ec5-64101323cb13\edbfb811
| Ptotal= 85.20 mm |    Comments: 25-Year-6-Hour-SCS-Type-II
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	1.75	8.52	3.50	18.74	5.25	3.41
0.25	3.41	2.00	8.52	3.75	8.52	5.50	3.41
0.50	3.41	2.25	10.22	4.00	8.52	5.75	3.41
0.75	5.11	2.50	10.22	4.25	6.82	6.00	3.41
1.00	5.11	2.75	51.12	4.50	6.82		
1.25	5.11	3.00	132.91	4.75	5.11		
1.50	5.11	3.25	18.74	5.00	5.11		

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

CALIB / NASHYD (0052) / ID= 1 DT= 5.0 min					
	Area	(ha)=	17.19	Curve Number (CN)=	63.0
	Ia	(mm)=	8.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=		0.98		

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	1.667	5.11	3.250	132.91	4.83	5.11
0.167	0.00	1.750	5.11	3.333	18.75	4.92	5.11
0.250	0.00	1.833	8.52	3.417	18.74	5.00	5.11
0.333	3.41	1.917	8.52	3.500	18.74	5.08	5.11
0.417	3.41	2.000	8.52	3.583	18.74	5.17	5.11
0.500	3.41	2.083	8.52	3.667	18.74	5.25	5.11
0.583	3.41	2.167	8.52	3.750	18.74	5.33	3.41
0.667	3.41	2.250	8.52	3.833	8.52	5.42	3.41
0.750	3.41	2.333	10.22	3.917	8.52	5.50	3.41
0.833	5.11	2.417	10.22	4.000	8.52	5.58	3.41
0.917	5.11	2.500	10.22	4.083	8.52	5.67	3.41
1.000	5.11	2.583	10.22	4.167	8.52	5.75	3.41
1.083	5.11	2.667	10.22	4.250	8.52	5.83	3.41
1.167	5.11	2.750	10.22	4.333	6.82	5.92	3.41
1.250	5.11	2.833	51.12	4.417	6.82	6.00	3.41
1.333	5.11	2.917	51.12	4.500	6.82	6.08	3.41
1.417	5.11	3.000	51.12	4.583	6.82	6.17	3.41
1.500	5.11	3.083	132.91	4.667	6.82	6.25	3.41
1.583	5.11	3.167	132.91	4.750	6.82		

Unit Hyd Qpeak (cms)= 0.670

PEAK FLOW (cms)= 0.492 (i)
TIME TO PEAK (hrs)= 4.250
RUNOFF VOLUME (mm)= 26.327
TOTAL RAINFALL (mm)= 85.200
RUNOFF COEFFICIENT = 0.309

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

ROUTE CHN(0040) / IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

		AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2	(0052)	17.19	0.49	4.25	26.33	0.02	0.63
OUTFLOW: ID= 1	(0040)	17.19	0.43	4.83	26.33	0.02	0.63

CALIB / NASHYD (0050) / ID= 1 DT= 5.0 min					
	Area	(ha)=	24.24	Curve Number (CN)=	63.0
	Ia	(mm)=	8.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=		1.13		

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	1.667	5.11	3.250	132.91	4.83	5.11
0.167	0.00	1.750	5.11	3.333	18.75	4.92	5.11
0.250	0.00	1.833	8.52	3.417	18.74	5.00	5.11

0.333	3.41	1.917	8.52	3.500	18.74	5.08	5.11
0.417	3.41	2.000	8.52	3.583	18.74	5.17	5.11
0.500	3.41	2.083	8.52	3.667	18.74	5.25	5.11
0.583	3.41	2.167	8.52	3.750	18.74	5.33	3.41
0.667	3.41	2.250	8.52	3.833	8.52	5.42	3.41
0.750	3.41	2.333	10.22	3.917	8.52	5.50	3.41
0.833	5.11	2.417	10.22	4.000	8.52	5.58	3.41
0.917	5.11	2.500	10.22	4.083	8.52	5.67	3.41
1.000	5.11	2.583	10.22	4.167	8.52	5.75	3.41
1.083	5.11	2.667	10.22	4.250	8.52	5.83	3.41
1.167	5.11	2.750	10.22	4.333	6.82	5.92	3.41
1.250	5.11	2.833	51.12	4.417	6.82	6.00	3.41
1.333	5.11	2.917	51.12	4.500	6.82	6.08	3.41
1.417	5.11	3.000	51.12	4.583	6.82	6.17	3.41
1.500	5.11	3.083	132.91	4.667	6.82	6.25	3.41
1.583	5.11	3.167	132.91	4.750	6.82		

Unit Hyd Qpeak (cms)= 0.819

PEAK FLOW (cms)= 0.622 (i)
TIME TO PEAK (hrs)= 4.500
RUNOFF VOLUME (mm)= 26.327
TOTAL RAINFALL (mm)= 85.200
RUNOFF COEFFICIENT = 0.309

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

ROUTE CHN(0041)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0050)	24.24	0.62	4.50	26.33	0.04	0.21
OUTFLOW: ID= 1 (0041)	24.24	0.34	5.92	26.29	0.03	0.19

ADD HYD (0053)|
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0040):	17.19	0.428	4.83	26.33
+ ID2= 2 (0041):	24.24	0.340	5.92	26.29
ID = 3 (0053):	41.43	0.718	5.17	26.31

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0028)|	Area (ha)= 1.13
ID= 1 DT= 5.0 min	Total Imp(%)= 70.00	Dir. Conn.(%)= 58.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.79	0.34
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	86.79	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	1.667	5.11	3.250	132.91	4.83	5.11
0.167	0.00	1.750	5.11	3.333	18.75	4.92	5.11
0.250	0.00	1.833	8.52	3.417	18.74	5.00	5.11
0.333	3.41	1.917	8.52	3.500	18.74	5.08	5.11
0.417	3.41	2.000	8.52	3.583	18.74	5.17	5.11
0.500	3.41	2.083	8.52	3.667	18.74	5.25	5.11
0.583	3.41	2.167	8.52	3.750	18.74	5.33	3.41
0.667	3.41	2.250	8.52	3.833	8.52	5.42	3.41
0.750	3.41	2.333	10.22	3.917	8.52	5.50	3.41
0.833	5.11	2.417	10.22	4.000	8.52	5.58	3.41
0.917	5.11	2.500	10.22	4.083	8.52	5.67	3.41
1.000	5.11	2.583	10.22	4.167	8.52	5.75	3.41
1.083	5.11	2.667	10.22	4.250	8.52	5.83	3.41
1.167	5.11	2.750	10.22	4.333	6.82	5.92	3.41
1.250	5.11	2.833	51.12	4.417	6.82	6.00	3.41

1.333	5.11	2.917	51.12	4.500	6.82	6.08	3.41
1.417	5.11	3.000	51.12	4.583	6.82	6.17	3.41
1.500	5.11	3.083	132.91	4.667	6.82	6.25	3.41
1.583	5.11	3.167	132.91	4.750	6.82		

Max.Eff.Inten.(mm/hr)=		132.91	132.65	
over (min)		5.00	10.00	
Storage Coeff. (min)=		2.09 (ii)	6.93 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.31	0.14	
				TOTALS
PEAK FLOW	(cms)=	0.24	0.10	0.343 (iii)
TIME TO PEAK	(hrs)=	3.25	3.25	3.25
RUNOFF VOLUME	(mm)=	84.20	49.06	69.44
TOTAL RAINFALL	(mm)=	85.20	85.20	85.20
RUNOFF COEFFICIENT	=	0.99	0.58	0.81

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0032)	Area (ha)= 3.80
ID= 1 DT= 5.0 min	Total Imp(%)= 80.00 Dir. Conn.(%)= 60.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	1.667	5.11	3.250	132.91	4.83	5.11
0.167	0.00	1.750	5.11	3.333	18.75	4.92	5.11
0.250	0.00	1.833	8.52	3.417	18.74	5.00	5.11
0.333	3.41	1.917	8.52	3.500	18.74	5.08	5.11
0.417	3.41	2.000	8.52	3.583	18.74	5.17	5.11
0.500	3.41	2.083	8.52	3.667	18.74	5.25	5.11
0.583	3.41	2.167	8.52	3.750	18.74	5.33	3.41
0.667	3.41	2.250	8.52	3.833	8.52	5.42	3.41
0.750	3.41	2.333	10.22	3.917	8.52	5.50	3.41
0.833	5.11	2.417	10.22	4.000	8.52	5.58	3.41
0.917	5.11	2.500	10.22	4.083	8.52	5.67	3.41
1.000	5.11	2.583	10.22	4.167	8.52	5.75	3.41
1.083	5.11	2.667	10.22	4.250	8.52	5.83	3.41
1.167	5.11	2.750	10.22	4.333	6.82	5.92	3.41
1.250	5.11	2.833	51.12	4.417	6.82	6.00	3.41
1.333	5.11	2.917	51.12	4.500	6.82	6.08	3.41
1.417	5.11	3.000	51.12	4.583	6.82	6.17	3.41
1.500	5.11	3.083	132.91	4.667	6.82	6.25	3.41
1.583	5.11	3.167	132.91	4.750	6.82		

Max.Eff.Inten.(mm/hr)=		132.91	213.91	
over (min)		5.00	10.00	
Storage Coeff. (min)=		3.01 (ii)	7.07 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.28	0.14	
				TOTALS
PEAK FLOW	(cms)=	0.84	0.37	1.210 (iii)
TIME TO PEAK	(hrs)=	3.25	3.25	3.25
RUNOFF VOLUME	(mm)=	84.20	56.69	73.20
TOTAL RAINFALL	(mm)=	85.20	85.20	85.20
RUNOFF COEFFICIENT	=	0.99	0.67	0.86

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0034)	Area (ha)= 29.06
ID= 1 DT= 5.0 min	Total Imp(%)= 66.00 Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	1.667	5.11	3.250	132.91	4.83	5.11
0.167	0.00	1.750	5.11	3.333	18.75	4.92	5.11
0.250	0.00	1.833	8.52	3.417	18.74	5.00	5.11
0.333	3.41	1.917	8.52	3.500	18.74	5.08	5.11
0.417	3.41	2.000	8.52	3.583	18.74	5.17	5.11
0.500	3.41	2.083	8.52	3.667	18.74	5.25	5.11
0.583	3.41	2.167	8.52	3.750	18.74	5.33	3.41
0.667	3.41	2.250	8.52	3.833	8.52	5.42	3.41
0.750	3.41	2.333	10.22	3.917	8.52	5.50	3.41
0.833	5.11	2.417	10.22	4.000	8.52	5.58	3.41
0.917	5.11	2.500	10.22	4.083	8.52	5.67	3.41
1.000	5.11	2.583	10.22	4.167	8.52	5.75	3.41
1.083	5.11	2.667	10.22	4.250	8.52	5.83	3.41
1.167	5.11	2.750	10.22	4.333	6.82	5.92	3.41
1.250	5.11	2.833	51.12	4.417	6.82	6.00	3.41
1.333	5.11	2.917	51.12	4.500	6.82	6.08	3.41
1.417	5.11	3.000	51.12	4.583	6.82	6.17	3.41
1.500	5.11	3.083	132.91	4.667	6.82	6.25	3.41
1.583	5.11	3.167	132.91	4.750	6.82		

```
     Max.Eff.Inten.(mm/hr)=     132.91       122.55
               over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.55 (ii)   12.05 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.20         0.09
                                                      *TOTALS*
     PEAK FLOW       (cms)=       5.65         2.12      7.498 (iii)
     TIME TO PEAK    (hrs)=       3.25         3.33       3.25
     RUNOFF VOLUME    (mm)=      84.20        47.78      67.81
     TOTAL RAINFALL   (mm)=      85.20        85.20      85.20
     RUNOFF COEFFICIENT   =       0.99         0.56       0.80


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    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  (  0035)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
       ID1= 1 (  0032):      3.80   1.210     3.25    73.20
     + ID2= 2 (  0034):     29.06   7.498     3.25    67.81
       ================================================
       ID = 3 (  0035):     32.86   8.708     3.25    68.43

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

```
--------------------
| RESERVOIR(  0033)|     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    |   0.4930      1.5666
                         0.0360     0.7150    |   0.7890      1.8478
                         0.0660     1.0737    |   1.0520      2.0613
                         0.2630     1.3645    |   1.3140      2.2797

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0035)     32.860     8.708      3.25      68.43
   OUTFLOW: ID= 1 (  0033)     32.860     0.664      4.42      66.47

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  7.62
                  TIME SHIFT OF PEAK FLOW         (min)= 70.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.7291
```

```
--------------------
| ADD HYD  (  0029)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
       ID1= 1 (  0028):      1.13   0.343     3.25    69.44
     + ID2= 2 (  0033):     32.86   0.664     4.42    66.47
       ================================================
       ID = 3 (  0029):     33.99   0.686     4.25    66.57

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

```
--------------------
| ADD HYD  (  0029)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
       ID1= 3 (  0029):     33.99   0.686     4.25    66.57
     + ID2= 2 (  0053):     41.43   0.718     5.17    26.31
       ================================================
       ID = 1 (  0029):     75.42   1.371     5.00    44.45

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\258055ef-29f7-4452-9555-e25149793a21\scen
  Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\258055ef-29f7-4452-9555-e25149793a21\scen


DATE: 05-03-2024                              TIME: 01:44:31

USER:


COMMENTS: _____________________________________________________________
```

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  ***********************************************
  ** SIMULATION : 17. 50-Year-6-Hour-SCS-Type-I **
  ***********************************************


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```

```
|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              3a0c766d-3ecf-4101-8ec5-64101323cb13\573d0df0
| Ptotal= 95.90 mm |    Comments: 50-Year-6-Hour-SCS-Type-II
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	1.75	9.59	3.50	21.10	5.25	3.84
0.25	3.84	2.00	9.59	3.75	9.59	5.50	3.84
0.50	3.84	2.25	11.51	4.00	9.59	5.75	3.84
0.75	5.75	2.50	11.51	4.25	7.67	6.00	3.84
1.00	5.75	2.75	57.54	4.50	7.67		
1.25	5.75	3.00	149.60	4.75	5.75		
1.50	5.75	3.25	21.10	5.00	5.75		

```
--------------------
| CALIB            |
| NASHYD   (  0052)|   Area    (ha)=  17.19   Curve Number    (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.98

        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	1.667	5.75	3.250	149.60	4.83	5.75
0.167	0.00	1.750	5.75	3.333	21.10	4.92	5.75
0.250	0.00	1.833	9.59	3.417	21.10	5.00	5.75
0.333	3.84	1.917	9.59	3.500	21.10	5.08	5.75
0.417	3.84	2.000	9.59	3.583	21.10	5.17	5.75
0.500	3.84	2.083	9.59	3.667	21.10	5.25	5.75
0.583	3.84	2.167	9.59	3.750	21.10	5.33	3.84
0.667	3.84	2.250	9.59	3.833	9.59	5.42	3.84
0.750	3.84	2.333	11.51	3.917	9.59	5.50	3.84
0.833	5.75	2.417	11.51	4.000	9.59	5.58	3.84
0.917	5.75	2.500	11.51	4.083	9.59	5.67	3.84
1.000	5.75	2.583	11.51	4.167	9.59	5.75	3.84
1.083	5.75	2.667	11.51	4.250	9.59	5.83	3.84
1.167	5.75	2.750	11.51	4.333	7.67	5.92	3.84
1.250	5.75	2.833	57.54	4.417	7.67	6.00	3.84
1.333	5.75	2.917	57.54	4.500	7.67	6.08	3.84
1.417	5.75	3.000	57.54	4.583	7.67	6.17	3.84
1.500	5.75	3.083	149.60	4.667	7.67	6.25	3.84
1.583	5.75	3.167	149.60	4.750	7.67		

```
     Unit Hyd Qpeak  (cms)=   0.670

     PEAK FLOW       (cms)=   0.612 (i)
     TIME TO PEAK    (hrs)=   4.250
     RUNOFF VOLUME    (mm)=  32.590
     TOTAL RAINFALL   (mm)=  95.900
     RUNOFF COEFFICIENT   =   0.340

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

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```
| ROUTE CHN(  0040)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
```

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
		<---- hydrograph ---->			<-pipe / channel->	
INFLOW : ID= 2 (0052)	17.19	0.61	4.25	32.59	0.03	0.63
OUTFLOW: ID= 1 (0040)	17.19	0.53	4.83	32.59	0.03	0.63

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--------------------
| CALIB            |
| NASHYD   (  0050)|   Area    (ha)=  24.24   Curve Number    (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.13

        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	1.667	5.75	3.250	149.60	4.83	5.75
0.167	0.00	1.750	5.75	3.333	21.10	4.92	5.75
0.250	0.00	1.833	9.59	3.417	21.10	5.00	5.75
0.333	3.84	1.917	9.59	3.500	21.10	5.08	5.75
0.417	3.84	2.000	9.59	3.583	21.10	5.17	5.75
0.500	3.84	2.083	9.59	3.667	21.10	5.25	5.75
0.583	3.84	2.167	9.59	3.750	21.10	5.33	3.84
0.667	3.84	2.250	9.59	3.833	9.59	5.42	3.84
0.750	3.84	2.333	11.51	3.917	9.59	5.50	3.84
0.833	5.75	2.417	11.51	4.000	9.59	5.58	3.84
0.917	5.75	2.500	11.51	4.083	9.59	5.67	3.84
1.000	5.75	2.583	11.51	4.167	9.59	5.75	3.84
1.083	5.75	2.667	11.51	4.250	9.59	5.83	3.84
1.167	5.75	2.750	11.51	4.333	7.67	5.92	3.84
1.250	5.75	2.833	57.54	4.417	7.67	6.00	3.84
1.333	5.75	2.917	57.54	4.500	7.67	6.08	3.84
1.417	5.75	3.000	57.54	4.583	7.67	6.17	3.84
1.500	5.75	3.083	149.60	4.667	7.67	6.25	3.84
1.583	5.75	3.167	149.60	4.750	7.67		

Unit Hyd Qpeak (cms)= 0.819

PEAK FLOW (cms)= 0.774 (i)
TIME TO PEAK (hrs)= 4.500
RUNOFF VOLUME (mm)= 32.591
TOTAL RAINFALL (mm)= 95.900
RUNOFF COEFFICIENT = 0.340

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

ROUTE CHN(0041)
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0050)	24.24	0.77	4.50	32.59	0.04	0.22
OUTFLOW: ID= 1 (0041)	24.24	0.43	5.83	32.55	0.03	0.19

ADD HYD (0053)|
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0040):	17.19	0.532	4.83	32.59
+ ID2= 2 (0041):	24.24	0.428	5.83	32.55
ID = 3 (0053):	41.43	0.902	5.17	32.57

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0028)| Area (ha)= 1.13
ID= 1 DT= 5.0 min	Total Imp(%)= 70.00 Dir. Conn.(%)= 58.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.79	0.34
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	86.79	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	1.667	5.75	3.250	149.60	4.83	5.75
0.167	0.00	1.750	5.75	3.333	21.10	4.92	5.75
0.250	0.00	1.833	9.59	3.417	21.10	5.00	5.75
0.333	3.84	1.917	9.59	3.500	21.10	5.08	5.75
0.417	3.84	2.000	9.59	3.583	21.10	5.17	5.75
0.500	3.84	2.083	9.59	3.667	21.10	5.25	5.75
0.583	3.84	2.167	9.59	3.750	21.10	5.33	3.84
0.667	3.84	2.250	9.59	3.833	9.59	5.42	3.84
0.750	3.84	2.333	11.51	3.917	9.59	5.50	3.84
0.833	5.75	2.417	11.51	4.000	9.59	5.58	3.84
0.917	5.75	2.500	11.51	4.083	9.59	5.67	3.84

1.000	5.75	2.583	11.51	4.167	9.59	5.75	3.84
1.083	5.75	2.667	11.51	4.250	9.59	5.83	3.84
1.167	5.75	2.750	11.51	4.333	7.67	5.92	3.84
1.250	5.75	2.833	57.54	4.417	7.67	6.00	3.84
1.333	5.75	2.917	57.54	4.500	7.67	6.08	3.84
1.417	5.75	3.000	57.54	4.583	7.67	6.17	3.84
1.500	5.75	3.083	149.60	4.667	7.67	6.25	3.84
1.583	5.75	3.167	149.60	4.750	7.67		

Max.Eff.Inten.(mm/hr)=	149.60	156.16	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.00 (ii)	6.61 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.31	0.14	
			TOTALS
PEAK FLOW (cms)=	0.27	0.12	0.394 (iii)
TIME TO PEAK (hrs)=	3.25	3.25	3.25
RUNOFF VOLUME (mm)=	94.90	58.18	79.47
TOTAL RAINFALL (mm)=	95.90	95.90	95.90
RUNOFF COEFFICIENT =	0.99	0.61	0.83

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0032)	Area (ha)= 3.80
ID= 1 DT= 5.0 min	Total Imp(%)= 80.00 Dir. Conn.(%)= 60.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	1.667	5.75	3.250	149.60	4.83	5.75
0.167	0.00	1.750	5.75	3.333	21.10	4.92	5.75
0.250	0.00	1.833	9.59	3.417	21.10	5.00	5.75
0.333	3.84	1.917	9.59	3.500	21.10	5.08	5.75
0.417	3.84	2.000	9.59	3.583	21.10	5.17	5.75
0.500	3.84	2.083	9.59	3.667	21.10	5.25	5.75
0.583	3.84	2.167	9.59	3.750	21.10	5.33	3.84
0.667	3.84	2.250	9.59	3.833	9.59	5.42	3.84
0.750	3.84	2.333	11.51	3.917	9.59	5.50	3.84
0.833	5.75	2.417	11.51	4.000	9.59	5.58	3.84
0.917	5.75	2.500	11.51	4.083	9.59	5.67	3.84
1.000	5.75	2.583	11.51	4.167	9.59	5.75	3.84
1.083	5.75	2.667	11.51	4.250	9.59	5.83	3.84
1.167	5.75	2.750	11.51	4.333	7.67	5.92	3.84
1.250	5.75	2.833	57.54	4.417	7.67	6.00	3.84
1.333	5.75	2.917	57.54	4.500	7.67	6.08	3.84
1.417	5.75	3.000	57.54	4.583	7.67	6.17	3.84
1.500	5.75	3.083	149.60	4.667	7.67	6.25	3.84
1.583	5.75	3.167	149.60	4.750	7.67		

Max.Eff.Inten.(mm/hr)=	149.60	248.49	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.87 (ii)	6.74 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.28	0.14	
			TOTALS
PEAK FLOW (cms)=	0.94	0.44	1.385 (iii)
TIME TO PEAK (hrs)=	3.25	3.25	3.25
RUNOFF VOLUME (mm)=	94.90	66.42	83.51
TOTAL RAINFALL (mm)=	95.90	95.90	95.90
RUNOFF COEFFICIENT =	0.99	0.69	0.87

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0034)	Area (ha)= 29.06
ID= 1 DT= 5.0 min	Total Imp(%)= 66.00 Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	1.667	5.75	3.250	149.60	4.83	5.75
0.167	0.00	1.750	5.75	3.333	21.10	4.92	5.75
0.250	0.00	1.833	9.59	3.417	21.10	5.00	5.75
0.333	3.84	1.917	9.59	3.500	21.10	5.08	5.75
0.417	3.84	2.000	9.59	3.583	21.10	5.17	5.75
0.500	3.84	2.083	9.59	3.667	21.10	5.25	5.75
0.583	3.84	2.167	9.59	3.750	21.10	5.33	3.84
0.667	3.84	2.250	9.59	3.833	9.59	5.42	3.84
0.750	3.84	2.333	11.51	3.917	9.59	5.50	3.84
0.833	5.75	2.417	11.51	4.000	9.59	5.58	3.84
0.917	5.75	2.500	11.51	4.083	9.59	5.67	3.84
1.000	5.75	2.583	11.51	4.167	9.59	5.75	3.84
1.083	5.75	2.667	11.51	4.250	9.59	5.83	3.84
1.167	5.75	2.750	11.51	4.333	7.67	5.92	3.84
1.250	5.75	2.833	57.54	4.417	7.67	6.00	3.84

```
              1.333    5.75 | 2.917   57.54 | 4.500    7.67 |  6.08    3.84
              1.417    5.75 | 3.000   57.54 | 4.583    7.67 |  6.17    3.84
              1.500    5.75 | 3.083  149.60 | 4.667    7.67 |  6.25    3.84
              1.583    5.75 | 3.167  149.60 | 4.750    7.67 |

    Max.Eff.Inten.(mm/hr)=     149.60       144.61
                over (min)        5.00        15.00
    Storage Coeff.  (min)=       5.29 (ii)   10.25 (ii)
    Unit Hyd. Tpeak (min)=       5.00        15.00
    Unit Hyd. peak  (cms)=       0.21         0.09
                                                      *TOTALS*
    PEAK FLOW       (cms)=       6.40         2.68       8.775 (iii)
    TIME TO PEAK    (hrs)=       3.25         3.33        3.25
    RUNOFF VOLUME    (mm)=      94.90        56.79       77.75
    TOTAL RAINFALL   (mm)=      95.90        95.90       95.90
    RUNOFF COEFFICIENT   =       0.99         0.59        0.81


      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  77.0    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  (  0035)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)      (mm)
       ID1= 1 (  0032):     3.80   1.385     3.25    83.51
     + ID2= 2 (  0034):    29.06   8.775     3.25    77.75
       ================================================
       ID = 3 (  0035):    32.86  10.160     3.25    78.41

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

```
--------------------
| RESERVOIR(  0033)|     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   |   0.4930      1.5666
                         0.0360     0.7150   |   0.7890      1.8478
                         0.0660     1.0737   |   1.0520      2.0613
                         0.2630     1.3645   |   1.3140      2.2797

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0035)     32.860     10.160      3.25      78.41
   OUTFLOW: ID= 1 (  0033)     32.860      0.889      4.17      76.43

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  8.75
                  TIME SHIFT OF PEAK FLOW         (min)= 55.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.9288
```

```
--------------------
| ADD HYD  (  0029)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)      (mm)
       ID1= 1 (  0028):     1.13   0.394     3.25    79.47
     + ID2= 2 (  0033):    32.86   0.889     4.17    76.43
       ================================================
       ID = 3 (  0029):    33.99   0.917     4.17    76.54

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

```
--------------------
| ADD HYD  (  0029)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)      (mm)
       ID1= 3 (  0029):    33.99   0.917     4.17    76.54
     + ID2= 2 (  0053):    41.43   0.902     5.17    32.57
       ================================================
       ID = 1 (  0029):    75.42   1.740     4.92    52.38

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\836ccd8f-71b7-438a-9afb-091474395088\scen
  Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\836ccd8f-71b7-438a-9afb-091474395088\scen


DATE: 05-03-2024                          TIME: 01:44:31

USER:



COMMENTS: _____________________________________________________________
```

```
--------------------
  **********************************************
  ** SIMULATION : 18. 100-Year-6-Hour-SCS-Type- **
```

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  ***********************************************
```

```
--------------------
|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              3a0c766d-3ecf-4101-8ec5-64101323cb13\a340cffa
| Ptotal=106.50 mm |    Comments: 100-Year-6-Hour-SCS-Type-II
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	1.75	10.65	3.50	23.43	5.25	4.26
0.25	4.26	2.00	10.65	3.75	10.65	5.50	4.26
0.50	4.26	2.25	12.78	4.00	10.65	5.75	4.26
0.75	6.39	2.50	12.78	4.25	8.52	6.00	4.26
1.00	6.39	2.75	63.90	4.50	8.52		
1.25	6.39	3.00	166.14	4.75	6.39		
1.50	6.39	3.25	23.43	5.00	6.39		

```
--------------------
| CALIB            |
| NASHYD   (  0052)|   Area    (ha)=  17.19   Curve Number   (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.98

        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	1.667	6.39	3.250	166.14	4.83	6.39
0.167	0.00	1.750	6.39	3.333	23.43	4.92	6.39
0.250	0.00	1.833	10.65	3.417	23.43	5.00	6.39
0.333	4.26	1.917	10.65	3.500	23.43	5.08	6.39
0.417	4.26	2.000	10.65	3.583	23.43	5.17	6.39
0.500	4.26	2.083	10.65	3.667	23.43	5.25	6.39
0.583	4.26	2.167	10.65	3.750	23.43	5.33	4.26
0.667	4.26	2.250	10.65	3.833	10.65	5.42	4.26
0.750	4.26	2.333	12.78	3.917	10.65	5.50	4.26
0.833	6.39	2.417	12.78	4.000	10.65	5.58	4.26
0.917	6.39	2.500	12.78	4.083	10.65	5.67	4.26
1.000	6.39	2.583	12.78	4.167	10.65	5.75	4.26
1.083	6.39	2.667	12.78	4.250	10.65	5.83	4.26
1.167	6.39	2.750	12.78	4.333	8.52	5.92	4.26
1.250	6.39	2.833	63.90	4.417	8.52	6.00	4.26
1.333	6.39	2.917	63.90	4.500	8.52	6.08	4.26
1.417	6.39	3.000	63.90	4.583	8.52	6.17	4.26
1.500	6.39	3.083	166.14	4.667	8.52	6.25	4.26
1.583	6.39	3.167	166.14	4.750	8.52		

```
     Unit Hyd Qpeak  (cms)=   0.670

     PEAK FLOW       (cms)=   0.739 (i)
     TIME TO PEAK    (hrs)=   4.250
     RUNOFF VOLUME    (mm)=  39.173
     TOTAL RAINFALL   (mm)= 106.500
     RUNOFF COEFFICIENT   =   0.368

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

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0040)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
              <------ DATA FOR SECTION (   1.1) ------>
              Distance      Elevation       Manning
                 0.00         253.33        0.0800
                 4.07         253.22        0.0800
                31.67         252.50        0.0800
                80.33         251.02        0.0800
               112.54         250.38    0.0800 /0.0300  Main Channel
               147.82         250.41    0.0300 /0.0800  Main Channel
               227.35         251.81        0.0800
               234.22         251.93        0.0800
               240.16         252.02        0.0800
               245.25         252.11        0.0800
               250.86         252.20        0.0800
               254.81         252.26        0.0800

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
       (m)       (m)     (cu.m.)      (cms)        (m/s)      (min)
      0.10   250.48    .379E+04       2.1          0.63       30.46
      0.20   250.58    .945E+04       8.0          0.98       19.68
      0.30   250.68    .163E+05      17.1          1.21       15.91
      0.40   250.77    .244E+05      29.2          1.38       13.93
      0.50   250.87    .338E+05      44.4          1.52       12.68
      0.60   250.97    .443E+05      62.6          1.63       11.80
      0.70   251.07    .560E+05      84.0          1.73       11.12
      0.79   251.17    .688E+05     108.6          1.82       10.56
      0.89   251.27    .826E+05     136.4          1.91       10.10
      0.99   251.37    .975E+05     167.3          1.99        9.71
      1.09   251.47    .113E+06     201.6          2.06        9.37
      1.19   251.57    .130E+06     239.1          2.12        9.08
      1.29   251.67    .148E+06     280.0          2.19        8.82
      1.39   251.77    .167E+06     324.3          2.24        8.58
      1.49   251.87    .187E+06     372.0          2.30        8.38
      1.59   251.97    .208E+06     423.3          2.35        8.19
      1.69   252.07    .230E+06     478.2          2.40        8.02
      1.79   252.17    .253E+06     536.8          2.45        7.86
      1.89   252.26    .277E+06     599.1          2.50        7.72

                                   <---- hydrograph ---->   <-pipe / channel->
                            AREA     QPEAK    TPEAK    R.V.   MAX DEPTH  MAX VEL
                            (ha)     (cms)    (hrs)    (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0052)   17.19     0.74     4.25   39.17      0.04      0.63
   OUTFLOW: ID= 1 (  0040)   17.19     0.64     4.83   39.17      0.03      0.63

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0050)|   Area    (ha)=  24.24   Curve Number   (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.13

        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	1.667	6.39	3.250	166.14	4.83	6.39
0.167	0.00	1.750	6.39	3.333	23.43	4.92	6.39
0.250	0.00	1.833	10.65	3.417	23.43	5.00	6.39
0.333	4.26	1.917	10.65	3.500	23.43	5.08	6.39
0.417	4.26	2.000	10.65	3.583	23.43	5.17	6.39
0.500	4.26	2.083	10.65	3.667	23.43	5.25	6.39
0.583	4.26	2.167	10.65	3.750	23.43	5.33	4.26
0.667	4.26	2.250	10.65	3.833	10.65	5.42	4.26
0.750	4.26	2.333	12.78	3.917	10.65	5.50	4.26
0.833	6.39	2.417	12.78	4.000	10.65	5.58	4.26
0.917	6.39	2.500	12.78	4.083	10.65	5.67	4.26
1.000	6.39	2.583	12.78	4.167	10.65	5.75	4.26
1.083	6.39	2.667	12.78	4.250	10.65	5.83	4.26
1.167	6.39	2.750	12.78	4.333	8.52	5.92	4.26
1.250	6.39	2.833	63.90	4.417	8.52	6.00	4.26
1.333	6.39	2.917	63.90	4.500	8.52	6.08	4.26
1.417	6.39	3.000	63.90	4.583	8.52	6.17	4.26
1.500	6.39	3.083	166.14	4.667	8.52	6.25	4.26
1.583	6.39	3.167	166.14	4.750	8.52		

Unit Hyd Qpeak (cms)= 0.819

PEAK FLOW (cms)= 0.934 (i)
TIME TO PEAK (hrs)= 4.417
RUNOFF VOLUME (mm)= 39.173
TOTAL RAINFALL (mm)= 106.500
RUNOFF COEFFICIENT = 0.368

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

ROUTE CHN(0041)
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0050)	24.24	0.93	4.42	39.17	0.05	0.24
OUTFLOW: ID= 1 (0041)	24.24	0.52	5.75	39.14	0.03	0.20

ADD HYD (0053)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0040):	17.19	0.642	4.83	39.17
+ ID2= 2 (0041):	24.24	0.524	5.75	39.14
ID = 3 (0053):	41.43	1.102	5.17	39.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0028)| Area (ha)= 1.13
ID= 1 DT= 5.0 min	Total Imp(%)= 70.00 Dir. Conn.(%)= 58.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.79	0.34
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	86.79	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	1.667	6.39	3.250	166.14	4.83	6.39
0.167	0.00	1.750	6.39	3.333	23.43	4.92	6.39
0.250	0.00	1.833	10.65	3.417	23.43	5.00	6.39
0.333	4.26	1.917	10.65	3.500	23.43	5.08	6.39
0.417	4.26	2.000	10.65	3.583	23.43	5.17	6.39
0.500	4.26	2.083	10.65	3.667	23.43	5.25	6.39
0.583	4.26	2.167	10.65	3.750	23.43	5.33	4.26

0.667	4.26	2.250	10.65	3.833	10.65	5.42	4.26
0.750	4.26	2.333	12.78	3.917	10.65	5.50	4.26
0.833	6.39	2.417	12.78	4.000	10.65	5.58	4.26
0.917	6.39	2.500	12.78	4.083	10.65	5.67	4.26
1.000	6.39	2.583	12.78	4.167	10.65	5.75	4.26
1.083	6.39	2.667	12.78	4.250	10.65	5.83	4.26
1.167	6.39	2.750	12.78	4.333	8.52	5.92	4.26
1.250	6.39	2.833	63.90	4.417	8.52	6.00	4.26
1.333	6.39	2.917	63.90	4.500	8.52	6.08	4.26
1.417	6.39	3.000	63.90	4.583	8.52	6.17	4.26
1.500	6.39	3.083	166.14	4.667	8.52	6.25	4.26
1.583	6.39	3.167	166.14	4.750	8.52		

Max.Eff.Inten.(mm/hr)=	166.14	179.74	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.92 (ii)	6.34 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.31	0.15	
			TOTALS
PEAK FLOW (cms)=	0.30	0.14	0.445 (iii)
TIME TO PEAK (hrs)=	3.25	3.25	3.25
RUNOFF VOLUME (mm)=	105.50	67.43	89.51
TOTAL RAINFALL (mm)=	106.50	106.50	106.50
RUNOFF COEFFICIENT =	0.99	0.63	0.84

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0032)	Area (ha)= 3.80
ID= 1 DT= 5.0 min	Total Imp(%)= 80.00 Dir. Conn.(%)= 60.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	1.667	6.39	3.250	166.14	4.83	6.39
0.167	0.00	1.750	6.39	3.333	23.43	4.92	6.39
0.250	0.00	1.833	10.65	3.417	23.43	5.00	6.39
0.333	4.26	1.917	10.65	3.500	23.43	5.08	6.39
0.417	4.26	2.000	10.65	3.583	23.43	5.17	6.39
0.500	4.26	2.083	10.65	3.667	23.43	5.25	6.39
0.583	4.26	2.167	10.65	3.750	23.43	5.33	4.26
0.667	4.26	2.250	10.65	3.833	10.65	5.42	4.26
0.750	4.26	2.333	12.78	3.917	10.65	5.50	4.26
0.833	6.39	2.417	12.78	4.000	10.65	5.58	4.26
0.917	6.39	2.500	12.78	4.083	10.65	5.67	4.26
1.000	6.39	2.583	12.78	4.167	10.65	5.75	4.26
1.083	6.39	2.667	12.78	4.250	10.65	5.83	4.26
1.167	6.39	2.750	12.78	4.333	8.52	5.92	4.26
1.250	6.39	2.833	63.90	4.417	8.52	6.00	4.26
1.333	6.39	2.917	63.90	4.500	8.52	6.08	4.26
1.417	6.39	3.000	63.90	4.583	8.52	6.17	4.26
1.500	6.39	3.083	166.14	4.667	8.52	6.25	4.26
1.583	6.39	3.167	166.14	4.750	8.52		

Max.Eff.Inten.(mm/hr)=	166.14	282.86	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.76 (ii)	6.47 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.28	0.14	
			TOTALS
PEAK FLOW (cms)=	1.05	0.51	1.559 (iii)
TIME TO PEAK (hrs)=	3.25	3.25	3.25
RUNOFF VOLUME (mm)=	105.50	76.20	93.78
TOTAL RAINFALL (mm)=	106.50	106.50	106.50
RUNOFF COEFFICIENT =	0.99	0.72	0.88

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0034)	Area (ha)= 29.06
ID= 1 DT= 5.0 min	Total Imp(%)= 66.00 Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	1.667	6.39	3.250	166.14	4.83	6.39
0.167	0.00	1.750	6.39	3.333	23.43	4.92	6.39
0.250	0.00	1.833	10.65	3.417	23.43	5.00	6.39
0.333	4.26	1.917	10.65	3.500	23.43	5.08	6.39
0.417	4.26	2.000	10.65	3.583	23.43	5.17	6.39
0.500	4.26	2.083	10.65	3.667	23.43	5.25	6.39
0.583	4.26	2.167	10.65	3.750	23.43	5.33	4.26
0.667	4.26	2.250	10.65	3.833	10.65	5.42	4.26
0.750	4.26	2.333	12.78	3.917	10.65	5.50	4.26
0.833	6.39	2.417	12.78	4.000	10.65	5.58	4.26
0.917	6.39	2.500	12.78	4.083	10.65	5.67	4.26

```
                1.000    6.39 | 2.583   12.78 | 4.167   10.65 |  5.75    4.26
                1.083    6.39 | 2.667   12.78 | 4.250   10.65 |  5.83    4.26
                1.167    6.39 | 2.750   12.78 | 4.333    8.52 |  5.92    4.26
                1.250    6.39 | 2.833   63.90 | 4.417    8.52 |  6.00    4.26
                1.333    6.39 | 2.917   63.90 | 4.500    8.52 |  6.08    4.26
                1.417    6.39 | 3.000   63.90 | 4.583    8.52 |  6.17    4.26
                1.500    6.39 | 3.083  166.14 | 4.667    8.52 |  6.25    4.26
                1.583    6.39 | 3.167  166.14 | 4.750    8.52 |

     Max.Eff.Inten.(mm/hr)=     166.14       166.77
                  over (min)        5.00        10.00
     Storage Coeff.  (min)=       5.07 (ii)    9.83 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.21         0.11
                                                        *TOTALS*
     PEAK FLOW       (cms)=       7.13         3.33       10.467 (iii)
     TIME TO PEAK    (hrs)=       3.25         3.25         3.25
     RUNOFF VOLUME    (mm)=     105.50        65.93        87.69
     TOTAL RAINFALL   (mm)=     106.50       106.50       106.50
     RUNOFF COEFFICIENT   =       0.99         0.62         0.82


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    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  (  0035)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0032):     3.80   1.559     3.25    93.78
     + ID2= 2 (  0034):    29.06  10.467     3.25    87.69
       ================================================
       ID = 3 (  0035):    32.86  12.026     3.25    88.40

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

```
--------------------
| RESERVOIR(  0033)|     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    |  0.4930     1.5666
                         0.0360     0.7150    |  0.7890     1.8478
                         0.0660     1.0737    |  1.0520     2.0613
                         0.2630     1.3645    |  1.3140     2.2797

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0035)     32.860    12.026      3.25      88.40
   OUTFLOW: ID= 1 (  0033)     32.860     1.137      4.00      86.40

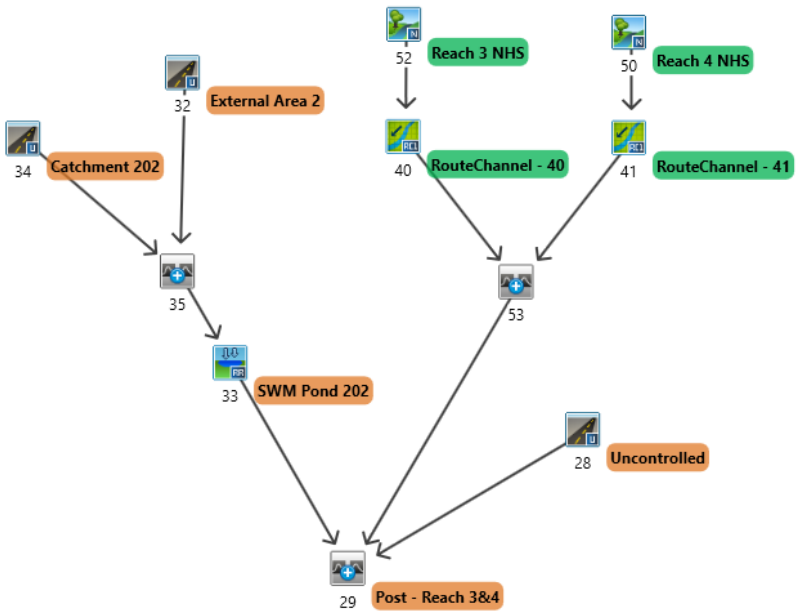
                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.46
                  TIME SHIFT OF PEAK FLOW         (min)= 45.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  2.1329
```

```
--------------------
| ADD HYD  (  0029)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0028):     1.13   0.445     3.25    89.51
     + ID2= 2 (  0033):    32.86   1.137     4.00    86.40
       ================================================
       ID = 3 (  0029):    33.99   1.172     3.92    86.51

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

```
--------------------
| ADD HYD  (  0029)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0029):    33.99   1.172     3.92    86.51
     + ID2= 2 (  0053):    41.43   1.102     5.17    39.15
       ================================================
       ID = 1 (  0029):    75.42   2.138     4.83    60.49

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



SCHAEFFERS
CONSULTING ENGINEERS

Visual OTTHYMO™ Schematic

POST- DEVELOPMENT – REACH 3/4
2-100YR, 12HR SCS

Job #: 5170	**Date: April 2024**

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

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


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DATE: 05-03-2024                          TIME: 01:44:31

USER:


COMMENTS: _____________________________________________________________

--------------------------------------------------------------------------------
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  ***********************************************
  ** SIMULATION : 07. 2-Year-12-Hour-SCS-Type-I **
  ***********************************************


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| Ptotal= 46.70 mm |    Comments: 2-Year-12-Hour-SCS-Type-II
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	1.87	6.50	8.41	9.75	1.63
0.25	1.17	3.50	1.87	6.75	3.74	10.00	1.63
0.50	1.17	3.75	1.87	7.00	3.74	10.25	0.93
0.75	1.17	4.00	1.87	7.25	2.80	10.50	0.93
1.00	1.17	4.25	2.80	7.50	2.80	10.75	0.93
1.25	1.17	4.50	2.80	7.75	2.80	11.00	0.93
1.50	1.17	4.75	3.74	8.00	2.80	11.25	0.93
1.75	1.17	5.00	3.74	8.25	1.63	11.50	0.93
2.00	1.17	5.25	5.60	8.50	1.63	11.75	0.93

2.25	1.40	5.50	5.60	8.75	1.63	12.00	0.93
2.50	1.40	5.75	22.42	9.00	1.63		
2.75	1.40	6.00	61.64	9.25	1.63		
3.00	1.40	6.25	8.41	9.50	1.63		

CALIB	
NASHYD (0052)	Area (ha)= 17.19 Curve Number (CN)= 63.0
ID= 1 DT= 5.0 min	Ia (mm)= 8.00 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.98

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	1.40	6.250	61.64	9.33	1.63
0.167	0.00	3.250	1.40	6.333	8.41	9.42	1.63
0.250	0.00	3.333	1.87	6.417	8.41	9.50	1.63
0.333	1.17	3.417	1.87	6.500	8.41	9.58	1.63
0.417	1.17	3.500	1.87	6.583	8.41	9.67	1.63
0.500	1.17	3.583	1.87	6.667	8.41	9.75	1.63
0.583	1.17	3.667	1.87	6.750	8.41	9.83	1.63
0.667	1.17	3.750	1.87	6.833	3.74	9.92	1.63
0.750	1.17	3.833	1.87	6.917	3.74	10.00	1.63
0.833	1.17	3.917	1.87	7.000	3.74	10.08	1.63
0.917	1.17	4.000	1.87	7.083	3.74	10.17	1.63
1.000	1.17	4.083	1.87	7.167	3.74	10.25	1.63
1.083	1.17	4.167	1.87	7.250	3.74	10.33	0.93
1.167	1.17	4.250	1.87	7.333	2.80	10.42	0.93
1.250	1.17	4.333	2.80	7.417	2.80	10.50	0.93
1.333	1.17	4.417	2.80	7.500	2.80	10.58	0.93
1.417	1.17	4.500	2.80	7.583	2.80	10.67	0.93
1.500	1.17	4.583	2.80	7.667	2.80	10.75	0.93
1.583	1.17	4.667	2.80	7.750	2.80	10.83	0.93
1.667	1.17	4.750	2.80	7.833	2.80	10.92	0.93
1.750	1.17	4.833	3.74	7.917	2.80	11.00	0.93
1.833	1.17	4.917	3.74	8.000	2.80	11.08	0.93
1.917	1.17	5.000	3.74	8.083	2.80	11.17	0.93
2.000	1.17	5.083	3.74	8.167	2.80	11.25	0.93
2.083	1.17	5.167	3.74	8.250	2.80	11.33	0.93
2.167	1.17	5.250	3.74	8.333	1.63	11.42	0.93
2.250	1.17	5.333	5.60	8.417	1.63	11.50	0.93
2.333	1.40	5.417	5.60	8.500	1.63	11.58	0.93
2.417	1.40	5.500	5.60	8.583	1.63	11.67	0.93
2.500	1.40	5.583	5.60	8.667	1.63	11.75	0.93
2.583	1.40	5.667	5.60	8.750	1.63	11.83	0.93
2.667	1.40	5.750	5.60	8.833	1.63	11.92	0.93
2.750	1.40	5.833	22.42	8.917	1.63	12.00	0.93
2.833	1.40	5.917	22.42	9.000	1.63	12.08	0.93
2.917	1.40	6.000	22.42	9.083	1.63	12.17	0.93
3.000	1.40	6.083	61.64	9.167	1.63	12.25	0.93
3.083	1.40	6.167	61.64	9.250	1.63		

Unit Hyd Qpeak (cms)= 0.670

PEAK FLOW (cms)= 0.122 (i)
TIME TO PEAK (hrs)= 7.333

RUNOFF VOLUME (mm)= 7.972
TOTAL RAINFALL (mm)= 46.700
RUNOFF COEFFICIENT = 0.171

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

ROUTE CHN(0040)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0052)	17.19	0.12	7.33	7.97	0.01	0.63
OUTFLOW: ID= 1 (0040)	17.19	0.11	7.83	7.97	0.01	0.63

CALIB	
NASHYD (0050)	Area (ha)= 24.24 Curve Number (CN)= 63.0

|ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 1.13

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	1.40	6.250	61.64	9.33	1.63
0.167	0.00	3.250	1.40	6.333	8.41	9.42	1.63
0.250	0.00	3.333	1.87	6.417	8.41	9.50	1.63
0.333	1.17	3.417	1.87	6.500	8.41	9.58	1.63
0.417	1.17	3.500	1.87	6.583	8.41	9.67	1.63
0.500	1.17	3.583	1.87	6.667	8.41	9.75	1.63
0.583	1.17	3.667	1.87	6.750	8.41	9.83	1.63
0.667	1.17	3.750	1.87	6.833	3.74	9.92	1.63
0.750	1.17	3.833	1.87	6.917	3.74	10.00	1.63
0.833	1.17	3.917	1.87	7.000	3.74	10.08	1.63
0.917	1.17	4.000	1.87	7.083	3.74	10.17	1.63
1.000	1.17	4.083	1.87	7.167	3.74	10.25	1.63
1.083	1.17	4.167	1.87	7.250	3.74	10.33	0.93
1.167	1.17	4.250	1.87	7.333	2.80	10.42	0.93
1.250	1.17	4.333	2.80	7.417	2.80	10.50	0.93
1.333	1.17	4.417	2.80	7.500	2.80	10.58	0.93
1.417	1.17	4.500	2.80	7.583	2.80	10.67	0.93
1.500	1.17	4.583	2.80	7.667	2.80	10.75	0.93
1.583	1.17	4.667	2.80	7.750	2.80	10.83	0.93
1.667	1.17	4.750	2.80	7.833	2.80	10.92	0.93
1.750	1.17	4.833	3.74	7.917	2.80	11.00	0.93
1.833	1.17	4.917	3.74	8.000	2.80	11.08	0.93
1.917	1.17	5.000	3.74	8.083	2.80	11.17	0.93
2.000	1.17	5.083	3.74	8.167	2.80	11.25	0.93
2.083	1.17	5.167	3.74	8.250	2.80	11.33	0.93
2.167	1.17	5.250	3.74	8.333	1.63	11.42	0.93
2.250	1.17	5.333	5.60	8.417	1.63	11.50	0.93
2.333	1.40	5.417	5.60	8.500	1.63	11.58	0.93
2.417	1.40	5.500	5.60	8.583	1.63	11.67	0.93
2.500	1.40	5.583	5.60	8.667	1.63	11.75	0.93
2.583	1.40	5.667	5.60	8.750	1.63	11.83	0.93
2.667	1.40	5.750	5.60	8.833	1.63	11.92	0.93
2.750	1.40	5.833	22.42	8.917	1.63	12.00	0.93
2.833	1.40	5.917	22.42	9.000	1.63	12.08	0.93
2.917	1.40	6.000	22.42	9.083	1.63	12.17	0.93
3.000	1.40	6.083	61.64	9.167	1.63	12.25	0.93
3.083	1.40	6.167	61.64	9.250	1.63		

Unit Hyd Qpeak (cms)= 0.819

PEAK FLOW (cms)= 0.155 (i)
TIME TO PEAK (hrs)= 7.500
RUNOFF VOLUME (mm)= 7.972
TOTAL RAINFALL (mm)= 46.700
RUNOFF COEFFICIENT = 0.171

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

| ROUTE CHN(0041)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
		<---- hydrograph ---->			<-pipe / channel->	
INFLOW : ID= 2 (0050)	24.24	0.15	7.50	7.97	0.02	0.18
OUTFLOW: ID= 1 (0041)	24.24	0.08	9.17	7.94	0.02	0.17

ADD HYD (0053)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0040):	17.19	0.106	7.83	7.97
+ ID2= 2 (0041):	24.24	0.082	9.17	7.94
ID = 3 (0053):	41.43	0.173	8.25	7.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0028)| Area (ha)= 1.13

|ID= 1 DT= 5.0 min | Total Imp(%)= 70.00 Dir. Conn.(%)= 58.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.79	0.34
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	86.79	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	1.40	6.250	61.64	9.33	1.63
0.167	0.00	3.250	1.40	6.333	8.41	9.42	1.63
0.250	0.00	3.333	1.87	6.417	8.41	9.50	1.63
0.333	1.17	3.417	1.87	6.500	8.41	9.58	1.63
0.417	1.17	3.500	1.87	6.583	8.41	9.67	1.63
0.500	1.17	3.583	1.87	6.667	8.41	9.75	1.63
0.583	1.17	3.667	1.87	6.750	8.41	9.83	1.63
0.667	1.17	3.750	1.87	6.833	3.74	9.92	1.63
0.750	1.17	3.833	1.87	6.917	3.74	10.00	1.63
0.833	1.17	3.917	1.87	7.000	3.74	10.08	1.63
0.917	1.17	4.000	1.87	7.083	3.74	10.17	1.63
1.000	1.17	4.083	1.87	7.167	3.74	10.25	1.63
1.083	1.17	4.167	1.87	7.250	3.74	10.33	0.93
1.167	1.17	4.250	1.87	7.333	2.80	10.42	0.93
1.250	1.17	4.333	2.80	7.417	2.80	10.50	0.93
1.333	1.17	4.417	2.80	7.500	2.80	10.58	0.93
1.417	1.17	4.500	2.80	7.583	2.80	10.67	0.93
1.500	1.17	4.583	2.80	7.667	2.80	10.75	0.93
1.583	1.17	4.667	2.80	7.750	2.80	10.83	0.93
1.667	1.17	4.750	2.80	7.833	2.80	10.92	0.93
1.750	1.17	4.833	3.74	7.917	2.80	11.00	0.93
1.833	1.17	4.917	3.74	8.000	2.80	11.08	0.93
1.917	1.17	5.000	3.74	8.083	2.80	11.17	0.93
2.000	1.17	5.083	3.74	8.167	2.80	11.25	0.93
2.083	1.17	5.167	3.74	8.250	2.80	11.33	0.93
2.167	1.17	5.250	3.74	8.333	1.63	11.42	0.93
2.250	1.17	5.333	5.60	8.417	1.63	11.50	0.93
2.333	1.40	5.417	5.60	8.500	1.63	11.58	0.93
2.417	1.40	5.500	5.60	8.583	1.63	11.67	0.93
2.500	1.40	5.583	5.60	8.667	1.63	11.75	0.93
2.583	1.40	5.667	5.60	8.750	1.63	11.83	0.93
2.667	1.40	5.750	5.60	8.833	1.63	11.92	0.93
2.750	1.40	5.833	22.42	8.917	1.63	12.00	0.93
2.833	1.40	5.917	22.42	9.000	1.63	12.08	0.93
2.917	1.40	6.000	22.42	9.083	1.63	12.17	0.93
3.000	1.40	6.083	61.64	9.167	1.63	12.25	0.93
3.083	1.40	6.167	61.64	9.250	1.63		

Max.Eff.Inten.(mm/hr)=		61.64	44.65	
over (min)		5.00	15.00	
Storage Coeff. (min)=		2.85 (ii)	12.59 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.28	0.08	
				TOTALS
PEAK FLOW	(cms)=	0.11	0.03	0.134 (iii)
TIME TO PEAK	(hrs)=	6.25	6.33	6.25
RUNOFF VOLUME	(mm)=	45.70	19.11	34.53
TOTAL RAINFALL	(mm)=	46.70	46.70	46.70
RUNOFF COEFFICIENT	=	0.98	0.41	0.74

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0032)

|ID= 1 DT= 5.0 min | Area (ha)= 3.80 Total Imp(%)= 80.00 Dir. Conn.(%)= 60.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	1.40	6.250	61.64	9.33	1.63
0.167	0.00	3.250	1.40	6.333	8.41	9.42	1.63
0.250	0.00	3.333	1.87	6.417	8.41	9.50	1.63
0.333	1.17	3.417	1.87	6.500	8.41	9.58	1.63
0.417	1.17	3.500	1.87	6.583	8.41	9.67	1.63
0.500	1.17	3.583	1.87	6.667	8.41	9.75	1.63
0.583	1.17	3.667	1.87	6.750	8.41	9.83	1.63
0.667	1.17	3.750	1.87	6.833	3.74	9.92	1.63
0.750	1.17	3.833	1.87	6.917	3.74	10.00	1.63
0.833	1.17	3.917	1.87	7.000	3.74	10.08	1.63
0.917	1.17	4.000	1.87	7.083	3.74	10.17	1.63
1.000	1.17	4.083	1.87	7.167	3.74	10.25	1.63
1.083	1.17	4.167	1.87	7.250	3.74	10.33	0.93
1.167	1.17	4.250	1.87	7.333	2.80	10.42	0.93
1.250	1.17	4.333	2.80	7.417	2.80	10.50	0.93
1.333	1.17	4.417	2.80	7.500	2.80	10.58	0.93
1.417	1.17	4.500	2.80	7.583	2.80	10.67	0.93
1.500	1.17	4.583	2.80	7.667	2.80	10.75	0.93
1.583	1.17	4.667	2.80	7.750	2.80	10.83	0.93
1.667	1.17	4.750	2.80	7.833	2.80	10.92	0.93
1.750	1.17	4.833	3.74	7.917	2.80	11.00	0.93
1.833	1.17	4.917	3.74	8.000	2.80	11.08	0.93
1.917	1.17	5.000	3.74	8.083	2.80	11.17	0.93
2.000	1.17	5.083	3.74	8.167	2.80	11.25	0.93
2.083	1.17	5.167	3.74	8.250	2.80	11.33	0.93
2.167	1.17	5.250	3.74	8.333	1.63	11.42	0.93
2.250	1.17	5.333	5.60	8.417	1.63	11.50	0.93
2.333	1.40	5.417	5.60	8.500	1.63	11.58	0.93
2.417	1.40	5.500	5.60	8.583	1.63	11.67	0.93
2.500	1.40	5.583	5.60	8.667	1.63	11.75	0.93

2.583	1.40	5.667	5.60	8.750	1.63	11.83	0.93
2.667	1.40	5.750	5.60	8.833	1.63	11.92	0.93
2.750	1.40	5.833	22.42	8.917	1.63	12.00	0.93
2.833	1.40	5.917	22.42	9.000	1.63	12.08	0.93
2.917	1.40	6.000	22.42	9.083	1.63	12.17	0.93
3.000	1.40	6.083	61.64	9.167	1.63	12.25	0.93
3.083	1.40	6.167	61.64	9.250	1.63		

			TOTALS
Max.Eff.Inten.(mm/hr)=	61.64	78.27	
over (min)	5.00	15.00	
Storage Coeff. (min)=	4.10 (ii)	11.88 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.24	0.09	
PEAK FLOW (cms)=	0.38	0.11	0.476 (iii)
TIME TO PEAK (hrs)=	6.25	6.33	6.25
RUNOFF VOLUME (mm)=	45.70	23.79	36.93
TOTAL RAINFALL (mm)=	46.70	46.70	46.70
RUNOFF COEFFICIENT =	0.98	0.51	0.79

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0034)	Area (ha)= 29.06
ID= 1 DT= 5.0 min	Total Imp(%)= 66.00 Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	1.40	6.250	61.64	9.33	1.63
0.167	0.00	3.250	1.40	6.333	8.41	9.42	1.63
0.250	0.00	3.333	1.87	6.417	8.41	9.50	1.63
0.333	1.17	3.417	1.87	6.500	8.41	9.58	1.63
0.417	1.17	3.500	1.87	6.583	8.41	9.67	1.63
0.500	1.17	3.583	1.87	6.667	8.41	9.75	1.63
0.583	1.17	3.667	1.87	6.750	8.41	9.83	1.63
0.667	1.17	3.750	1.87	6.833	3.74	9.92	1.63
0.750	1.17	3.833	1.87	6.917	3.74	10.00	1.63
0.833	1.17	3.917	1.87	7.000	3.74	10.08	1.63
0.917	1.17	4.000	1.87	7.083	3.74	10.17	1.63
1.000	1.17	4.083	1.87	7.167	3.74	10.25	1.63
1.083	1.17	4.167	1.87	7.250	3.74	10.33	0.93
1.167	1.17	4.250	1.87	7.333	2.80	10.42	0.93
1.250	1.17	4.333	2.80	7.417	2.80	10.50	0.93
1.333	1.17	4.417	2.80	7.500	2.80	10.58	0.93
1.417	1.17	4.500	2.80	7.583	2.80	10.67	0.93
1.500	1.17	4.583	2.80	7.667	2.80	10.75	0.93
1.583	1.17	4.667	2.80	7.750	2.80	10.83	0.93
1.667	1.17	4.750	2.80	7.833	2.80	10.92	0.93
1.750	1.17	4.833	3.74	7.917	2.80	11.00	0.93
1.833	1.17	4.917	3.74	8.000	2.80	11.08	0.93
1.917	1.17	5.000	3.74	8.083	2.80	11.17	0.93
2.000	1.17	5.083	3.74	8.167	2.80	11.25	0.93
2.083	1.17	5.167	3.74	8.250	2.80	11.33	0.93
2.167	1.17	5.250	3.74	8.333	1.63	11.42	0.93
2.250	1.17	5.333	5.60	8.417	1.63	11.50	0.93
2.333	1.40	5.417	5.60	8.500	1.63	11.58	0.93
2.417	1.40	5.500	5.60	8.583	1.63	11.67	0.93
2.500	1.40	5.583	5.60	8.667	1.63	11.75	0.93
2.583	1.40	5.667	5.60	8.750	1.63	11.83	0.93
2.667	1.40	5.750	5.60	8.833	1.63	11.92	0.93
2.750	1.40	5.833	22.42	8.917	1.63	12.00	0.93
2.833	1.40	5.917	22.42	9.000	1.63	12.08	0.93
2.917	1.40	6.000	22.42	9.083	1.63	12.17	0.93
3.000	1.40	6.083	61.64	9.167	1.63	12.25	0.93
3.083	1.40	6.167	61.64	9.250	1.63		

			TOTALS
Max.Eff.Inten.(mm/hr)=	61.64	37.69	
over (min)	10.00	20.00	
Storage Coeff. (min)=	7.54 (ii)	17.97 (ii)	
Unit Hyd. Tpeak (min)=	10.00	20.00	
Unit Hyd. peak (cms)=	0.13	0.06	
PEAK FLOW (cms)=	2.34	0.55	2.716 (iii)
TIME TO PEAK (hrs)=	6.25	6.42	6.25
RUNOFF VOLUME (mm)=	45.70	18.38	33.40
TOTAL RAINFALL (mm)=	46.70	46.70	46.70
RUNOFF COEFFICIENT =	0.98	0.39	0.72

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0035)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0032):		3.80	0.476	6.25	36.93
+ ID2= 2 (0034):		29.06	2.716	6.25	33.40
ID = 3 (0035):		32.86	3.192	6.25	33.81

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0033)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)

```
                        0.0000     0.0000   |   0.4930      1.5666
                        0.0360     0.7150   |   0.7890      1.8478
                        0.0660     1.0737   |   1.0520      2.0613
                        0.2630     1.3645   |   1.3140      2.2797

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0035)     32.860      3.192      6.25      33.81
   OUTFLOW: ID= 1 (  0033)     32.860      0.059     12.33      32.03

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.83
                  TIME SHIFT OF PEAK FLOW         (min)=365.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.9844

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

--------------------
| ADD HYD  (  0029)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0028):     1.13   0.134     6.25    34.53
      + ID2= 2 (  0033):    32.86   0.059    12.33    32.03
        ====================================================
        ID = 3 (  0029):    33.99   0.156     6.25    32.11

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

--------------------
| ADD HYD  (  0029)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0029):    33.99   0.156     6.25    32.11
      + ID2= 2 (  0053):    41.43   0.173     8.25     7.95
        ====================================================
        ID = 1 (  0029):    75.42   0.232     8.25    18.84

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

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

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

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\6576e6ca-ef7b-417c-97ab-7cb1dbdd82ce\scen
  Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\6576e6ca-ef7b-417c-97ab-7cb1dbdd82ce\scen

DATE: 05-03-2024                          TIME: 01:44:31

USER:


COMMENTS: _____________________________________________________

--------------------------------------------------------------------------------
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  ***********************************************
  ** SIMULATION : 08. 5-Year-12-Hour-SCS-Type-I **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              3a0c766d-3ecf-4101-8ec5-64101323cb13\8c2f7a62
| Ptotal= 64.30 mm |    Comments: 5-Year-12-Hour-SCS-Type-II
--------------------
                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    2.57 |  6.50   11.57 |  9.75    2.25
                0.25    1.61 |  3.50    2.57 |  6.75    5.14 | 10.00    2.25
                0.50    1.61 |  3.75    2.57 |  7.00    5.14 | 10.25    1.29
                0.75    1.61 |  4.00    2.57 |  7.25    3.86 | 10.50    1.29
                1.00    1.61 |  4.25    3.86 |  7.50    3.86 | 10.75    1.29
                1.25    1.61 |  4.50    3.86 |  7.75    3.86 | 11.00    1.29
                1.50    1.61 |  4.75    5.14 |  8.00    3.86 | 11.25    1.29
                1.75    1.61 |  5.00    5.14 |  8.25    2.25 | 11.50    1.29
                2.00    1.61 |  5.25    7.72 |  8.50    2.25 | 11.75    1.29
                2.25    1.93 |  5.50    7.72 |  8.75    2.25 | 12.00    1.29
                2.50    1.93 |  5.75   30.86 |  9.00    2.25 |
                2.75    1.93 |  6.00   84.88 |  9.25    2.25 |
                3.00    1.93 |  6.25   11.57 |  9.50    2.25 |

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

--------------------
| CALIB            |
| NASHYD   (  0052)|   Area     (ha)=  17.19   Curve Number    (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.98

        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    1.93 | 6.250   84.87 |  9.33    2.25
               0.167    0.00 | 3.250    1.93 | 6.333   11.57 |  9.42    2.25
               0.250    0.00 | 3.333    2.57 | 6.417   11.57 |  9.50    2.25
```

0.333	1.61	3.417	2.57	6.500	11.57	9.58	2.25
0.417	1.61	3.500	2.57	6.583	11.57	9.67	2.25
0.500	1.61	3.583	2.57	6.667	11.57	9.75	2.25
0.583	1.61	3.667	2.57	6.750	11.57	9.83	2.25
0.667	1.61	3.750	2.57	6.833	5.14	9.92	2.25
0.750	1.61	3.833	2.57	6.917	5.14	10.00	2.25
0.833	1.61	3.917	2.57	7.000	5.14	10.08	2.25
0.917	1.61	4.000	2.57	7.083	5.14	10.17	2.25
1.000	1.61	4.083	2.57	7.167	5.14	10.25	2.25
1.083	1.61	4.167	2.57	7.250	5.14	10.33	1.29
1.167	1.61	4.250	2.57	7.333	3.86	10.42	1.29
1.250	1.61	4.333	3.86	7.417	3.86	10.50	1.29
1.333	1.61	4.417	3.86	7.500	3.86	10.58	1.29
1.417	1.61	4.500	3.86	7.583	3.86	10.67	1.29
1.500	1.61	4.583	3.86	7.667	3.86	10.75	1.29
1.583	1.61	4.667	3.86	7.750	3.86	10.83	1.29
1.667	1.61	4.750	3.86	7.833	3.86	10.92	1.29
1.750	1.61	4.833	5.14	7.917	3.86	11.00	1.29
1.833	1.61	4.917	5.14	8.000	3.86	11.08	1.29
1.917	1.61	5.000	5.14	8.083	3.86	11.17	1.29
2.000	1.61	5.083	5.14	8.167	3.86	11.25	1.29
2.083	1.61	5.167	5.14	8.250	3.86	11.33	1.29
2.167	1.61	5.250	5.14	8.333	2.25	11.42	1.29
2.250	1.61	5.333	7.72	8.417	2.25	11.50	1.29
2.333	1.93	5.417	7.72	8.500	2.25	11.58	1.29
2.417	1.93	5.500	7.72	8.583	2.25	11.67	1.29
2.500	1.93	5.583	7.72	8.667	2.25	11.75	1.29
2.583	1.93	5.667	7.72	8.750	2.25	11.83	1.29
2.667	1.93	5.750	7.72	8.833	2.25	11.92	1.29
2.750	1.93	5.833	30.86	8.917	2.25	12.00	1.29
2.833	1.93	5.917	30.86	9.000	2.25	12.08	1.29
2.917	1.93	6.000	30.87	9.083	2.25	12.17	1.29
3.000	1.93	6.083	84.88	9.167	2.25	12.25	1.29
3.083	1.93	6.167	84.88	9.250	2.25		

Unit Hyd Qpeak (cms)= 0.670

PEAK FLOW (cms)= 0.244 (i)
TIME TO PEAK (hrs)= 7.250
RUNOFF VOLUME (mm)= 15.426
TOTAL RAINFALL (mm)= 64.300
RUNOFF COEFFICIENT = 0.240

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

CALIB					
NASHYD (0050)	Area	(ha)=	24.24	Curve Number	(CN)= 63.0
ID= 1 DT= 5.0 min	Ia	(mm)=	8.00	# of Linear Res.	(N)= 3.00
	U.H. Tp	(hrs)=	1.13		

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

ROUTE CHN(0040)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0052)	17.19	0.24	7.25	15.43	0.01	0.63
OUTFLOW: ID= 1 (0040)	17.19	0.21	7.83	15.43	0.01	0.63

---- 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	1.93	6.250	84.87	9.33	2.25
0.167	0.00	3.250	1.93	6.333	11.57	9.42	2.25
0.250	0.00	3.333	2.57	6.417	11.57	9.50	2.25
0.333	1.61	3.417	2.57	6.500	11.57	9.58	2.25
0.417	1.61	3.500	2.57	6.583	11.57	9.67	2.25
0.500	1.61	3.583	2.57	6.667	11.57	9.75	2.25
0.583	1.61	3.667	2.57	6.750	11.57	9.83	2.25
0.667	1.61	3.750	2.57	6.833	5.14	9.92	2.25
0.750	1.61	3.833	2.57	6.917	5.14	10.00	2.25
0.833	1.61	3.917	2.57	7.000	5.14	10.08	2.25
0.917	1.61	4.000	2.57	7.083	5.14	10.17	2.25
1.000	1.61	4.083	2.57	7.167	5.14	10.25	2.25
1.083	1.61	4.167	2.57	7.250	5.14	10.33	1.29

1.167	1.61	4.250	2.57	7.333	3.86	10.42	1.29
1.250	1.61	4.333	3.86	7.417	3.86	10.50	1.29
1.333	1.61	4.417	3.86	7.500	3.86	10.58	1.29
1.417	1.61	4.500	3.86	7.583	3.86	10.67	1.29
1.500	1.61	4.583	3.86	7.667	3.86	10.75	1.29
1.583	1.61	4.667	3.86	7.750	3.86	10.83	1.29
1.667	1.61	4.750	3.86	7.833	3.86	10.92	1.29
1.750	1.61	4.833	5.14	7.917	3.86	11.00	1.29
1.833	1.61	4.917	5.14	8.000	3.86	11.08	1.29
1.917	1.61	5.000	5.14	8.083	3.86	11.17	1.29
2.000	1.61	5.083	5.14	8.167	3.86	11.25	1.29
2.083	1.61	5.167	5.14	8.250	3.86	11.33	1.29
2.167	1.61	5.250	5.14	8.333	2.25	11.42	1.29
2.250	1.61	5.333	7.72	8.417	2.25	11.50	1.29
2.333	1.93	5.417	7.72	8.500	2.25	11.58	1.29
2.417	1.93	5.500	7.72	8.583	2.25	11.67	1.29
2.500	1.93	5.583	7.72	8.667	2.25	11.75	1.29
2.583	1.93	5.667	7.72	8.750	2.25	11.83	1.29
2.667	1.93	5.750	7.72	8.833	2.25	11.92	1.29
2.750	1.93	5.833	30.86	8.917	2.25	12.00	1.29
2.833	1.93	5.917	30.86	9.000	2.25	12.08	1.29
2.917	1.93	6.000	30.87	9.083	2.25	12.17	1.29
3.000	1.93	6.083	84.88	9.167	2.25	12.25	1.29
3.083	1.93	6.167	84.88	9.250	2.25		

Unit Hyd Qpeak (cms)= 0.819

PEAK FLOW (cms)= 0.308 (i)
TIME TO PEAK (hrs)= 7.417
RUNOFF VOLUME (mm)= 15.426
TOTAL RAINFALL (mm)= 64.300
RUNOFF COEFFICIENT = 0.240

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

ROUTE CHN(0041)
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0050)	24.24	0.31	7.42	15.43	0.03	0.19
OUTFLOW: ID= 1 (0041)	24.24	0.16	9.08	15.39	0.02	0.18

ADD HYD (0053)|
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0040):	17.19	0.212	7.83	15.43
+ ID2= 2 (0041):	24.24	0.164	9.08	15.39
ID = 3 (0053):	41.43	0.347	8.17	15.40

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0028)| Area (ha)= 1.13
ID= 1 DT= 5.0 min	Total Imp(%)= 70.00 Dir. Conn.(%)= 58.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.79	0.34
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	86.79	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	1.93	6.250	84.87	9.33	2.25
0.167	0.00	3.250	1.93	6.333	11.57	9.42	2.25
0.250	0.00	3.333	2.57	6.417	11.57	9.50	2.25
0.333	1.61	3.417	2.57	6.500	11.57	9.58	2.25
0.417	1.61	3.500	2.57	6.583	11.57	9.67	2.25
0.500	1.61	3.583	2.57	6.667	11.57	9.75	2.25
0.583	1.61	3.667	2.57	6.750	11.57	9.83	2.25

0.667	1.61	3.750	2.57	6.833	5.14	9.92	2.25
0.750	1.61	3.833	2.57	6.917	5.14	10.00	2.25
0.833	1.61	3.917	2.57	7.000	5.14	10.08	2.25
0.917	1.61	4.000	2.57	7.083	5.14	10.17	2.25
1.000	1.61	4.083	2.57	7.167	5.14	10.25	2.25
1.083	1.61	4.167	2.57	7.250	5.14	10.33	1.29
1.167	1.61	4.250	2.57	7.333	3.86	10.42	1.29
1.250	1.61	4.333	3.86	7.417	3.86	10.50	1.29
1.333	1.61	4.417	3.86	7.500	3.86	10.58	1.29
1.417	1.61	4.500	3.86	7.583	3.86	10.67	1.29
1.500	1.61	4.583	3.86	7.667	3.86	10.75	1.29
1.583	1.61	4.667	3.86	7.750	3.86	10.83	1.29
1.667	1.61	4.750	3.86	7.833	3.86	10.92	1.29
1.750	1.61	4.833	5.14	7.917	3.86	11.00	1.29
1.833	1.61	4.917	5.14	8.000	3.86	11.08	1.29
1.917	1.61	5.000	5.14	8.083	3.86	11.17	1.29
2.000	1.61	5.083	5.14	8.167	3.86	11.25	1.29
2.083	1.61	5.167	5.14	8.250	3.86	11.33	1.29
2.167	1.61	5.250	5.14	8.333	2.25	11.42	1.29
2.250	1.61	5.333	7.72	8.417	2.25	11.50	1.29
2.333	1.93	5.417	7.72	8.500	2.25	11.58	1.29
2.417	1.93	5.500	7.72	8.583	2.25	11.67	1.29
2.500	1.93	5.583	7.72	8.667	2.25	11.75	1.29
2.583	1.93	5.667	7.72	8.750	2.25	11.83	1.29
2.667	1.93	5.750	7.72	8.833	2.25	11.92	1.29
2.750	1.93	5.833	30.86	8.917	2.25	12.00	1.29
2.833	1.93	5.917	30.86	9.000	2.25	12.08	1.29
2.917	1.93	6.000	30.87	9.083	2.25	12.17	1.29
3.000	1.93	6.083	84.88	9.167	2.25	12.25	1.29
3.083	1.93	6.167	84.88	9.250	2.25		

Max.Eff.Inten.(mm/hr)=	84.88	74.04	
over (min)	5.00	15.00	
Storage Coeff. (min)=	2.51 (ii)	10.46 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.29	0.09	
			TOTALS
PEAK FLOW (cms)=	0.15	0.05	0.195 (iii)
TIME TO PEAK (hrs)=	6.25	6.33	6.25
RUNOFF VOLUME (mm)=	63.30	32.09	50.19
TOTAL RAINFALL (mm)=	64.30	64.30	64.30
RUNOFF COEFFICIENT =	0.98	0.50	0.78

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0032)	Area (ha)=	3.80	
ID= 1 DT= 5.0 min	Total Imp(%)=	80.00	Dir. Conn.(%)= 60.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	1.93	6.250	84.87	9.33	2.25
0.167	0.00	3.250	1.93	6.333	11.57	9.42	2.25
0.250	0.00	3.333	2.57	6.417	11.57	9.50	2.25
0.333	1.61	3.417	2.57	6.500	11.57	9.58	2.25
0.417	1.61	3.500	2.57	6.583	11.57	9.67	2.25
0.500	1.61	3.583	2.57	6.667	11.57	9.75	2.25
0.583	1.61	3.667	2.57	6.750	11.57	9.83	2.25
0.667	1.61	3.750	2.57	6.833	5.14	9.92	2.25
0.750	1.61	3.833	2.57	6.917	5.14	10.00	2.25
0.833	1.61	3.917	2.57	7.000	5.14	10.08	2.25
0.917	1.61	4.000	2.57	7.083	5.14	10.17	2.25
1.000	1.61	4.083	2.57	7.167	5.14	10.25	2.25
1.083	1.61	4.167	2.57	7.250	5.14	10.33	1.29
1.167	1.61	4.250	2.57	7.333	3.86	10.42	1.29
1.250	1.61	4.333	3.86	7.417	3.86	10.50	1.29
1.333	1.61	4.417	3.86	7.500	3.86	10.58	1.29
1.417	1.61	4.500	3.86	7.583	3.86	10.67	1.29
1.500	1.61	4.583	3.86	7.667	3.86	10.75	1.29
1.583	1.61	4.667	3.86	7.750	3.86	10.83	1.29
1.667	1.61	4.750	3.86	7.833	3.86	10.92	1.29
1.750	1.61	4.833	5.14	7.917	3.86	11.00	1.29
1.833	1.61	4.917	5.14	8.000	3.86	11.08	1.29
1.917	1.61	5.000	5.14	8.083	3.86	11.17	1.29
2.000	1.61	5.083	5.14	8.167	3.86	11.25	1.29
2.083	1.61	5.167	5.14	8.250	3.86	11.33	1.29
2.167	1.61	5.250	5.14	8.333	2.25	11.42	1.29
2.250	1.61	5.333	7.72	8.417	2.25	11.50	1.29
2.333	1.93	5.417	7.72	8.500	2.25	11.58	1.29
2.417	1.93	5.500	7.72	8.583	2.25	11.67	1.29
2.500	1.93	5.583	7.72	8.667	2.25	11.75	1.29
2.583	1.93	5.667	7.72	8.750	2.25	11.83	1.29
2.667	1.93	5.750	7.72	8.833	2.25	11.92	1.29
2.750	1.93	5.833	30.86	8.917	2.25	12.00	1.29
2.833	1.93	5.917	30.86	9.000	2.25	12.08	1.29
2.917	1.93	6.000	30.87	9.083	2.25	12.17	1.29
3.000	1.93	6.083	84.88	9.167	2.25	12.25	1.29
3.083	1.93	6.167	84.88	9.250	2.25		

Max.Eff.Inten.(mm/hr)=	84.88	123.95	
over (min)	5.00	10.00	
Storage Coeff. (min)=	3.61 (ii)	8.46 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.25	0.12	
			TOTALS
PEAK FLOW (cms)=	0.53	0.20	0.735 (iii)
TIME TO PEAK (hrs)=	6.25	6.25	6.25
RUNOFF VOLUME (mm)=	63.30	38.29	53.30
TOTAL RAINFALL (mm)=	64.30	64.30	64.30
RUNOFF COEFFICIENT =	0.98	0.60	0.83

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0034)	Area (ha)= 29.06
ID= 1 DT= 5.0 min	Total Imp(%)= 66.00 Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	1.93	6.250	84.87	9.33	2.25
0.167	0.00	3.250	1.93	6.333	11.57	9.42	2.25
0.250	0.00	3.333	2.57	6.417	11.57	9.50	2.25
0.333	1.61	3.417	2.57	6.500	11.57	9.58	2.25
0.417	1.61	3.500	2.57	6.583	11.57	9.67	2.25
0.500	1.61	3.583	2.57	6.667	11.57	9.75	2.25
0.583	1.61	3.667	2.57	6.750	11.57	9.83	2.25
0.667	1.61	3.750	2.57	6.833	5.14	9.92	2.25
0.750	1.61	3.833	2.57	6.917	5.14	10.00	2.25
0.833	1.61	3.917	2.57	7.000	5.14	10.08	2.25
0.917	1.61	4.000	2.57	7.083	5.14	10.17	2.25
1.000	1.61	4.083	2.57	7.167	5.14	10.25	2.25
1.083	1.61	4.167	2.57	7.250	5.14	10.33	1.29
1.167	1.61	4.250	2.57	7.333	3.86	10.42	1.29
1.250	1.61	4.333	3.86	7.417	3.86	10.50	1.29
1.333	1.61	4.417	3.86	7.500	3.86	10.58	1.29
1.417	1.61	4.500	3.86	7.583	3.86	10.67	1.29
1.500	1.61	4.583	3.86	7.667	3.86	10.75	1.29
1.583	1.61	4.667	3.86	7.750	3.86	10.83	1.29
1.667	1.61	4.750	3.86	7.833	3.86	10.92	1.29
1.750	1.61	4.833	5.14	7.917	3.86	11.00	1.29
1.833	1.61	4.917	5.14	8.000	3.86	11.08	1.29
1.917	1.61	5.000	5.14	8.083	3.86	11.17	1.29
2.000	1.61	5.083	5.14	8.167	3.86	11.25	1.29
2.083	1.61	5.167	5.14	8.250	3.86	11.33	1.29
2.167	1.61	5.250	5.14	8.333	2.25	11.42	1.29
2.250	1.61	5.333	7.72	8.417	2.25	11.50	1.29
2.333	1.93	5.417	7.72	8.500	2.25	11.58	1.29
2.417	1.93	5.500	7.72	8.583	2.25	11.67	1.29
2.500	1.93	5.583	7.72	8.667	2.25	11.75	1.29
2.583	1.93	5.667	7.72	8.750	2.25	11.83	1.29
2.667	1.93	5.750	7.72	8.833	2.25	11.92	1.29
2.750	1.93	5.833	30.86	8.917	2.25	12.00	1.29
2.833	1.93	5.917	30.86	9.000	2.25	12.08	1.29
2.917	1.93	6.000	30.87	9.083	2.25	12.17	1.29
3.000	1.93	6.083	84.88	9.167	2.25	12.25	1.29
3.083	1.93	6.167	84.88	9.250	2.25		

				TOTALS
Max.Eff.Inten.(mm/hr)=		84.88	67.96	
over (min)		5.00	15.00	
Storage Coeff. (min)=		6.64 (ii)	14.87 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.18	0.08	
PEAK FLOW	(cms)=	3.51	1.07	4.428 (iii)
TIME TO PEAK	(hrs)=	6.25	6.33	6.25
RUNOFF VOLUME	(mm)=	63.30	31.08	48.80
TOTAL RAINFALL	(mm)=	64.30	64.30	64.30
RUNOFF COEFFICIENT	=	0.98	0.48	0.76

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0035)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0032):	3.80	0.735	6.25	53.30
	+ ID2= 2 (0034):	29.06	4.428	6.25	48.80
	ID = 3 (0035):	32.86	5.163	6.25	49.32

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0033)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.4930	1.5666
	0.0360	0.7150	0.7890	1.8478
	0.0660	1.0737	1.0520	2.0613
	0.2630	1.3645	1.3140	2.2797

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0035)	32.860	5.163	6.25	49.32
OUTFLOW: ID= 1 (0033)	32.860	0.206	8.58	47.27

PEAK FLOW REDUCTION [Qout/Qin](%)= 3.99
TIME SHIFT OF PEAK FLOW (min)=140.00
MAXIMUM STORAGE USED (ha.m.)= 1.2807

ADD HYD (0029)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0028):	1.13	0.195	6.25	50.19
	+ ID2= 2 (0033):	32.86	0.206	8.58	47.27

```
       ================================================
       ID = 3 (  0029):    33.99   0.232     6.25    47.37

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

--------------------
| ADD HYD  (  0029)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0029):    33.99   0.232     6.25    47.37
     + ID2= 2 (  0053):    41.43   0.347     8.17    15.40
       ================================================
       ID = 1 (  0029):    75.42   0.560     8.25    29.81

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

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


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DATE: 05-03-2024                          TIME: 01:44:32

USER:



COMMENTS: _____________________________________________________________


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  ***********************************************
  ** SIMULATION : 09. 10-Year-12-Hour-SCS-Type- **
  ***********************************************
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| Ptotal= 76.00 mm |    Comments: 10-Year-12-Hour-SCS-Type-II
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```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	3.04	6.50	13.68	9.75	2.66
0.25	1.90	3.50	3.04	6.75	6.08	10.00	2.66
0.50	1.90	3.75	3.04	7.00	6.08	10.25	1.52
0.75	1.90	4.00	3.04	7.25	4.56	10.50	1.52
1.00	1.90	4.25	4.56	7.50	4.56	10.75	1.52
1.25	1.90	4.50	4.56	7.75	4.56	11.00	1.52
1.50	1.90	4.75	6.08	8.00	4.56	11.25	1.52
1.75	1.90	5.00	6.08	8.25	2.66	11.50	1.52
2.00	1.90	5.25	9.12	8.50	2.66	11.75	1.52
2.25	2.28	5.50	9.12	8.75	2.66	12.00	1.52
2.50	2.28	5.75	36.48	9.00	2.66		
2.75	2.28	6.00	100.32	9.25	2.66		
3.00	2.28	6.25	13.68	9.50	2.66		

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| CALIB            |
| NASHYD   (  0052)|   Area     (ha)=  17.19   Curve Number    (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.98

       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	2.28	6.250	100.32	9.33	2.66
0.167	0.00	3.250	2.28	6.333	13.68	9.42	2.66
0.250	0.00	3.333	3.04	6.417	13.68	9.50	2.66
0.333	1.90	3.417	3.04	6.500	13.68	9.58	2.66
0.417	1.90	3.500	3.04	6.583	13.68	9.67	2.66
0.500	1.90	3.583	3.04	6.667	13.68	9.75	2.66
0.583	1.90	3.667	3.04	6.750	13.68	9.83	2.66
0.667	1.90	3.750	3.04	6.833	6.08	9.92	2.66
0.750	1.90	3.833	3.04	6.917	6.08	10.00	2.66
0.833	1.90	3.917	3.04	7.000	6.08	10.08	2.66
0.917	1.90	4.000	3.04	7.083	6.08	10.17	2.66
1.000	1.90	4.083	3.04	7.167	6.08	10.25	2.66
1.083	1.90	4.167	3.04	7.250	6.08	10.33	1.52
1.167	1.90	4.250	3.04	7.333	4.56	10.42	1.52
1.250	1.90	4.333	4.56	7.417	4.56	10.50	1.52
1.333	1.90	4.417	4.56	7.500	4.56	10.58	1.52
1.417	1.90	4.500	4.56	7.583	4.56	10.67	1.52
1.500	1.90	4.583	4.56	7.667	4.56	10.75	1.52
1.583	1.90	4.667	4.56	7.750	4.56	10.83	1.52
1.667	1.90	4.750	4.56	7.833	4.56	10.92	1.52
1.750	1.90	4.833	6.08	7.917	4.56	11.00	1.52
1.833	1.90	4.917	6.08	8.000	4.56	11.08	1.52
1.917	1.90	5.000	6.08	8.083	4.56	11.17	1.52
2.000	1.90	5.083	6.08	8.167	4.56	11.25	1.52
2.083	1.90	5.167	6.08	8.250	4.56	11.33	1.52

2.167	1.90	5.250	6.08	8.333	2.66	11.42	1.52
2.250	1.90	5.333	9.12	8.417	2.66	11.50	1.52
2.333	2.28	5.417	9.12	8.500	2.66	11.58	1.52
2.417	2.28	5.500	9.12	8.583	2.66	11.67	1.52
2.500	2.28	5.583	9.12	8.667	2.66	11.75	1.52
2.583	2.28	5.667	9.12	8.750	2.66	11.83	1.52
2.667	2.28	5.750	9.12	8.833	2.66	11.92	1.52
2.750	2.28	5.833	36.48	8.917	2.66	12.00	1.52
2.833	2.28	5.917	36.48	9.000	2.66	12.08	1.52
2.917	2.28	6.000	36.48	9.083	2.66	12.17	1.52
3.000	2.28	6.083	100.32	9.167	2.66	12.25	1.52
3.083	2.28	6.167	100.32	9.250	2.66		

Unit Hyd Qpeak (cms)= 0.670

PEAK FLOW (cms)= 0.341 (i)
TIME TO PEAK (hrs)= 7.250
RUNOFF VOLUME (mm)= 21.291
TOTAL RAINFALL (mm)= 76.000
RUNOFF COEFFICIENT = 0.280

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

ROUTE CHN(0040)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

		AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0052)		17.19	0.34	7.25	21.29	0.02	0.63
OUTFLOW: ID= 1 (0040)		17.19	0.30	7.75	21.29	0.01	0.63

CALIB				
NASHYD (0050)	Area (ha)= 24.24	Curve Number (CN)= 63.0		
ID= 1 DT= 5.0 min	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00		
	U.H. Tp(hrs)= 1.13			

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	2.28	6.250	100.32	9.33	2.66
0.167	0.00	3.250	2.28	6.333	13.68	9.42	2.66
0.250	0.00	3.333	3.04	6.417	13.68	9.50	2.66
0.333	1.90	3.417	3.04	6.500	13.68	9.58	2.66
0.417	1.90	3.500	3.04	6.583	13.68	9.67	2.66
0.500	1.90	3.583	3.04	6.667	13.68	9.75	2.66
0.583	1.90	3.667	3.04	6.750	13.68	9.83	2.66
0.667	1.90	3.750	3.04	6.833	6.08	9.92	2.66
0.750	1.90	3.833	3.04	6.917	6.08	10.00	2.66
0.833	1.90	3.917	3.04	7.000	6.08	10.08	2.66
0.917	1.90	4.000	3.04	7.083	6.08	10.17	2.66
1.000	1.90	4.083	3.04	7.167	6.08	10.25	2.66
1.083	1.90	4.167	3.04	7.250	6.08	10.33	1.52
1.167	1.90	4.250	3.04	7.333	4.56	10.42	1.52
1.250	1.90	4.333	4.56	7.417	4.56	10.50	1.52
1.333	1.90	4.417	4.56	7.500	4.56	10.58	1.52
1.417	1.90	4.500	4.56	7.583	4.56	10.67	1.52
1.500	1.90	4.583	4.56	7.667	4.56	10.75	1.52
1.583	1.90	4.667	4.56	7.750	4.56	10.83	1.52
1.667	1.90	4.750	4.56	7.833	4.56	10.92	1.52
1.750	1.90	4.833	6.08	7.917	4.56	11.00	1.52
1.833	1.90	4.917	6.08	8.000	4.56	11.08	1.52
1.917	1.90	5.000	6.08	8.083	4.56	11.17	1.52
2.000	1.90	5.083	6.08	8.167	4.56	11.25	1.52
2.083	1.90	5.167	6.08	8.250	4.56	11.33	1.52
2.167	1.90	5.250	6.08	8.333	2.66	11.42	1.52
2.250	1.90	5.333	9.12	8.417	2.66	11.50	1.52
2.333	2.28	5.417	9.12	8.500	2.66	11.58	1.52
2.417	2.28	5.500	9.12	8.583	2.66	11.67	1.52
2.500	2.28	5.583	9.12	8.667	2.66	11.75	1.52
2.583	2.28	5.667	9.12	8.750	2.66	11.83	1.52
2.667	2.28	5.750	9.12	8.833	2.66	11.92	1.52
2.750	2.28	5.833	36.48	8.917	2.66	12.00	1.52
2.833	2.28	5.917	36.48	9.000	2.66	12.08	1.52
2.917	2.28	6.000	36.48	9.083	2.66	12.17	1.52

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               3.000    2.28 | 6.083  100.32 | 9.167    2.66 | 12.25    1.52
               3.083    2.28 | 6.167  100.32 | 9.250    2.66 |

     Unit Hyd Qpeak  (cms)=   0.819

     PEAK FLOW       (cms)=   0.431 (i)
     TIME TO PEAK    (hrs)=   7.417
     RUNOFF VOLUME    (mm)=  21.291
     TOTAL RAINFALL   (mm)=  76.000
     RUNOFF COEFFICIENT   =   0.280

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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--------------------
| ROUTE CHN(  0041)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
              <------ DATA FOR SECTION (   1.1) ------>
              Distance      Elevation       Manning
                  0.00        253.97        0.0800
                 44.18        253.34        0.0800
                 72.75        252.34    0.0800 /0.0300  Main Channel
                 94.18        252.35        0.0300      Main Channel
                117.64        252.31        0.0300      Main Channel
                131.62        252.33    0.0300 /0.0800  Main Channel
                138.41        252.72        0.0800
                150.91        253.00        0.0800
                172.41        253.50        0.0800
                180.51        253.60        0.0800

     <---------------------- TRAVEL TIME TABLE ----------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.02   252.33    .386E+03        0.0         0.17     149.17
       0.09   252.40    .580E+04        2.2         0.57      44.29
       0.15   252.47    .122E+05        7.3         0.90      27.96
       0.22   252.53    .189E+05       14.6         1.17      21.61
       0.29   252.60    .259E+05       23.9         1.40      18.12
       0.35   252.67    .333E+05       35.0         1.59      15.86
       0.42   252.73    .409E+05       47.8         1.77      14.27
       0.49   252.80    .490E+05       62.2         1.93      13.13
       0.55   252.87    .576E+05       78.3         2.06      12.25
       0.62   252.93    .667E+05       96.1         2.19      11.57
       0.69   253.00    .762E+05      115.4         2.30      11.01
       0.75   253.07    .863E+05      136.5         2.40      10.54
       0.82   253.13    .969E+05      159.1         2.49      10.15
       0.89   253.20    .108E+06      183.3         2.58       9.81
       0.95   253.27    .119E+06      209.2         2.66       9.51
       1.02   253.33    .131E+06      236.7         2.73       9.26
       1.09   253.40    .144E+06      265.1         2.79       9.06
       1.15   253.47    .157E+06      295.3         2.85       8.88
       1.22   253.54    .172E+06      327.0         2.89       8.75

                                 <---- hydrograph ---->   <-pipe / channel->
                            AREA    QPEAK   TPEAK   R.V.  MAX DEPTH  MAX VEL
                            (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0050)   24.24     0.43    7.42  21.29      0.03      0.19
   OUTFLOW: ID= 1 (  0041)   24.24     0.23    9.00  21.26      0.03      0.18
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--------------------
| ADD HYD  (  0053)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0040):    17.19    0.296     7.75    21.29
     + ID2= 2 (  0041):    24.24    0.231     9.00    21.26
       ================================================
       ID = 3 (  0053):    41.43    0.488     8.08    21.27

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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| CALIB            |
| STANDHYD (  0028)|   Area    (ha)=   1.13
|ID= 1 DT= 5.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  58.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.79         0.34
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      86.79        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    2.28 | 6.250  100.32 |  9.33    2.66
 0.167    0.00 | 3.250    2.28 | 6.333   13.68 |  9.42    2.66
 0.250    0.00 | 3.333    3.04 | 6.417   13.68 |  9.50    2.66
 0.333    1.90 | 3.417    3.04 | 6.500   13.68 |  9.58    2.66
 0.417    1.90 | 3.500    3.04 | 6.583   13.68 |  9.67    2.66
 0.500    1.90 | 3.583    3.04 | 6.667   13.68 |  9.75    2.66
 0.583    1.90 | 3.667    3.04 | 6.750   13.68 |  9.83    2.66
 0.667    1.90 | 3.750    3.04 | 6.833    6.08 |  9.92    2.66
 0.750    1.90 | 3.833    3.04 | 6.917    6.08 | 10.00    2.66
 0.833    1.90 | 3.917    3.04 | 7.000    6.08 | 10.08    2.66
 0.917    1.90 | 4.000    3.04 | 7.083    6.08 | 10.17    2.66
 1.000    1.90 | 4.083    3.04 | 7.167    6.08 | 10.25    2.66
 1.083    1.90 | 4.167    3.04 | 7.250    6.08 | 10.33    1.52
 1.167    1.90 | 4.250    3.04 | 7.333    4.56 | 10.42    1.52
 1.250    1.90 | 4.333    4.56 | 7.417    4.56 | 10.50    1.52
 1.333    1.90 | 4.417    4.56 | 7.500    4.56 | 10.58    1.52
 1.417    1.90 | 4.500    4.56 | 7.583    4.56 | 10.67    1.52
 1.500    1.90 | 4.583    4.56 | 7.667    4.56 | 10.75    1.52
 1.583    1.90 | 4.667    4.56 | 7.750    4.56 | 10.83    1.52
 1.667    1.90 | 4.750    4.56 | 7.833    4.56 | 10.92    1.52
 1.750    1.90 | 4.833    6.08 | 7.917    4.56 | 11.00    1.52
 1.833    1.90 | 4.917    6.08 | 8.000    4.56 | 11.08    1.52
 1.917    1.90 | 5.000    6.08 | 8.083    4.56 | 11.17    1.52
 2.000    1.90 | 5.083    6.08 | 8.167    4.56 | 11.25    1.52
 2.083    1.90 | 5.167    6.08 | 8.250    4.56 | 11.33    1.52
 2.167    1.90 | 5.250    6.08 | 8.333    2.66 | 11.42    1.52
 2.250    1.90 | 5.333    9.12 | 8.417    2.66 | 11.50    1.52
 2.333    2.28 | 5.417    9.12 | 8.500    2.66 | 11.58    1.52
 2.417    2.28 | 5.500    9.12 | 8.583    2.66 | 11.67    1.52
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2.500	2.28	5.583	9.12	8.667	2.66	11.75	1.52
2.583	2.28	5.667	9.12	8.750	2.66	11.83	1.52
2.667	2.28	5.750	9.12	8.833	2.66	11.92	1.52
2.750	2.28	5.833	36.48	8.917	2.66	12.00	1.52
2.833	2.28	5.917	36.48	9.000	2.66	12.08	1.52
2.917	2.28	6.000	36.48	9.083	2.66	12.17	1.52
3.000	2.28	6.083	100.32	9.167	2.66	12.25	1.52
3.083	2.28	6.167	100.32	9.250	2.66		

			TOTALS
Max.Eff.Inten.(mm/hr)=	100.32	94.83	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.34 (ii)	9.55 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.30	0.12	
PEAK FLOW (cms)=	0.18	0.07	0.248 (iii)
TIME TO PEAK (hrs)=	6.25	6.25	6.25
RUNOFF VOLUME (mm)=	75.00	41.43	60.89
TOTAL RAINFALL (mm)=	76.00	76.00	76.00
RUNOFF COEFFICIENT =	0.99	0.55	0.80

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0032)	Area (ha)= 3.80
ID= 1 DT= 5.0 min	Total Imp(%)= 80.00 Dir. Conn.(%)= 60.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	2.28	6.250	100.32	9.33	2.66
0.167	0.00	3.250	2.28	6.333	13.68	9.42	2.66
0.250	0.00	3.333	3.04	6.417	13.68	9.50	2.66
0.333	1.90	3.417	3.04	6.500	13.68	9.58	2.66
0.417	1.90	3.500	3.04	6.583	13.68	9.67	2.66
0.500	1.90	3.583	3.04	6.667	13.68	9.75	2.66
0.583	1.90	3.667	3.04	6.750	13.68	9.83	2.66
0.667	1.90	3.750	3.04	6.833	6.08	9.92	2.66
0.750	1.90	3.833	3.04	6.917	6.08	10.00	2.66
0.833	1.90	3.917	3.04	7.000	6.08	10.08	2.66
0.917	1.90	4.000	3.04	7.083	6.08	10.17	2.66
1.000	1.90	4.083	3.04	7.167	6.08	10.25	2.66
1.083	1.90	4.167	3.04	7.250	6.08	10.33	1.52
1.167	1.90	4.250	3.04	7.333	4.56	10.42	1.52
1.250	1.90	4.333	4.56	7.417	4.56	10.50	1.52
1.333	1.90	4.417	4.56	7.500	4.56	10.58	1.52
1.417	1.90	4.500	4.56	7.583	4.56	10.67	1.52
1.500	1.90	4.583	4.56	7.667	4.56	10.75	1.52
1.583	1.90	4.667	4.56	7.750	4.56	10.83	1.52
1.667	1.90	4.750	4.56	7.833	4.56	10.92	1.52
1.750	1.90	4.833	6.08	7.917	4.56	11.00	1.52
1.833	1.90	4.917	6.08	8.000	4.56	11.08	1.52
1.917	1.90	5.000	6.08	8.083	4.56	11.17	1.52
2.000	1.90	5.083	6.08	8.167	4.56	11.25	1.52
2.083	1.90	5.167	6.08	8.250	4.56	11.33	1.52
2.167	1.90	5.250	6.08	8.333	2.66	11.42	1.52
2.250	1.90	5.333	9.12	8.417	2.66	11.50	1.52
2.333	2.28	5.417	9.12	8.500	2.66	11.58	1.52
2.417	2.28	5.500	9.12	8.583	2.66	11.67	1.52
2.500	2.28	5.583	9.12	8.667	2.66	11.75	1.52
2.583	2.28	5.667	9.12	8.750	2.66	11.83	1.52
2.667	2.28	5.750	9.12	8.833	2.66	11.92	1.52
2.750	2.28	5.833	36.48	8.917	2.66	12.00	1.52
2.833	2.28	5.917	36.48	9.000	2.66	12.08	1.52
2.917	2.28	6.000	36.48	9.083	2.66	12.17	1.52
3.000	2.28	6.083	100.32	9.167	2.66	12.25	1.52
3.083	2.28	6.167	100.32	9.250	2.66		

			TOTALS
Max.Eff.Inten.(mm/hr)=	100.32	155.34	
over (min)	5.00	10.00	
Storage Coeff. (min)=	3.37 (ii)	7.91 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.26	0.13	
PEAK FLOW (cms)=	0.63	0.26	0.893 (iii)
TIME TO PEAK (hrs)=	6.25	6.25	6.25
RUNOFF VOLUME (mm)=	75.00	48.48	64.39
TOTAL RAINFALL (mm)=	76.00	76.00	76.00
RUNOFF COEFFICIENT =	0.99	0.64	0.85

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0034)	Area (ha)= 29.06
ID= 1 DT= 5.0 min	Total Imp(%)= 66.00 Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	2.28	6.250	100.32	9.33	2.66
0.167	0.00	3.250	2.28	6.333	13.68	9.42	2.66
0.250	0.00	3.333	3.04	6.417	13.68	9.50	2.66
0.333	1.90	3.417	3.04	6.500	13.68	9.58	2.66
0.417	1.90	3.500	3.04	6.583	13.68	9.67	2.66
0.500	1.90	3.583	3.04	6.667	13.68	9.75	2.66
0.583	1.90	3.667	3.04	6.750	13.68	9.83	2.66
0.667	1.90	3.750	3.04	6.833	6.08	9.92	2.66
0.750	1.90	3.833	3.04	6.917	6.08	10.00	2.66
0.833	1.90	3.917	3.04	7.000	6.08	10.08	2.66
0.917	1.90	4.000	3.04	7.083	6.08	10.17	2.66
1.000	1.90	4.083	3.04	7.167	6.08	10.25	2.66
1.083	1.90	4.167	3.04	7.250	6.08	10.33	1.52
1.167	1.90	4.250	3.04	7.333	4.56	10.42	1.52
1.250	1.90	4.333	4.56	7.417	4.56	10.50	1.52
1.333	1.90	4.417	4.56	7.500	4.56	10.58	1.52
1.417	1.90	4.500	4.56	7.583	4.56	10.67	1.52
1.500	1.90	4.583	4.56	7.667	4.56	10.75	1.52
1.583	1.90	4.667	4.56	7.750	4.56	10.83	1.52
1.667	1.90	4.750	4.56	7.833	4.56	10.92	1.52
1.750	1.90	4.833	6.08	7.917	4.56	11.00	1.52
1.833	1.90	4.917	6.08	8.000	4.56	11.08	1.52
1.917	1.90	5.000	6.08	8.083	4.56	11.17	1.52
2.000	1.90	5.083	6.08	8.167	4.56	11.25	1.52
2.083	1.90	5.167	6.08	8.250	4.56	11.33	1.52
2.167	1.90	5.250	6.08	8.333	2.66	11.42	1.52
2.250	1.90	5.333	9.12	8.417	2.66	11.50	1.52
2.333	2.28	5.417	9.12	8.500	2.66	11.58	1.52
2.417	2.28	5.500	9.12	8.583	2.66	11.67	1.52
2.500	2.28	5.583	9.12	8.667	2.66	11.75	1.52
2.583	2.28	5.667	9.12	8.750	2.66	11.83	1.52
2.667	2.28	5.750	9.12	8.833	2.66	11.92	1.52
2.750	2.28	5.833	36.48	8.917	2.66	12.00	1.52
2.833	2.28	5.917	36.48	9.000	2.66	12.08	1.52
2.917	2.28	6.000	36.48	9.083	2.66	12.17	1.52
3.000	2.28	6.083	100.32	9.167	2.66	12.25	1.52
3.083	2.28	6.167	100.32	9.250	2.66		

Max.Eff.Inten.(mm/hr)=	100.32	87.37	
over (min)	5.00	15.00	
Storage Coeff. (min)=	6.21 (ii)	13.66 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.19	0.08	
			TOTALS
PEAK FLOW (cms)=	4.19	1.45	5.451 (iii)
TIME TO PEAK (hrs)=	6.25	6.33	6.25
RUNOFF VOLUME (mm)=	75.00	40.26	59.37
TOTAL RAINFALL (mm)=	76.00	76.00	76.00
RUNOFF COEFFICIENT =	0.99	0.53	0.78

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0035)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0032):	3.80	0.893	6.25	64.39
+ ID2= 2 (0034):	29.06	5.451	6.25	59.37
ID = 3 (0035):	32.86	6.344	6.25	59.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0033)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.4930	1.5666
	0.0360	0.7150	0.7890	1.8478
	0.0660	1.0737	1.0520	2.0613
	0.2630	1.3645	1.3140	2.2797

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0035)	32.860	6.344	6.25	59.95
OUTFLOW: ID= 1 (0033)	32.860	0.373	8.25	57.85

PEAK FLOW REDUCTION [Qout/Qin](%)= 5.88
TIME SHIFT OF PEAK FLOW (min)=120.00
MAXIMUM STORAGE USED (ha.m.)= 1.4611

ADD HYD (0029)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0028):	1.13	0.248	6.25	60.89
+ ID2= 2 (0033):	32.86	0.373	8.25	57.85
ID = 3 (0029):	33.99	0.386	8.25	57.96

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0029)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0029):	33.99	0.386	8.25	57.96
+ ID2= 2 (0053):	41.43	0.488	8.08	21.27
ID = 1 (0029):	75.42	0.874	8.17	37.80

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

V V I SSSSS U U A L (v 6.2.2015)
V V I SS U U A A L

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       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

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

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DATE: 05-03-2024                          TIME: 01:44:31

USER:

COMMENTS: _____________________________________________________________
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--------------------------------------------------------------------------------
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  ***********************************************
  ** SIMULATION : 10. 25-Year-12-Hour-SCS-Type- **
  ***********************************************

--------------------
|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              3a0c766d-3ecf-4101-8ec5-64101323cb13\5eef7ed8
| Ptotal= 90.70 mm |    Comments: 25-Year-12-Hour-SCS-Type-II
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	3.63	6.50	16.33	9.75	3.17
0.25	2.27	3.50	3.63	6.75	7.26	10.00	3.17
0.50	2.27	3.75	3.63	7.00	7.26	10.25	1.81
0.75	2.27	4.00	3.63	7.25	5.44	10.50	1.81
1.00	2.27	4.25	5.44	7.50	5.44	10.75	1.81
1.25	2.27	4.50	5.44	7.75	5.44	11.00	1.81
1.50	2.27	4.75	7.26	8.00	5.44	11.25	1.81
1.75	2.27	5.00	7.26	8.25	3.17	11.50	1.81
2.00	2.27	5.25	10.88	8.50	3.17	11.75	1.81
2.25	2.72	5.50	10.88	8.75	3.17	12.00	1.81
2.50	2.72	5.75	43.54	9.00	3.17		
2.75	2.72	6.00	119.72	9.25	3.17		
3.00	2.72	6.25	16.33	9.50	3.17		

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

--------------------
| CALIB            |
| NASHYD   (  0052)|   Area     (ha)=  17.19   Curve Number    (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.98

        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	2.72	6.250	119.72	9.33	3.17
0.167	0.00	3.250	2.72	6.333	16.33	9.42	3.17
0.250	0.00	3.333	3.63	6.417	16.33	9.50	3.17
0.333	2.27	3.417	3.63	6.500	16.33	9.58	3.17
0.417	2.27	3.500	3.63	6.583	16.33	9.67	3.17
0.500	2.27	3.583	3.63	6.667	16.33	9.75	3.17
0.583	2.27	3.667	3.63	6.750	16.33	9.83	3.17
0.667	2.27	3.750	3.63	6.833	7.26	9.92	3.17
0.750	2.27	3.833	3.63	6.917	7.26	10.00	3.17
0.833	2.27	3.917	3.63	7.000	7.26	10.08	3.17
0.917	2.27	4.000	3.63	7.083	7.26	10.17	3.17
1.000	2.27	4.083	3.63	7.167	7.26	10.25	3.17
1.083	2.27	4.167	3.63	7.250	7.26	10.33	1.81
1.167	2.27	4.250	3.63	7.333	5.44	10.42	1.81
1.250	2.27	4.333	5.44	7.417	5.44	10.50	1.81
1.333	2.27	4.417	5.44	7.500	5.44	10.58	1.81
1.417	2.27	4.500	5.44	7.583	5.44	10.67	1.81
1.500	2.27	4.583	5.44	7.667	5.44	10.75	1.81
1.583	2.27	4.667	5.44	7.750	5.44	10.83	1.81
1.667	2.27	4.750	5.44	7.833	5.44	10.92	1.81
1.750	2.27	4.833	7.26	7.917	5.44	11.00	1.81
1.833	2.27	4.917	7.26	8.000	5.44	11.08	1.81
1.917	2.27	5.000	7.26	8.083	5.44	11.17	1.81
2.000	2.27	5.083	7.26	8.167	5.44	11.25	1.81
2.083	2.27	5.167	7.26	8.250	5.44	11.33	1.81
2.167	2.27	5.250	7.26	8.333	3.17	11.42	1.81
2.250	2.27	5.333	10.88	8.417	3.17	11.50	1.81
2.333	2.72	5.417	10.88	8.500	3.17	11.58	1.81
2.417	2.72	5.500	10.88	8.583	3.17	11.67	1.81
2.500	2.72	5.583	10.88	8.667	3.17	11.75	1.81
2.583	2.72	5.667	10.88	8.750	3.17	11.83	1.81
2.667	2.72	5.750	10.88	8.833	3.17	11.92	1.81
2.750	2.72	5.833	43.54	8.917	3.17	12.00	1.81
2.833	2.72	5.917	43.54	9.000	3.17	12.08	1.81
2.917	2.72	6.000	43.54	9.083	3.17	12.17	1.81
3.000	2.72	6.083	119.72	9.167	3.17	12.25	1.81
3.083	2.72	6.167	119.72	9.250	3.17		

```
    Unit Hyd Qpeak  (cms)=   0.670

    PEAK FLOW       (cms)=   0.477 (i)
    TIME TO PEAK    (hrs)=   7.250
    RUNOFF VOLUME    (mm)=  29.495
    TOTAL RAINFALL   (mm)=  90.700
    RUNOFF COEFFICIENT   =   0.325

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

```
--------------------
| ROUTE CHN(  0040)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
              <------ DATA FOR SECTION (   1.1) ------>
              Distance      Elevation       Manning
                  0.00         253.33        0.0800
                  4.07         253.22        0.0800
                 31.67         252.50        0.0800
                 80.33         251.02        0.0800
                112.54         250.38    0.0800 /0.0300  Main Channel
                147.82         250.41    0.0300 /0.0800  Main Channel
                227.35         251.81        0.0800
                234.22         251.93        0.0800
                240.16         252.02        0.0800
                245.25         252.11        0.0800
                250.86         252.20        0.0800
                254.81         252.26        0.0800

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE     VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)         (m/s)      (min)
       0.10   250.48    .379E+04        2.1          0.63      30.46
       0.20   250.58    .945E+04        8.0          0.98      19.68
       0.30   250.68    .163E+05       17.1          1.21      15.91
       0.40   250.77    .244E+05       29.2          1.38      13.93
       0.50   250.87    .338E+05       44.4          1.52      12.68
       0.60   250.97    .443E+05       62.6          1.63      11.80
       0.70   251.07    .560E+05       84.0          1.73      11.12
       0.79   251.17    .688E+05      108.6          1.82      10.56
       0.89   251.27    .826E+05      136.4          1.91      10.10
       0.99   251.37    .975E+05      167.3          1.99       9.71
       1.09   251.47    .113E+06      201.6          2.06       9.37
       1.19   251.57    .130E+06      239.1          2.12       9.08
       1.29   251.67    .148E+06      280.0          2.19       8.82
       1.39   251.77    .167E+06      324.3          2.24       8.58
       1.49   251.87    .187E+06      372.0          2.30       8.38
       1.59   251.97    .208E+06      423.3          2.35       8.19
       1.69   252.07    .230E+06      478.2          2.40       8.02
       1.79   252.17    .253E+06      536.8          2.45       7.86
       1.89   252.26    .277E+06      599.1          2.50       7.72

                                <---- hydrograph ---->   <-pipe / channel->
                           AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                           (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
  INFLOW : ID= 2 (  0052)  17.19     0.48    7.25  29.50      0.02      0.63
  OUTFLOW: ID= 1 (  0040)  17.19     0.41    7.75  29.49      0.02      0.63
```

```
--------------------
| CALIB            |
| NASHYD   (  0050)|   Area     (ha)=  24.24   Curve Number    (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.13

        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     2.72 | 6.250   119.72 |  9.33     3.17
 0.167     0.00 | 3.250     2.72 | 6.333    16.33 |  9.42     3.17
 0.250     0.00 | 3.333     3.63 | 6.417    16.33 |  9.50     3.17
 0.333     2.27 | 3.417     3.63 | 6.500    16.33 |  9.58     3.17
 0.417     2.27 | 3.500     3.63 | 6.583    16.33 |  9.67     3.17
 0.500     2.27 | 3.583     3.63 | 6.667    16.33 |  9.75     3.17
 0.583     2.27 | 3.667     3.63 | 6.750    16.33 |  9.83     3.17
 0.667     2.27 | 3.750     3.63 | 6.833     7.26 |  9.92     3.17
 0.750     2.27 | 3.833     3.63 | 6.917     7.26 | 10.00     3.17
 0.833     2.27 | 3.917     3.63 | 7.000     7.26 | 10.08     3.17
 0.917     2.27 | 4.000     3.63 | 7.083     7.26 | 10.17     3.17
 1.000     2.27 | 4.083     3.63 | 7.167     7.26 | 10.25     3.17
 1.083     2.27 | 4.167     3.63 | 7.250     7.26 | 10.33     1.81
 1.167     2.27 | 4.250     3.63 | 7.333     5.44 | 10.42     1.81
 1.250     2.27 | 4.333     5.44 | 7.417     5.44 | 10.50     1.81
 1.333     2.27 | 4.417     5.44 | 7.500     5.44 | 10.58     1.81
 1.417     2.27 | 4.500     5.44 | 7.583     5.44 | 10.67     1.81
 1.500     2.27 | 4.583     5.44 | 7.667     5.44 | 10.75     1.81
 1.583     2.27 | 4.667     5.44 | 7.750     5.44 | 10.83     1.81
 1.667     2.27 | 4.750     5.44 | 7.833     5.44 | 10.92     1.81
 1.750     2.27 | 4.833     7.26 | 7.917     5.44 | 11.00     1.81
 1.833     2.27 | 4.917     7.26 | 8.000     5.44 | 11.08     1.81
 1.917     2.27 | 5.000     7.26 | 8.083     5.44 | 11.17     1.81
 2.000     2.27 | 5.083     7.26 | 8.167     5.44 | 11.25     1.81
 2.083     2.27 | 5.167     7.26 | 8.250     5.44 | 11.33     1.81
 2.167     2.27 | 5.250     7.26 | 8.333     3.17 | 11.42     1.81
 2.250     2.27 | 5.333    10.88 | 8.417     3.17 | 11.50     1.81
 2.333     2.72 | 5.417    10.88 | 8.500     3.17 | 11.58     1.81
 2.417     2.72 | 5.500    10.88 | 8.583     3.17 | 11.67     1.81
 2.500     2.72 | 5.583    10.88 | 8.667     3.17 | 11.75     1.81
 2.583     2.72 | 5.667    10.88 | 8.750     3.17 | 11.83     1.81
 2.667     2.72 | 5.750    10.88 | 8.833     3.17 | 11.92     1.81
 2.750     2.72 | 5.833    43.54 | 8.917     3.17 | 12.00     1.81
 2.833     2.72 | 5.917    43.54 | 9.000     3.17 | 12.08     1.81
 2.917     2.72 | 6.000    43.54 | 9.083     3.17 | 12.17     1.81
 3.000     2.72 | 6.083   119.72 | 9.167     3.17 | 12.25     1.81
 3.083     2.72 | 6.167   119.72 | 9.250     3.17 |

  Unit Hyd Qpeak  (cms)=   0.819

  PEAK FLOW       (cms)=   0.603 (i)
  TIME TO PEAK    (hrs)=   7.417
  RUNOFF VOLUME    (mm)=  29.495
  TOTAL RAINFALL   (mm)=  90.700
  RUNOFF COEFFICIENT   =   0.325

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

```
--------------------
| ROUTE CHN(  0041)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
              <------ DATA FOR SECTION (   1.1) ------>
              Distance      Elevation       Manning
                  0.00         253.97        0.0800
                 44.18         253.34        0.0800
```

72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0050)	24.24	0.60	7.42	29.50	0.04	0.21
OUTFLOW: ID= 1 (0041)	24.24	0.33	8.83	29.46	0.03	0.19

ADD HYD (0053)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0040):	17.19	0.414	7.75	29.49
	+ ID2= 2 (0041):	24.24	0.327	8.83	29.46
	ID = 3 (0053):	41.43	0.692	8.08	29.47

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
STANDHYD (0028)	Area (ha)= 1.13			
ID= 1 DT= 5.0 min	Total Imp(%)= 70.00	Dir. Conn.(%)= 58.00		
		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	0.79	0.34	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	1.00	2.00	
Length	(m)=	86.79	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	2.72	6.250	119.72	9.33	3.17
0.167	0.00	3.250	2.72	6.333	16.33	9.42	3.17
0.250	0.00	3.333	3.63	6.417	16.33	9.50	3.17
0.333	2.27	3.417	3.63	6.500	16.33	9.58	3.17
0.417	2.27	3.500	3.63	6.583	16.33	9.67	3.17
0.500	2.27	3.583	3.63	6.667	16.33	9.75	3.17
0.583	2.27	3.667	3.63	6.750	16.33	9.83	3.17
0.667	2.27	3.750	3.63	6.833	7.26	9.92	3.17
0.750	2.27	3.833	3.63	6.917	7.26	10.00	3.17
0.833	2.27	3.917	3.63	7.000	7.26	10.08	3.17
0.917	2.27	4.000	3.63	7.083	7.26	10.17	3.17
1.000	2.27	4.083	3.63	7.167	7.26	10.25	3.17
1.083	2.27	4.167	3.63	7.250	7.26	10.33	1.81
1.167	2.27	4.250	3.63	7.333	5.44	10.42	1.81
1.250	2.27	4.333	5.44	7.417	5.44	10.50	1.81
1.333	2.27	4.417	5.44	7.500	5.44	10.58	1.81
1.417	2.27	4.500	5.44	7.583	5.44	10.67	1.81
1.500	2.27	4.583	5.44	7.667	5.44	10.75	1.81
1.583	2.27	4.667	5.44	7.750	5.44	10.83	1.81
1.667	2.27	4.750	5.44	7.833	5.44	10.92	1.81
1.750	2.27	4.833	7.26	7.917	5.44	11.00	1.81
1.833	2.27	4.917	7.26	8.000	5.44	11.08	1.81
1.917	2.27	5.000	7.26	8.083	5.44	11.17	1.81
2.000	2.27	5.083	7.26	8.167	5.44	11.25	1.81
2.083	2.27	5.167	7.26	8.250	5.44	11.33	1.81
2.167	2.27	5.250	7.26	8.333	3.17	11.42	1.81
2.250	2.27	5.333	10.88	8.417	3.17	11.50	1.81
2.333	2.72	5.417	10.88	8.500	3.17	11.58	1.81
2.417	2.72	5.500	10.88	8.583	3.17	11.67	1.81
2.500	2.72	5.583	10.88	8.667	3.17	11.75	1.81
2.583	2.72	5.667	10.88	8.750	3.17	11.83	1.81
2.667	2.72	5.750	10.88	8.833	3.17	11.92	1.81
2.750	2.72	5.833	43.54	8.917	3.17	12.00	1.81
2.833	2.72	5.917	43.54	9.000	3.17	12.08	1.81
2.917	2.72	6.000	43.54	9.083	3.17	12.17	1.81
3.000	2.72	6.083	119.72	9.167	3.17	12.25	1.81
3.083	2.72	6.167	119.72	9.250	3.17		

Max.Eff.Inten.(mm/hr)	=	119.72	121.80	
over	(min)	5.00	10.00	
Storage Coeff.	(min)=	2.18 (ii)	8.71 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	10.00	
Unit Hyd. peak	(cms)=	0.31	0.12	
				TOTALS
PEAK FLOW	(cms)=	0.22	0.09	0.306 (iii)
TIME TO PEAK	(hrs)=	6.25	6.25	6.25
RUNOFF VOLUME	(mm)=	89.70	53.72	74.58
TOTAL RAINFALL	(mm)=	90.70	90.70	90.70
RUNOFF COEFFICIENT	=	0.99	0.59	0.82

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

```
       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0032)|   Area    (ha)=   3.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  60.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.04         0.76
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     159.16        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	2.72	6.250	119.72	9.33	3.17
0.167	0.00	3.250	2.72	6.333	16.33	9.42	3.17
0.250	0.00	3.333	3.63	6.417	16.33	9.50	3.17
0.333	2.27	3.417	3.63	6.500	16.33	9.58	3.17
0.417	2.27	3.500	3.63	6.583	16.33	9.67	3.17
0.500	2.27	3.583	3.63	6.667	16.33	9.75	3.17
0.583	2.27	3.667	3.63	6.750	16.33	9.83	3.17
0.667	2.27	3.750	3.63	6.833	7.26	9.92	3.17
0.750	2.27	3.833	3.63	6.917	7.26	10.00	3.17
0.833	2.27	3.917	3.63	7.000	7.26	10.08	3.17
0.917	2.27	4.000	3.63	7.083	7.26	10.17	3.17
1.000	2.27	4.083	3.63	7.167	7.26	10.25	3.17
1.083	2.27	4.167	3.63	7.250	7.26	10.33	1.81
1.167	2.27	4.250	3.63	7.333	5.44	10.42	1.81
1.250	2.27	4.333	5.44	7.417	5.44	10.50	1.81
1.333	2.27	4.417	5.44	7.500	5.44	10.58	1.81
1.417	2.27	4.500	5.44	7.583	5.44	10.67	1.81
1.500	2.27	4.583	5.44	7.667	5.44	10.75	1.81
1.583	2.27	4.667	5.44	7.750	5.44	10.83	1.81
1.667	2.27	4.750	5.44	7.833	5.44	10.92	1.81
1.750	2.27	4.833	7.26	7.917	5.44	11.00	1.81
1.833	2.27	4.917	7.26	8.000	5.44	11.08	1.81
1.917	2.27	5.000	7.26	8.083	5.44	11.17	1.81
2.000	2.27	5.083	7.26	8.167	5.44	11.25	1.81
2.083	2.27	5.167	7.26	8.250	5.44	11.33	1.81
2.167	2.27	5.250	7.26	8.333	3.17	11.42	1.81
2.250	2.27	5.333	10.88	8.417	3.17	11.50	1.81
2.333	2.72	5.417	10.88	8.500	3.17	11.58	1.81
2.417	2.72	5.500	10.88	8.583	3.17	11.67	1.81
2.500	2.72	5.583	10.88	8.667	3.17	11.75	1.81
2.583	2.72	5.667	10.88	8.750	3.17	11.83	1.81
2.667	2.72	5.750	10.88	8.833	3.17	11.92	1.81
2.750	2.72	5.833	43.54	8.917	3.17	12.00	1.81
2.833	2.72	5.917	43.54	9.000	3.17	12.08	1.81
2.917	2.72	6.000	43.54	9.083	3.17	12.17	1.81
3.000	2.72	6.083	119.72	9.167	3.17	12.25	1.81
3.083	2.72	6.167	119.72	9.250	3.17		

```
     Max.Eff.Inten.(mm/hr)=     119.72       195.34
              over (min)          5.00        10.00
     Storage Coeff.  (min)=       3.14 (ii)    7.37 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.27         0.13
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.75         0.34          1.094 (iii)
     TIME TO PEAK    (hrs)=       6.25         6.25          6.25
     RUNOFF VOLUME    (mm)=      89.70        61.67         78.49
     TOTAL RAINFALL   (mm)=      90.70        90.70         90.70
     RUNOFF COEFFICIENT   =       0.99         0.68          0.87

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0034)|   Area    (ha)=  29.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  66.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      19.18         9.88
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     440.15        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	2.72	6.250	119.72	9.33	3.17
0.167	0.00	3.250	2.72	6.333	16.33	9.42	3.17
0.250	0.00	3.333	3.63	6.417	16.33	9.50	3.17
0.333	2.27	3.417	3.63	6.500	16.33	9.58	3.17
0.417	2.27	3.500	3.63	6.583	16.33	9.67	3.17
0.500	2.27	3.583	3.63	6.667	16.33	9.75	3.17
0.583	2.27	3.667	3.63	6.750	16.33	9.83	3.17
0.667	2.27	3.750	3.63	6.833	7.26	9.92	3.17
0.750	2.27	3.833	3.63	6.917	7.26	10.00	3.17
0.833	2.27	3.917	3.63	7.000	7.26	10.08	3.17
0.917	2.27	4.000	3.63	7.083	7.26	10.17	3.17
1.000	2.27	4.083	3.63	7.167	7.26	10.25	3.17
1.083	2.27	4.167	3.63	7.250	7.26	10.33	1.81
1.167	2.27	4.250	3.63	7.333	5.44	10.42	1.81
1.250	2.27	4.333	5.44	7.417	5.44	10.50	1.81
1.333	2.27	4.417	5.44	7.500	5.44	10.58	1.81
1.417	2.27	4.500	5.44	7.583	5.44	10.67	1.81
1.500	2.27	4.583	5.44	7.667	5.44	10.75	1.81
1.583	2.27	4.667	5.44	7.750	5.44	10.83	1.81

1.667	2.27	4.750	5.44	7.833	5.44	10.92	1.81
1.750	2.27	4.833	7.26	7.917	5.44	11.00	1.81
1.833	2.27	4.917	7.26	8.000	5.44	11.08	1.81
1.917	2.27	5.000	7.26	8.083	5.44	11.17	1.81
2.000	2.27	5.083	7.26	8.167	5.44	11.25	1.81
2.083	2.27	5.167	7.26	8.250	5.44	11.33	1.81
2.167	2.27	5.250	7.26	8.333	3.17	11.42	1.81
2.250	2.27	5.333	10.88	8.417	3.17	11.50	1.81
2.333	2.72	5.417	10.88	8.500	3.17	11.58	1.81
2.417	2.72	5.500	10.88	8.583	3.17	11.67	1.81
2.500	2.72	5.583	10.88	8.667	3.17	11.75	1.81
2.583	2.72	5.667	10.88	8.750	3.17	11.83	1.81
2.667	2.72	5.750	10.88	8.833	3.17	11.92	1.81
2.750	2.72	5.833	43.54	8.917	3.17	12.00	1.81
2.833	2.72	5.917	43.54	9.000	3.17	12.08	1.81
2.917	2.72	6.000	43.54	9.083	3.17	12.17	1.81
3.000	2.72	6.083	119.72	9.167	3.17	12.25	1.81
3.083	2.72	6.167	119.72	9.250	3.17		

Max.Eff.Inten.(mm/hr)=	119.72	112.63	
over (min)	5.00	15.00	
Storage Coeff. (min)=	5.78 (ii)	12.51 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.20	0.08	
			TOTALS
PEAK FLOW (cms)=	5.05	1.95	6.781 (iii)
TIME TO PEAK (hrs)=	6.25	6.33	6.25
RUNOFF VOLUME (mm)=	89.70	52.38	72.91
TOTAL RAINFALL (mm)=	90.70	90.70	90.70
RUNOFF COEFFICIENT =	0.99	0.58	0.80

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0035)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0032):	3.80	1.094	6.25	78.49
+ ID2= 2 (0034):	29.06	6.781	6.25	72.91
ID = 3 (0035):	32.86	7.874	6.25	73.55

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0033) | 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	0.4930	1.5666
	0.0360	0.7150	0.7890	1.8478
	0.0660	1.0737	1.0520	2.0613
	0.2630	1.3645	1.3140	2.2797

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0035)	32.860	7.874	6.25	73.55
OUTFLOW: ID= 1 (0033)	32.860	0.638	7.25	71.43

PEAK FLOW REDUCTION [Qout/Qin](%)= 8.11
TIME SHIFT OF PEAK FLOW (min)= 60.00
MAXIMUM STORAGE USED (ha.m.)= 1.7052

ADD HYD (0029) | 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0028):	1.13	0.306	6.25	74.58
+ ID2= 2 (0033):	32.86	0.638	7.25	71.43
ID = 3 (0029):	33.99	0.660	7.25	71.53

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0029) | 3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0029):	33.99	0.660	7.25	71.53
+ ID2= 2 (0053):	41.43	0.692	8.08	29.47
ID = 1 (0029):	75.42	1.311	7.92	48.43

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\79ee5c6b-9572-4031-bd75-ef010cec5dfe\scen
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DATE: 05-03-2024 TIME: 01:44:31

USER:

COMMENTS: _____

**** SIMULATION : 11. 50-Year-12-Hour-SCS-Type- ****

READ STORM	Filename: C:\Users\mmsingh\AppData\Local\Temp\3a0c766d-3ecf-4101-8ec5-64101323cb13\69aab664
Ptotal=101.70 mm	Comments: 50-Year-12-Hour-SCS-Type-II

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	4.07	6.50	18.31	9.75	3.56
0.25	2.54	3.50	4.07	6.75	8.14	10.00	3.56
0.50	2.54	3.75	4.07	7.00	8.14	10.25	2.03
0.75	2.54	4.00	4.07	7.25	6.10	10.50	2.03
1.00	2.54	4.25	6.10	7.50	6.10	10.75	2.03
1.25	2.54	4.50	6.10	7.75	6.10	11.00	2.03
1.50	2.54	4.75	8.14	8.00	6.10	11.25	2.03
1.75	2.54	5.00	8.14	8.25	3.56	11.50	2.03
2.00	2.54	5.25	12.20	8.50	3.56	11.75	2.03
2.25	3.05	5.50	12.20	8.75	3.56	12.00	2.03
2.50	3.05	5.75	48.82	9.00	3.56		
2.75	3.05	6.00	134.24	9.25	3.56		
3.00	3.05	6.25	18.31	9.50	3.56		

CALIB			
NASHYD (0052)	Area (ha)= 17.19	Curve Number (CN)= 63.0	
ID= 1 DT= 5.0 min	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.98		

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	3.05	6.250	134.24	9.33	3.56
0.167	0.00	3.250	3.05	6.333	18.31	9.42	3.56
0.250	0.00	3.333	4.07	6.417	18.31	9.50	3.56
0.333	2.54	3.417	4.07	6.500	18.31	9.58	3.56
0.417	2.54	3.500	4.07	6.583	18.31	9.67	3.56
0.500	2.54	3.583	4.07	6.667	18.31	9.75	3.56
0.583	2.54	3.667	4.07	6.750	18.31	9.83	3.56
0.667	2.54	3.750	4.07	6.833	8.14	9.92	3.56
0.750	2.54	3.833	4.07	6.917	8.14	10.00	3.56
0.833	2.54	3.917	4.07	7.000	8.14	10.08	3.56
0.917	2.54	4.000	4.07	7.083	8.14	10.17	3.56
1.000	2.54	4.083	4.07	7.167	8.14	10.25	3.56
1.083	2.54	4.167	4.07	7.250	8.14	10.33	2.03
1.167	2.54	4.250	4.07	7.333	6.10	10.42	2.03
1.250	2.54	4.333	6.10	7.417	6.10	10.50	2.03
1.333	2.54	4.417	6.10	7.500	6.10	10.58	2.03
1.417	2.54	4.500	6.10	7.583	6.10	10.67	2.03
1.500	2.54	4.583	6.10	7.667	6.10	10.75	2.03
1.583	2.54	4.667	6.10	7.750	6.10	10.83	2.03
1.667	2.54	4.750	6.10	7.833	6.10	10.92	2.03
1.750	2.54	4.833	8.14	7.917	6.10	11.00	2.03
1.833	2.54	4.917	8.14	8.000	6.10	11.08	2.03
1.917	2.54	5.000	8.14	8.083	6.10	11.17	2.03
2.000	2.54	5.083	8.14	8.167	6.10	11.25	2.03
2.083	2.54	5.167	8.14	8.250	6.10	11.33	2.03
2.167	2.54	5.250	8.14	8.333	3.56	11.42	2.03
2.250	2.54	5.333	12.20	8.417	3.56	11.50	2.03
2.333	3.05	5.417	12.20	8.500	3.56	11.58	2.03
2.417	3.05	5.500	12.20	8.583	3.56	11.67	2.03
2.500	3.05	5.583	12.20	8.667	3.56	11.75	2.03
2.583	3.05	5.667	12.20	8.750	3.56	11.83	2.03
2.667	3.05	5.750	12.20	8.833	3.56	11.92	2.03
2.750	3.05	5.833	48.82	8.917	3.56	12.00	2.03
2.833	3.05	5.917	48.82	9.000	3.56	12.08	2.03
2.917	3.05	6.000	48.82	9.083	3.56	12.17	2.03
3.000	3.05	6.083	134.24	9.167	3.56	12.25	2.03
3.083	3.05	6.167	134.24	9.250	3.56		

Unit Hyd Qpeak (cms)= 0.670

PEAK FLOW (cms)= 0.588 (i)
TIME TO PEAK (hrs)= 7.250
RUNOFF VOLUME (mm)= 36.149
TOTAL RAINFALL (mm)= 101.700
RUNOFF COEFFICIENT = 0.355

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

ROUTE CHN(0040)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

		<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0052)		17.19	0.59	7.25	36.15	0.03	0.63
OUTFLOW: ID= 1 (0040)		17.19	0.51	7.75	36.15	0.02	0.63

CALIB NASHYD (0050) | ID= 1 DT= 5.0 min	Area (ha)= 24.24	Curve Number (CN)= 63.0
	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 1.13	

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	3.05	6.250	134.24	9.33	3.56
0.167	0.00	3.250	3.05	6.333	18.31	9.42	3.56
0.250	0.00	3.333	4.07	6.417	18.31	9.50	3.56
0.333	2.54	3.417	4.07	6.500	18.31	9.58	3.56
0.417	2.54	3.500	4.07	6.583	18.31	9.67	3.56
0.500	2.54	3.583	4.07	6.667	18.31	9.75	3.56
0.583	2.54	3.667	4.07	6.750	18.31	9.83	3.56
0.667	2.54	3.750	4.07	6.833	8.14	9.92	3.56
0.750	2.54	3.833	4.07	6.917	8.14	10.00	3.56
0.833	2.54	3.917	4.07	7.000	8.14	10.08	3.56
0.917	2.54	4.000	4.07	7.083	8.14	10.17	3.56
1.000	2.54	4.083	4.07	7.167	8.14	10.25	3.56
1.083	2.54	4.167	4.07	7.250	8.14	10.33	2.03
1.167	2.54	4.250	4.07	7.333	6.10	10.42	2.03
1.250	2.54	4.333	6.10	7.417	6.10	10.50	2.03
1.333	2.54	4.417	6.10	7.500	6.10	10.58	2.03
1.417	2.54	4.500	6.10	7.583	6.10	10.67	2.03
1.500	2.54	4.583	6.10	7.667	6.10	10.75	2.03
1.583	2.54	4.667	6.10	7.750	6.10	10.83	2.03
1.667	2.54	4.750	6.10	7.833	6.10	10.92	2.03
1.750	2.54	4.833	8.14	7.917	6.10	11.00	2.03
1.833	2.54	4.917	8.14	8.000	6.10	11.08	2.03
1.917	2.54	5.000	8.14	8.083	6.10	11.17	2.03
2.000	2.54	5.083	8.14	8.167	6.10	11.25	2.03
2.083	2.54	5.167	8.14	8.250	6.10	11.33	2.03
2.167	2.54	5.250	8.14	8.333	3.56	11.42	2.03
2.250	2.54	5.333	12.20	8.417	3.56	11.50	2.03
2.333	3.05	5.417	12.20	8.500	3.56	11.58	2.03
2.417	3.05	5.500	12.20	8.583	3.56	11.67	2.03
2.500	3.05	5.583	12.20	8.667	3.56	11.75	2.03
2.583	3.05	5.667	12.20	8.750	3.56	11.83	2.03
2.667	3.05	5.750	12.20	8.833	3.56	11.92	2.03
2.750	3.05	5.833	48.82	8.917	3.56	12.00	2.03
2.833	3.05	5.917	48.82	9.000	3.56	12.08	2.03
2.917	3.05	6.000	48.82	9.083	3.56	12.17	2.03
3.000	3.05	6.083	134.24	9.167	3.56	12.25	2.03
3.083	3.05	6.167	134.24	9.250	3.56		

Unit Hyd Qpeak (cms)= 0.819

PEAK FLOW (cms)= 0.744 (i)
TIME TO PEAK (hrs)= 7.417
RUNOFF VOLUME (mm)= 36.149
TOTAL RAINFALL (mm)= 101.700
RUNOFF COEFFICIENT = 0.355

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

ROUTE CHN(0041) | IN= 2---> OUT= 1 |	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57

0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

	<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0050)	24.24	0.74	7.42	36.15	0.04	0.22
OUTFLOW: ID= 1 (0041)	24.24	0.41	8.75	36.11	0.03	0.19

ADD HYD (0053)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0040):	17.19	0.510	7.75	36.15
	+ ID2= 2 (0041):	24.24	0.408	8.75	36.11
	ID = 3 (0053):	41.43	0.862	8.08	36.13

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB STANDHYD (0028)	Area (ha)= 1.13		
ID= 1 DT= 5.0 min	Total Imp(%)= 70.00	Dir. Conn.(%)= 58.00	
		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.79	0.34
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	86.79	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	3.05	6.250	134.24	9.33	3.56
0.167	0.00	3.250	3.05	6.333	18.31	9.42	3.56
0.250	0.00	3.333	4.07	6.417	18.31	9.50	3.56
0.333	2.54	3.417	4.07	6.500	18.31	9.58	3.56
0.417	2.54	3.500	4.07	6.583	18.31	9.67	3.56
0.500	2.54	3.583	4.07	6.667	18.31	9.75	3.56
0.583	2.54	3.667	4.07	6.750	18.31	9.83	3.56
0.667	2.54	3.750	4.07	6.833	8.14	9.92	3.56
0.750	2.54	3.833	4.07	6.917	8.14	10.00	3.56
0.833	2.54	3.917	4.07	7.000	8.14	10.08	3.56
0.917	2.54	4.000	4.07	7.083	8.14	10.17	3.56
1.000	2.54	4.083	4.07	7.167	8.14	10.25	3.56
1.083	2.54	4.167	4.07	7.250	8.14	10.33	2.03
1.167	2.54	4.250	4.07	7.333	6.10	10.42	2.03
1.250	2.54	4.333	6.10	7.417	6.10	10.50	2.03
1.333	2.54	4.417	6.10	7.500	6.10	10.58	2.03
1.417	2.54	4.500	6.10	7.583	6.10	10.67	2.03
1.500	2.54	4.583	6.10	7.667	6.10	10.75	2.03
1.583	2.54	4.667	6.10	7.750	6.10	10.83	2.03
1.667	2.54	4.750	6.10	7.833	6.10	10.92	2.03
1.750	2.54	4.833	8.14	7.917	6.10	11.00	2.03
1.833	2.54	4.917	8.14	8.000	6.10	11.08	2.03
1.917	2.54	5.000	8.14	8.083	6.10	11.17	2.03
2.000	2.54	5.083	8.14	8.167	6.10	11.25	2.03
2.083	2.54	5.167	8.14	8.250	6.10	11.33	2.03
2.167	2.54	5.250	8.14	8.333	3.56	11.42	2.03
2.250	2.54	5.333	12.20	8.417	3.56	11.50	2.03
2.333	3.05	5.417	12.20	8.500	3.56	11.58	2.03
2.417	3.05	5.500	12.20	8.583	3.56	11.67	2.03
2.500	3.05	5.583	12.20	8.667	3.56	11.75	2.03
2.583	3.05	5.667	12.20	8.750	3.56	11.83	2.03
2.667	3.05	5.750	12.20	8.833	3.56	11.92	2.03
2.750	3.05	5.833	48.82	8.917	3.56	12.00	2.03
2.833	3.05	5.917	48.82	9.000	3.56	12.08	2.03
2.917	3.05	6.000	48.82	9.083	3.56	12.17	2.03
3.000	3.05	6.083	134.24	9.167	3.56	12.25	2.03
3.083	3.05	6.167	134.24	9.250	3.56		

				TOTALS
Max.Eff.Inten.(mm/hr)=		134.24	142.37	
over (min)		5.00	10.00	
Storage Coeff. (min)=		2.09 (ii)	6.91 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.31	0.14	
PEAK FLOW	(cms)=	0.24	0.11	0.356 (iii)
TIME TO PEAK	(hrs)=	6.25	6.25	6.25
RUNOFF VOLUME	(mm)=	100.70	63.22	84.95
TOTAL RAINFALL	(mm)=	101.70	101.70	101.70
RUNOFF COEFFICIENT	=	0.99	0.62	0.84

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB STANDHYD (0032)	Area (ha)= 3.80		
ID= 1 DT= 5.0 min	Total Imp(%)= 80.00	Dir. Conn.(%)= 60.00	
		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	3.05	6.250	134.24	9.33	3.56
0.167	0.00	3.250	3.05	6.333	18.31	9.42	3.56
0.250	0.00	3.333	4.07	6.417	18.31	9.50	3.56
0.333	2.54	3.417	4.07	6.500	18.31	9.58	3.56
0.417	2.54	3.500	4.07	6.583	18.31	9.67	3.56
0.500	2.54	3.583	4.07	6.667	18.31	9.75	3.56
0.583	2.54	3.667	4.07	6.750	18.31	9.83	3.56
0.667	2.54	3.750	4.07	6.833	8.14	9.92	3.56
0.750	2.54	3.833	4.07	6.917	8.14	10.00	3.56
0.833	2.54	3.917	4.07	7.000	8.14	10.08	3.56
0.917	2.54	4.000	4.07	7.083	8.14	10.17	3.56
1.000	2.54	4.083	4.07	7.167	8.14	10.25	3.56
1.083	2.54	4.167	4.07	7.250	8.14	10.33	2.03
1.167	2.54	4.250	4.07	7.333	6.10	10.42	2.03
1.250	2.54	4.333	6.10	7.417	6.10	10.50	2.03
1.333	2.54	4.417	6.10	7.500	6.10	10.58	2.03
1.417	2.54	4.500	6.10	7.583	6.10	10.67	2.03
1.500	2.54	4.583	6.10	7.667	6.10	10.75	2.03
1.583	2.54	4.667	6.10	7.750	6.10	10.83	2.03
1.667	2.54	4.750	6.10	7.833	6.10	10.92	2.03
1.750	2.54	4.833	8.14	7.917	6.10	11.00	2.03
1.833	2.54	4.917	8.14	8.000	6.10	11.08	2.03
1.917	2.54	5.000	8.14	8.083	6.10	11.17	2.03
2.000	2.54	5.083	8.14	8.167	6.10	11.25	2.03
2.083	2.54	5.167	8.14	8.250	6.10	11.33	2.03
2.167	2.54	5.250	8.14	8.333	3.56	11.42	2.03
2.250	2.54	5.333	12.20	8.417	3.56	11.50	2.03
2.333	3.05	5.417	12.20	8.500	3.56	11.58	2.03
2.417	3.05	5.500	12.20	8.583	3.56	11.67	2.03
2.500	3.05	5.583	12.20	8.667	3.56	11.75	2.03
2.583	3.05	5.667	12.20	8.750	3.56	11.83	2.03
2.667	3.05	5.750	12.20	8.833	3.56	11.92	2.03
2.750	3.05	5.833	48.82	8.917	3.56	12.00	2.03
2.833	3.05	5.917	48.82	9.000	3.56	12.08	2.03
2.917	3.05	6.000	48.82	9.083	3.56	12.17	2.03
3.000	3.05	6.083	134.24	9.167	3.56	12.25	2.03
3.083	3.05	6.167	134.24	9.250	3.56		

			TOTALS
Max.Eff.Inten.(mm/hr)=	134.24	225.48	
over (min)	5.00	10.00	
Storage Coeff. (min)=	3.00 (ii)	7.04 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.28	0.14	
PEAK FLOW (cms)=	0.85	0.40	1.245 (iii)
TIME TO PEAK (hrs)=	6.25	6.25	6.25
RUNOFF VOLUME (mm)=	100.70	71.76	89.12
TOTAL RAINFALL (mm)=	101.70	101.70	101.70
RUNOFF COEFFICIENT =	0.99	0.71	0.88

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0034)	Area (ha)= 29.06
ID= 1 DT= 5.0 min	Total Imp(%)= 66.00 Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	3.05	6.250	134.24	9.33	3.56
0.167	0.00	3.250	3.05	6.333	18.31	9.42	3.56
0.250	0.00	3.333	4.07	6.417	18.31	9.50	3.56
0.333	2.54	3.417	4.07	6.500	18.31	9.58	3.56
0.417	2.54	3.500	4.07	6.583	18.31	9.67	3.56
0.500	2.54	3.583	4.07	6.667	18.31	9.75	3.56
0.583	2.54	3.667	4.07	6.750	18.31	9.83	3.56
0.667	2.54	3.750	4.07	6.833	8.14	9.92	3.56
0.750	2.54	3.833	4.07	6.917	8.14	10.00	3.56
0.833	2.54	3.917	4.07	7.000	8.14	10.08	3.56
0.917	2.54	4.000	4.07	7.083	8.14	10.17	3.56
1.000	2.54	4.083	4.07	7.167	8.14	10.25	3.56
1.083	2.54	4.167	4.07	7.250	8.14	10.33	2.03
1.167	2.54	4.250	4.07	7.333	6.10	10.42	2.03
1.250	2.54	4.333	6.10	7.417	6.10	10.50	2.03
1.333	2.54	4.417	6.10	7.500	6.10	10.58	2.03
1.417	2.54	4.500	6.10	7.583	6.10	10.67	2.03
1.500	2.54	4.583	6.10	7.667	6.10	10.75	2.03
1.583	2.54	4.667	6.10	7.750	6.10	10.83	2.03
1.667	2.54	4.750	6.10	7.833	6.10	10.92	2.03
1.750	2.54	4.833	8.14	7.917	6.10	11.00	2.03
1.833	2.54	4.917	8.14	8.000	6.10	11.08	2.03
1.917	2.54	5.000	8.14	8.083	6.10	11.17	2.03
2.000	2.54	5.083	8.14	8.167	6.10	11.25	2.03
2.083	2.54	5.167	8.14	8.250	6.10	11.33	2.03
2.167	2.54	5.250	8.14	8.333	3.56	11.42	2.03
2.250	2.54	5.333	12.20	8.417	3.56	11.50	2.03
2.333	3.05	5.417	12.20	8.500	3.56	11.58	2.03
2.417	3.05	5.500	12.20	8.583	3.56	11.67	2.03
2.500	3.05	5.583	12.20	8.667	3.56	11.75	2.03
2.583	3.05	5.667	12.20	8.750	3.56	11.83	2.03
2.667	3.05	5.750	12.20	8.833	3.56	11.92	2.03
2.750	3.05	5.833	48.82	8.917	3.56	12.00	2.03
2.833	3.05	5.917	48.82	9.000	3.56	12.08	2.03
2.917	3.05	6.000	48.82	9.083	3.56	12.17	2.03
3.000	3.05	6.083	134.24	9.167	3.56	12.25	2.03
3.083	3.05	6.167	134.24	9.250	3.56		

Max.Eff.Inten.(mm/hr)=	134.24	131.95
over (min)	5.00	15.00
Storage Coeff. (min)=	5.53 (ii)	11.84 (ii)

```
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.20         0.09
                                                        *TOTALS*
     PEAK FLOW       (cms)=       5.70         2.35         7.800 (iii)
     TIME TO PEAK    (hrs)=       6.25         6.33         6.25
     RUNOFF VOLUME    (mm)=     100.70        61.76        83.18
     TOTAL RAINFALL   (mm)=     101.70       101.70       101.70
     RUNOFF COEFFICIENT   =       0.99         0.61         0.82


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    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  (  0035)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0032):     3.80   1.245     6.25    89.12
     + ID2= 2 (  0034):    29.06   7.800     6.25    83.18
       ================================================
       ID = 3 (  0035):    32.86   9.045     6.25    83.87

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

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--------------------
| RESERVOIR(  0033)|     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   |   0.4930     1.5666
                          0.0360     0.7150   |   0.7890     1.8478
                          0.0660     1.0737   |   1.0520     2.0613
                          0.2630     1.3645   |   1.3140     2.2797

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0035)     32.860     9.045      6.25      83.87
   OUTFLOW: ID= 1 (  0033)     32.860     0.852      7.08      81.72

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.42
                  TIME SHIFT OF PEAK FLOW         (min)= 50.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.8991
```

```
--------------------
| ADD HYD  (  0029)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0028):     1.13   0.356     6.25    84.95
     + ID2= 2 (  0033):    32.86   0.852     7.08    81.72
       ================================================
       ID = 3 (  0029):    33.99   0.877     7.08    81.83

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

```
--------------------
| ADD HYD  (  0029)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0029):    33.99   0.877     7.08    81.83
     + ID2= 2 (  0053):    41.43   0.862     8.08    36.13
       ================================================
       ID = 1 (  0029):    75.42   1.654     7.92    56.73

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

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```

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\ca86f81b-6ed3-4625-9acf-bb59c13a3f09\scen
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DATE: 05-03-2024                          TIME: 01:44:32

USER:


COMMENTS: _____
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```
----------------------
  ***********************************************
  ** SIMULATION : 12. 100-Year-12-Hour-SCS-Type **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              3a0c766d-3ecf-4101-8ec5-64101323cb13\9f01baed
| Ptotal=112.50 mm |    Comments: 100-Year-12-Hour-SCS-Type-II
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	4.50	6.50	20.25	9.75	3.94
0.25	2.81	3.50	4.50	6.75	9.00	10.00	3.94
0.50	2.81	3.75	4.50	7.00	9.00	10.25	2.25
0.75	2.81	4.00	4.50	7.25	6.75	10.50	2.25
1.00	2.81	4.25	6.75	7.50	6.75	10.75	2.25
1.25	2.81	4.50	6.75	7.75	6.75	11.00	2.25
1.50	2.81	4.75	9.00	8.00	6.75	11.25	2.25
1.75	2.81	5.00	9.00	8.25	3.94	11.50	2.25
2.00	2.81	5.25	13.50	8.50	3.94	11.75	2.25
2.25	3.38	5.50	13.50	8.75	3.94	12.00	2.25
2.50	3.37	5.75	54.00	9.00	3.94		
2.75	3.38	6.00	148.50	9.25	3.94		
3.00	3.38	6.25	20.25	9.50	3.94		

CALIB			
NASHYD (0052)	Area (ha)= 17.19	Curve Number (CN)= 63.0	
ID= 1 DT= 5.0 min	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.98		

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	3.38	6.250	148.50	9.33	3.94
0.167	0.00	3.250	3.38	6.333	20.25	9.42	3.94
0.250	0.00	3.333	4.50	6.417	20.25	9.50	3.94
0.333	2.81	3.417	4.50	6.500	20.25	9.58	3.94
0.417	2.81	3.500	4.50	6.583	20.25	9.67	3.94
0.500	2.81	3.583	4.50	6.667	20.25	9.75	3.94
0.583	2.81	3.667	4.50	6.750	20.25	9.83	3.94
0.667	2.81	3.750	4.50	6.833	9.00	9.92	3.94
0.750	2.81	3.833	4.50	6.917	9.00	10.00	3.94
0.833	2.81	3.917	4.50	7.000	9.00	10.08	3.94
0.917	2.81	4.000	4.50	7.083	9.00	10.17	3.94
1.000	2.81	4.083	4.50	7.167	9.00	10.25	3.94
1.083	2.81	4.167	4.50	7.250	9.00	10.33	2.25
1.167	2.81	4.250	4.50	7.333	6.75	10.42	2.25
1.250	2.81	4.333	6.75	7.417	6.75	10.50	2.25
1.333	2.81	4.417	6.75	7.500	6.75	10.58	2.25
1.417	2.81	4.500	6.75	7.583	6.75	10.67	2.25
1.500	2.81	4.583	6.75	7.667	6.75	10.75	2.25
1.583	2.81	4.667	6.75	7.750	6.75	10.83	2.25
1.667	2.81	4.750	6.75	7.833	6.75	10.92	2.25
1.750	2.81	4.833	9.00	7.917	6.75	11.00	2.25
1.833	2.81	4.917	9.00	8.000	6.75	11.08	2.25
1.917	2.81	5.000	9.00	8.083	6.75	11.17	2.25
2.000	2.81	5.083	9.00	8.167	6.75	11.25	2.25
2.083	2.81	5.167	9.00	8.250	6.75	11.33	2.25
2.167	2.81	5.250	9.00	8.333	3.94	11.42	2.25
2.250	2.81	5.333	13.50	8.417	3.94	11.50	2.25
2.333	3.37	5.417	13.50	8.500	3.94	11.58	2.25
2.417	3.38	5.500	13.50	8.583	3.94	11.67	2.25
2.500	3.38	5.583	13.50	8.667	3.94	11.75	2.25
2.583	3.37	5.667	13.50	8.750	3.94	11.83	2.25
2.667	3.37	5.750	13.50	8.833	3.94	11.92	2.25
2.750	3.37	5.833	54.00	8.917	3.94	12.00	2.25
2.833	3.37	5.917	54.00	9.000	3.94	12.08	2.25
2.917	3.38	6.000	54.00	9.083	3.94	12.17	2.25
3.000	3.38	6.083	148.50	9.167	3.94	12.25	2.25
3.083	3.37	6.167	148.50	9.250	3.94		

Unit Hyd Qpeak (cms)= 0.670

PEAK FLOW (cms)= 0.704 (i)
TIME TO PEAK (hrs)= 7.250
RUNOFF VOLUME (mm)= 43.048
TOTAL RAINFALL (mm)= 112.500
RUNOFF COEFFICIENT = 0.383

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

ROUTE CHN(0040)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
		<---- hydrograph ---->			<-pipe / channel->	
INFLOW : ID= 2 (0052)	17.19	0.70	7.25	43.05	0.03	0.63
OUTFLOW: ID= 1 (0040)	17.19	0.61	7.75	43.05	0.03	0.63

CALIB NASHYD (0050) / ID= 1 DT= 5.0 min				
	Area (ha)= 24.24	Curve Number (CN)= 63.0		
	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00		
	U.H. Tp(hrs)= 1.13			

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	3.38	6.250	148.50	9.33	3.94
0.167	0.00	3.250	3.38	6.333	20.25	9.42	3.94
0.250	0.00	3.333	4.50	6.417	20.25	9.50	3.94
0.333	2.81	3.417	4.50	6.500	20.25	9.58	3.94
0.417	2.81	3.500	4.50	6.583	20.25	9.67	3.94
0.500	2.81	3.583	4.50	6.667	20.25	9.75	3.94
0.583	2.81	3.667	4.50	6.750	20.25	9.83	3.94
0.667	2.81	3.750	4.50	6.833	9.00	9.92	3.94
0.750	2.81	3.833	4.50	6.917	9.00	10.00	3.94
0.833	2.81	3.917	4.50	7.000	9.00	10.08	3.94
0.917	2.81	4.000	4.50	7.083	9.00	10.17	3.94
1.000	2.81	4.083	4.50	7.167	9.00	10.25	3.94
1.083	2.81	4.167	4.50	7.250	9.00	10.33	2.25
1.167	2.81	4.250	4.50	7.333	6.75	10.42	2.25
1.250	2.81	4.333	6.75	7.417	6.75	10.50	2.25
1.333	2.81	4.417	6.75	7.500	6.75	10.58	2.25
1.417	2.81	4.500	6.75	7.583	6.75	10.67	2.25
1.500	2.81	4.583	6.75	7.667	6.75	10.75	2.25
1.583	2.81	4.667	6.75	7.750	6.75	10.83	2.25
1.667	2.81	4.750	6.75	7.833	6.75	10.92	2.25
1.750	2.81	4.833	9.00	7.917	6.75	11.00	2.25
1.833	2.81	4.917	9.00	8.000	6.75	11.08	2.25
1.917	2.81	5.000	9.00	8.083	6.75	11.17	2.25
2.000	2.81	5.083	9.00	8.167	6.75	11.25	2.25
2.083	2.81	5.167	9.00	8.250	6.75	11.33	2.25
2.167	2.81	5.250	9.00	8.333	3.94	11.42	2.25
2.250	2.81	5.333	13.50	8.417	3.94	11.50	2.25
2.333	3.37	5.417	13.50	8.500	3.94	11.58	2.25
2.417	3.38	5.500	13.50	8.583	3.94	11.67	2.25
2.500	3.38	5.583	13.50	8.667	3.94	11.75	2.25
2.583	3.37	5.667	13.50	8.750	3.94	11.83	2.25
2.667	3.37	5.750	13.50	8.833	3.94	11.92	2.25
2.750	3.37	5.833	54.00	8.917	3.94	12.00	2.25
2.833	3.37	5.917	54.00	9.000	3.94	12.08	2.25
2.917	3.38	6.000	54.00	9.083	3.94	12.17	2.25
3.000	3.38	6.083	148.50	9.167	3.94	12.25	2.25
3.083	3.37	6.167	148.50	9.250	3.94		

Unit Hyd Qpeak (cms)= 0.819

PEAK FLOW (cms)= 0.890 (i)
TIME TO PEAK (hrs)= 7.417
RUNOFF VOLUME (mm)= 43.048
TOTAL RAINFALL (mm)= 112.500
RUNOFF COEFFICIENT = 0.383

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

ROUTE CHN(0041) / IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
		<---- hydrograph ---->			<-pipe / channel->	
INFLOW : ID= 2 (0050)	24.24	0.89	7.42	43.05	0.05	0.23
OUTFLOW: ID= 1 (0041)	24.24	0.50	8.67	43.01	0.03	0.20

ADD HYD (0053)

1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0040):	17.19	0.610	7.75	43.05
+ ID2= 2 (0041):	24.24	0.496	8.67	43.01
ID = 3 (0053):	41.43	1.044	8.08	43.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0028)	Area (ha)= 1.13
ID= 1 DT= 5.0 min	Total Imp(%)= 70.00 Dir. Conn.(%)= 58.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.79	0.34
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	86.79	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	3.38	6.250	148.50	9.33	3.94
0.167	0.00	3.250	3.38	6.333	20.25	9.42	3.94
0.250	0.00	3.333	4.50	6.417	20.25	9.50	3.94
0.333	2.81	3.417	4.50	6.500	20.25	9.58	3.94
0.417	2.81	3.500	4.50	6.583	20.25	9.67	3.94
0.500	2.81	3.583	4.50	6.667	20.25	9.75	3.94
0.583	2.81	3.667	4.50	6.750	20.25	9.83	3.94
0.667	2.81	3.750	4.50	6.833	9.00	9.92	3.94
0.750	2.81	3.833	4.50	6.917	9.00	10.00	3.94
0.833	2.81	3.917	4.50	7.000	9.00	10.08	3.94
0.917	2.81	4.000	4.50	7.083	9.00	10.17	3.94
1.000	2.81	4.083	4.50	7.167	9.00	10.25	3.94
1.083	2.81	4.167	4.50	7.250	9.00	10.33	2.25
1.167	2.81	4.250	4.50	7.333	6.75	10.42	2.25
1.250	2.81	4.333	6.75	7.417	6.75	10.50	2.25
1.333	2.81	4.417	6.75	7.500	6.75	10.58	2.25
1.417	2.81	4.500	6.75	7.583	6.75	10.67	2.25
1.500	2.81	4.583	6.75	7.667	6.75	10.75	2.25
1.583	2.81	4.667	6.75	7.750	6.75	10.83	2.25
1.667	2.81	4.750	6.75	7.833	6.75	10.92	2.25
1.750	2.81	4.833	9.00	7.917	6.75	11.00	2.25
1.833	2.81	4.917	9.00	8.000	6.75	11.08	2.25
1.917	2.81	5.000	9.00	8.083	6.75	11.17	2.25
2.000	2.81	5.083	9.00	8.167	6.75	11.25	2.25
2.083	2.81	5.167	9.00	8.250	6.75	11.33	2.25
2.167	2.81	5.250	9.00	8.333	3.94	11.42	2.25
2.250	2.81	5.333	13.50	8.417	3.94	11.50	2.25
2.333	3.37	5.417	13.50	8.500	3.94	11.58	2.25
2.417	3.38	5.500	13.50	8.583	3.94	11.67	2.25
2.500	3.38	5.583	13.50	8.667	3.94	11.75	2.25
2.583	3.37	5.667	13.50	8.750	3.94	11.83	2.25
2.667	3.37	5.750	13.50	8.833	3.94	11.92	2.25
2.750	3.37	5.833	54.00	8.917	3.94	12.00	2.25
2.833	3.37	5.917	54.00	9.000	3.94	12.08	2.25
2.917	3.38	6.000	54.00	9.083	3.94	12.17	2.25
3.000	3.38	6.083	148.50	9.167	3.94	12.25	2.25
3.083	3.37	6.167	148.50	9.250	3.94		

				TOTALS
Max.Eff.Inten.(mm/hr)=		148.50	162.79	
over (min)		5.00	10.00	
Storage Coeff. (min)=		2.00 (ii)	6.63 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.31	0.14	
PEAK FLOW	(cms)=	0.27	0.13	0.399 (iii)
TIME TO PEAK	(hrs)=	6.25	6.25	6.25
RUNOFF VOLUME	(mm)=	111.50	72.74	95.22
TOTAL RAINFALL	(mm)=	112.50	112.50	112.50
RUNOFF COEFFICIENT	=	0.99	0.65	0.85

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0032)	Area (ha)= 3.80
ID= 1 DT= 5.0 min	Total Imp(%)= 80.00 Dir. Conn.(%)= 60.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	3.38	6.250	148.50	9.33	3.94
0.167	0.00	3.250	3.38	6.333	20.25	9.42	3.94
0.250	0.00	3.333	4.50	6.417	20.25	9.50	3.94
0.333	2.81	3.417	4.50	6.500	20.25	9.58	3.94
0.417	2.81	3.500	4.50	6.583	20.25	9.67	3.94
0.500	2.81	3.583	4.50	6.667	20.25	9.75	3.94
0.583	2.81	3.667	4.50	6.750	20.25	9.83	3.94
0.667	2.81	3.750	4.50	6.833	9.00	9.92	3.94
0.750	2.81	3.833	4.50	6.917	9.00	10.00	3.94
0.833	2.81	3.917	4.50	7.000	9.00	10.08	3.94
0.917	2.81	4.000	4.50	7.083	9.00	10.17	3.94
1.000	2.81	4.083	4.50	7.167	9.00	10.25	3.94
1.083	2.81	4.167	4.50	7.250	9.00	10.33	2.25
1.167	2.81	4.250	4.50	7.333	6.75	10.42	2.25
1.250	2.81	4.333	6.75	7.417	6.75	10.50	2.25
1.333	2.81	4.417	6.75	7.500	6.75	10.58	2.25
1.417	2.81	4.500	6.75	7.583	6.75	10.67	2.25
1.500	2.81	4.583	6.75	7.667	6.75	10.75	2.25

1.583	2.81	4.667	6.75	7.750	6.75	10.83	2.25
1.667	2.81	4.750	6.75	7.833	6.75	10.92	2.25
1.750	2.81	4.833	9.00	7.917	6.75	11.00	2.25
1.833	2.81	4.917	9.00	8.000	6.75	11.08	2.25
1.917	2.81	5.000	9.00	8.083	6.75	11.17	2.25
2.000	2.81	5.083	9.00	8.167	6.75	11.25	2.25
2.083	2.81	5.167	9.00	8.250	6.75	11.33	2.25
2.167	2.81	5.250	9.00	8.333	3.94	11.42	2.25
2.250	2.81	5.333	13.50	8.417	3.94	11.50	2.25
2.333	3.37	5.417	13.50	8.500	3.94	11.58	2.25
2.417	3.38	5.500	13.50	8.583	3.94	11.67	2.25
2.500	3.38	5.583	13.50	8.667	3.94	11.75	2.25
2.583	3.37	5.667	13.50	8.750	3.94	11.83	2.25
2.667	3.37	5.750	13.50	8.833	3.94	11.92	2.25
2.750	3.37	5.833	54.00	8.917	3.94	12.00	2.25
2.833	3.37	5.917	54.00	9.000	3.94	12.08	2.25
2.917	3.38	6.000	54.00	9.083	3.94	12.17	2.25
3.000	3.38	6.083	148.50	9.167	3.94	12.25	2.25
3.083	3.37	6.167	148.50	9.250	3.94		

			TOTALS
Max.Eff.Inten.(mm/hr)=	148.50	255.14	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.88 (ii)	6.77 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.28	0.14	
PEAK FLOW (cms)=	0.94	0.46	1.395 (iii)
TIME TO PEAK (hrs)=	6.25	6.25	6.25
RUNOFF VOLUME (mm)=	111.50	81.79	99.62
TOTAL RAINFALL (mm)=	112.50	112.50	112.50
RUNOFF COEFFICIENT =	0.99	0.73	0.89

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0034)	Area (ha)=	29.06	
ID= 1 DT= 5.0 min	Total Imp(%)=	66.00	Dir. Conn.(%)= 55.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	19.18	9.88
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	440.15	40.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

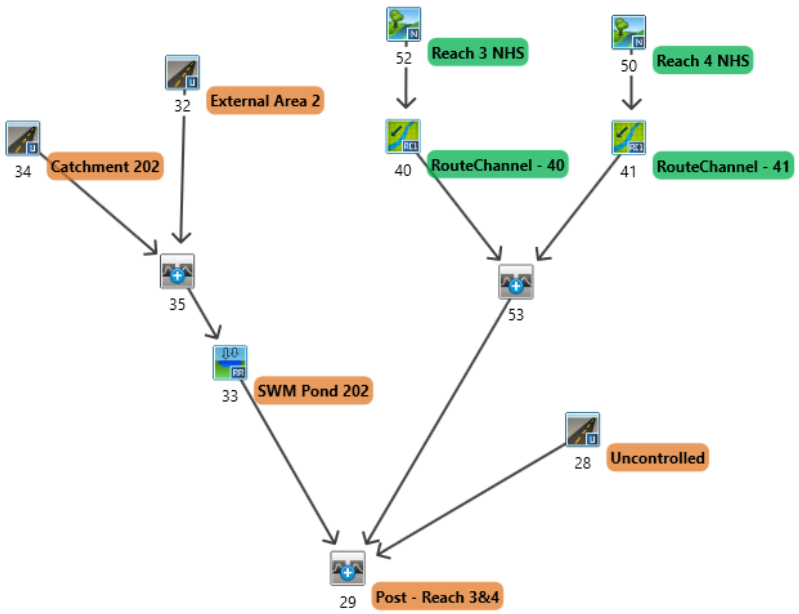
TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.38	6.250	148.50	9.33	3.94
0.167	0.00	3.250	3.38	6.333	20.25	9.42	3.94
0.250	0.00	3.333	4.50	6.417	20.25	9.50	3.94
0.333	2.81	3.417	4.50	6.500	20.25	9.58	3.94
0.417	2.81	3.500	4.50	6.583	20.25	9.67	3.94
0.500	2.81	3.583	4.50	6.667	20.25	9.75	3.94
0.583	2.81	3.667	4.50	6.750	20.25	9.83	3.94
0.667	2.81	3.750	4.50	6.833	9.00	9.92	3.94
0.750	2.81	3.833	4.50	6.917	9.00	10.00	3.94
0.833	2.81	3.917	4.50	7.000	9.00	10.08	3.94
0.917	2.81	4.000	4.50	7.083	9.00	10.17	3.94
1.000	2.81	4.083	4.50	7.167	9.00	10.25	3.94
1.083	2.81	4.167	4.50	7.250	9.00	10.33	2.25
1.167	2.81	4.250	4.50	7.333	6.75	10.42	2.25
1.250	2.81	4.333	6.75	7.417	6.75	10.50	2.25
1.333	2.81	4.417	6.75	7.500	6.75	10.58	2.25
1.417	2.81	4.500	6.75	7.583	6.75	10.67	2.25
1.500	2.81	4.583	6.75	7.667	6.75	10.75	2.25
1.583	2.81	4.667	6.75	7.750	6.75	10.83	2.25
1.667	2.81	4.750	6.75	7.833	6.75	10.92	2.25
1.750	2.81	4.833	9.00	7.917	6.75	11.00	2.25
1.833	2.81	4.917	9.00	8.000	6.75	11.08	2.25
1.917	2.81	5.000	9.00	8.083	6.75	11.17	2.25
2.000	2.81	5.083	9.00	8.167	6.75	11.25	2.25
2.083	2.81	5.167	9.00	8.250	6.75	11.33	2.25
2.167	2.81	5.250	9.00	8.333	3.94	11.42	2.25
2.250	2.81	5.333	13.50	8.417	3.94	11.50	2.25
2.333	3.37	5.417	13.50	8.500	3.94	11.58	2.25
2.417	3.38	5.500	13.50	8.583	3.94	11.67	2.25
2.500	3.38	5.583	13.50	8.667	3.94	11.75	2.25
2.583	3.37	5.667	13.50	8.750	3.94	11.83	2.25
2.667	3.37	5.750	13.50	8.833	3.94	11.92	2.25
2.750	3.37	5.833	54.00	8.917	3.94	12.00	2.25
2.833	3.37	5.917	54.00	9.000	3.94	12.08	2.25
2.917	3.38	6.000	54.00	9.083	3.94	12.17	2.25
3.000	3.38	6.083	148.50	9.167	3.94	12.25	2.25
3.083	3.37	6.167	148.50	9.250	3.94		

			TOTALS
Max.Eff.Inten.(mm/hr)=	148.50	151.15	
over (min)	5.00	15.00	
Storage Coeff. (min)=	5.31 (ii)	10.28 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.21	0.09	
PEAK FLOW (cms)=	6.34	2.85	8.917 (iii)
TIME TO PEAK (hrs)=	6.25	6.33	6.25
RUNOFF VOLUME (mm)=	111.50	71.19	93.36
TOTAL RAINFALL (mm)=	112.50	112.50	112.50
RUNOFF COEFFICIENT =	0.99	0.63	0.83

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0035)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)

```
        ID1= 1 (  0032):     3.80   1.395     6.25    99.62
      + ID2= 2 (  0034):    29.06   8.917     6.25    93.36
        ================================================
        ID = 3 (  0035):    32.86  10.312     6.25    94.08

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0033)|     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   |   0.4930      1.5666
                          0.0360     0.7150   |   0.7890      1.8478
                          0.0660     1.0737   |   1.0520      2.0613
                          0.2630     1.3645   |   1.3140      2.2797

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0035)     32.860     10.312      6.25      94.08
   OUTFLOW: ID= 1 (  0033)     32.860      1.092      7.00      91.93

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 10.59
                  TIME SHIFT OF PEAK FLOW         (min)= 45.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  2.0954

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

--------------------
| ADD HYD  (  0029)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0028):     1.13   0.399     6.25    95.22
      + ID2= 2 (  0033):    32.86   1.092     7.00    91.93
        ================================================
        ID = 3 (  0029):    33.99   1.122     6.92    92.04

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

--------------------
| ADD HYD  (  0029)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0029):    33.99   1.122     6.92    92.04
      + ID2= 2 (  0053):    41.43   1.044     8.08    43.03
        ================================================
        ID = 1 (  0029):    75.42   2.022     7.83    65.11

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



SCHAEFFERS
CONSULTING ENGINEERS

Visual OTTHYMO™ Schematic

POST- DEVELOPMENT – REACH 3/4
2-100YR, 24HR SCS

Job #: 5170	**Date: April 2024**

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

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


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DATE: 05-03-2024                          TIME: 01:44:31

USER:


COMMENTS: _____________________________________________________________

--------------------------------------------------------------------------------
------------------------
  ***********************************************
  ** SIMULATION : 01. 2-Year-24-Hour-SCS-Type-I **
  ***********************************************


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| Ptotal= 55.00 mm |    Comments: 2-Year-24-Hour-SCS-Type-II
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.10	12.50	7.92	18.75	0.99
0.25	0.55	6.50	1.10	12.75	4.07	19.00	0.99
0.50	0.55	6.75	1.10	13.00	4.07	19.25	0.99
0.75	0.55	7.00	1.10	13.25	0.77	19.50	0.99
1.00	0.55	7.25	1.10	13.50	0.77	19.75	0.99
1.25	0.55	7.50	1.10	13.75	4.51	20.00	0.99
1.50	0.55	7.75	1.10	14.00	4.51	20.25	0.66
1.75	0.55	8.00	1.10	14.25	1.65	20.50	0.66
2.00	0.99	8.25	1.49	14.50	1.65	20.75	0.66

2.25	0.72	8.50	1.48	14.75	1.65	21.00	0.66
2.50	0.71	8.75	1.49	15.00	1.65	21.25	0.66
2.75	0.72	9.00	1.49	15.25	1.65	21.50	0.66
3.00	0.71	9.25	1.76	15.50	1.65	21.75	0.66
3.25	0.71	9.50	1.76	15.75	1.65	22.00	0.66
3.50	0.71	9.75	1.98	16.00	1.65	22.25	0.66
3.75	0.72	10.00	1.98	16.25	0.99	22.50	0.66
4.00	0.71	10.25	2.53	16.50	0.99	22.75	0.66
4.25	0.88	10.50	2.53	16.75	0.99	23.00	0.66
4.50	0.88	10.75	3.41	17.00	0.99	23.25	0.66
4.75	0.88	11.00	3.41	17.25	0.99	23.50	0.66
5.00	0.88	11.25	5.28	17.50	0.99	23.75	0.66
5.25	0.88	11.50	5.28	17.75	0.99	24.00	0.66
5.50	0.88	11.75	22.88	18.00	0.99		
5.75	0.88	12.00	60.72	18.25	0.99		
6.00	0.88	12.25	7.92	18.50	0.99		

CALIB			
NASHYD (0052)	Area (ha)=	17.19	Curve Number (CN)= 63.0
ID= 1 DT= 5.0 min	Ia (mm)=	8.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.98	

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	6.167	0.88	12.250	60.72	18.33	0.99
0.167	0.00	6.250	0.88	12.333	7.93	18.42	0.99
0.250	0.00	6.333	1.10	12.417	7.92	18.50	0.99
0.333	0.55	6.417	1.10	12.500	7.92	18.58	0.99
0.417	0.55	6.500	1.10	12.583	7.92	18.67	0.99
0.500	0.55	6.583	1.10	12.667	7.92	18.75	0.99
0.583	0.55	6.667	1.10	12.750	7.92	18.83	0.99
0.667	0.55	6.750	1.10	12.833	4.07	18.92	0.99
0.750	0.55	6.833	1.10	12.917	4.07	19.00	0.99
0.833	0.55	6.917	1.10	13.000	4.07	19.08	0.99
0.917	0.55	7.000	1.10	13.083	4.07	19.17	0.99
1.000	0.55	7.083	1.10	13.167	4.07	19.25	0.99
1.083	0.55	7.167	1.10	13.250	4.07	19.33	0.99
1.167	0.55	7.250	1.10	13.333	0.77	19.42	0.99
1.250	0.55	7.333	1.10	13.417	0.77	19.50	0.99
1.333	0.55	7.417	1.10	13.500	0.77	19.58	0.99
1.417	0.55	7.500	1.10	13.583	0.77	19.67	0.99
1.500	0.55	7.583	1.10	13.667	0.77	19.75	0.99
1.583	0.55	7.667	1.10	13.750	0.77	19.83	0.99
1.667	0.55	7.750	1.10	13.833	4.51	19.92	0.99
1.750	0.55	7.833	1.10	13.917	4.51	20.00	0.99
1.833	0.55	7.917	1.10	14.000	4.51	20.08	0.99
1.917	0.55	8.000	1.10	14.083	4.51	20.17	0.99
2.000	0.55	8.083	1.10	14.167	4.51	20.25	0.99
2.083	0.99	8.167	1.10	14.250	4.51	20.33	0.66
2.167	0.99	8.250	1.10	14.333	1.65	20.42	0.66
2.250	0.99	8.333	1.49	14.417	1.65	20.50	0.66
2.333	0.71	8.417	1.49	14.500	1.65	20.58	0.66
2.417	0.72	8.500	1.48	14.583	1.65	20.67	0.66
2.500	0.72	8.583	1.48	14.667	1.65	20.75	0.66
2.583	0.71	8.667	1.48	14.750	1.65	20.83	0.66
2.667	0.71	8.750	1.48	14.833	1.65	20.92	0.66
2.750	0.71	8.833	1.49	14.917	1.65	21.00	0.66
2.833	0.71	8.917	1.49	15.000	1.65	21.08	0.66
2.917	0.72	9.000	1.48	15.083	1.65	21.17	0.66
3.000	0.72	9.083	1.49	15.167	1.65	21.25	0.66
3.083	0.71	9.167	1.49	15.250	1.65	21.33	0.66
3.167	0.71	9.250	1.48	15.333	1.65	21.42	0.66
3.250	0.71	9.333	1.76	15.417	1.65	21.50	0.66
3.333	0.71	9.417	1.76	15.500	1.65	21.58	0.66
3.417	0.71	9.500	1.76	15.583	1.65	21.67	0.66
3.500	0.71	9.583	1.76	15.667	1.65	21.75	0.66
3.583	0.71	9.667	1.76	15.750	1.65	21.83	0.66
3.667	0.71	9.750	1.76	15.833	1.65	21.92	0.66
3.750	0.71	9.833	1.98	15.917	1.65	22.00	0.66
3.833	0.71	9.917	1.98	16.000	1.65	22.08	0.66
3.917	0.72	10.000	1.98	16.083	1.65	22.17	0.66
4.000	0.72	10.083	1.98	16.167	1.65	22.25	0.66
4.083	0.71	10.167	1.98	16.250	1.65	22.33	0.66
4.167	0.71	10.250	1.98	16.333	0.99	22.42	0.66
4.250	0.71	10.333	2.53	16.417	0.99	22.50	0.66
4.333	0.88	10.417	2.53	16.500	0.99	22.58	0.66
4.417	0.88	10.500	2.53	16.583	0.99	22.67	0.66
4.500	0.88	10.583	2.53	16.667	0.99	22.75	0.66
4.583	0.88	10.667	2.53	16.750	0.99	22.83	0.66
4.667	0.88	10.750	2.53	16.833	0.99	22.92	0.66
4.750	0.88	10.833	3.41	16.917	0.99	23.00	0.66
4.833	0.88	10.917	3.41	17.000	0.99	23.08	0.66
4.917	0.88	11.000	3.41	17.083	0.99	23.17	0.66
5.000	0.88	11.083	3.41	17.167	0.99	23.25	0.66
5.083	0.88	11.167	3.41	17.250	0.99	23.33	0.66
5.167	0.88	11.250	3.41	17.333	0.99	23.42	0.66
5.250	0.88	11.333	5.28	17.417	0.99	23.50	0.66
5.333	0.88	11.417	5.28	17.500	0.99	23.58	0.66
5.417	0.88	11.500	5.28	17.583	0.99	23.67	0.66
5.500	0.88	11.583	5.28	17.667	0.99	23.75	0.66
5.583	0.88	11.667	5.28	17.750	0.99	23.83	0.66
5.667	0.88	11.750	5.28	17.833	0.99	23.92	0.66
5.750	0.88	11.833	22.88	17.917	0.99	24.00	0.66
5.833	0.88	11.917	22.88	18.000	0.99	24.08	0.66
5.917	0.88	12.000	22.88	18.083	0.99	24.17	0.66
6.000	0.88	12.083	60.72	18.167	0.99	24.25	0.66
6.083	0.88	12.167	60.72	18.250	0.99		

Unit Hyd Qpeak (cms)= 0.670

PEAK FLOW (cms)= 0.146 (i)
TIME TO PEAK (hrs)= 13.250
RUNOFF VOLUME (mm)= 11.260
TOTAL RAINFALL (mm)= 55.000
RUNOFF COEFFICIENT = 0.205

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

ROUTE CHN(0040)		
IN= 2---> OUT= 1	Routing time step (min)'=	5.00

<------ DATA FOR SECTION (1.1) ------>
Distance Elevation Manning

0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0052)	17.19	0.15	13.25	11.26	0.01	0.63
OUTFLOW: ID= 1 (0040)	17.19	0.13	13.75	11.26	0.01	0.63

| CALIB |		
| NASHYD (0050)|	Area (ha)= 24.24	Curve Number (CN)= 63.0
|ID= 1 DT= 5.0 min |	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 1.13	

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	6.167	0.88	12.250	60.72	18.33	0.99
0.167	0.00	6.250	0.88	12.333	7.93	18.42	0.99
0.250	0.00	6.333	1.10	12.417	7.92	18.50	0.99
0.333	0.55	6.417	1.10	12.500	7.92	18.58	0.99
0.417	0.55	6.500	1.10	12.583	7.92	18.67	0.99
0.500	0.55	6.583	1.10	12.667	7.92	18.75	0.99
0.583	0.55	6.667	1.10	12.750	7.92	18.83	0.99
0.667	0.55	6.750	1.10	12.833	4.07	18.92	0.99
0.750	0.55	6.833	1.10	12.917	4.07	19.00	0.99
0.833	0.55	6.917	1.10	13.000	4.07	19.08	0.99
0.917	0.55	7.000	1.10	13.083	4.07	19.17	0.99
1.000	0.55	7.083	1.10	13.167	4.07	19.25	0.99
1.083	0.55	7.167	1.10	13.250	4.07	19.33	0.99
1.167	0.55	7.250	1.10	13.333	0.77	19.42	0.99
1.250	0.55	7.333	1.10	13.417	0.77	19.50	0.99
1.333	0.55	7.417	1.10	13.500	0.77	19.58	0.99
1.417	0.55	7.500	1.10	13.583	0.77	19.67	0.99
1.500	0.55	7.583	1.10	13.667	0.77	19.75	0.99
1.583	0.55	7.667	1.10	13.750	0.77	19.83	0.99
1.667	0.55	7.750	1.10	13.833	4.51	19.92	0.99
1.750	0.55	7.833	1.10	13.917	4.51	20.00	0.99
1.833	0.55	7.917	1.10	14.000	4.51	20.08	0.99
1.917	0.55	8.000	1.10	14.083	4.51	20.17	0.99
2.000	0.55	8.083	1.10	14.167	4.51	20.25	0.99
2.083	0.99	8.167	1.10	14.250	4.51	20.33	0.66
2.167	0.99	8.250	1.10	14.333	1.65	20.42	0.66
2.250	0.99	8.333	1.49	14.417	1.65	20.50	0.66
2.333	0.71	8.417	1.49	14.500	1.65	20.58	0.66
2.417	0.72	8.500	1.48	14.583	1.65	20.67	0.66
2.500	0.72	8.583	1.48	14.667	1.65	20.75	0.66
2.583	0.71	8.667	1.48	14.750	1.65	20.83	0.66
2.667	0.71	8.750	1.48	14.833	1.65	20.92	0.66
2.750	0.71	8.833	1.49	14.917	1.65	21.00	0.66
2.833	0.71	8.917	1.49	15.000	1.65	21.08	0.66
2.917	0.72	9.000	1.48	15.083	1.65	21.17	0.66
3.000	0.72	9.083	1.49	15.167	1.65	21.25	0.66
3.083	0.71	9.167	1.49	15.250	1.65	21.33	0.66
3.167	0.71	9.250	1.48	15.333	1.65	21.42	0.66
3.250	0.71	9.333	1.76	15.417	1.65	21.50	0.66
3.333	0.71	9.417	1.76	15.500	1.65	21.58	0.66
3.417	0.71	9.500	1.76	15.583	1.65	21.67	0.66
3.500	0.71	9.583	1.76	15.667	1.65	21.75	0.66
3.583	0.71	9.667	1.76	15.750	1.65	21.83	0.66
3.667	0.71	9.750	1.76	15.833	1.65	21.92	0.66
3.750	0.71	9.833	1.98	15.917	1.65	22.00	0.66
3.833	0.71	9.917	1.98	16.000	1.65	22.08	0.66
3.917	0.72	10.000	1.98	16.083	1.65	22.17	0.66
4.000	0.72	10.083	1.98	16.167	1.65	22.25	0.66
4.083	0.71	10.167	1.98	16.250	1.65	22.33	0.66
4.167	0.71	10.250	1.98	16.333	0.99	22.42	0.66
4.250	0.71	10.333	2.53	16.417	0.99	22.50	0.66
4.333	0.88	10.417	2.53	16.500	0.99	22.58	0.66
4.417	0.88	10.500	2.53	16.583	0.99	22.67	0.66
4.500	0.88	10.583	2.53	16.667	0.99	22.75	0.66
4.583	0.88	10.667	2.53	16.750	0.99	22.83	0.66
4.667	0.88	10.750	2.53	16.833	0.99	22.92	0.66
4.750	0.88	10.833	3.41	16.917	0.99	23.00	0.66
4.833	0.88	10.917	3.41	17.000	0.99	23.08	0.66
4.917	0.88	11.000	3.41	17.083	0.99	23.17	0.66
5.000	0.88	11.083	3.41	17.167	0.99	23.25	0.66
5.083	0.88	11.167	3.41	17.250	0.99	23.33	0.66
5.167	0.88	11.250	3.41	17.333	0.99	23.42	0.66
5.250	0.88	11.333	5.28	17.417	0.99	23.50	0.66
5.333	0.88	11.417	5.28	17.500	0.99	23.58	0.66
5.417	0.88	11.500	5.28	17.583	0.99	23.67	0.66

5.500	0.88	11.583	5.28	17.667	0.99	23.75	0.66
5.583	0.88	11.667	5.28	17.750	0.99	23.83	0.66
5.667	0.88	11.750	5.28	17.833	0.99	23.92	0.66
5.750	0.88	11.833	22.88	17.917	0.99	24.00	0.66
5.833	0.88	11.917	22.88	18.000	0.99	24.08	0.66
5.917	0.88	12.000	22.88	18.083	0.99	24.17	0.66
6.000	0.88	12.083	60.72	18.167	0.99	24.25	0.66
6.083	0.88	12.167	60.72	18.250	0.99		

Unit Hyd Qpeak (cms)= 0.819

PEAK FLOW (cms)= 0.185 (i)
TIME TO PEAK (hrs)= 13.417
RUNOFF VOLUME (mm)= 11.260
TOTAL RAINFALL (mm)= 55.000
RUNOFF COEFFICIENT = 0.205

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

ROUTE CHN(0041)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

<---- hydrograph ----> <-pipe / channel->

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0050)	24.24	0.19	13.42	11.26	0.02	0.18
OUTFLOW: ID= 1 (0041)	24.24	0.10	15.17	11.22	0.02	0.17

ADD HYD (0053)					
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0040):	17.19	0.127	13.75	11.26
+ ID2= 2 (0041):	24.24	0.097	15.17	11.22
ID = 3 (0053):	41.43	0.204	14.08	11.24

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0028)|	Area (ha)= 1.13
ID= 1 DT= 5.0 min	Total Imp(%)= 70.00 Dir. Conn.(%)= 58.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.79	0.34
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	86.79	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	6.167	0.88	12.250	60.72	18.33	0.99
0.167	0.00	6.250	0.88	12.333	7.93	18.42	0.99
0.250	0.00	6.333	1.10	12.417	7.92	18.50	0.99
0.333	0.55	6.417	1.10	12.500	7.92	18.58	0.99
0.417	0.55	6.500	1.10	12.583	7.92	18.67	0.99
0.500	0.55	6.583	1.10	12.667	7.92	18.75	0.99
0.583	0.55	6.667	1.10	12.750	7.92	18.83	0.99
0.667	0.55	6.750	1.10	12.833	4.07	18.92	0.99
0.750	0.55	6.833	1.10	12.917	4.07	19.00	0.99
0.833	0.55	6.917	1.10	13.000	4.07	19.08	0.99
0.917	0.55	7.000	1.10	13.083	4.07	19.17	0.99
1.000	0.55	7.083	1.10	13.167	4.07	19.25	0.99
1.083	0.55	7.167	1.10	13.250	4.07	19.33	0.99
1.167	0.55	7.250	1.10	13.333	0.77	19.42	0.99
1.250	0.55	7.333	1.10	13.417	0.77	19.50	0.99
1.333	0.55	7.417	1.10	13.500	0.77	19.58	0.99
1.417	0.55	7.500	1.10	13.583	0.77	19.67	0.99
1.500	0.55	7.583	1.10	13.667	0.77	19.75	0.99
1.583	0.55	7.667	1.10	13.750	0.77	19.83	0.99
1.667	0.55	7.750	1.10	13.833	4.51	19.92	0.99
1.750	0.55	7.833	1.10	13.917	4.51	20.00	0.99
1.833	0.55	7.917	1.10	14.000	4.51	20.08	0.99
1.917	0.55	8.000	1.10	14.083	4.51	20.17	0.99

2.000	0.55	8.083	1.10	14.167	4.51	20.25	0.99
2.083	0.99	8.167	1.10	14.250	4.51	20.33	0.66
2.167	0.99	8.250	1.10	14.333	1.65	20.42	0.66
2.250	0.99	8.333	1.49	14.417	1.65	20.50	0.66
2.333	0.71	8.417	1.49	14.500	1.65	20.58	0.66
2.417	0.72	8.500	1.48	14.583	1.65	20.67	0.66
2.500	0.72	8.583	1.48	14.667	1.65	20.75	0.66
2.583	0.71	8.667	1.48	14.750	1.65	20.83	0.66
2.667	0.71	8.750	1.48	14.833	1.65	20.92	0.66
2.750	0.71	8.833	1.49	14.917	1.65	21.00	0.66
2.833	0.71	8.917	1.49	15.000	1.65	21.08	0.66
2.917	0.72	9.000	1.48	15.083	1.65	21.17	0.66
3.000	0.72	9.083	1.49	15.167	1.65	21.25	0.66
3.083	0.71	9.167	1.49	15.250	1.65	21.33	0.66
3.167	0.71	9.250	1.48	15.333	1.65	21.42	0.66
3.250	0.71	9.333	1.76	15.417	1.65	21.50	0.66
3.333	0.71	9.417	1.76	15.500	1.65	21.58	0.66
3.417	0.71	9.500	1.76	15.583	1.65	21.67	0.66
3.500	0.71	9.583	1.76	15.667	1.65	21.75	0.66
3.583	0.71	9.667	1.76	15.750	1.65	21.83	0.66
3.667	0.71	9.750	1.76	15.833	1.65	21.92	0.66
3.750	0.71	9.833	1.98	15.917	1.65	22.00	0.66
3.833	0.71	9.917	1.98	16.000	1.65	22.08	0.66
3.917	0.72	10.000	1.98	16.083	1.65	22.17	0.66
4.000	0.72	10.083	1.98	16.167	1.65	22.25	0.66
4.083	0.71	10.167	1.98	16.250	1.65	22.33	0.66
4.167	0.71	10.250	1.98	16.333	0.99	22.42	0.66
4.250	0.71	10.333	2.53	16.417	0.99	22.50	0.66
4.333	0.88	10.417	2.53	16.500	0.99	22.58	0.66
4.417	0.88	10.500	2.53	16.583	0.99	22.67	0.66
4.500	0.88	10.583	2.53	16.667	0.99	22.75	0.66
4.583	0.88	10.667	2.53	16.750	0.99	22.83	0.66
4.667	0.88	10.750	2.53	16.833	0.99	22.92	0.66
4.750	0.88	10.833	3.41	16.917	0.99	23.00	0.66
4.833	0.88	10.917	3.41	17.000	0.99	23.08	0.66
4.917	0.88	11.000	3.41	17.083	0.99	23.17	0.66
5.000	0.88	11.083	3.41	17.167	0.99	23.25	0.66
5.083	0.88	11.167	3.41	17.250	0.99	23.33	0.66
5.167	0.88	11.250	3.41	17.333	0.99	23.42	0.66
5.250	0.88	11.333	5.28	17.417	0.99	23.50	0.66
5.333	0.88	11.417	5.28	17.500	0.99	23.58	0.66
5.417	0.88	11.500	5.28	17.583	0.99	23.67	0.66
5.500	0.88	11.583	5.28	17.667	0.99	23.75	0.66
5.583	0.88	11.667	5.28	17.750	0.99	23.83	0.66
5.667	0.88	11.750	5.28	17.833	0.99	23.92	0.66
5.750	0.88	11.833	22.88	17.917	0.99	24.00	0.66
5.833	0.88	11.917	22.88	18.000	0.99	24.08	0.66
5.917	0.88	12.000	22.88	18.083	0.99	24.17	0.66
6.000	0.88	12.083	60.72	18.167	0.99	24.25	0.66
6.083	0.88	12.167	60.72	18.250	0.99		

Max.Eff.Inten.(mm/hr)=	60.72		47.76	
over (min)	5.00		15.00	
Storage Coeff. (min)=	2.86	(ii)	12.35	(ii)
Unit Hyd. Tpeak (min)=	5.00		15.00	
Unit Hyd. peak (cms)=	0.28		0.08	
				TOTALS
PEAK FLOW (cms)=	0.11		0.03	0.135 (iii)
TIME TO PEAK (hrs)=	12.25		12.33	12.25
RUNOFF VOLUME (mm)=	54.00		25.04	41.83
TOTAL RAINFALL (mm)=	55.00		55.00	55.00
RUNOFF COEFFICIENT =	0.98		0.46	0.76

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
STANDHYD (0032)	Area (ha)=	3.80			
ID= 1 DT= 5.0 min	Total Imp(%)=	80.00	Dir. Conn.(%)=	60.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	6.167	0.88	12.250	60.72	18.33	0.99
0.167	0.00	6.250	0.88	12.333	7.93	18.42	0.99
0.250	0.00	6.333	1.10	12.417	7.92	18.50	0.99
0.333	0.55	6.417	1.10	12.500	7.92	18.58	0.99
0.417	0.55	6.500	1.10	12.583	7.92	18.67	0.99
0.500	0.55	6.583	1.10	12.667	7.92	18.75	0.99
0.583	0.55	6.667	1.10	12.750	7.92	18.83	0.99
0.667	0.55	6.750	1.10	12.833	4.07	18.92	0.99
0.750	0.55	6.833	1.10	12.917	4.07	19.00	0.99
0.833	0.55	6.917	1.10	13.000	4.07	19.08	0.99
0.917	0.55	7.000	1.10	13.083	4.07	19.17	0.99
1.000	0.55	7.083	1.10	13.167	4.07	19.25	0.99
1.083	0.55	7.167	1.10	13.250	4.07	19.33	0.99
1.167	0.55	7.250	1.10	13.333	0.77	19.42	0.99
1.250	0.55	7.333	1.10	13.417	0.77	19.50	0.99
1.333	0.55	7.417	1.10	13.500	0.77	19.58	0.99
1.417	0.55	7.500	1.10	13.583	0.77	19.67	0.99
1.500	0.55	7.583	1.10	13.667	0.77	19.75	0.99
1.583	0.55	7.667	1.10	13.750	0.77	19.83	0.99
1.667	0.55	7.750	1.10	13.833	4.51	19.92	0.99
1.750	0.55	7.833	1.10	13.917	4.51	20.00	0.99
1.833	0.55	7.917	1.10	14.000	4.51	20.08	0.99
1.917	0.55	8.000	1.10	14.083	4.51	20.17	0.99
2.000	0.55	8.083	1.10	14.167	4.51	20.25	0.99
2.083	0.99	8.167	1.10	14.250	4.51	20.33	0.66
2.167	0.99	8.250	1.10	14.333	1.65	20.42	0.66
2.250	0.99	8.333	1.49	14.417	1.65	20.50	0.66
2.333	0.71	8.417	1.49	14.500	1.65	20.58	0.66
2.417	0.72	8.500	1.48	14.583	1.65	20.67	0.66
2.500	0.72	8.583	1.48	14.667	1.65	20.75	0.66
2.583	0.71	8.667	1.48	14.750	1.65	20.83	0.66
2.667	0.71	8.750	1.48	14.833	1.65	20.92	0.66

2.750	0.71	8.833	1.49	14.917	1.65	21.00	0.66
2.833	0.71	8.917	1.49	15.000	1.65	21.08	0.66
2.917	0.72	9.000	1.48	15.083	1.65	21.17	0.66
3.000	0.72	9.083	1.49	15.167	1.65	21.25	0.66
3.083	0.71	9.167	1.49	15.250	1.65	21.33	0.66
3.167	0.71	9.250	1.48	15.333	1.65	21.42	0.66
3.250	0.71	9.333	1.76	15.417	1.65	21.50	0.66
3.333	0.71	9.417	1.76	15.500	1.65	21.58	0.66
3.417	0.71	9.500	1.76	15.583	1.65	21.67	0.66
3.500	0.71	9.583	1.76	15.667	1.65	21.75	0.66
3.583	0.71	9.667	1.76	15.750	1.65	21.83	0.66
3.667	0.71	9.750	1.76	15.833	1.65	21.92	0.66
3.750	0.71	9.833	1.98	15.917	1.65	22.00	0.66
3.833	0.71	9.917	1.98	16.000	1.65	22.08	0.66
3.917	0.72	10.000	1.98	16.083	1.65	22.17	0.66
4.000	0.72	10.083	1.98	16.167	1.65	22.25	0.66
4.083	0.71	10.167	1.98	16.250	1.65	22.33	0.66
4.167	0.71	10.250	1.98	16.333	0.99	22.42	0.66
4.250	0.71	10.333	2.53	16.417	0.99	22.50	0.66
4.333	0.88	10.417	2.53	16.500	0.99	22.58	0.66
4.417	0.88	10.500	2.53	16.583	0.99	22.67	0.66
4.500	0.88	10.583	2.53	16.667	0.99	22.75	0.66
4.583	0.88	10.667	2.53	16.750	0.99	22.83	0.66
4.667	0.88	10.750	2.53	16.833	0.99	22.92	0.66
4.750	0.88	10.833	3.41	16.917	0.99	23.00	0.66
4.833	0.88	10.917	3.41	17.000	0.99	23.08	0.66
4.917	0.88	11.000	3.41	17.083	0.99	23.17	0.66
5.000	0.88	11.083	3.41	17.167	0.99	23.25	0.66
5.083	0.88	11.167	3.41	17.250	0.99	23.33	0.66
5.167	0.88	11.250	3.41	17.333	0.99	23.42	0.66
5.250	0.88	11.333	5.28	17.417	0.99	23.50	0.66
5.333	0.88	11.417	5.28	17.500	0.99	23.58	0.66
5.417	0.88	11.500	5.28	17.583	0.99	23.67	0.66
5.500	0.88	11.583	5.28	17.667	0.99	23.75	0.66
5.583	0.88	11.667	5.28	17.750	0.99	23.83	0.66
5.667	0.88	11.750	5.28	17.833	0.99	23.92	0.66
5.750	0.88	11.833	22.88	17.917	0.99	24.00	0.66
5.833	0.88	11.917	22.88	18.000	0.99	24.08	0.66
5.917	0.88	12.000	22.88	18.083	0.99	24.17	0.66
6.000	0.88	12.083	60.72	18.167	0.99	24.25	0.66
6.083	0.88	12.167	60.72	18.250	0.99		

Max.Eff.Inten.(mm/hr)=	60.72	82.10	
over (min)	5.00	15.00	
Storage Coeff. (min)=	4.12 (ii)	11.76 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.24	0.09	
			TOTALS
PEAK FLOW (cms)=	0.38	0.11	0.480 (iii)
TIME TO PEAK (hrs)=	12.25	12.33	12.25
RUNOFF VOLUME (mm)=	54.00	30.48	44.59
TOTAL RAINFALL (mm)=	55.00	55.00	55.00
RUNOFF COEFFICIENT =	0.98	0.55	0.81

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB		
STANDHYD (0034)	Area (ha)=	29.06
ID= 1 DT= 5.0 min	Total Imp(%)=	66.00 Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	6.167	0.88	12.250	60.72	18.33	0.99
0.167	0.00	6.250	0.88	12.333	7.93	18.42	0.99
0.250	0.00	6.333	1.10	12.417	7.92	18.50	0.99
0.333	0.55	6.417	1.10	12.500	7.92	18.58	0.99
0.417	0.55	6.500	1.10	12.583	7.92	18.67	0.99
0.500	0.55	6.583	1.10	12.667	7.92	18.75	0.99
0.583	0.55	6.667	1.10	12.750	7.92	18.83	0.99
0.667	0.55	6.750	1.10	12.833	4.07	18.92	0.99
0.750	0.55	6.833	1.10	12.917	4.07	19.00	0.99
0.833	0.55	6.917	1.10	13.000	4.07	19.08	0.99
0.917	0.55	7.000	1.10	13.083	4.07	19.17	0.99
1.000	0.55	7.083	1.10	13.167	4.07	19.25	0.99
1.083	0.55	7.167	1.10	13.250	4.07	19.33	0.99
1.167	0.55	7.250	1.10	13.333	0.77	19.42	0.99
1.250	0.55	7.333	1.10	13.417	0.77	19.50	0.99
1.333	0.55	7.417	1.10	13.500	0.77	19.58	0.99
1.417	0.55	7.500	1.10	13.583	0.77	19.67	0.99
1.500	0.55	7.583	1.10	13.667	0.77	19.75	0.99
1.583	0.55	7.667	1.10	13.750	0.77	19.83	0.99
1.667	0.55	7.750	1.10	13.833	4.51	19.92	0.99
1.750	0.55	7.833	1.10	13.917	4.51	20.00	0.99
1.833	0.55	7.917	1.10	14.000	4.51	20.08	0.99
1.917	0.55	8.000	1.10	14.083	4.51	20.17	0.99
2.000	0.55	8.083	1.10	14.167	4.51	20.25	0.99
2.083	0.99	8.167	1.10	14.250	4.51	20.33	0.66
2.167	0.99	8.250	1.10	14.333	1.65	20.42	0.66
2.250	0.99	8.333	1.49	14.417	1.65	20.50	0.66
2.333	0.71	8.417	1.49	14.500	1.65	20.58	0.66
2.417	0.72	8.500	1.48	14.583	1.65	20.67	0.66
2.500	0.72	8.583	1.48	14.667	1.65	20.75	0.66
2.583	0.71	8.667	1.48	14.750	1.65	20.83	0.66
2.667	0.71	8.750	1.48	14.833	1.65	20.92	0.66
2.750	0.71	8.833	1.49	14.917	1.65	21.00	0.66
2.833	0.71	8.917	1.49	15.000	1.65	21.08	0.66
2.917	0.72	9.000	1.48	15.083	1.65	21.17	0.66
3.000	0.72	9.083	1.49	15.167	1.65	21.25	0.66
3.083	0.71	9.167	1.49	15.250	1.65	21.33	0.66
3.167	0.71	9.250	1.48	15.333	1.65	21.42	0.66
3.250	0.71	9.333	1.76	15.417	1.65	21.50	0.66
3.333	0.71	9.417	1.76	15.500	1.65	21.58	0.66
3.417	0.71	9.500	1.76	15.583	1.65	21.67	0.66

3.500	0.71	9.583	1.76	15.667	1.65	21.75	0.66
3.583	0.71	9.667	1.76	15.750	1.65	21.83	0.66
3.667	0.71	9.750	1.76	15.833	1.65	21.92	0.66
3.750	0.71	9.833	1.98	15.917	1.65	22.00	0.66
3.833	0.71	9.917	1.98	16.000	1.65	22.08	0.66
3.917	0.72	10.000	1.98	16.083	1.65	22.17	0.66
4.000	0.72	10.083	1.98	16.167	1.65	22.25	0.66
4.083	0.71	10.167	1.98	16.250	1.65	22.33	0.66
4.167	0.71	10.250	1.98	16.333	0.99	22.42	0.66
4.250	0.71	10.333	2.53	16.417	0.99	22.50	0.66
4.333	0.88	10.417	2.53	16.500	0.99	22.58	0.66
4.417	0.88	10.500	2.53	16.583	0.99	22.67	0.66
4.500	0.88	10.583	2.53	16.667	0.99	22.75	0.66
4.583	0.88	10.667	2.53	16.750	0.99	22.83	0.66
4.667	0.88	10.750	2.53	16.833	0.99	22.92	0.66
4.750	0.88	10.833	3.41	16.917	0.99	23.00	0.66
4.833	0.88	10.917	3.41	17.000	0.99	23.08	0.66
4.917	0.88	11.000	3.41	17.083	0.99	23.17	0.66
5.000	0.88	11.083	3.41	17.167	0.99	23.25	0.66
5.083	0.88	11.167	3.41	17.250	0.99	23.33	0.66
5.167	0.88	11.250	3.41	17.333	0.99	23.42	0.66
5.250	0.88	11.333	5.28	17.417	0.99	23.50	0.66
5.333	0.88	11.417	5.28	17.500	0.99	23.58	0.66
5.417	0.88	11.500	5.28	17.583	0.99	23.67	0.66
5.500	0.88	11.583	5.28	17.667	0.99	23.75	0.66
5.583	0.88	11.667	5.28	17.750	0.99	23.83	0.66
5.667	0.88	11.750	5.28	17.833	0.99	23.92	0.66
5.750	0.88	11.833	22.88	17.917	0.99	24.00	0.66
5.833	0.88	11.917	22.88	18.000	0.99	24.08	0.66
5.917	0.88	12.000	22.88	18.083	0.99	24.17	0.66
6.000	0.88	12.083	60.72	18.167	0.99	24.25	0.66
6.083	0.88	12.167	60.72	18.250	0.99		

Max.Eff.Inten.(mm/hr)=	60.72	43.64	
over (min)	10.00	20.00	
Storage Coeff. (min)=	7.59 (ii)	17.42 (ii)	
Unit Hyd. Tpeak (min)=	10.00	20.00	
Unit Hyd. peak (cms)=	0.13	0.06	
			TOTALS
PEAK FLOW (cms)=	2.31	0.62	2.751 (iii)
TIME TO PEAK (hrs)=	12.25	12.42	12.25
RUNOFF VOLUME (mm)=	54.00	24.17	40.58
TOTAL RAINFALL (mm)=	55.00	55.00	55.00
RUNOFF COEFFICIENT =	0.98	0.44	0.74

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0035)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0032):	3.80	0.480	12.25	44.59
+ ID2= 2 (0034):	29.06	2.751	12.25	40.58
ID = 3 (0035):	32.86	3.230	12.25	41.04

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0033)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.4930	1.5666
	0.0360	0.7150	0.7890	1.8478
	0.0660	1.0737	1.0520	2.0613
	0.2630	1.3645	1.3140	2.2797

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0035)	32.860	3.230	12.25	41.04
OUTFLOW: ID= 1 (0033)	32.860	0.066	20.42	38.69

PEAK FLOW REDUCTION [Qout/Qin](%)= 2.04
TIME SHIFT OF PEAK FLOW (min)=490.00
MAXIMUM STORAGE USED (ha.m.)= 1.0737

ADD HYD (0029)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0028):	1.13	0.135	12.25	41.83
+ ID2= 2 (0033):	32.86	0.066	20.42	38.69
ID = 3 (0029):	33.99	0.161	12.25	38.79

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0029)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0029):	33.99	0.161	12.25	38.79
+ ID2= 2 (0053):	41.43	0.204	14.08	11.24
ID = 1 (0029):	75.42	0.273	14.17	23.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\d7bb78e8-51c5-47b1-8b4c-7ea925be6b80\scen
Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\d7bb78e8-51c5-47b1-8b4c-7ea925be6b80\scen

DATE: 05-03-2024 TIME: 01:44:32

USER:

COMMENTS: _____

** SIMULATION : 02. 5-Year-24-Hour-SCS-Type-I **

READ STORM	Filename: C:\Users\mmsingh\AppData\Local\Temp\3a0c766d-3ecf-4101-8ec5-64101323cb13\361a8f55
Ptotal= 76.00 mm	Comments: 5-Year-24-Hour-SCS-Type-II

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.52	12.50	10.94	18.75	1.37
0.25	0.76	6.50	1.52	12.75	5.62	19.00	1.37
0.50	0.76	6.75	1.52	13.00	5.62	19.25	1.37
0.75	0.76	7.00	1.52	13.25	1.06	19.50	1.37
1.00	0.76	7.25	1.52	13.50	1.06	19.75	1.37
1.25	0.76	7.50	1.52	13.75	6.23	20.00	1.37
1.50	0.76	7.75	1.52	14.00	6.23	20.25	0.91
1.75	0.76	8.00	1.52	14.25	2.28	20.50	0.91
2.00	1.37	8.25	2.05	14.50	2.28	20.75	0.91
2.25	0.99	8.50	2.05	14.75	2.28	21.00	0.91
2.50	0.99	8.75	2.05	15.00	2.28	21.25	0.91
2.75	0.99	9.00	2.05	15.25	2.28	21.50	0.91
3.00	0.99	9.25	2.43	15.50	2.28	21.75	0.91
3.25	0.99	9.50	2.43	15.75	2.28	22.00	0.91
3.50	0.99	9.75	2.74	16.00	2.28	22.25	0.91
3.75	0.99	10.00	2.74	16.25	1.37	22.50	0.91
4.00	0.99	10.25	3.50	16.50	1.37	22.75	0.91
4.25	1.22	10.50	3.50	16.75	1.37	23.00	0.91
4.50	1.22	10.75	4.71	17.00	1.37	23.25	0.91
4.75	1.22	11.00	4.71	17.25	1.37	23.50	0.91
5.00	1.22	11.25	7.30	17.50	1.37	23.75	0.91
5.25	1.22	11.50	7.30	17.75	1.37	24.00	0.91
5.50	1.22	11.75	31.62	18.00	1.37		
5.75	1.22	12.00	83.90	18.25	1.37		
6.00	1.22	12.25	10.94	18.50	1.37		

CALIB NASHYD (0052) ID= 1 DT= 5.0 min	Area (ha)= 17.19	Curve Number (CN)= 63.0
	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.98	

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	6.167	1.22	12.250	83.90	18.33	1.37
0.167	0.00	6.250	1.22	12.333	10.95	18.42	1.37
0.250	0.00	6.333	1.52	12.417	10.94	18.50	1.37
0.333	0.76	6.417	1.52	12.500	10.94	18.58	1.37
0.417	0.76	6.500	1.52	12.583	10.94	18.67	1.37
0.500	0.76	6.583	1.52	12.667	10.94	18.75	1.37
0.583	0.76	6.667	1.52	12.750	10.94	18.83	1.37
0.667	0.76	6.750	1.52	12.833	5.62	18.92	1.37
0.750	0.76	6.833	1.52	12.917	5.62	19.00	1.37
0.833	0.76	6.917	1.52	13.000	5.62	19.08	1.37
0.917	0.76	7.000	1.52	13.083	5.62	19.17	1.37
1.000	0.76	7.083	1.52	13.167	5.62	19.25	1.37
1.083	0.76	7.167	1.52	13.250	5.62	19.33	1.37
1.167	0.76	7.250	1.52	13.333	1.06	19.42	1.37
1.250	0.76	7.333	1.52	13.417	1.06	19.50	1.37
1.333	0.76	7.417	1.52	13.500	1.06	19.58	1.37
1.417	0.76	7.500	1.52	13.583	1.06	19.67	1.37
1.500	0.76	7.583	1.52	13.667	1.06	19.75	1.37
1.583	0.76	7.667	1.52	13.750	1.06	19.83	1.37
1.667	0.76	7.750	1.52	13.833	6.23	19.92	1.37
1.750	0.76	7.833	1.52	13.917	6.23	20.00	1.37
1.833	0.76	7.917	1.52	14.000	6.23	20.08	1.37
1.917	0.76	8.000	1.52	14.083	6.23	20.17	1.37
2.000	0.76	8.083	1.52	14.167	6.23	20.25	1.37
2.083	1.37	8.167	1.52	14.250	6.23	20.33	0.91
2.167	1.37	8.250	1.52	14.333	2.28	20.42	0.91
2.250	1.37	8.333	2.05	14.417	2.28	20.50	0.91
2.333	0.99	8.417	2.05	14.500	2.28	20.58	0.91
2.417	0.99	8.500	2.05	14.583	2.28	20.67	0.91
2.500	0.99	8.583	2.05	14.667	2.28	20.75	0.91
2.583	0.99	8.667	2.05	14.750	2.28	20.83	0.91
2.667	0.99	8.750	2.05	14.833	2.28	20.92	0.91
2.750	0.99	8.833	2.05	14.917	2.28	21.00	0.91
2.833	0.99	8.917	2.05	15.000	2.28	21.08	0.91
2.917	0.99	9.000	2.05	15.083	2.28	21.17	0.91
3.000	0.99	9.083	2.05	15.167	2.28	21.25	0.91
3.083	0.99	9.167	2.05	15.250	2.28	21.33	0.91
3.167	0.99	9.250	2.05	15.333	2.28	21.42	0.91
3.250	0.99	9.333	2.43	15.417	2.28	21.50	0.91
3.333	0.99	9.417	2.43	15.500	2.28	21.58	0.91
3.417	0.99	9.500	2.43	15.583	2.28	21.67	0.91
3.500	0.99	9.583	2.43	15.667	2.28	21.75	0.91
3.583	0.99	9.667	2.43	15.750	2.28	21.83	0.91

3.667	0.99	9.750	2.43	15.833	2.28	21.92	0.91
3.750	0.99	9.833	2.74	15.917	2.28	22.00	0.91
3.833	0.99	9.917	2.74	16.000	2.28	22.08	0.91
3.917	0.99	10.000	2.74	16.083	2.28	22.17	0.91
4.000	0.99	10.083	2.74	16.167	2.28	22.25	0.91
4.083	0.99	10.167	2.74	16.250	2.28	22.33	0.91
4.167	0.99	10.250	2.74	16.333	1.37	22.42	0.91
4.250	0.99	10.333	3.50	16.417	1.37	22.50	0.91
4.333	1.22	10.417	3.50	16.500	1.37	22.58	0.91
4.417	1.22	10.500	3.50	16.583	1.37	22.67	0.91
4.500	1.22	10.583	3.50	16.667	1.37	22.75	0.91
4.583	1.22	10.667	3.50	16.750	1.37	22.83	0.91
4.667	1.22	10.750	3.50	16.833	1.37	22.92	0.91
4.750	1.22	10.833	4.71	16.917	1.37	23.00	0.91
4.833	1.22	10.917	4.71	17.000	1.37	23.08	0.91
4.917	1.22	11.000	4.71	17.083	1.37	23.17	0.91
5.000	1.22	11.083	4.71	17.167	1.37	23.25	0.91
5.083	1.22	11.167	4.71	17.250	1.37	23.33	0.91
5.167	1.22	11.250	4.71	17.333	1.37	23.42	0.91
5.250	1.22	11.333	7.30	17.417	1.37	23.50	0.91
5.333	1.22	11.417	7.30	17.500	1.37	23.58	0.91
5.417	1.22	11.500	7.30	17.583	1.37	23.67	0.91
5.500	1.22	11.583	7.30	17.667	1.37	23.75	0.91
5.583	1.22	11.667	7.30	17.750	1.37	23.83	0.91
5.667	1.22	11.750	7.30	17.833	1.37	23.92	0.91
5.750	1.22	11.833	31.61	17.917	1.37	24.00	0.91
5.833	1.22	11.917	31.62	18.000	1.37	24.08	0.91
5.917	1.22	12.000	31.62	18.083	1.37	24.17	0.91
6.000	1.22	12.083	83.90	18.167	1.37	24.25	0.91
6.083	1.22	12.167	83.90	18.250	1.37		

Unit Hyd Qpeak (cms)= 0.670

PEAK FLOW (cms)= 0.285 (i)
TIME TO PEAK (hrs)= 13.250
RUNOFF VOLUME (mm)= 21.292
TOTAL RAINFALL (mm)= 76.000
RUNOFF COEFFICIENT = 0.280

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

ROUTE CHN(0040)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0052)	17.19	0.29	13.25	21.29	0.01	0.63
OUTFLOW: ID= 1 (0040)	17.19	0.25	13.75	21.29	0.01	0.63

CALIB					
NASHYD (0050)	Area	(ha)= 24.24	Curve Number	(CN)= 63.0	
ID= 1 DT= 5.0 min	Ia	(mm)= 8.00	# of Linear Res.	(N)= 3.00	
	U.H. Tp	(hrs)= 1.13			

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	6.167	1.22	12.250	83.90	18.33	1.37
0.167	0.00	6.250	1.22	12.333	10.95	18.42	1.37
0.250	0.00	6.333	1.52	12.417	10.94	18.50	1.37
0.333	0.76	6.417	1.52	12.500	10.94	18.58	1.37
0.417	0.76	6.500	1.52	12.583	10.94	18.67	1.37
0.500	0.76	6.583	1.52	12.667	10.94	18.75	1.37
0.583	0.76	6.667	1.52	12.750	10.94	18.83	1.37
0.667	0.76	6.750	1.52	12.833	5.62	18.92	1.37
0.750	0.76	6.833	1.52	12.917	5.62	19.00	1.37
0.833	0.76	6.917	1.52	13.000	5.62	19.08	1.37
0.917	0.76	7.000	1.52	13.083	5.62	19.17	1.37
1.000	0.76	7.083	1.52	13.167	5.62	19.25	1.37
1.083	0.76	7.167	1.52	13.250	5.62	19.33	1.37
1.167	0.76	7.250	1.52	13.333	1.06	19.42	1.37
1.250	0.76	7.333	1.52	13.417	1.06	19.50	1.37
1.333	0.76	7.417	1.52	13.500	1.06	19.58	1.37
1.417	0.76	7.500	1.52	13.583	1.06	19.67	1.37

1.500	0.76	7.583	1.52	13.667	1.06	19.75	1.37
1.583	0.76	7.667	1.52	13.750	1.06	19.83	1.37
1.667	0.76	7.750	1.52	13.833	6.23	19.92	1.37
1.750	0.76	7.833	1.52	13.917	6.23	20.00	1.37
1.833	0.76	7.917	1.52	14.000	6.23	20.08	1.37
1.917	0.76	8.000	1.52	14.083	6.23	20.17	1.37
2.000	0.76	8.083	1.52	14.167	6.23	20.25	1.37
2.083	1.37	8.167	1.52	14.250	6.23	20.33	0.91
2.167	1.37	8.250	1.52	14.333	2.28	20.42	0.91
2.250	1.37	8.333	2.05	14.417	2.28	20.50	0.91
2.333	0.99	8.417	2.05	14.500	2.28	20.58	0.91
2.417	0.99	8.500	2.05	14.583	2.28	20.67	0.91
2.500	0.99	8.583	2.05	14.667	2.28	20.75	0.91
2.583	0.99	8.667	2.05	14.750	2.28	20.83	0.91
2.667	0.99	8.750	2.05	14.833	2.28	20.92	0.91
2.750	0.99	8.833	2.05	14.917	2.28	21.00	0.91
2.833	0.99	8.917	2.05	15.000	2.28	21.08	0.91
2.917	0.99	9.000	2.05	15.083	2.28	21.17	0.91
3.000	0.99	9.083	2.05	15.167	2.28	21.25	0.91
3.083	0.99	9.167	2.05	15.250	2.28	21.33	0.91
3.167	0.99	9.250	2.05	15.333	2.28	21.42	0.91
3.250	0.99	9.333	2.43	15.417	2.28	21.50	0.91
3.333	0.99	9.417	2.43	15.500	2.28	21.58	0.91
3.417	0.99	9.500	2.43	15.583	2.28	21.67	0.91
3.500	0.99	9.583	2.43	15.667	2.28	21.75	0.91
3.583	0.99	9.667	2.43	15.750	2.28	21.83	0.91
3.667	0.99	9.750	2.43	15.833	2.28	21.92	0.91
3.750	0.99	9.833	2.74	15.917	2.28	22.00	0.91
3.833	0.99	9.917	2.74	16.000	2.28	22.08	0.91
3.917	0.99	10.000	2.74	16.083	2.28	22.17	0.91
4.000	0.99	10.083	2.74	16.167	2.28	22.25	0.91
4.083	0.99	10.167	2.74	16.250	2.28	22.33	0.91
4.167	0.99	10.250	2.74	16.333	1.37	22.42	0.91
4.250	0.99	10.333	3.50	16.417	1.37	22.50	0.91
4.333	1.22	10.417	3.50	16.500	1.37	22.58	0.91
4.417	1.22	10.500	3.50	16.583	1.37	22.67	0.91
4.500	1.22	10.583	3.50	16.667	1.37	22.75	0.91
4.583	1.22	10.667	3.50	16.750	1.37	22.83	0.91
4.667	1.22	10.750	3.50	16.833	1.37	22.92	0.91
4.750	1.22	10.833	4.71	16.917	1.37	23.00	0.91
4.833	1.22	10.917	4.71	17.000	1.37	23.08	0.91
4.917	1.22	11.000	4.71	17.083	1.37	23.17	0.91
5.000	1.22	11.083	4.71	17.167	1.37	23.25	0.91
5.083	1.22	11.167	4.71	17.250	1.37	23.33	0.91
5.167	1.22	11.250	4.71	17.333	1.37	23.42	0.91
5.250	1.22	11.333	7.30	17.417	1.37	23.50	0.91
5.333	1.22	11.417	7.30	17.500	1.37	23.58	0.91
5.417	1.22	11.500	7.30	17.583	1.37	23.67	0.91
5.500	1.22	11.583	7.30	17.667	1.37	23.75	0.91
5.583	1.22	11.667	7.30	17.750	1.37	23.83	0.91
5.667	1.22	11.750	7.30	17.833	1.37	23.92	0.91
5.750	1.22	11.833	31.61	17.917	1.37	24.00	0.91
5.833	1.22	11.917	31.62	18.000	1.37	24.08	0.91
5.917	1.22	12.000	31.62	18.083	1.37	24.17	0.91
6.000	1.22	12.083	83.90	18.167	1.37	24.25	0.91
6.083	1.22	12.167	83.90	18.250	1.37		

Unit Hyd Qpeak (cms)= 0.819

PEAK FLOW (cms)= 0.361 (i)
TIME TO PEAK (hrs)= 13.417

RUNOFF VOLUME (mm)= 21.292
TOTAL RAINFALL (mm)= 76.000
RUNOFF COEFFICIENT = 0.280

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

ROUTE CHN(0041)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0050)	24.24	0.36	13.42	21.29	0.03	0.19
OUTFLOW: ID= 1 (0041)	24.24	0.19	15.00	21.26	0.02	0.18

ADD HYD (0053)|	
1 + 2 = 3	AREA (ha)

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

```
       ID1= 1 (  0040):    17.19   0.247    13.75    21.29
     + ID2= 2 (  0041):    24.24   0.190    15.00    21.26
       ================================================
       ID = 3 (  0053):    41.43   0.404    14.00    21.27

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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| CALIB            |
| STANDHYD (  0028)|   Area    (ha)=   1.13
|ID= 1 DT= 5.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  58.00
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                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.79         0.34
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      86.79        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 hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.22	12.250	83.90	18.33	1.37
0.167	0.00	6.250	1.22	12.333	10.95	18.42	1.37
0.250	0.00	6.333	1.52	12.417	10.94	18.50	1.37
0.333	0.76	6.417	1.52	12.500	10.94	18.58	1.37
0.417	0.76	6.500	1.52	12.583	10.94	18.67	1.37
0.500	0.76	6.583	1.52	12.667	10.94	18.75	1.37
0.583	0.76	6.667	1.52	12.750	10.94	18.83	1.37
0.667	0.76	6.750	1.52	12.833	5.62	18.92	1.37
0.750	0.76	6.833	1.52	12.917	5.62	19.00	1.37
0.833	0.76	6.917	1.52	13.000	5.62	19.08	1.37
0.917	0.76	7.000	1.52	13.083	5.62	19.17	1.37
1.000	0.76	7.083	1.52	13.167	5.62	19.25	1.37
1.083	0.76	7.167	1.52	13.250	5.62	19.33	1.37
1.167	0.76	7.250	1.52	13.333	1.06	19.42	1.37
1.250	0.76	7.333	1.52	13.417	1.06	19.50	1.37
1.333	0.76	7.417	1.52	13.500	1.06	19.58	1.37
1.417	0.76	7.500	1.52	13.583	1.06	19.67	1.37
1.500	0.76	7.583	1.52	13.667	1.06	19.75	1.37
1.583	0.76	7.667	1.52	13.750	1.06	19.83	1.37
1.667	0.76	7.750	1.52	13.833	6.23	19.92	1.37
1.750	0.76	7.833	1.52	13.917	6.23	20.00	1.37
1.833	0.76	7.917	1.52	14.000	6.23	20.08	1.37
1.917	0.76	8.000	1.52	14.083	6.23	20.17	1.37
2.000	0.76	8.083	1.52	14.167	6.23	20.25	1.37
2.083	1.37	8.167	1.52	14.250	6.23	20.33	0.91
2.167	1.37	8.250	1.52	14.333	2.28	20.42	0.91
2.250	1.37	8.333	2.05	14.417	2.28	20.50	0.91
2.333	0.99	8.417	2.05	14.500	2.28	20.58	0.91
2.417	0.99	8.500	2.05	14.583	2.28	20.67	0.91
2.500	0.99	8.583	2.05	14.667	2.28	20.75	0.91
2.583	0.99	8.667	2.05	14.750	2.28	20.83	0.91
2.667	0.99	8.750	2.05	14.833	2.28	20.92	0.91
2.750	0.99	8.833	2.05	14.917	2.28	21.00	0.91
2.833	0.99	8.917	2.05	15.000	2.28	21.08	0.91
2.917	0.99	9.000	2.05	15.083	2.28	21.17	0.91
3.000	0.99	9.083	2.05	15.167	2.28	21.25	0.91
3.083	0.99	9.167	2.05	15.250	2.28	21.33	0.91
3.167	0.99	9.250	2.05	15.333	2.28	21.42	0.91
3.250	0.99	9.333	2.43	15.417	2.28	21.50	0.91
3.333	0.99	9.417	2.43	15.500	2.28	21.58	0.91
3.417	0.99	9.500	2.43	15.583	2.28	21.67	0.91
3.500	0.99	9.583	2.43	15.667	2.28	21.75	0.91
3.583	0.99	9.667	2.43	15.750	2.28	21.83	0.91
3.667	0.99	9.750	2.43	15.833	2.28	21.92	0.91
3.750	0.99	9.833	2.74	15.917	2.28	22.00	0.91
3.833	0.99	9.917	2.74	16.000	2.28	22.08	0.91
3.917	0.99	10.000	2.74	16.083	2.28	22.17	0.91
4.000	0.99	10.083	2.74	16.167	2.28	22.25	0.91
4.083	0.99	10.167	2.74	16.250	2.28	22.33	0.91
4.167	0.99	10.250	2.74	16.333	1.37	22.42	0.91
4.250	0.99	10.333	3.50	16.417	1.37	22.50	0.91
4.333	1.22	10.417	3.50	16.500	1.37	22.58	0.91
4.417	1.22	10.500	3.50	16.583	1.37	22.67	0.91
4.500	1.22	10.583	3.50	16.667	1.37	22.75	0.91
4.583	1.22	10.667	3.50	16.750	1.37	22.83	0.91
4.667	1.22	10.750	3.50	16.833	1.37	22.92	0.91
4.750	1.22	10.833	4.71	16.917	1.37	23.00	0.91
4.833	1.22	10.917	4.71	17.000	1.37	23.08	0.91
4.917	1.22	11.000	4.71	17.083	1.37	23.17	0.91
5.000	1.22	11.083	4.71	17.167	1.37	23.25	0.91
5.083	1.22	11.167	4.71	17.250	1.37	23.33	0.91
5.167	1.22	11.250	4.71	17.333	1.37	23.42	0.91
5.250	1.22	11.333	7.30	17.417	1.37	23.50	0.91
5.333	1.22	11.417	7.30	17.500	1.37	23.58	0.91
5.417	1.22	11.500	7.30	17.583	1.37	23.67	0.91
5.500	1.22	11.583	7.30	17.667	1.37	23.75	0.91
5.583	1.22	11.667	7.30	17.750	1.37	23.83	0.91
5.667	1.22	11.750	7.30	17.833	1.37	23.92	0.91
5.750	1.22	11.833	31.61	17.917	1.37	24.00	0.91
5.833	1.22	11.917	31.62	18.000	1.37	24.08	0.91
5.917	1.22	12.000	31.62	18.083	1.37	24.17	0.91
6.000	1.22	12.083	83.90	18.167	1.37	24.25	0.91
6.083	1.22	12.167	83.90	18.250	1.37		

```
     Max.Eff.Inten.(mm/hr)=      83.90        78.22
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       2.52 (ii)   10.30 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.29         0.09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.15         0.05          0.198 (iii)
     TIME TO PEAK    (hrs)=      12.25        12.33          12.25
     RUNOFF VOLUME    (mm)=      75.00        41.43          60.90
     TOTAL RAINFALL   (mm)=      76.00        76.00          76.00
     RUNOFF COEFFICIENT   =       0.99         0.55           0.80

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
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| STANDHYD (  0032)|   Area     (ha)=   3.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  60.00
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                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.04         0.76
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     159.16        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 hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.22	12.250	83.90	18.33	1.37
0.167	0.00	6.250	1.22	12.333	10.95	18.42	1.37
0.250	0.00	6.333	1.52	12.417	10.94	18.50	1.37
0.333	0.76	6.417	1.52	12.500	10.94	18.58	1.37
0.417	0.76	6.500	1.52	12.583	10.94	18.67	1.37
0.500	0.76	6.583	1.52	12.667	10.94	18.75	1.37
0.583	0.76	6.667	1.52	12.750	10.94	18.83	1.37
0.667	0.76	6.750	1.52	12.833	5.62	18.92	1.37
0.750	0.76	6.833	1.52	12.917	5.62	19.00	1.37
0.833	0.76	6.917	1.52	13.000	5.62	19.08	1.37
0.917	0.76	7.000	1.52	13.083	5.62	19.17	1.37
1.000	0.76	7.083	1.52	13.167	5.62	19.25	1.37
1.083	0.76	7.167	1.52	13.250	5.62	19.33	1.37
1.167	0.76	7.250	1.52	13.333	1.06	19.42	1.37
1.250	0.76	7.333	1.52	13.417	1.06	19.50	1.37
1.333	0.76	7.417	1.52	13.500	1.06	19.58	1.37
1.417	0.76	7.500	1.52	13.583	1.06	19.67	1.37
1.500	0.76	7.583	1.52	13.667	1.06	19.75	1.37
1.583	0.76	7.667	1.52	13.750	1.06	19.83	1.37
1.667	0.76	7.750	1.52	13.833	6.23	19.92	1.37
1.750	0.76	7.833	1.52	13.917	6.23	20.00	1.37
1.833	0.76	7.917	1.52	14.000	6.23	20.08	1.37
1.917	0.76	8.000	1.52	14.083	6.23	20.17	1.37
2.000	0.76	8.083	1.52	14.167	6.23	20.25	1.37
2.083	1.37	8.167	1.52	14.250	6.23	20.33	0.91
2.167	1.37	8.250	1.52	14.333	2.28	20.42	0.91
2.250	1.37	8.333	2.05	14.417	2.28	20.50	0.91
2.333	0.99	8.417	2.05	14.500	2.28	20.58	0.91
2.417	0.99	8.500	2.05	14.583	2.28	20.67	0.91
2.500	0.99	8.583	2.05	14.667	2.28	20.75	0.91
2.583	0.99	8.667	2.05	14.750	2.28	20.83	0.91
2.667	0.99	8.750	2.05	14.833	2.28	20.92	0.91
2.750	0.99	8.833	2.05	14.917	2.28	21.00	0.91
2.833	0.99	8.917	2.05	15.000	2.28	21.08	0.91
2.917	0.99	9.000	2.05	15.083	2.28	21.17	0.91
3.000	0.99	9.083	2.05	15.167	2.28	21.25	0.91
3.083	0.99	9.167	2.05	15.250	2.28	21.33	0.91
3.167	0.99	9.250	2.05	15.333	2.28	21.42	0.91
3.250	0.99	9.333	2.43	15.417	2.28	21.50	0.91
3.333	0.99	9.417	2.43	15.500	2.28	21.58	0.91
3.417	0.99	9.500	2.43	15.583	2.28	21.67	0.91
3.500	0.99	9.583	2.43	15.667	2.28	21.75	0.91
3.583	0.99	9.667	2.43	15.750	2.28	21.83	0.91
3.667	0.99	9.750	2.43	15.833	2.28	21.92	0.91
3.750	0.99	9.833	2.74	15.917	2.28	22.00	0.91
3.833	0.99	9.917	2.74	16.000	2.28	22.08	0.91
3.917	0.99	10.000	2.74	16.083	2.28	22.17	0.91
4.000	0.99	10.083	2.74	16.167	2.28	22.25	0.91
4.083	0.99	10.167	2.74	16.250	2.28	22.33	0.91
4.167	0.99	10.250	2.74	16.333	1.37	22.42	0.91
4.250	0.99	10.333	3.50	16.417	1.37	22.50	0.91
4.333	1.22	10.417	3.50	16.500	1.37	22.58	0.91
4.417	1.22	10.500	3.50	16.583	1.37	22.67	0.91
4.500	1.22	10.583	3.50	16.667	1.37	22.75	0.91
4.583	1.22	10.667	3.50	16.750	1.37	22.83	0.91
4.667	1.22	10.750	3.50	16.833	1.37	22.92	0.91
4.750	1.22	10.833	4.71	16.917	1.37	23.00	0.91
4.833	1.22	10.917	4.71	17.000	1.37	23.08	0.91
4.917	1.22	11.000	4.71	17.083	1.37	23.17	0.91
5.000	1.22	11.083	4.71	17.167	1.37	23.25	0.91
5.083	1.22	11.167	4.71	17.250	1.37	23.33	0.91
5.167	1.22	11.250	4.71	17.333	1.37	23.42	0.91
5.250	1.22	11.333	7.30	17.417	1.37	23.50	0.91
5.333	1.22	11.417	7.30	17.500	1.37	23.58	0.91
5.417	1.22	11.500	7.30	17.583	1.37	23.67	0.91
5.500	1.22	11.583	7.30	17.667	1.37	23.75	0.91
5.583	1.22	11.667	7.30	17.750	1.37	23.83	0.91
5.667	1.22	11.750	7.30	17.833	1.37	23.92	0.91
5.750	1.22	11.833	31.61	17.917	1.37	24.00	0.91
5.833	1.22	11.917	31.62	18.000	1.37	24.08	0.91
5.917	1.22	12.000	31.62	18.083	1.37	24.17	0.91
6.000	1.22	12.083	83.90	18.167	1.37	24.25	0.91
6.083	1.22	12.167	83.90	18.250	1.37		

```
     Max.Eff.Inten.(mm/hr)=      83.90       128.64
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      3.62 (ii)    8.50 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.25         0.12
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.53         0.21        0.741 (iii)
     TIME TO PEAK    (hrs)=     12.25        12.25       12.25
     RUNOFF VOLUME    (mm)=     75.00        48.48       64.39
     TOTAL RAINFALL   (mm)=     76.00        76.00       76.00
     RUNOFF COEFFICIENT   =      0.99         0.64        0.85

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN* =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0034)|   Area     (ha)=  29.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  66.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      19.18         9.88
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     440.15        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	6.167	1.22	12.250	83.90	18.33	1.37
0.167	0.00	6.250	1.22	12.333	10.95	18.42	1.37
0.250	0.00	6.333	1.52	12.417	10.94	18.50	1.37
0.333	0.76	6.417	1.52	12.500	10.94	18.58	1.37
0.417	0.76	6.500	1.52	12.583	10.94	18.67	1.37
0.500	0.76	6.583	1.52	12.667	10.94	18.75	1.37
0.583	0.76	6.667	1.52	12.750	10.94	18.83	1.37
0.667	0.76	6.750	1.52	12.833	5.62	18.92	1.37
0.750	0.76	6.833	1.52	12.917	5.62	19.00	1.37
0.833	0.76	6.917	1.52	13.000	5.62	19.08	1.37
0.917	0.76	7.000	1.52	13.083	5.62	19.17	1.37
1.000	0.76	7.083	1.52	13.167	5.62	19.25	1.37
1.083	0.76	7.167	1.52	13.250	5.62	19.33	1.37
1.167	0.76	7.250	1.52	13.333	1.06	19.42	1.37
1.250	0.76	7.333	1.52	13.417	1.06	19.50	1.37
1.333	0.76	7.417	1.52	13.500	1.06	19.58	1.37
1.417	0.76	7.500	1.52	13.583	1.06	19.67	1.37
1.500	0.76	7.583	1.52	13.667	1.06	19.75	1.37
1.583	0.76	7.667	1.52	13.750	1.06	19.83	1.37
1.667	0.76	7.750	1.52	13.833	6.23	19.92	1.37
1.750	0.76	7.833	1.52	13.917	6.23	20.00	1.37
1.833	0.76	7.917	1.52	14.000	6.23	20.08	1.37
1.917	0.76	8.000	1.52	14.083	6.23	20.17	1.37
2.000	0.76	8.083	1.52	14.167	6.23	20.25	1.37
2.083	1.37	8.167	1.52	14.250	6.23	20.33	0.91
2.167	1.37	8.250	1.52	14.333	2.28	20.42	0.91
2.250	1.37	8.333	2.05	14.417	2.28	20.50	0.91
2.333	0.99	8.417	2.05	14.500	2.28	20.58	0.91
2.417	0.99	8.500	2.05	14.583	2.28	20.67	0.91
2.500	0.99	8.583	2.05	14.667	2.28	20.75	0.91
2.583	0.99	8.667	2.05	14.750	2.28	20.83	0.91
2.667	0.99	8.750	2.05	14.833	2.28	20.92	0.91
2.750	0.99	8.833	2.05	14.917	2.28	21.00	0.91
2.833	0.99	8.917	2.05	15.000	2.28	21.08	0.91
2.917	0.99	9.000	2.05	15.083	2.28	21.17	0.91
3.000	0.99	9.083	2.05	15.167	2.28	21.25	0.91
3.083	0.99	9.167	2.05	15.250	2.28	21.33	0.91
3.167	0.99	9.250	2.05	15.333	2.28	21.42	0.91
3.250	0.99	9.333	2.43	15.417	2.28	21.50	0.91
3.333	0.99	9.417	2.43	15.500	2.28	21.58	0.91
3.417	0.99	9.500	2.43	15.583	2.28	21.67	0.91
3.500	0.99	9.583	2.43	15.667	2.28	21.75	0.91
3.583	0.99	9.667	2.43	15.750	2.28	21.83	0.91
3.667	0.99	9.750	2.43	15.833	2.28	21.92	0.91
3.750	0.99	9.833	2.74	15.917	2.28	22.00	0.91
3.833	0.99	9.917	2.74	16.000	2.28	22.08	0.91
3.917	0.99	10.000	2.74	16.083	2.28	22.17	0.91
4.000	0.99	10.083	2.74	16.167	2.28	22.25	0.91
4.083	0.99	10.167	2.74	16.250	2.28	22.33	0.91
4.167	0.99	10.250	2.74	16.333	1.37	22.42	0.91
4.250	0.99	10.333	3.50	16.417	1.37	22.50	0.91
4.333	1.22	10.417	3.50	16.500	1.37	22.58	0.91
4.417	1.22	10.500	3.50	16.583	1.37	22.67	0.91
4.500	1.22	10.583	3.50	16.667	1.37	22.75	0.91
4.583	1.22	10.667	3.50	16.750	1.37	22.83	0.91
4.667	1.22	10.750	3.50	16.833	1.37	22.92	0.91
4.750	1.22	10.833	4.71	16.917	1.37	23.00	0.91
4.833	1.22	10.917	4.71	17.000	1.37	23.08	0.91
4.917	1.22	11.000	4.71	17.083	1.37	23.17	0.91
5.000	1.22	11.083	4.71	17.167	1.37	23.25	0.91
5.083	1.22	11.167	4.71	17.250	1.37	23.33	0.91
5.167	1.22	11.250	4.71	17.333	1.37	23.42	0.91
5.250	1.22	11.333	7.30	17.417	1.37	23.50	0.91
5.333	1.22	11.417	7.30	17.500	1.37	23.58	0.91
5.417	1.22	11.500	7.30	17.583	1.37	23.67	0.91
5.500	1.22	11.583	7.30	17.667	1.37	23.75	0.91
5.583	1.22	11.667	7.30	17.750	1.37	23.83	0.91
5.667	1.22	11.750	7.30	17.833	1.37	23.92	0.91
5.750	1.22	11.833	31.61	17.917	1.37	24.00	0.91
5.833	1.22	11.917	31.62	18.000	1.37	24.08	0.91
5.917	1.22	12.000	31.62	18.083	1.37	24.17	0.91
6.000	1.22	12.083	83.90	18.167	1.37	24.25	0.91
6.083	1.22	12.167	83.90	18.250	1.37		

Max.Eff.Inten.(mm/hr)=	83.90	72.02		
over (min)	5.00	15.00		
Storage Coeff. (min)=	6.67 (ii)	14.72 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	0.18	0.08		
			TOTALS	
PEAK FLOW (cms)=	3.47	1.18	4.500 (iii)	
TIME TO PEAK (hrs)=	12.25	12.33	12.25	
RUNOFF VOLUME (mm)=	75.00	40.26	59.37	
TOTAL RAINFALL (mm)=	76.00	76.00	76.00	
RUNOFF COEFFICIENT =	0.99	0.53	0.78	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0035)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0032):	3.80	0.741	12.25	64.39
	+ ID2= 2 (0034):	29.06	4.500	12.25	59.37
	ID = 3 (0035):	32.86	5.241	12.25	59.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0033)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.4930	1.5666
	0.0360	0.7150	0.7890	1.8478
	0.0660	1.0737	1.0520	2.0613
	0.2630	1.3645	1.3140	2.2797

```
                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0035)     32.860      5.241     12.25      59.95
   OUTFLOW: ID= 1 (  0033)     32.860      0.262     14.50      57.48

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  5.00
                  TIME SHIFT OF PEAK FLOW         (min)=135.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.3645
```

```
--------------------
| ADD HYD  (  0029)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0028):     1.13   0.198    12.25    60.90
      + ID2= 2 (  0033):    32.86   0.262    14.50    57.48
        ==========================================================
        ID = 3 (  0029):    33.99   0.274    14.25    57.59

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

```
--------------------
| ADD HYD  (  0029)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0029):    33.99   0.274    14.25    57.59
      + ID2= 2 (  0053):    41.43   0.404    14.00    21.27
        ==========================================================
        ID = 1 (  0029):    75.42   0.672    14.25    37.64

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

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

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

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\ca60e274-7385-4035-9407-bf4dbc4d1113\scen
  Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\ca60e274-7385-4035-9407-bf4dbc4d1113\scen

DATE: 05-03-2024                          TIME: 01:44:32

USER:


COMMENTS: _____________________________________________________________
```

```
------------------------
  ********************************************
  ** SIMULATION : 03. 10-Year-24-Hour-SCS-Type- **
  ********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              3a0c766d-3ecf-4101-8ec5-64101323cb13\efc9bd42
| Ptotal= 89.90 mm |    Comments: New DesignStormManualInput
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.80	12.50	12.95	18.75	1.62
0.25	0.90	6.50	1.80	12.75	6.65	19.00	1.62
0.50	0.90	6.75	1.80	13.00	6.65	19.25	1.62
0.75	0.90	7.00	1.80	13.25	1.26	19.50	1.62
1.00	0.90	7.25	1.80	13.50	1.26	19.75	1.62
1.25	0.90	7.50	1.80	13.75	7.37	20.00	1.62
1.50	0.90	7.75	1.80	14.00	7.37	20.25	1.08
1.75	0.90	8.00	1.80	14.25	2.70	20.50	1.08
2.00	1.62	8.25	2.43	14.50	2.70	20.75	1.08
2.25	1.17	8.50	2.43	14.75	2.70	21.00	1.08
2.50	1.17	8.75	2.43	15.00	2.70	21.25	1.08
2.75	1.17	9.00	2.43	15.25	2.70	21.50	1.08
3.00	1.17	9.25	2.88	15.50	2.70	21.75	1.08
3.25	1.17	9.50	2.88	15.75	2.70	22.00	1.08
3.50	1.17	9.75	3.24	16.00	2.70	22.25	1.08
3.75	1.17	10.00	3.24	16.25	1.62	22.50	1.08
4.00	1.17	10.25	4.14	16.50	1.62	22.75	1.08
4.25	1.44	10.50	4.14	16.75	1.62	23.00	1.08
4.50	1.44	10.75	5.57	17.00	1.62	23.25	1.08
4.75	1.44	11.00	5.57	17.25	1.62	23.50	1.08
5.00	1.44	11.25	8.63	17.50	1.62	23.75	1.08
5.25	1.44	11.50	8.63	17.75	1.62	24.00	1.08
5.50	1.44	11.75	37.40	18.00	1.62		
5.75	1.44	12.00	99.25	18.25	1.62		
6.00	1.44	12.25	12.95	18.50	1.62		

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| CALIB            |
| NASHYD   (  0052)|   Area     (ha)=  17.19   Curve Number    (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.98

        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	6.167	1.44	12.250	99.25	18.33	1.62
0.167	0.00	6.250	1.44	12.333	12.96	18.42	1.62
0.250	0.00	6.333	1.80	12.417	12.95	18.50	1.62
0.333	0.90	6.417	1.80	12.500	12.95	18.58	1.62
0.417	0.90	6.500	1.80	12.583	12.95	18.67	1.62
0.500	0.90	6.583	1.80	12.667	12.95	18.75	1.62
0.583	0.90	6.667	1.80	12.750	12.95	18.83	1.62
0.667	0.90	6.750	1.80	12.833	6.65	18.92	1.62
0.750	0.90	6.833	1.80	12.917	6.65	19.00	1.62
0.833	0.90	6.917	1.80	13.000	6.65	19.08	1.62
0.917	0.90	7.000	1.80	13.083	6.65	19.17	1.62
1.000	0.90	7.083	1.80	13.167	6.65	19.25	1.62
1.083	0.90	7.167	1.80	13.250	6.65	19.33	1.62
1.167	0.90	7.250	1.80	13.333	1.26	19.42	1.62
1.250	0.90	7.333	1.80	13.417	1.26	19.50	1.62
1.333	0.90	7.417	1.80	13.500	1.26	19.58	1.62
1.417	0.90	7.500	1.80	13.583	1.26	19.67	1.62
1.500	0.90	7.583	1.80	13.667	1.26	19.75	1.62
1.583	0.90	7.667	1.80	13.750	1.26	19.83	1.62
1.667	0.90	7.750	1.80	13.833	7.37	19.92	1.62
1.750	0.90	7.833	1.80	13.917	7.37	20.00	1.62
1.833	0.90	7.917	1.80	14.000	7.37	20.08	1.62
1.917	0.90	8.000	1.80	14.083	7.37	20.17	1.62
2.000	0.90	8.083	1.80	14.167	7.37	20.25	1.62
2.083	1.62	8.167	1.80	14.250	7.37	20.33	1.08
2.167	1.62	8.250	1.80	14.333	2.70	20.42	1.08
2.250	1.62	8.333	2.43	14.417	2.70	20.50	1.08
2.333	1.17	8.417	2.43	14.500	2.70	20.58	1.08
2.417	1.17	8.500	2.43	14.583	2.70	20.67	1.08
2.500	1.17	8.583	2.43	14.667	2.70	20.75	1.08
2.583	1.17	8.667	2.43	14.750	2.70	20.83	1.08
2.667	1.17	8.750	2.43	14.833	2.70	20.92	1.08
2.750	1.17	8.833	2.43	14.917	2.70	21.00	1.08
2.833	1.17	8.917	2.43	15.000	2.70	21.08	1.08
2.917	1.17	9.000	2.43	15.083	2.70	21.17	1.08
3.000	1.17	9.083	2.43	15.167	2.70	21.25	1.08
3.083	1.17	9.167	2.43	15.250	2.70	21.33	1.08
3.167	1.17	9.250	2.43	15.333	2.70	21.42	1.08
3.250	1.17	9.333	2.88	15.417	2.70	21.50	1.08
3.333	1.17	9.417	2.88	15.500	2.70	21.58	1.08
3.417	1.17	9.500	2.88	15.583	2.70	21.67	1.08
3.500	1.17	9.583	2.88	15.667	2.70	21.75	1.08
3.583	1.17	9.667	2.88	15.750	2.70	21.83	1.08
3.667	1.17	9.750	2.88	15.833	2.70	21.92	1.08
3.750	1.17	9.833	3.24	15.917	2.70	22.00	1.08
3.833	1.17	9.917	3.24	16.000	2.70	22.08	1.08
3.917	1.17	10.000	3.24	16.083	2.70	22.17	1.08
4.000	1.17	10.083	3.24	16.167	2.70	22.25	1.08
4.083	1.17	10.167	3.24	16.250	2.70	22.33	1.08
4.167	1.17	10.250	3.24	16.333	1.62	22.42	1.08
4.250	1.17	10.333	4.14	16.417	1.62	22.50	1.08
4.333	1.44	10.417	4.14	16.500	1.62	22.58	1.08
4.417	1.44	10.500	4.14	16.583	1.62	22.67	1.08
4.500	1.44	10.583	4.14	16.667	1.62	22.75	1.08
4.583	1.44	10.667	4.14	16.750	1.62	22.83	1.08
4.667	1.44	10.750	4.14	16.833	1.62	22.92	1.08
4.750	1.44	10.833	5.57	16.917	1.62	23.00	1.08
4.833	1.44	10.917	5.57	17.000	1.62	23.08	1.08
4.917	1.44	11.000	5.57	17.083	1.62	23.17	1.08
5.000	1.44	11.083	5.57	17.167	1.62	23.25	1.08
5.083	1.44	11.167	5.57	17.250	1.62	23.33	1.08
5.167	1.44	11.250	5.57	17.333	1.62	23.42	1.08
5.250	1.44	11.333	8.63	17.417	1.62	23.50	1.08
5.333	1.44	11.417	8.63	17.500	1.62	23.58	1.08
5.417	1.44	11.500	8.63	17.583	1.62	23.67	1.08
5.500	1.44	11.583	8.63	17.667	1.62	23.75	1.08
5.583	1.44	11.667	8.63	17.750	1.62	23.83	1.08
5.667	1.44	11.750	8.63	17.833	1.62	23.92	1.08
5.750	1.44	11.833	37.40	17.917	1.62	24.00	1.08
5.833	1.44	11.917	37.40	18.000	1.62	24.08	1.08
5.917	1.44	12.000	37.40	18.083	1.62	24.17	1.08
6.000	1.44	12.083	99.24	18.167	1.62	24.25	1.08
6.083	1.44	12.167	99.25	18.250	1.62		

Unit Hyd Qpeak (cms)= 0.670

PEAK FLOW (cms)= 0.394 (i)
TIME TO PEAK (hrs)= 13.250
RUNOFF VOLUME (mm)= 29.028
TOTAL RAINFALL (mm)= 89.900
RUNOFF COEFFICIENT = 0.323

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

ROUTE CHN(0040)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71

1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

	<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0052)	17.19	0.39	13.25	29.03	0.02	0.63
OUTFLOW: ID= 1 (0040)	17.19	0.34	13.75	29.03	0.02	0.63

CALIB			
NASHYD (0050)	Area (ha)= 24.24	Curve Number (CN)= 63.0	
ID= 1 DT= 5.0 min	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.13		

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	6.167	1.44	12.250	99.25	18.33	1.62
0.167	0.00	6.250	1.44	12.333	12.96	18.42	1.62
0.250	0.00	6.333	1.80	12.417	12.95	18.50	1.62
0.333	0.90	6.417	1.80	12.500	12.95	18.58	1.62
0.417	0.90	6.500	1.80	12.583	12.95	18.67	1.62
0.500	0.90	6.583	1.80	12.667	12.95	18.75	1.62
0.583	0.90	6.667	1.80	12.750	12.95	18.83	1.62
0.667	0.90	6.750	1.80	12.833	6.65	18.92	1.62
0.750	0.90	6.833	1.80	12.917	6.65	19.00	1.62
0.833	0.90	6.917	1.80	13.000	6.65	19.08	1.62
0.917	0.90	7.000	1.80	13.083	6.65	19.17	1.62
1.000	0.90	7.083	1.80	13.167	6.65	19.25	1.62
1.083	0.90	7.167	1.80	13.250	6.65	19.33	1.62
1.167	0.90	7.250	1.80	13.333	1.26	19.42	1.62
1.250	0.90	7.333	1.80	13.417	1.26	19.50	1.62
1.333	0.90	7.417	1.80	13.500	1.26	19.58	1.62
1.417	0.90	7.500	1.80	13.583	1.26	19.67	1.62
1.500	0.90	7.583	1.80	13.667	1.26	19.75	1.62
1.583	0.90	7.667	1.80	13.750	1.26	19.83	1.62
1.667	0.90	7.750	1.80	13.833	7.37	19.92	1.62
1.750	0.90	7.833	1.80	13.917	7.37	20.00	1.62
1.833	0.90	7.917	1.80	14.000	7.37	20.08	1.62
1.917	0.90	8.000	1.80	14.083	7.37	20.17	1.62
2.000	0.90	8.083	1.80	14.167	7.37	20.25	1.62
2.083	1.62	8.167	1.80	14.250	7.37	20.33	1.08
2.167	1.62	8.250	1.80	14.333	2.70	20.42	1.08
2.250	1.62	8.333	2.43	14.417	2.70	20.50	1.08
2.333	1.17	8.417	2.43	14.500	2.70	20.58	1.08
2.417	1.17	8.500	2.43	14.583	2.70	20.67	1.08
2.500	1.17	8.583	2.43	14.667	2.70	20.75	1.08
2.583	1.17	8.667	2.43	14.750	2.70	20.83	1.08
2.667	1.17	8.750	2.43	14.833	2.70	20.92	1.08
2.750	1.17	8.833	2.43	14.917	2.70	21.00	1.08
2.833	1.17	8.917	2.43	15.000	2.70	21.08	1.08
2.917	1.17	9.000	2.43	15.083	2.70	21.17	1.08
3.000	1.17	9.083	2.43	15.167	2.70	21.25	1.08
3.083	1.17	9.167	2.43	15.250	2.70	21.33	1.08
3.167	1.17	9.250	2.43	15.333	2.70	21.42	1.08
3.250	1.17	9.333	2.88	15.417	2.70	21.50	1.08
3.333	1.17	9.417	2.88	15.500	2.70	21.58	1.08
3.417	1.17	9.500	2.88	15.583	2.70	21.67	1.08
3.500	1.17	9.583	2.88	15.667	2.70	21.75	1.08
3.583	1.17	9.667	2.88	15.750	2.70	21.83	1.08
3.667	1.17	9.750	2.88	15.833	2.70	21.92	1.08
3.750	1.17	9.833	3.24	15.917	2.70	22.00	1.08
3.833	1.17	9.917	3.24	16.000	2.70	22.08	1.08
3.917	1.17	10.000	3.24	16.083	2.70	22.17	1.08
4.000	1.17	10.083	3.24	16.167	2.70	22.25	1.08
4.083	1.17	10.167	3.24	16.250	2.70	22.33	1.08
4.167	1.17	10.250	3.24	16.333	1.62	22.42	1.08
4.250	1.17	10.333	4.14	16.417	1.62	22.50	1.08
4.333	1.44	10.417	4.14	16.500	1.62	22.58	1.08
4.417	1.44	10.500	4.14	16.583	1.62	22.67	1.08
4.500	1.44	10.583	4.14	16.667	1.62	22.75	1.08
4.583	1.44	10.667	4.14	16.750	1.62	22.83	1.08
4.667	1.44	10.750	4.14	16.833	1.62	22.92	1.08
4.750	1.44	10.833	5.57	16.917	1.62	23.00	1.08
4.833	1.44	10.917	5.57	17.000	1.62	23.08	1.08
4.917	1.44	11.000	5.57	17.083	1.62	23.17	1.08
5.000	1.44	11.083	5.57	17.167	1.62	23.25	1.08
5.083	1.44	11.167	5.57	17.250	1.62	23.33	1.08
5.167	1.44	11.250	5.57	17.333	1.62	23.42	1.08
5.250	1.44	11.333	8.63	17.417	1.62	23.50	1.08
5.333	1.44	11.417	8.63	17.500	1.62	23.58	1.08
5.417	1.44	11.500	8.63	17.583	1.62	23.67	1.08
5.500	1.44	11.583	8.63	17.667	1.62	23.75	1.08
5.583	1.44	11.667	8.63	17.750	1.62	23.83	1.08
5.667	1.44	11.750	8.63	17.833	1.62	23.92	1.08
5.750	1.44	11.833	37.40	17.917	1.62	24.00	1.08
5.833	1.44	11.917	37.40	18.000	1.62	24.08	1.08
5.917	1.44	12.000	37.40	18.083	1.62	24.17	1.08
6.000	1.44	12.083	99.24	18.167	1.62	24.25	1.08
6.083	1.44	12.167	99.25	18.250	1.62		

Unit Hyd Qpeak (cms)= 0.819

PEAK FLOW (cms)= 0.499 (i)
TIME TO PEAK (hrs)= 13.417
RUNOFF VOLUME (mm)= 29.028
TOTAL RAINFALL (mm)= 89.900
RUNOFF COEFFICIENT = 0.323

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

ROUTE CHN(0041)		
IN= 2---> OUT= 1	Routing time step (min)'= 5.00	
	<------ DATA FOR SECTION (1.1) ------>	
	Distance	Elevation	Manning

0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0050)	24.24	0.50	13.42	29.03	0.03	0.20
OUTFLOW: ID= 1 (0041)	24.24	0.27	14.92	28.99	0.03	0.18

ADD HYD (0053)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0040):	17.19	0.341	13.75	29.03
+ ID2= 2 (0041):	24.24	0.266	14.92	28.99
ID = 3 (0053):	41.43	0.564	14.00	29.01

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB STANDHYD (0028)				
ID= 1 DT= 5.0 min	Area (ha)=	1.13		
	Total Imp(%)=	70.00	Dir. Conn.(%)=	58.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.79	0.34
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	86.79	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	6.167	1.44	12.250	99.25	18.33	1.62
0.167	0.00	6.250	1.44	12.333	12.96	18.42	1.62
0.250	0.00	6.333	1.80	12.417	12.95	18.50	1.62
0.333	0.90	6.417	1.80	12.500	12.95	18.58	1.62
0.417	0.90	6.500	1.80	12.583	12.95	18.67	1.62
0.500	0.90	6.583	1.80	12.667	12.95	18.75	1.62
0.583	0.90	6.667	1.80	12.750	12.95	18.83	1.62
0.667	0.90	6.750	1.80	12.833	6.65	18.92	1.62
0.750	0.90	6.833	1.80	12.917	6.65	19.00	1.62
0.833	0.90	6.917	1.80	13.000	6.65	19.08	1.62
0.917	0.90	7.000	1.80	13.083	6.65	19.17	1.62
1.000	0.90	7.083	1.80	13.167	6.65	19.25	1.62
1.083	0.90	7.167	1.80	13.250	6.65	19.33	1.62
1.167	0.90	7.250	1.80	13.333	1.26	19.42	1.62
1.250	0.90	7.333	1.80	13.417	1.26	19.50	1.62
1.333	0.90	7.417	1.80	13.500	1.26	19.58	1.62
1.417	0.90	7.500	1.80	13.583	1.26	19.67	1.62
1.500	0.90	7.583	1.80	13.667	1.26	19.75	1.62
1.583	0.90	7.667	1.80	13.750	1.26	19.83	1.62
1.667	0.90	7.750	1.80	13.833	7.37	19.92	1.62
1.750	0.90	7.833	1.80	13.917	7.37	20.00	1.62
1.833	0.90	7.917	1.80	14.000	7.37	20.08	1.62
1.917	0.90	8.000	1.80	14.083	7.37	20.17	1.62
2.000	0.90	8.083	1.80	14.167	7.37	20.25	1.62
2.083	1.62	8.167	1.80	14.250	7.37	20.33	1.08
2.167	1.62	8.250	1.80	14.333	2.70	20.42	1.08
2.250	1.62	8.333	2.43	14.417	2.70	20.50	1.08
2.333	1.17	8.417	2.43	14.500	2.70	20.58	1.08
2.417	1.17	8.500	2.43	14.583	2.70	20.67	1.08
2.500	1.17	8.583	2.43	14.667	2.70	20.75	1.08
2.583	1.17	8.667	2.43	14.750	2.70	20.83	1.08
2.667	1.17	8.750	2.43	14.833	2.70	20.92	1.08
2.750	1.17	8.833	2.43	14.917	2.70	21.00	1.08
2.833	1.17	8.917	2.43	15.000	2.70	21.08	1.08
2.917	1.17	9.000	2.43	15.083	2.70	21.17	1.08
3.000	1.17	9.083	2.43	15.167	2.70	21.25	1.08
3.083	1.17	9.167	2.43	15.250	2.70	21.33	1.08
3.167	1.17	9.250	2.43	15.333	2.70	21.42	1.08
3.250	1.17	9.333	2.88	15.417	2.70	21.50	1.08
3.333	1.17	9.417	2.88	15.500	2.70	21.58	1.08
3.417	1.17	9.500	2.88	15.583	2.70	21.67	1.08
3.500	1.17	9.583	2.88	15.667	2.70	21.75	1.08
3.583	1.17	9.667	2.88	15.750	2.70	21.83	1.08
3.667	1.17	9.750	2.88	15.833	2.70	21.92	1.08
3.750	1.17	9.833	3.24	15.917	2.70	22.00	1.08
3.833	1.17	9.917	3.24	16.000	2.70	22.08	1.08
3.917	1.17	10.000	3.24	16.083	2.70	22.17	1.08
4.000	1.17	10.083	3.24	16.167	2.70	22.25	1.08
4.083	1.17	10.167	3.24	16.250	2.70	22.33	1.08

4.167	1.17	10.250	3.24	16.333	1.62	22.42	1.08
4.250	1.17	10.333	4.14	16.417	1.62	22.50	1.08
4.333	1.44	10.417	4.14	16.500	1.62	22.58	1.08
4.417	1.44	10.500	4.14	16.583	1.62	22.67	1.08
4.500	1.44	10.583	4.14	16.667	1.62	22.75	1.08
4.583	1.44	10.667	4.14	16.750	1.62	22.83	1.08
4.667	1.44	10.750	4.14	16.833	1.62	22.92	1.08
4.750	1.44	10.833	5.57	16.917	1.62	23.00	1.08
4.833	1.44	10.917	5.57	17.000	1.62	23.08	1.08
4.917	1.44	11.000	5.57	17.083	1.62	23.17	1.08
5.000	1.44	11.083	5.57	17.167	1.62	23.25	1.08
5.083	1.44	11.167	5.57	17.250	1.62	23.33	1.08
5.167	1.44	11.250	5.57	17.333	1.62	23.42	1.08
5.250	1.44	11.333	8.63	17.417	1.62	23.50	1.08
5.333	1.44	11.417	8.63	17.500	1.62	23.58	1.08
5.417	1.44	11.500	8.63	17.583	1.62	23.67	1.08
5.500	1.44	11.583	8.63	17.667	1.62	23.75	1.08
5.583	1.44	11.667	8.63	17.750	1.62	23.83	1.08
5.667	1.44	11.750	8.63	17.833	1.62	23.92	1.08
5.750	1.44	11.833	37.40	17.917	1.62	24.00	1.08
5.833	1.44	11.917	37.40	18.000	1.62	24.08	1.08
5.917	1.44	12.000	37.40	18.083	1.62	24.17	1.08
6.000	1.44	12.083	99.24	18.167	1.62	24.25	1.08
6.083	1.44	12.167	99.25	18.250	1.62		

Max.Eff.Inten.(mm/hr)=	99.25	99.43	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.35 (ii)	9.43 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.30	0.12	
			TOTALS
PEAK FLOW (cms)=	0.18	0.07	0.251 (iii)
TIME TO PEAK (hrs)=	12.25	12.25	12.25
RUNOFF VOLUME (mm)=	88.90	53.04	73.83
TOTAL RAINFALL (mm)=	89.90	89.90	89.90
RUNOFF COEFFICIENT =	0.99	0.59	0.82

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0032)	Area (ha)=	3.80	
ID= 1 DT= 5.0 min	Total Imp(%)=	80.00	Dir. Conn.(%)= 60.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	6.167	1.44	12.250	99.25	18.33	1.62
0.167	0.00	6.250	1.44	12.333	12.96	18.42	1.62
0.250	0.00	6.333	1.80	12.417	12.95	18.50	1.62
0.333	0.90	6.417	1.80	12.500	12.95	18.58	1.62
0.417	0.90	6.500	1.80	12.583	12.95	18.67	1.62
0.500	0.90	6.583	1.80	12.667	12.95	18.75	1.62
0.583	0.90	6.667	1.80	12.750	12.95	18.83	1.62
0.667	0.90	6.750	1.80	12.833	6.65	18.92	1.62
0.750	0.90	6.833	1.80	12.917	6.65	19.00	1.62
0.833	0.90	6.917	1.80	13.000	6.65	19.08	1.62
0.917	0.90	7.000	1.80	13.083	6.65	19.17	1.62
1.000	0.90	7.083	1.80	13.167	6.65	19.25	1.62
1.083	0.90	7.167	1.80	13.250	6.65	19.33	1.62
1.167	0.90	7.250	1.80	13.333	1.26	19.42	1.62
1.250	0.90	7.333	1.80	13.417	1.26	19.50	1.62
1.333	0.90	7.417	1.80	13.500	1.26	19.58	1.62
1.417	0.90	7.500	1.80	13.583	1.26	19.67	1.62
1.500	0.90	7.583	1.80	13.667	1.26	19.75	1.62
1.583	0.90	7.667	1.80	13.750	1.26	19.83	1.62
1.667	0.90	7.750	1.80	13.833	7.37	19.92	1.62
1.750	0.90	7.833	1.80	13.917	7.37	20.00	1.62
1.833	0.90	7.917	1.80	14.000	7.37	20.08	1.62
1.917	0.90	8.000	1.80	14.083	7.37	20.17	1.62
2.000	0.90	8.083	1.80	14.167	7.37	20.25	1.62
2.083	1.62	8.167	1.80	14.250	7.37	20.33	1.08
2.167	1.62	8.250	1.80	14.333	2.70	20.42	1.08
2.250	1.62	8.333	2.43	14.417	2.70	20.50	1.08
2.333	1.17	8.417	2.43	14.500	2.70	20.58	1.08
2.417	1.17	8.500	2.43	14.583	2.70	20.67	1.08
2.500	1.17	8.583	2.43	14.667	2.70	20.75	1.08
2.583	1.17	8.667	2.43	14.750	2.70	20.83	1.08
2.667	1.17	8.750	2.43	14.833	2.70	20.92	1.08
2.750	1.17	8.833	2.43	14.917	2.70	21.00	1.08
2.833	1.17	8.917	2.43	15.000	2.70	21.08	1.08
2.917	1.17	9.000	2.43	15.083	2.70	21.17	1.08
3.000	1.17	9.083	2.43	15.167	2.70	21.25	1.08
3.083	1.17	9.167	2.43	15.250	2.70	21.33	1.08
3.167	1.17	9.250	2.43	15.333	2.70	21.42	1.08
3.250	1.17	9.333	2.88	15.417	2.70	21.50	1.08
3.333	1.17	9.417	2.88	15.500	2.70	21.58	1.08
3.417	1.17	9.500	2.88	15.583	2.70	21.67	1.08
3.500	1.17	9.583	2.88	15.667	2.70	21.75	1.08
3.583	1.17	9.667	2.88	15.750	2.70	21.83	1.08
3.667	1.17	9.750	2.88	15.833	2.70	21.92	1.08
3.750	1.17	9.833	3.24	15.917	2.70	22.00	1.08
3.833	1.17	9.917	3.24	16.000	2.70	22.08	1.08
3.917	1.17	10.000	3.24	16.083	2.70	22.17	1.08
4.000	1.17	10.083	3.24	16.167	2.70	22.25	1.08
4.083	1.17	10.167	3.24	16.250	2.70	22.33	1.08
4.167	1.17	10.250	3.24	16.333	1.62	22.42	1.08
4.250	1.17	10.333	4.14	16.417	1.62	22.50	1.08
4.333	1.44	10.417	4.14	16.500	1.62	22.58	1.08
4.417	1.44	10.500	4.14	16.583	1.62	22.67	1.08
4.500	1.44	10.583	4.14	16.667	1.62	22.75	1.08
4.583	1.44	10.667	4.14	16.750	1.62	22.83	1.08
4.667	1.44	10.750	4.14	16.833	1.62	22.92	1.08
4.750	1.44	10.833	5.57	16.917	1.62	23.00	1.08
4.833	1.44	10.917	5.57	17.000	1.62	23.08	1.08

4.917	1.44	11.000	5.57	17.083	1.62	23.17	1.08
5.000	1.44	11.083	5.57	17.167	1.62	23.25	1.08
5.083	1.44	11.167	5.57	17.250	1.62	23.33	1.08
5.167	1.44	11.250	5.57	17.333	1.62	23.42	1.08
5.250	1.44	11.333	8.63	17.417	1.62	23.50	1.08
5.333	1.44	11.417	8.63	17.500	1.62	23.58	1.08
5.417	1.44	11.500	8.63	17.583	1.62	23.67	1.08
5.500	1.44	11.583	8.63	17.667	1.62	23.75	1.08
5.583	1.44	11.667	8.63	17.750	1.62	23.83	1.08
5.667	1.44	11.750	8.63	17.833	1.62	23.92	1.08
5.750	1.44	11.833	37.40	17.917	1.62	24.00	1.08
5.833	1.44	11.917	37.40	18.000	1.62	24.08	1.08
5.917	1.44	12.000	37.40	18.083	1.62	24.17	1.08
6.000	1.44	12.083	99.24	18.167	1.62	24.25	1.08
6.083	1.44	12.167	99.25	18.250	1.62		

Max.Eff.Inten.(mm/hr)=	99.25	160.21	
over (min)	5.00	10.00	
Storage Coeff. (min)=	3.39 (ii)	7.95 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.26	0.13	
			TOTALS
PEAK FLOW (cms)=	0.62	0.27	0.899 (iii)
TIME TO PEAK (hrs)=	12.25	12.25	12.25
RUNOFF VOLUME (mm)=	88.90	60.95	77.72
TOTAL RAINFALL (mm)=	89.90	89.90	89.90
RUNOFF COEFFICIENT =	0.99	0.68	0.86

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0034)	Area (ha)=	29.06	
ID= 1 DT= 5.0 min	Total Imp(%)=	66.00	Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	6.167	1.44	12.250	99.25	18.33	1.62
0.167	0.00	6.250	1.44	12.333	12.96	18.42	1.62
0.250	0.00	6.333	1.80	12.417	12.95	18.50	1.62
0.333	0.90	6.417	1.80	12.500	12.95	18.58	1.62
0.417	0.90	6.500	1.80	12.583	12.95	18.67	1.62
0.500	0.90	6.583	1.80	12.667	12.95	18.75	1.62
0.583	0.90	6.667	1.80	12.750	12.95	18.83	1.62
0.667	0.90	6.750	1.80	12.833	6.65	18.92	1.62
0.750	0.90	6.833	1.80	12.917	6.65	19.00	1.62
0.833	0.90	6.917	1.80	13.000	6.65	19.08	1.62
0.917	0.90	7.000	1.80	13.083	6.65	19.17	1.62
1.000	0.90	7.083	1.80	13.167	6.65	19.25	1.62
1.083	0.90	7.167	1.80	13.250	6.65	19.33	1.62
1.167	0.90	7.250	1.80	13.333	1.26	19.42	1.62
1.250	0.90	7.333	1.80	13.417	1.26	19.50	1.62
1.333	0.90	7.417	1.80	13.500	1.26	19.58	1.62
1.417	0.90	7.500	1.80	13.583	1.26	19.67	1.62
1.500	0.90	7.583	1.80	13.667	1.26	19.75	1.62
1.583	0.90	7.667	1.80	13.750	1.26	19.83	1.62
1.667	0.90	7.750	1.80	13.833	7.37	19.92	1.62
1.750	0.90	7.833	1.80	13.917	7.37	20.00	1.62
1.833	0.90	7.917	1.80	14.000	7.37	20.08	1.62
1.917	0.90	8.000	1.80	14.083	7.37	20.17	1.62
2.000	0.90	8.083	1.80	14.167	7.37	20.25	1.62
2.083	1.62	8.167	1.80	14.250	7.37	20.33	1.08
2.167	1.62	8.250	1.80	14.333	2.70	20.42	1.08
2.250	1.62	8.333	2.43	14.417	2.70	20.50	1.08
2.333	1.17	8.417	2.43	14.500	2.70	20.58	1.08
2.417	1.17	8.500	2.43	14.583	2.70	20.67	1.08
2.500	1.17	8.583	2.43	14.667	2.70	20.75	1.08
2.583	1.17	8.667	2.43	14.750	2.70	20.83	1.08
2.667	1.17	8.750	2.43	14.833	2.70	20.92	1.08
2.750	1.17	8.833	2.43	14.917	2.70	21.00	1.08
2.833	1.17	8.917	2.43	15.000	2.70	21.08	1.08
2.917	1.17	9.000	2.43	15.083	2.70	21.17	1.08
3.000	1.17	9.083	2.43	15.167	2.70	21.25	1.08
3.083	1.17	9.167	2.43	15.250	2.70	21.33	1.08
3.167	1.17	9.250	2.43	15.333	2.70	21.42	1.08
3.250	1.17	9.333	2.88	15.417	2.70	21.50	1.08
3.333	1.17	9.417	2.88	15.500	2.70	21.58	1.08
3.417	1.17	9.500	2.88	15.583	2.70	21.67	1.08
3.500	1.17	9.583	2.88	15.667	2.70	21.75	1.08
3.583	1.17	9.667	2.88	15.750	2.70	21.83	1.08
3.667	1.17	9.750	2.88	15.833	2.70	21.92	1.08
3.750	1.17	9.833	3.24	15.917	2.70	22.00	1.08
3.833	1.17	9.917	3.24	16.000	2.70	22.08	1.08
3.917	1.17	10.000	3.24	16.083	2.70	22.17	1.08
4.000	1.17	10.083	3.24	16.167	2.70	22.25	1.08
4.083	1.17	10.167	3.24	16.250	2.70	22.33	1.08
4.167	1.17	10.250	3.24	16.333	1.62	22.42	1.08
4.250	1.17	10.333	4.14	16.417	1.62	22.50	1.08
4.333	1.44	10.417	4.14	16.500	1.62	22.58	1.08
4.417	1.44	10.500	4.14	16.583	1.62	22.67	1.08
4.500	1.44	10.583	4.14	16.667	1.62	22.75	1.08
4.583	1.44	10.667	4.14	16.750	1.62	22.83	1.08
4.667	1.44	10.750	4.14	16.833	1.62	22.92	1.08
4.750	1.44	10.833	5.57	16.917	1.62	23.00	1.08
4.833	1.44	10.917	5.57	17.000	1.62	23.08	1.08
4.917	1.44	11.000	5.57	17.083	1.62	23.17	1.08
5.000	1.44	11.083	5.57	17.167	1.62	23.25	1.08
5.083	1.44	11.167	5.57	17.250	1.62	23.33	1.08
5.167	1.44	11.250	5.57	17.333	1.62	23.42	1.08
5.250	1.44	11.333	8.63	17.417	1.62	23.50	1.08
5.333	1.44	11.417	8.63	17.500	1.62	23.58	1.08
5.417	1.44	11.500	8.63	17.583	1.62	23.67	1.08
5.500	1.44	11.583	8.63	17.667	1.62	23.75	1.08
5.583	1.44	11.667	8.63	17.750	1.62	23.83	1.08

```
               5.667    1.44 |11.750    8.63 |17.833    1.62 | 23.92    1.08
               5.750    1.44 |11.833   37.40 |17.917    1.62 | 24.00    1.08
               5.833    1.44 |11.917   37.40 |18.000    1.62 | 24.08    1.08
               5.917    1.44 |12.000   37.40 |18.083    1.62 | 24.17    1.08
               6.000    1.44 |12.083   99.24 |18.167    1.62 | 24.25    1.08
               6.083    1.44 |12.167   99.25 |18.250    1.62 |

     Max.Eff.Inten.(mm/hr)=      99.25        91.87
                 over (min)        5.00        15.00
     Storage Coeff.  (min)=       6.23 (ii)   13.54 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.19         0.08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       4.15         1.57         5.542 (iii)
     TIME TO PEAK    (hrs)=      12.25        12.33        12.25
     RUNOFF VOLUME    (mm)=      88.90        51.71        72.16
     TOTAL RAINFALL   (mm)=      89.90        89.90        89.90
     RUNOFF COEFFICIENT   =       0.99         0.58         0.80


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    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  (  0035)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0032):     3.80   0.899    12.25    77.72
      + ID2= 2 (  0034):    29.06   5.542    12.25    72.16
        ================================================
        ID = 3 (  0035):    32.86   6.440    12.25    72.80

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

```
--------------------
| RESERVOIR(  0033)|     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   |   0.4930     1.5666
                         0.0360     0.7150   |   0.7890     1.8478
                         0.0660     1.0737   |   1.0520     2.0613
                         0.2630     1.3645   |   1.3140     2.2797

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0035)     32.860      6.440     12.25      72.80
   OUTFLOW: ID= 1 (  0033)     32.860      0.492     13.33      70.30

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  7.64
                  TIME SHIFT OF PEAK FLOW         (min)= 65.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.5666
```

```
--------------------
| ADD HYD  (  0029)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0028):     1.13   0.251    12.25    73.83
      + ID2= 2 (  0033):    32.86   0.492    13.33    70.30
        ================================================
        ID = 3 (  0029):    33.99   0.511    13.25    70.42

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

```
--------------------
| ADD HYD  (  0029)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0029):    33.99   0.511    13.25    70.42
      + ID2= 2 (  0053):    41.43   0.564    14.00    29.01
        ================================================
        ID = 1 (  0029):    75.42   1.028    14.17    47.67

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

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


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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\bd5fa856-fdd6-463d-a799-118366142c29\scen
  Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\bd5fa856-fdd6-463d-a799-118366142c29\scen


DATE: 05-03-2024                          TIME: 01:44:32

USER:



COMMENTS: _____________________________________________________________
```

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  ***********************************************
  ** SIMULATION : 04. 25-Year-24-Hour-SCS-Type- **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              3a0c766d-3ecf-4101-8ec5-64101323cb13\6b809c2e
| Ptotal=107.50 mm |    Comments: 25-Year-24-Hour-SCS-Type-II
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	2.15	12.50	15.48	18.75	1.93
0.25	1.07	6.50	2.15	12.75	7.95	19.00	1.94
0.50	1.07	6.75	2.15	13.00	7.96	19.25	1.93
0.75	1.07	7.00	2.15	13.25	1.50	19.50	1.94
1.00	1.07	7.25	2.15	13.50	1.50	19.75	1.93
1.25	1.08	7.50	2.15	13.75	8.82	20.00	1.94
1.50	1.07	7.75	2.15	14.00	8.82	20.25	1.29
1.75	1.08	8.00	2.15	14.25	3.22	20.50	1.29
2.00	1.93	8.25	2.90	14.50	3.22	20.75	1.29
2.25	1.40	8.50	2.90	14.75	3.22	21.00	1.29
2.50	1.40	8.75	2.90	15.00	3.23	21.25	1.29
2.75	1.40	9.00	2.90	15.25	3.22	21.50	1.29
3.00	1.40	9.25	3.44	15.50	3.22	21.75	1.29
3.25	1.40	9.50	3.44	15.75	3.22	22.00	1.29
3.50	1.40	9.75	3.87	16.00	3.22	22.25	1.29
3.75	1.40	10.00	3.87	16.25	1.94	22.50	1.29
4.00	1.40	10.25	4.95	16.50	1.93	22.75	1.29
4.25	1.72	10.50	4.95	16.75	1.93	23.00	1.29
4.50	1.72	10.75	6.67	17.00	1.94	23.25	1.29
4.75	1.72	11.00	6.66	17.25	1.93	23.50	1.29
5.00	1.72	11.25	10.32	17.50	1.94	23.75	1.29
5.25	1.72	11.50	10.32	17.75	1.93	24.00	1.29
5.50	1.72	11.75	44.72	18.00	1.94		
5.75	1.72	12.00	118.68	18.25	1.93		
6.00	1.72	12.25	15.48	18.50	1.94		

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| CALIB            |
| NASHYD   (  0052)|   Area     (ha)=  17.19   Curve Number    (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.98

         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	6.167	1.72	12.250	118.68	18.33	1.94
0.167	0.00	6.250	1.72	12.333	15.49	18.42	1.93
0.250	0.00	6.333	2.15	12.417	15.48	18.50	1.93
0.333	1.08	6.417	2.15	12.500	15.48	18.58	1.94
0.417	1.07	6.500	2.15	12.583	15.48	18.67	1.94
0.500	1.07	6.583	2.15	12.667	15.48	18.75	1.94
0.583	1.08	6.667	2.15	12.750	15.48	18.83	1.94
0.667	1.07	6.750	2.15	12.833	7.96	18.92	1.93
0.750	1.07	6.833	2.15	12.917	7.95	19.00	1.93
0.833	1.07	6.917	2.15	13.000	7.95	19.08	1.94
0.917	1.07	7.000	2.15	13.083	7.95	19.17	1.94
1.000	1.07	7.083	2.15	13.167	7.96	19.25	1.94
1.083	1.07	7.167	2.15	13.250	7.96	19.33	1.94
1.167	1.07	7.250	2.15	13.333	1.51	19.42	1.93
1.250	1.07	7.333	2.15	13.417	1.50	19.50	1.94
1.333	1.08	7.417	2.15	13.500	1.50	19.58	1.94
1.417	1.08	7.500	2.15	13.583	1.50	19.67	1.94
1.500	1.08	7.583	2.15	13.667	1.50	19.75	1.94
1.583	1.07	7.667	2.15	13.750	1.50	19.83	1.93
1.667	1.07	7.750	2.15	13.833	8.81	19.92	1.93
1.750	1.08	7.833	2.15	13.917	8.82	20.00	1.94
1.833	1.08	7.917	2.15	14.000	8.82	20.08	1.94
1.917	1.08	8.000	2.15	14.083	8.81	20.17	1.94
2.000	1.08	8.083	2.15	14.167	8.82	20.25	1.93
2.083	1.93	8.167	2.15	14.250	8.82	20.33	1.29
2.167	1.93	8.250	2.15	14.333	3.23	20.42	1.29
2.250	1.93	8.333	2.90	14.417	3.22	20.50	1.29
2.333	1.40	8.417	2.90	14.500	3.22	20.58	1.29
2.417	1.40	8.500	2.90	14.583	3.22	20.67	1.29
2.500	1.40	8.583	2.90	14.667	3.22	20.75	1.29
2.583	1.40	8.667	2.90	14.750	3.22	20.83	1.29
2.667	1.40	8.750	2.90	14.833	3.22	20.92	1.29
2.750	1.40	8.833	2.90	14.917	3.22	21.00	1.29
2.833	1.40	8.917	2.90	15.000	3.22	21.08	1.29
2.917	1.40	9.000	2.90	15.083	3.23	21.17	1.29
3.000	1.40	9.083	2.90	15.167	3.23	21.25	1.29
3.083	1.40	9.167	2.90	15.250	3.23	21.33	1.29
3.167	1.40	9.250	2.90	15.333	3.22	21.42	1.29
3.250	1.40	9.333	3.44	15.417	3.22	21.50	1.29
3.333	1.40	9.417	3.44	15.500	3.22	21.58	1.29
3.417	1.40	9.500	3.44	15.583	3.22	21.67	1.29
3.500	1.40	9.583	3.44	15.667	3.22	21.75	1.29
3.583	1.40	9.667	3.44	15.750	3.22	21.83	1.29
3.667	1.40	9.750	3.44	15.833	3.22	21.92	1.29
3.750	1.40	9.833	3.87	15.917	3.22	22.00	1.29
3.833	1.40	9.917	3.87	16.000	3.22	22.08	1.29
3.917	1.40	10.000	3.87	16.083	3.22	22.17	1.29
4.000	1.40	10.083	3.87	16.167	3.22	22.25	1.29
4.083	1.40	10.167	3.87	16.250	3.22	22.33	1.29
4.167	1.40	10.250	3.87	16.333	1.94	22.42	1.29
4.250	1.40	10.333	4.94	16.417	1.94	22.50	1.29
4.333	1.72	10.417	4.95	16.500	1.94	22.58	1.29
4.417	1.72	10.500	4.95	16.583	1.94	22.67	1.29
4.500	1.72	10.583	4.94	16.667	1.93	22.75	1.29
4.583	1.72	10.667	4.95	16.750	1.93	22.83	1.29
4.667	1.72	10.750	4.95	16.833	1.94	22.92	1.29
4.750	1.72	10.833	6.66	16.917	1.93	23.00	1.29
4.833	1.72	10.917	6.67	17.000	1.93	23.08	1.29
4.917	1.72	11.000	6.67	17.083	1.94	23.17	1.29
5.000	1.72	11.083	6.66	17.167	1.94	23.25	1.29
5.083	1.72	11.167	6.66	17.250	1.94	23.33	1.29
5.167	1.72	11.250	6.66	17.333	1.94	23.42	1.29
5.250	1.72	11.333	10.32	17.417	1.93	23.50	1.29
5.333	1.72	11.417	10.32	17.500	1.93	23.58	1.29
5.417	1.72	11.500	10.32	17.583	1.94	23.67	1.29
5.500	1.72	11.583	10.32	17.667	1.94	23.75	1.29
5.583	1.72	11.667	10.32	17.750	1.94	23.83	1.29
5.667	1.72	11.750	10.32	17.833	1.94	23.92	1.29
5.750	1.72	11.833	44.72	17.917	1.93	24.00	1.29

5.833	1.72	11.917	44.72	18.000	1.93	24.08	1.29
5.917	1.72	12.000	44.72	18.083	1.94	24.17	1.29
6.000	1.72	12.083	118.67	18.167	1.94	24.25	1.29
6.083	1.72	12.167	118.68	18.250	1.94		

Unit Hyd Qpeak (cms)= 0.670

PEAK FLOW (cms)= 0.546 (i)
TIME TO PEAK (hrs)= 13.167
RUNOFF VOLUME (mm)= 39.812
TOTAL RAINFALL (mm)= 107.500
RUNOFF COEFFICIENT = 0.370

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

ROUTE CHN(0040)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

	<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0052)	17.19	0.55	13.17	39.81	0.03	0.63
OUTFLOW: ID= 1 (0040)	17.19	0.47	13.67	39.81	0.02	0.63

CALIB			
NASHYD (0050)	Area (ha)= 24.24	Curve Number (CN)= 63.0	
ID= 1 DT= 5.0 min	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.13		

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	6.167	1.72	12.250	118.68	18.33	1.94
0.167	0.00	6.250	1.72	12.333	15.49	18.42	1.93
0.250	0.00	6.333	2.15	12.417	15.48	18.50	1.93
0.333	1.08	6.417	2.15	12.500	15.48	18.58	1.94
0.417	1.07	6.500	2.15	12.583	15.48	18.67	1.94
0.500	1.07	6.583	2.15	12.667	15.48	18.75	1.94
0.583	1.08	6.667	2.15	12.750	15.48	18.83	1.94
0.667	1.07	6.750	2.15	12.833	7.96	18.92	1.93
0.750	1.07	6.833	2.15	12.917	7.95	19.00	1.93
0.833	1.07	6.917	2.15	13.000	7.95	19.08	1.94
0.917	1.07	7.000	2.15	13.083	7.95	19.17	1.94
1.000	1.07	7.083	2.15	13.167	7.96	19.25	1.94
1.083	1.07	7.167	2.15	13.250	7.96	19.33	1.94
1.167	1.07	7.250	2.15	13.333	1.51	19.42	1.93
1.250	1.07	7.333	2.15	13.417	1.50	19.50	1.94
1.333	1.08	7.417	2.15	13.500	1.50	19.58	1.94
1.417	1.08	7.500	2.15	13.583	1.50	19.67	1.94
1.500	1.08	7.583	2.15	13.667	1.50	19.75	1.94
1.583	1.07	7.667	2.15	13.750	1.50	19.83	1.93
1.667	1.07	7.750	2.15	13.833	8.81	19.92	1.93
1.750	1.08	7.833	2.15	13.917	8.82	20.00	1.94
1.833	1.08	7.917	2.15	14.000	8.82	20.08	1.94
1.917	1.08	8.000	2.15	14.083	8.81	20.17	1.94
2.000	1.08	8.083	2.15	14.167	8.82	20.25	1.93
2.083	1.93	8.167	2.15	14.250	8.82	20.33	1.29
2.167	1.93	8.250	2.15	14.333	3.23	20.42	1.29
2.250	1.93	8.333	2.90	14.417	3.22	20.50	1.29
2.333	1.40	8.417	2.90	14.500	3.22	20.58	1.29
2.417	1.40	8.500	2.90	14.583	3.22	20.67	1.29
2.500	1.40	8.583	2.90	14.667	3.22	20.75	1.29
2.583	1.40	8.667	2.90	14.750	3.22	20.83	1.29
2.667	1.40	8.750	2.90	14.833	3.22	20.92	1.29
2.750	1.40	8.833	2.90	14.917	3.22	21.00	1.29
2.833	1.40	8.917	2.90	15.000	3.22	21.08	1.29
2.917	1.40	9.000	2.90	15.083	3.23	21.17	1.29
3.000	1.40	9.083	2.90	15.167	3.23	21.25	1.29
3.083	1.40	9.167	2.90	15.250	3.23	21.33	1.29
3.167	1.40	9.250	2.90	15.333	3.22	21.42	1.29
3.250	1.40	9.333	3.44	15.417	3.22	21.50	1.29
3.333	1.40	9.417	3.44	15.500	3.22	21.58	1.29
3.417	1.40	9.500	3.44	15.583	3.22	21.67	1.29
3.500	1.40	9.583	3.44	15.667	3.22	21.75	1.29
3.583	1.40	9.667	3.44	15.750	3.22	21.83	1.29

3.667	1.40	9.750	3.44	15.833	3.22	21.92	1.29
3.750	1.40	9.833	3.87	15.917	3.22	22.00	1.29
3.833	1.40	9.917	3.87	16.000	3.22	22.08	1.29
3.917	1.40	10.000	3.87	16.083	3.22	22.17	1.29
4.000	1.40	10.083	3.87	16.167	3.22	22.25	1.29
4.083	1.40	10.167	3.87	16.250	3.22	22.33	1.29
4.167	1.40	10.250	3.87	16.333	1.94	22.42	1.29
4.250	1.40	10.333	4.94	16.417	1.94	22.50	1.29
4.333	1.72	10.417	4.95	16.500	1.94	22.58	1.29
4.417	1.72	10.500	4.95	16.583	1.94	22.67	1.29
4.500	1.72	10.583	4.94	16.667	1.93	22.75	1.29
4.583	1.72	10.667	4.95	16.750	1.93	22.83	1.29
4.667	1.72	10.750	4.95	16.833	1.94	22.92	1.29
4.750	1.72	10.833	6.66	16.917	1.93	23.00	1.29
4.833	1.72	10.917	6.67	17.000	1.93	23.08	1.29
4.917	1.72	11.000	6.67	17.083	1.94	23.17	1.29
5.000	1.72	11.083	6.66	17.167	1.94	23.25	1.29
5.083	1.72	11.167	6.66	17.250	1.94	23.33	1.29
5.167	1.72	11.250	6.66	17.333	1.94	23.42	1.29
5.250	1.72	11.333	10.32	17.417	1.93	23.50	1.29
5.333	1.72	11.417	10.32	17.500	1.93	23.58	1.29
5.417	1.72	11.500	10.32	17.583	1.94	23.67	1.29
5.500	1.72	11.583	10.32	17.667	1.94	23.75	1.29
5.583	1.72	11.667	10.32	17.750	1.94	23.83	1.29
5.667	1.72	11.750	10.32	17.833	1.94	23.92	1.29
5.750	1.72	11.833	44.72	17.917	1.93	24.00	1.29
5.833	1.72	11.917	44.72	18.000	1.93	24.08	1.29
5.917	1.72	12.000	44.72	18.083	1.94	24.17	1.29
6.000	1.72	12.083	118.67	18.167	1.94	24.25	1.29
6.083	1.72	12.167	118.68	18.250	1.94		

Unit Hyd Qpeak (cms)= 0.819

PEAK FLOW (cms)= 0.692 (i)
TIME TO PEAK (hrs)= 13.333
RUNOFF VOLUME (mm)= 39.812
TOTAL RAINFALL (mm)= 107.500
RUNOFF COEFFICIENT = 0.370

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

ROUTE CHN(0041)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

		<---- hydrograph ---->			<-pipe / channel->	
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0050)	24.24	0.69	13.33	39.81	0.04	0.22
OUTFLOW: ID= 1 (0041)	24.24	0.38	14.75	39.78	0.03	0.19

ADD HYD (0053)|
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0040):	17.19	0.473	13.67	39.81
+ ID2= 2 (0041):	24.24	0.375	14.75	39.78
ID = 3 (0053):	41.43	0.795	14.00	39.79

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0028)|	Area (ha)= 1.13
ID= 1 DT= 5.0 min	Total Imp(%)= 70.00 Dir. Conn.(%)= 58.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.79	0.34
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	86.79	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	6.167	1.72	12.250	118.68	18.33	1.94

0.167	0.00	6.250	1.72	12.333	15.49	18.42	1.93
0.250	0.00	6.333	2.15	12.417	15.48	18.50	1.93
0.333	1.08	6.417	2.15	12.500	15.48	18.58	1.94
0.417	1.07	6.500	2.15	12.583	15.48	18.67	1.94
0.500	1.07	6.583	2.15	12.667	15.48	18.75	1.94
0.583	1.08	6.667	2.15	12.750	15.48	18.83	1.94
0.667	1.07	6.750	2.15	12.833	7.96	18.92	1.93
0.750	1.07	6.833	2.15	12.917	7.95	19.00	1.93
0.833	1.07	6.917	2.15	13.000	7.95	19.08	1.94
0.917	1.07	7.000	2.15	13.083	7.95	19.17	1.94
1.000	1.07	7.083	2.15	13.167	7.96	19.25	1.94
1.083	1.07	7.167	2.15	13.250	7.96	19.33	1.94
1.167	1.07	7.250	2.15	13.333	1.51	19.42	1.93
1.250	1.07	7.333	2.15	13.417	1.50	19.50	1.94
1.333	1.08	7.417	2.15	13.500	1.50	19.58	1.94
1.417	1.08	7.500	2.15	13.583	1.50	19.67	1.94
1.500	1.08	7.583	2.15	13.667	1.50	19.75	1.94
1.583	1.07	7.667	2.15	13.750	1.50	19.83	1.93
1.667	1.07	7.750	2.15	13.833	8.81	19.92	1.93
1.750	1.08	7.833	2.15	13.917	8.82	20.00	1.94
1.833	1.08	7.917	2.15	14.000	8.82	20.08	1.94
1.917	1.08	8.000	2.15	14.083	8.81	20.17	1.94
2.000	1.08	8.083	2.15	14.167	8.82	20.25	1.93
2.083	1.93	8.167	2.15	14.250	8.82	20.33	1.29
2.167	1.93	8.250	2.15	14.333	3.23	20.42	1.29
2.250	1.93	8.333	2.90	14.417	3.22	20.50	1.29
2.333	1.40	8.417	2.90	14.500	3.22	20.58	1.29
2.417	1.40	8.500	2.90	14.583	3.22	20.67	1.29
2.500	1.40	8.583	2.90	14.667	3.22	20.75	1.29
2.583	1.40	8.667	2.90	14.750	3.22	20.83	1.29
2.667	1.40	8.750	2.90	14.833	3.22	20.92	1.29
2.750	1.40	8.833	2.90	14.917	3.22	21.00	1.29
2.833	1.40	8.917	2.90	15.000	3.22	21.08	1.29
2.917	1.40	9.000	2.90	15.083	3.23	21.17	1.29
3.000	1.40	9.083	2.90	15.167	3.23	21.25	1.29
3.083	1.40	9.167	2.90	15.250	3.23	21.33	1.29
3.167	1.40	9.250	2.90	15.333	3.22	21.42	1.29
3.250	1.40	9.333	3.44	15.417	3.22	21.50	1.29
3.333	1.40	9.417	3.44	15.500	3.22	21.58	1.29
3.417	1.40	9.500	3.44	15.583	3.22	21.67	1.29
3.500	1.40	9.583	3.44	15.667	3.22	21.75	1.29
3.583	1.40	9.667	3.44	15.750	3.22	21.83	1.29
3.667	1.40	9.750	3.44	15.833	3.22	21.92	1.29
3.750	1.40	9.833	3.87	15.917	3.22	22.00	1.29
3.833	1.40	9.917	3.87	16.000	3.22	22.08	1.29
3.917	1.40	10.000	3.87	16.083	3.22	22.17	1.29
4.000	1.40	10.083	3.87	16.167	3.22	22.25	1.29
4.083	1.40	10.167	3.87	16.250	3.22	22.33	1.29
4.167	1.40	10.250	3.87	16.333	1.94	22.42	1.29
4.250	1.40	10.333	4.94	16.417	1.94	22.50	1.29
4.333	1.72	10.417	4.95	16.500	1.94	22.58	1.29
4.417	1.72	10.500	4.95	16.583	1.94	22.67	1.29
4.500	1.72	10.583	4.94	16.667	1.93	22.75	1.29
4.583	1.72	10.667	4.95	16.750	1.93	22.83	1.29
4.667	1.72	10.750	4.95	16.833	1.94	22.92	1.29
4.750	1.72	10.833	6.66	16.917	1.93	23.00	1.29
4.833	1.72	10.917	6.67	17.000	1.93	23.08	1.29
4.917	1.72	11.000	6.67	17.083	1.94	23.17	1.29
5.000	1.72	11.083	6.66	17.167	1.94	23.25	1.29
5.083	1.72	11.167	6.66	17.250	1.94	23.33	1.29
5.167	1.72	11.250	6.66	17.333	1.94	23.42	1.29
5.250	1.72	11.333	10.32	17.417	1.93	23.50	1.29
5.333	1.72	11.417	10.32	17.500	1.93	23.58	1.29
5.417	1.72	11.500	10.32	17.583	1.94	23.67	1.29
5.500	1.72	11.583	10.32	17.667	1.94	23.75	1.29
5.583	1.72	11.667	10.32	17.750	1.94	23.83	1.29
5.667	1.72	11.750	10.32	17.833	1.94	23.92	1.29
5.750	1.72	11.833	44.72	17.917	1.93	24.00	1.29
5.833	1.72	11.917	44.72	18.000	1.93	24.08	1.29
5.917	1.72	12.000	44.72	18.083	1.94	24.17	1.29
6.000	1.72	12.083	118.67	18.167	1.94	24.25	1.29
6.083	1.72	12.167	118.68	18.250	1.94		

Max.Eff.Inten.(mm/hr)=		118.68	126.95	
over (min)		5.00	10.00	
Storage Coeff. (min)=		2.19 (ii)	8.61 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.31	0.12	
				TOTALS
PEAK FLOW	(cms)=	0.22	0.09	0.310 (iii)
TIME TO PEAK	(hrs)=	12.25	12.25	12.25
RUNOFF VOLUME	(mm)=	106.50	68.31	90.46
TOTAL RAINFALL	(mm)=	107.50	107.50	107.50
RUNOFF COEFFICIENT	=	0.99	0.64	0.84

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0032)	Area (ha)=	3.80	
ID= 1 DT= 5.0 min	Total Imp(%)=	80.00	Dir. Conn.(%)= 60.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	6.167	1.72	12.250	118.68	18.33	1.94
0.167	0.00	6.250	1.72	12.333	15.49	18.42	1.93
0.250	0.00	6.333	2.15	12.417	15.48	18.50	1.93
0.333	1.08	6.417	2.15	12.500	15.48	18.58	1.94
0.417	1.07	6.500	2.15	12.583	15.48	18.67	1.94
0.500	1.07	6.583	2.15	12.667	15.48	18.75	1.94
0.583	1.08	6.667	2.15	12.750	15.48	18.83	1.94
0.667	1.07	6.750	2.15	12.833	7.96	18.92	1.93
0.750	1.07	6.833	2.15	12.917	7.95	19.00	1.93
0.833	1.07	6.917	2.15	13.000	7.95	19.08	1.94

0.917	1.07	7.000	2.15	13.083	7.95	19.17	1.94	
1.000	1.07	7.083	2.15	13.167	7.96	19.25	1.94	
1.083	1.07	7.167	2.15	13.250	7.96	19.33	1.94	
1.167	1.07	7.250	2.15	13.333	1.51	19.42	1.93	
1.250	1.07	7.333	2.15	13.417	1.50	19.50	1.94	
1.333	1.08	7.417	2.15	13.500	1.50	19.58	1.94	
1.417	1.08	7.500	2.15	13.583	1.50	19.67	1.94	
1.500	1.08	7.583	2.15	13.667	1.50	19.75	1.94	
1.583	1.07	7.667	2.15	13.750	1.50	19.83	1.93	
1.667	1.07	7.750	2.15	13.833	8.81	19.92	1.93	
1.750	1.08	7.833	2.15	13.917	8.82	20.00	1.94	
1.833	1.08	7.917	2.15	14.000	8.82	20.08	1.94	
1.917	1.08	8.000	2.15	14.083	8.81	20.17	1.94	
2.000	1.08	8.083	2.15	14.167	8.82	20.25	1.93	
2.083	1.93	8.167	2.15	14.250	8.82	20.33	1.29	
2.167	1.93	8.250	2.15	14.333	3.23	20.42	1.29	
2.250	1.93	8.333	2.90	14.417	3.22	20.50	1.29	
2.333	1.40	8.417	2.90	14.500	3.22	20.58	1.29	
2.417	1.40	8.500	2.90	14.583	3.22	20.67	1.29	
2.500	1.40	8.583	2.90	14.667	3.22	20.75	1.29	
2.583	1.40	8.667	2.90	14.750	3.22	20.83	1.29	
2.667	1.40	8.750	2.90	14.833	3.22	20.92	1.29	
2.750	1.40	8.833	2.90	14.917	3.22	21.00	1.29	
2.833	1.40	8.917	2.90	15.000	3.22	21.08	1.29	
2.917	1.40	9.000	2.90	15.083	3.23	21.17	1.29	
3.000	1.40	9.083	2.90	15.167	3.23	21.25	1.29	
3.083	1.40	9.167	2.90	15.250	3.23	21.33	1.29	
3.167	1.40	9.250	2.90	15.333	3.22	21.42	1.29	
3.250	1.40	9.333	3.44	15.417	3.22	21.50	1.29	
3.333	1.40	9.417	3.44	15.500	3.22	21.58	1.29	
3.417	1.40	9.500	3.44	15.583	3.22	21.67	1.29	
3.500	1.40	9.583	3.44	15.667	3.22	21.75	1.29	
3.583	1.40	9.667	3.44	15.750	3.22	21.83	1.29	
3.667	1.40	9.750	3.44	15.833	3.22	21.92	1.29	
3.750	1.40	9.833	3.87	15.917	3.22	22.00	1.29	
3.833	1.40	9.917	3.87	16.000	3.22	22.08	1.29	
3.917	1.40	10.000	3.87	16.083	3.22	22.17	1.29	
4.000	1.40	10.083	3.87	16.167	3.22	22.25	1.29	
4.083	1.40	10.167	3.87	16.250	3.22	22.33	1.29	
4.167	1.40	10.250	3.87	16.333	1.94	22.42	1.29	
4.250	1.40	10.333	4.94	16.417	1.94	22.50	1.29	
4.333	1.72	10.417	4.95	16.500	1.94	22.58	1.29	
4.417	1.72	10.500	4.95	16.583	1.94	22.67	1.29	
4.500	1.72	10.583	4.94	16.667	1.93	22.75	1.29	
4.583	1.72	10.667	4.95	16.750	1.93	22.83	1.29	
4.667	1.72	10.750	4.95	16.833	1.94	22.92	1.29	
4.750	1.72	10.833	6.66	16.917	1.93	23.00	1.29	
4.833	1.72	10.917	6.67	17.000	1.93	23.08	1.29	
4.917	1.72	11.000	6.67	17.083	1.94	23.17	1.29	
5.000	1.72	11.083	6.66	17.167	1.94	23.25	1.29	
5.083	1.72	11.167	6.66	17.250	1.94	23.33	1.29	
5.167	1.72	11.250	6.66	17.333	1.94	23.42	1.29	
5.250	1.72	11.333	10.32	17.417	1.93	23.50	1.29	
5.333	1.72	11.417	10.32	17.500	1.93	23.58	1.29	
5.417	1.72	11.500	10.32	17.583	1.94	23.67	1.29	
5.500	1.72	11.583	10.32	17.667	1.94	23.75	1.29	
5.583	1.72	11.667	10.32	17.750	1.94	23.83	1.29	
5.667	1.72	11.750	10.32	17.833	1.94	23.92	1.29	
5.750	1.72	11.833	44.72	17.917	1.93	24.00	1.29	
5.833	1.72	11.917	44.72	18.000	1.93	24.08	1.29	
5.917	1.72	12.000	44.72	18.083	1.94	24.17	1.29	
6.000	1.72	12.083	118.67	18.167	1.94	24.25	1.29	
6.083	1.72	12.167	118.68	18.250	1.94			

Max.Eff.Inten.(mm/hr)=	118.68	200.53	
over (min)	5.00	10.00	
Storage Coeff. (min)=	3.15 (ii)	7.40 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.27	0.13	
			TOTALS
PEAK FLOW (cms)=	0.75	0.35	1.101 (iii)
TIME TO PEAK (hrs)=	12.25	12.25	12.25
RUNOFF VOLUME (mm)=	106.50	77.13	94.75
TOTAL RAINFALL (mm)=	107.50	107.50	107.50
RUNOFF COEFFICIENT =	0.99	0.72	0.88

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0034)	Area (ha)= 29.06
ID= 1 DT= 5.0 min	Total Imp(%)= 66.00 Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	6.167	1.72	12.250	118.68	18.33	1.94
0.167	0.00	6.250	1.72	12.333	15.49	18.42	1.93
0.250	0.00	6.333	2.15	12.417	15.48	18.50	1.93
0.333	1.08	6.417	2.15	12.500	15.48	18.58	1.94
0.417	1.07	6.500	2.15	12.583	15.48	18.67	1.94
0.500	1.07	6.583	2.15	12.667	15.48	18.75	1.94
0.583	1.08	6.667	2.15	12.750	15.48	18.83	1.94
0.667	1.07	6.750	2.15	12.833	7.96	18.92	1.93
0.750	1.07	6.833	2.15	12.917	7.95	19.00	1.93
0.833	1.07	6.917	2.15	13.000	7.95	19.08	1.94
0.917	1.07	7.000	2.15	13.083	7.95	19.17	1.94
1.000	1.07	7.083	2.15	13.167	7.96	19.25	1.94
1.083	1.07	7.167	2.15	13.250	7.96	19.33	1.94
1.167	1.07	7.250	2.15	13.333	1.51	19.42	1.93
1.250	1.07	7.333	2.15	13.417	1.50	19.50	1.94
1.333	1.08	7.417	2.15	13.500	1.50	19.58	1.94
1.417	1.08	7.500	2.15	13.583	1.50	19.67	1.94
1.500	1.08	7.583	2.15	13.667	1.50	19.75	1.94
1.583	1.07	7.667	2.15	13.750	1.50	19.83	1.93

1.667	1.07	7.750	2.15	13.833	8.81	19.92	1.93
1.750	1.08	7.833	2.15	13.917	8.82	20.00	1.94
1.833	1.08	7.917	2.15	14.000	8.82	20.08	1.94
1.917	1.08	8.000	2.15	14.083	8.81	20.17	1.94
2.000	1.08	8.083	2.15	14.167	8.82	20.25	1.93
2.083	1.93	8.167	2.15	14.250	8.82	20.33	1.29
2.167	1.93	8.250	2.15	14.333	3.23	20.42	1.29
2.250	1.93	8.333	2.90	14.417	3.22	20.50	1.29
2.333	1.40	8.417	2.90	14.500	3.22	20.58	1.29
2.417	1.40	8.500	2.90	14.583	3.22	20.67	1.29
2.500	1.40	8.583	2.90	14.667	3.22	20.75	1.29
2.583	1.40	8.667	2.90	14.750	3.22	20.83	1.29
2.667	1.40	8.750	2.90	14.833	3.22	20.92	1.29
2.750	1.40	8.833	2.90	14.917	3.22	21.00	1.29
2.833	1.40	8.917	2.90	15.000	3.22	21.08	1.29
2.917	1.40	9.000	2.90	15.083	3.23	21.17	1.29
3.000	1.40	9.083	2.90	15.167	3.23	21.25	1.29
3.083	1.40	9.167	2.90	15.250	3.23	21.33	1.29
3.167	1.40	9.250	2.90	15.333	3.22	21.42	1.29
3.250	1.40	9.333	3.44	15.417	3.22	21.50	1.29
3.333	1.40	9.417	3.44	15.500	3.22	21.58	1.29
3.417	1.40	9.500	3.44	15.583	3.22	21.67	1.29
3.500	1.40	9.583	3.44	15.667	3.22	21.75	1.29
3.583	1.40	9.667	3.44	15.750	3.22	21.83	1.29
3.667	1.40	9.750	3.44	15.833	3.22	21.92	1.29
3.750	1.40	9.833	3.87	15.917	3.22	22.00	1.29
3.833	1.40	9.917	3.87	16.000	3.22	22.08	1.29
3.917	1.40	10.000	3.87	16.083	3.22	22.17	1.29
4.000	1.40	10.083	3.87	16.167	3.22	22.25	1.29
4.083	1.40	10.167	3.87	16.250	3.22	22.33	1.29
4.167	1.40	10.250	3.87	16.333	1.94	22.42	1.29
4.250	1.40	10.333	4.94	16.417	1.94	22.50	1.29
4.333	1.72	10.417	4.95	16.500	1.94	22.58	1.29
4.417	1.72	10.500	4.95	16.583	1.94	22.67	1.29
4.500	1.72	10.583	4.94	16.667	1.93	22.75	1.29
4.583	1.72	10.667	4.95	16.750	1.93	22.83	1.29
4.667	1.72	10.750	4.95	16.833	1.94	22.92	1.29
4.750	1.72	10.833	6.66	16.917	1.93	23.00	1.29
4.833	1.72	10.917	6.67	17.000	1.93	23.08	1.29
4.917	1.72	11.000	6.67	17.083	1.94	23.17	1.29
5.000	1.72	11.083	6.66	17.167	1.94	23.25	1.29
5.083	1.72	11.167	6.66	17.250	1.94	23.33	1.29
5.167	1.72	11.250	6.66	17.333	1.94	23.42	1.29
5.250	1.72	11.333	10.32	17.417	1.93	23.50	1.29
5.333	1.72	11.417	10.32	17.500	1.93	23.58	1.29
5.417	1.72	11.500	10.32	17.583	1.94	23.67	1.29
5.500	1.72	11.583	10.32	17.667	1.94	23.75	1.29
5.583	1.72	11.667	10.32	17.750	1.94	23.83	1.29
5.667	1.72	11.750	10.32	17.833	1.94	23.92	1.29
5.750	1.72	11.833	44.72	17.917	1.93	24.00	1.29
5.833	1.72	11.917	44.72	18.000	1.93	24.08	1.29
5.917	1.72	12.000	44.72	18.083	1.94	24.17	1.29
6.000	1.72	12.083	118.67	18.167	1.94	24.25	1.29
6.083	1.72	12.167	118.68	18.250	1.94		

Max.Eff.Inten.(mm/hr)=	118.68	117.71
over (min)	5.00	15.00
Storage Coeff. (min)=	5.80 (ii)	12.42 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.20	0.08
		TOTALS

PEAK FLOW	(cms)=	5.01	2.10	6.899 (iii)
TIME TO PEAK	(hrs)=	12.25	12.33	12.25
RUNOFF VOLUME	(mm)=	106.50	66.80	88.64
TOTAL RAINFALL	(mm)=	107.50	107.50	107.50
RUNOFF COEFFICIENT	=	0.99	0.62	0.82

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0035)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0032):	3.80	1.101	12.25	94.75
+ ID2= 2 (0034):	29.06	6.899	12.25	88.64
ID = 3 (0035):	32.86	8.000	12.25	89.34

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0033)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.4930	1.5666
	0.0360	0.7150	0.7890	1.8478
	0.0660	1.0737	1.0520	2.0613
	0.2630	1.3645	1.3140	2.2797

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0035)	32.860	8.000	12.25	89.34
OUTFLOW: ID= 1 (0033)	32.860	0.789	13.17	86.80

PEAK FLOW REDUCTION [Qout/Qin](%)= 9.86
TIME SHIFT OF PEAK FLOW (min)= 55.00
MAXIMUM STORAGE USED (ha.m.)= 1.8478

ADD HYD (0029)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0028):	1.13	0.310	12.25	90.46
+ ID2= 2 (0033):	32.86	0.789	13.17	86.80
ID = 3 (0029):	33.99	0.813	13.08	86.92

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0029)

```
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0029):    33.99   0.813    13.08    86.92
     + ID2= 2 (  0053):    41.43   0.795    14.00    39.79
       ================================================
       ID = 1 (  0029):    75.42   1.503    13.92    61.03

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

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

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  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\7b1bbe2a-4426-46d8-ba97-c81f0a9230cd\scen
  Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\7b1bbe2a-4426-46d8-ba97-c81f0a9230cd\scen

DATE: 05-03-2024                          TIME: 01:44:31

USER:


COMMENTS: _____________________________________________________________

------------------------------------------------------------------------------
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  ***********************************************
  ** SIMULATION : 05. 50-Year-24-Hour-SCS-Type- **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              3a0c766d-3ecf-4101-8ec5-64101323cb13\ada53171
| Ptotal=120.60 mm |    Comments: 50-Year-24-Hour-SCS-Type-II
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.00 |  6.25    2.41 | 12.50   17.37 | 18.75    2.17
                0.25    1.21 |  6.50    2.41 | 12.75    8.92 | 19.00    2.17
                0.50    1.21 |  6.75    2.41 | 13.00    8.92 | 19.25    2.17
                0.75    1.21 |  7.00    2.41 | 13.25    1.69 | 19.50    2.17
                1.00    1.21 |  7.25    2.41 | 13.50    1.69 | 19.75    2.17
                1.25    1.21 |  7.50    2.41 | 13.75    9.89 | 20.00    2.17
                1.50    1.21 |  7.75    2.41 | 14.00    9.89 | 20.25    1.45
                1.75    1.21 |  8.00    2.41 | 14.25    3.62 | 20.50    1.45
                2.00    2.17 |  8.25    3.26 | 14.50    3.62 | 20.75    1.45
                2.25    1.57 |  8.50    3.26 | 14.75    3.62 | 21.00    1.45
                2.50    1.57 |  8.75    3.26 | 15.00    3.62 | 21.25    1.45
                2.75    1.57 |  9.00    3.26 | 15.25    3.62 | 21.50    1.45
                3.00    1.57 |  9.25    3.86 | 15.50    3.62 | 21.75    1.45
                3.25    1.57 |  9.50    3.86 | 15.75    3.62 | 22.00    1.45
                3.50    1.57 |  9.75    4.34 | 16.00    3.62 | 22.25    1.45
                3.75    1.57 | 10.00    4.34 | 16.25    2.17 | 22.50    1.45
                4.00    1.57 | 10.25    5.55 | 16.50    2.17 | 22.75    1.45
                4.25    1.93 | 10.50    5.55 | 16.75    2.17 | 23.00    1.45
                4.50    1.93 | 10.75    7.48 | 17.00    2.17 | 23.25    1.45
                4.75    1.93 | 11.00    7.48 | 17.25    2.17 | 23.50    1.45
                5.00    1.93 | 11.25   11.58 | 17.50    2.17 | 23.75    1.45
                5.25    1.93 | 11.50   11.58 | 17.75    2.17 | 24.00    1.45
                5.50    1.93 | 11.75   50.17 | 18.00    2.17 |
                5.75    1.93 | 12.00  133.14 | 18.25    2.17 |
                6.00    1.93 | 12.25   17.37 | 18.50    2.17 |

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| CALIB            |
| NASHYD   (  0052)|   Area    (ha)=  17.19   Curve Number   (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.98

       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 | 6.167    1.93 |12.250  133.14 | 18.33    2.17
0.167    0.00 | 6.250    1.93 |12.333   17.38 | 18.42    2.17
0.250    0.00 | 6.333    2.41 |12.417   17.37 | 18.50    2.17
0.333    1.21 | 6.417    2.41 |12.500   17.37 | 18.58    2.17
0.417    1.21 | 6.500    2.41 |12.583   17.37 | 18.67    2.17
0.500    1.21 | 6.583    2.41 |12.667   17.37 | 18.75    2.17
0.583    1.21 | 6.667    2.41 |12.750   17.37 | 18.83    2.17
0.667    1.21 | 6.750    2.41 |12.833    8.93 | 18.92    2.17
0.750    1.21 | 6.833    2.41 |12.917    8.92 | 19.00    2.17
0.833    1.21 | 6.917    2.41 |13.000    8.92 | 19.08    2.17
0.917    1.21 | 7.000    2.41 |13.083    8.92 | 19.17    2.17
1.000    1.21 | 7.083    2.41 |13.167    8.92 | 19.25    2.17
1.083    1.21 | 7.167    2.41 |13.250    8.92 | 19.33    2.17
1.167    1.21 | 7.250    2.41 |13.333    1.69 | 19.42    2.17
1.250    1.21 | 7.333    2.41 |13.417    1.69 | 19.50    2.17
1.333    1.21 | 7.417    2.41 |13.500    1.69 | 19.58    2.17
1.417    1.21 | 7.500    2.41 |13.583    1.69 | 19.67    2.17
1.500    1.21 | 7.583    2.41 |13.667    1.69 | 19.75    2.17
1.583    1.21 | 7.667    2.41 |13.750    1.69 | 19.83    2.17
1.667    1.21 | 7.750    2.41 |13.833    9.89 | 19.92    2.17
1.750    1.21 | 7.833    2.41 |13.917    9.89 | 20.00    2.17
```

1.833	1.21	7.917	2.41	14.000	9.89	20.08	2.17
1.917	1.21	8.000	2.41	14.083	9.89	20.17	2.17
2.000	1.21	8.083	2.41	14.167	9.89	20.25	2.17
2.083	2.17	8.167	2.41	14.250	9.89	20.33	1.45
2.167	2.17	8.250	2.41	14.333	3.62	20.42	1.45
2.250	2.17	8.333	3.26	14.417	3.62	20.50	1.45
2.333	1.57	8.417	3.26	14.500	3.62	20.58	1.45
2.417	1.57	8.500	3.26	14.583	3.62	20.67	1.45
2.500	1.57	8.583	3.26	14.667	3.62	20.75	1.45
2.583	1.57	8.667	3.26	14.750	3.62	20.83	1.45
2.667	1.57	8.750	3.26	14.833	3.62	20.92	1.45
2.750	1.57	8.833	3.26	14.917	3.62	21.00	1.45
2.833	1.57	8.917	3.26	15.000	3.62	21.08	1.45
2.917	1.57	9.000	3.26	15.083	3.62	21.17	1.45
3.000	1.57	9.083	3.26	15.167	3.62	21.25	1.45
3.083	1.57	9.167	3.26	15.250	3.62	21.33	1.45
3.167	1.57	9.250	3.26	15.333	3.62	21.42	1.45
3.250	1.57	9.333	3.86	15.417	3.62	21.50	1.45
3.333	1.57	9.417	3.86	15.500	3.62	21.58	1.45
3.417	1.57	9.500	3.86	15.583	3.62	21.67	1.45
3.500	1.57	9.583	3.86	15.667	3.62	21.75	1.45
3.583	1.57	9.667	3.86	15.750	3.62	21.83	1.45
3.667	1.57	9.750	3.86	15.833	3.62	21.92	1.45
3.750	1.57	9.833	4.34	15.917	3.62	22.00	1.45
3.833	1.57	9.917	4.34	16.000	3.62	22.08	1.45
3.917	1.57	10.000	4.34	16.083	3.62	22.17	1.45
4.000	1.57	10.083	4.34	16.167	3.62	22.25	1.45
4.083	1.57	10.167	4.34	16.250	3.62	22.33	1.45
4.167	1.57	10.250	4.34	16.333	2.17	22.42	1.45
4.250	1.57	10.333	5.55	16.417	2.17	22.50	1.45
4.333	1.93	10.417	5.55	16.500	2.17	22.58	1.45
4.417	1.93	10.500	5.55	16.583	2.17	22.67	1.45
4.500	1.93	10.583	5.55	16.667	2.17	22.75	1.45
4.583	1.93	10.667	5.55	16.750	2.17	22.83	1.45
4.667	1.93	10.750	5.55	16.833	2.17	22.92	1.45
4.750	1.93	10.833	7.48	16.917	2.17	23.00	1.45
4.833	1.93	10.917	7.48	17.000	2.17	23.08	1.45
4.917	1.93	11.000	7.48	17.083	2.17	23.17	1.45
5.000	1.93	11.083	7.48	17.167	2.17	23.25	1.45
5.083	1.93	11.167	7.48	17.250	2.17	23.33	1.45
5.167	1.93	11.250	7.48	17.333	2.17	23.42	1.45
5.250	1.93	11.333	11.58	17.417	2.17	23.50	1.45
5.333	1.93	11.417	11.58	17.500	2.17	23.58	1.45
5.417	1.93	11.500	11.58	17.583	2.17	23.67	1.45
5.500	1.93	11.583	11.58	17.667	2.17	23.75	1.45
5.583	1.93	11.667	11.58	17.750	2.17	23.83	1.45
5.667	1.93	11.750	11.58	17.833	2.17	23.92	1.45
5.750	1.93	11.833	50.17	17.917	2.17	24.00	1.45
5.833	1.93	11.917	50.17	18.000	2.17	24.08	1.45
5.917	1.93	12.000	50.17	18.083	2.17	24.17	1.45
6.000	1.93	12.083	133.13	18.167	2.17	24.25	1.45
6.083	1.93	12.167	133.14	18.250	2.17		

Unit Hyd Qpeak (cms)= 0.670

PEAK FLOW (cms)= 0.669 (i)
TIME TO PEAK (hrs)= 13.167
RUNOFF VOLUME (mm)= 48.434
TOTAL RAINFALL (mm)= 120.600
RUNOFF COEFFICIENT = 0.402

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

ROUTE CHN(0040)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0052)	17.19	0.67	13.17	48.43	0.03	0.63
OUTFLOW: ID= 1 (0040)	17.19	0.58	13.67	48.43	0.03	0.63

CALIB			
NASHYD (0050)	Area (ha)= 24.24	Curve Number (CN)= 63.0	
ID= 1 DT= 5.0 min	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.13		

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	6.167	1.93	12.250	133.14	18.33	2.17
0.167	0.00	6.250	1.93	12.333	17.38	18.42	2.17
0.250	0.00	6.333	2.41	12.417	17.37	18.50	2.17
0.333	1.21	6.417	2.41	12.500	17.37	18.58	2.17
0.417	1.21	6.500	2.41	12.583	17.37	18.67	2.17
0.500	1.21	6.583	2.41	12.667	17.37	18.75	2.17
0.583	1.21	6.667	2.41	12.750	17.37	18.83	2.17
0.667	1.21	6.750	2.41	12.833	8.93	18.92	2.17
0.750	1.21	6.833	2.41	12.917	8.92	19.00	2.17
0.833	1.21	6.917	2.41	13.000	8.92	19.08	2.17
0.917	1.21	7.000	2.41	13.083	8.92	19.17	2.17
1.000	1.21	7.083	2.41	13.167	8.92	19.25	2.17
1.083	1.21	7.167	2.41	13.250	8.92	19.33	2.17
1.167	1.21	7.250	2.41	13.333	1.69	19.42	2.17
1.250	1.21	7.333	2.41	13.417	1.69	19.50	2.17
1.333	1.21	7.417	2.41	13.500	1.69	19.58	2.17
1.417	1.21	7.500	2.41	13.583	1.69	19.67	2.17
1.500	1.21	7.583	2.41	13.667	1.69	19.75	2.17
1.583	1.21	7.667	2.41	13.750	1.69	19.83	2.17
1.667	1.21	7.750	2.41	13.833	9.89	19.92	2.17
1.750	1.21	7.833	2.41	13.917	9.89	20.00	2.17
1.833	1.21	7.917	2.41	14.000	9.89	20.08	2.17
1.917	1.21	8.000	2.41	14.083	9.89	20.17	2.17
2.000	1.21	8.083	2.41	14.167	9.89	20.25	2.17
2.083	2.17	8.167	2.41	14.250	9.89	20.33	1.45
2.167	2.17	8.250	2.41	14.333	3.62	20.42	1.45
2.250	2.17	8.333	3.26	14.417	3.62	20.50	1.45
2.333	1.57	8.417	3.26	14.500	3.62	20.58	1.45
2.417	1.57	8.500	3.26	14.583	3.62	20.67	1.45
2.500	1.57	8.583	3.26	14.667	3.62	20.75	1.45
2.583	1.57	8.667	3.26	14.750	3.62	20.83	1.45
2.667	1.57	8.750	3.26	14.833	3.62	20.92	1.45
2.750	1.57	8.833	3.26	14.917	3.62	21.00	1.45
2.833	1.57	8.917	3.26	15.000	3.62	21.08	1.45
2.917	1.57	9.000	3.26	15.083	3.62	21.17	1.45
3.000	1.57	9.083	3.26	15.167	3.62	21.25	1.45
3.083	1.57	9.167	3.26	15.250	3.62	21.33	1.45
3.167	1.57	9.250	3.26	15.333	3.62	21.42	1.45
3.250	1.57	9.333	3.86	15.417	3.62	21.50	1.45
3.333	1.57	9.417	3.86	15.500	3.62	21.58	1.45
3.417	1.57	9.500	3.86	15.583	3.62	21.67	1.45
3.500	1.57	9.583	3.86	15.667	3.62	21.75	1.45
3.583	1.57	9.667	3.86	15.750	3.62	21.83	1.45
3.667	1.57	9.750	3.86	15.833	3.62	21.92	1.45
3.750	1.57	9.833	4.34	15.917	3.62	22.00	1.45
3.833	1.57	9.917	4.34	16.000	3.62	22.08	1.45
3.917	1.57	10.000	4.34	16.083	3.62	22.17	1.45
4.000	1.57	10.083	4.34	16.167	3.62	22.25	1.45
4.083	1.57	10.167	4.34	16.250	3.62	22.33	1.45
4.167	1.57	10.250	4.34	16.333	2.17	22.42	1.45
4.250	1.57	10.333	5.55	16.417	2.17	22.50	1.45
4.333	1.93	10.417	5.55	16.500	2.17	22.58	1.45
4.417	1.93	10.500	5.55	16.583	2.17	22.67	1.45
4.500	1.93	10.583	5.55	16.667	2.17	22.75	1.45
4.583	1.93	10.667	5.55	16.750	2.17	22.83	1.45
4.667	1.93	10.750	5.55	16.833	2.17	22.92	1.45
4.750	1.93	10.833	7.48	16.917	2.17	23.00	1.45
4.833	1.93	10.917	7.48	17.000	2.17	23.08	1.45
4.917	1.93	11.000	7.48	17.083	2.17	23.17	1.45
5.000	1.93	11.083	7.48	17.167	2.17	23.25	1.45
5.083	1.93	11.167	7.48	17.250	2.17	23.33	1.45
5.167	1.93	11.250	7.48	17.333	2.17	23.42	1.45
5.250	1.93	11.333	11.58	17.417	2.17	23.50	1.45
5.333	1.93	11.417	11.58	17.500	2.17	23.58	1.45
5.417	1.93	11.500	11.58	17.583	2.17	23.67	1.45
5.500	1.93	11.583	11.58	17.667	2.17	23.75	1.45
5.583	1.93	11.667	11.58	17.750	2.17	23.83	1.45
5.667	1.93	11.750	11.58	17.833	2.17	23.92	1.45
5.750	1.93	11.833	50.17	17.917	2.17	24.00	1.45
5.833	1.93	11.917	50.17	18.000	2.17	24.08	1.45
5.917	1.93	12.000	50.17	18.083	2.17	24.17	1.45
6.000	1.93	12.083	133.13	18.167	2.17	24.25	1.45
6.083	1.93	12.167	133.14	18.250	2.17		

Unit Hyd Qpeak (cms)= 0.819

PEAK FLOW (cms)= 0.847 (i)
TIME TO PEAK (hrs)= 13.333
RUNOFF VOLUME (mm)= 48.434
TOTAL RAINFALL (mm)= 120.600
RUNOFF COEFFICIENT = 0.402

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

ROUTE CHN(0041)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54

0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

	<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0050)	24.24	0.85	13.33	48.43	0.05	0.23
OUTFLOW: ID= 1 (0041)	24.24	0.47	14.67	48.40	0.03	0.20

ADD HYD (0053)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0040):	17.19	0.579	13.67	48.43
+ ID2= 2 (0041):	24.24	0.467	14.67	48.40
ID = 3 (0053):	41.43	0.987	13.92	48.41

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0028)	Area (ha)=	1.13	
ID= 1 DT= 5.0 min	Total Imp(%)=	70.00	Dir. Conn.(%)= 58.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.79	0.34
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	86.79	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	6.167	1.93	12.250	133.14	18.33	2.17
0.167	0.00	6.250	1.93	12.333	17.38	18.42	2.17
0.250	0.00	6.333	2.41	12.417	17.37	18.50	2.17
0.333	1.21	6.417	2.41	12.500	17.37	18.58	2.17
0.417	1.21	6.500	2.41	12.583	17.37	18.67	2.17
0.500	1.21	6.583	2.41	12.667	17.37	18.75	2.17
0.583	1.21	6.667	2.41	12.750	17.37	18.83	2.17
0.667	1.21	6.750	2.41	12.833	8.93	18.92	2.17
0.750	1.21	6.833	2.41	12.917	8.92	19.00	2.17
0.833	1.21	6.917	2.41	13.000	8.92	19.08	2.17
0.917	1.21	7.000	2.41	13.083	8.92	19.17	2.17
1.000	1.21	7.083	2.41	13.167	8.92	19.25	2.17
1.083	1.21	7.167	2.41	13.250	8.92	19.33	2.17
1.167	1.21	7.250	2.41	13.333	1.69	19.42	2.17
1.250	1.21	7.333	2.41	13.417	1.69	19.50	2.17
1.333	1.21	7.417	2.41	13.500	1.69	19.58	2.17
1.417	1.21	7.500	2.41	13.583	1.69	19.67	2.17
1.500	1.21	7.583	2.41	13.667	1.69	19.75	2.17
1.583	1.21	7.667	2.41	13.750	1.69	19.83	2.17
1.667	1.21	7.750	2.41	13.833	9.89	19.92	2.17
1.750	1.21	7.833	2.41	13.917	9.89	20.00	2.17
1.833	1.21	7.917	2.41	14.000	9.89	20.08	2.17
1.917	1.21	8.000	2.41	14.083	9.89	20.17	2.17
2.000	1.21	8.083	2.41	14.167	9.89	20.25	2.17
2.083	2.17	8.167	2.41	14.250	9.89	20.33	1.45
2.167	2.17	8.250	2.41	14.333	3.62	20.42	1.45
2.250	2.17	8.333	3.26	14.417	3.62	20.50	1.45
2.333	1.57	8.417	3.26	14.500	3.62	20.58	1.45
2.417	1.57	8.500	3.26	14.583	3.62	20.67	1.45
2.500	1.57	8.583	3.26	14.667	3.62	20.75	1.45
2.583	1.57	8.667	3.26	14.750	3.62	20.83	1.45
2.667	1.57	8.750	3.26	14.833	3.62	20.92	1.45
2.750	1.57	8.833	3.26	14.917	3.62	21.00	1.45
2.833	1.57	8.917	3.26	15.000	3.62	21.08	1.45
2.917	1.57	9.000	3.26	15.083	3.62	21.17	1.45
3.000	1.57	9.083	3.26	15.167	3.62	21.25	1.45
3.083	1.57	9.167	3.26	15.250	3.62	21.33	1.45
3.167	1.57	9.250	3.26	15.333	3.62	21.42	1.45
3.250	1.57	9.333	3.86	15.417	3.62	21.50	1.45
3.333	1.57	9.417	3.86	15.500	3.62	21.58	1.45
3.417	1.57	9.500	3.86	15.583	3.62	21.67	1.45
3.500	1.57	9.583	3.86	15.667	3.62	21.75	1.45
3.583	1.57	9.667	3.86	15.750	3.62	21.83	1.45
3.667	1.57	9.750	3.86	15.833	3.62	21.92	1.45
3.750	1.57	9.833	4.34	15.917	3.62	22.00	1.45
3.833	1.57	9.917	4.34	16.000	3.62	22.08	1.45
3.917	1.57	10.000	4.34	16.083	3.62	22.17	1.45
4.000	1.57	10.083	4.34	16.167	3.62	22.25	1.45
4.083	1.57	10.167	4.34	16.250	3.62	22.33	1.45
4.167	1.57	10.250	4.34	16.333	2.17	22.42	1.45
4.250	1.57	10.333	5.55	16.417	2.17	22.50	1.45
4.333	1.93	10.417	5.55	16.500	2.17	22.58	1.45
4.417	1.93	10.500	5.55	16.583	2.17	22.67	1.45
4.500	1.93	10.583	5.55	16.667	2.17	22.75	1.45
4.583	1.93	10.667	5.55	16.750	2.17	22.83	1.45
4.667	1.93	10.750	5.55	16.833	2.17	22.92	1.45
4.750	1.93	10.833	7.48	16.917	2.17	23.00	1.45
4.833	1.93	10.917	7.48	17.000	2.17	23.08	1.45
4.917	1.93	11.000	7.48	17.083	2.17	23.17	1.45
5.000	1.93	11.083	7.48	17.167	2.17	23.25	1.45
5.083	1.93	11.167	7.48	17.250	2.17	23.33	1.45
5.167	1.93	11.250	7.48	17.333	2.17	23.42	1.45
5.250	1.93	11.333	11.58	17.417	2.17	23.50	1.45
5.333	1.93	11.417	11.58	17.500	2.17	23.58	1.45
5.417	1.93	11.500	11.58	17.583	2.17	23.67	1.45
5.500	1.93	11.583	11.58	17.667	2.17	23.75	1.45
5.583	1.93	11.667	11.58	17.750	2.17	23.83	1.45
5.667	1.93	11.750	11.58	17.833	2.17	23.92	1.45
5.750	1.93	11.833	50.17	17.917	2.17	24.00	1.45
5.833	1.93	11.917	50.17	18.000	2.17	24.08	1.45
5.917	1.93	12.000	50.17	18.083	2.17	24.17	1.45
6.000	1.93	12.083	133.13	18.167	2.17	24.25	1.45
6.083	1.93	12.167	133.14	18.250	2.17		

Max.Eff.Inten.(mm/hr)= 133.14 147.72

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              over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.09 (ii)    6.93 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.31         0.14
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.24         0.12          0.360 (iii)
     TIME TO PEAK    (hrs)=      12.25        12.25           12.25
     RUNOFF VOLUME    (mm)=     119.60        79.99          102.96
     TOTAL RAINFALL   (mm)=     120.60       120.60          120.60
     RUNOFF COEFFICIENT   =       0.99         0.66            0.85

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
| STANDHYD (  0032)|   Area    (ha)=   3.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  60.00
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                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.04         0.76
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     159.16        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 | 6.167    1.93 |12.250  133.14 | 18.33    2.17
     0.167    0.00 | 6.250    1.93 |12.333   17.38 | 18.42    2.17
     0.250    0.00 | 6.333    2.41 |12.417   17.37 | 18.50    2.17
     0.333    1.21 | 6.417    2.41 |12.500   17.37 | 18.58    2.17
     0.417    1.21 | 6.500    2.41 |12.583   17.37 | 18.67    2.17
     0.500    1.21 | 6.583    2.41 |12.667   17.37 | 18.75    2.17
     0.583    1.21 | 6.667    2.41 |12.750   17.37 | 18.83    2.17
     0.667    1.21 | 6.750    2.41 |12.833    8.93 | 18.92    2.17
     0.750    1.21 | 6.833    2.41 |12.917    8.92 | 19.00    2.17
     0.833    1.21 | 6.917    2.41 |13.000    8.92 | 19.08    2.17
     0.917    1.21 | 7.000    2.41 |13.083    8.92 | 19.17    2.17
     1.000    1.21 | 7.083    2.41 |13.167    8.92 | 19.25    2.17
     1.083    1.21 | 7.167    2.41 |13.250    8.92 | 19.33    2.17
     1.167    1.21 | 7.250    2.41 |13.333    1.69 | 19.42    2.17
     1.250    1.21 | 7.333    2.41 |13.417    1.69 | 19.50    2.17
     1.333    1.21 | 7.417    2.41 |13.500    1.69 | 19.58    2.17
     1.417    1.21 | 7.500    2.41 |13.583    1.69 | 19.67    2.17
     1.500    1.21 | 7.583    2.41 |13.667    1.69 | 19.75    2.17
     1.583    1.21 | 7.667    2.41 |13.750    1.69 | 19.83    2.17
     1.667    1.21 | 7.750    2.41 |13.833    9.89 | 19.92    2.17
     1.750    1.21 | 7.833    2.41 |13.917    9.89 | 20.00    2.17
     1.833    1.21 | 7.917    2.41 |14.000    9.89 | 20.08    2.17
     1.917    1.21 | 8.000    2.41 |14.083    9.89 | 20.17    2.17
     2.000    1.21 | 8.083    2.41 |14.167    9.89 | 20.25    2.17
     2.083    2.17 | 8.167    2.41 |14.250    9.89 | 20.33    1.45
     2.167    2.17 | 8.250    2.41 |14.333    3.62 | 20.42    1.45
     2.250    2.17 | 8.333    3.26 |14.417    3.62 | 20.50    1.45
     2.333    1.57 | 8.417    3.26 |14.500    3.62 | 20.58    1.45
     2.417    1.57 | 8.500    3.26 |14.583    3.62 | 20.67    1.45
     2.500    1.57 | 8.583    3.26 |14.667    3.62 | 20.75    1.45
     2.583    1.57 | 8.667    3.26 |14.750    3.62 | 20.83    1.45
     2.667    1.57 | 8.750    3.26 |14.833    3.62 | 20.92    1.45
     2.750    1.57 | 8.833    3.26 |14.917    3.62 | 21.00    1.45
     2.833    1.57 | 8.917    3.26 |15.000    3.62 | 21.08    1.45
     2.917    1.57 | 9.000    3.26 |15.083    3.62 | 21.17    1.45
     3.000    1.57 | 9.083    3.26 |15.167    3.62 | 21.25    1.45
     3.083    1.57 | 9.167    3.26 |15.250    3.62 | 21.33    1.45
     3.167    1.57 | 9.250    3.26 |15.333    3.62 | 21.42    1.45
     3.250    1.57 | 9.333    3.86 |15.417    3.62 | 21.50    1.45
     3.333    1.57 | 9.417    3.86 |15.500    3.62 | 21.58    1.45
     3.417    1.57 | 9.500    3.86 |15.583    3.62 | 21.67    1.45
     3.500    1.57 | 9.583    3.86 |15.667    3.62 | 21.75    1.45
     3.583    1.57 | 9.667    3.86 |15.750    3.62 | 21.83    1.45
     3.667    1.57 | 9.750    3.86 |15.833    3.62 | 21.92    1.45
     3.750    1.57 | 9.833    4.34 |15.917    3.62 | 22.00    1.45
     3.833    1.57 | 9.917    4.34 |16.000    3.62 | 22.08    1.45
     3.917    1.57 |10.000    4.34 |16.083    3.62 | 22.17    1.45
     4.000    1.57 |10.083    4.34 |16.167    3.62 | 22.25    1.45
     4.083    1.57 |10.167    4.34 |16.250    3.62 | 22.33    1.45
     4.167    1.57 |10.250    4.34 |16.333    2.17 | 22.42    1.45
     4.250    1.57 |10.333    5.55 |16.417    2.17 | 22.50    1.45
     4.333    1.93 |10.417    5.55 |16.500    2.17 | 22.58    1.45
     4.417    1.93 |10.500    5.55 |16.583    2.17 | 22.67    1.45
     4.500    1.93 |10.583    5.55 |16.667    2.17 | 22.75    1.45
     4.583    1.93 |10.667    5.55 |16.750    2.17 | 22.83    1.45
     4.667    1.93 |10.750    5.55 |16.833    2.17 | 22.92    1.45
     4.750    1.93 |10.833    7.48 |16.917    2.17 | 23.00    1.45
     4.833    1.93 |10.917    7.48 |17.000    2.17 | 23.08    1.45
     4.917    1.93 |11.000    7.48 |17.083    2.17 | 23.17    1.45
     5.000    1.93 |11.083    7.48 |17.167    2.17 | 23.25    1.45
     5.083    1.93 |11.167    7.48 |17.250    2.17 | 23.33    1.45
     5.167    1.93 |11.250    7.48 |17.333    2.17 | 23.42    1.45
     5.250    1.93 |11.333   11.58 |17.417    2.17 | 23.50    1.45
     5.333    1.93 |11.417   11.58 |17.500    2.17 | 23.58    1.45
     5.417    1.93 |11.500   11.58 |17.583    2.17 | 23.67    1.45
     5.500    1.93 |11.583   11.58 |17.667    2.17 | 23.75    1.45
     5.583    1.93 |11.667   11.58 |17.750    2.17 | 23.83    1.45
     5.667    1.93 |11.750   11.58 |17.833    2.17 | 23.92    1.45
     5.750    1.93 |11.833   50.17 |17.917    2.17 | 24.00    1.45
     5.833    1.93 |11.917   50.17 |18.000    2.17 | 24.08    1.45
     5.917    1.93 |12.000   50.17 |18.083    2.17 | 24.17    1.45
     6.000    1.93 |12.083  133.13 |18.167    2.17 | 24.25    1.45
     6.083    1.93 |12.167  133.14 |18.250    2.17 |

Max.Eff.Inten.(mm/hr)=     133.14       230.65
              over (min)        5.00        10.00
Storage Coeff.  (min)=       3.01 (ii)    7.07 (ii)
Unit Hyd. Tpeak (min)=       5.00        10.00
Unit Hyd. peak  (cms)=       0.28         0.14
                                                    *TOTALS*
PEAK FLOW       (cms)=       0.84         0.41          1.253 (iii)
TIME TO PEAK    (hrs)=      12.25        12.25           12.25
RUNOFF VOLUME    (mm)=     119.60        89.39          107.51
TOTAL RAINFALL   (mm)=     120.60       120.60          120.60
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     RUNOFF COEFFICIENT   =       0.99         0.74          0.89

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
| STANDHYD (  0034)|   Area    (ha)=  29.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  66.00   Dir. Conn.(%)=  55.00
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                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      19.18         9.88
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     440.15        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	6.167	1.93	12.250	133.14	18.33	2.17
0.167	0.00	6.250	1.93	12.333	17.38	18.42	2.17
0.250	0.00	6.333	2.41	12.417	17.37	18.50	2.17
0.333	1.21	6.417	2.41	12.500	17.37	18.58	2.17
0.417	1.21	6.500	2.41	12.583	17.37	18.67	2.17
0.500	1.21	6.583	2.41	12.667	17.37	18.75	2.17
0.583	1.21	6.667	2.41	12.750	17.37	18.83	2.17
0.667	1.21	6.750	2.41	12.833	8.93	18.92	2.17
0.750	1.21	6.833	2.41	12.917	8.92	19.00	2.17
0.833	1.21	6.917	2.41	13.000	8.92	19.08	2.17
0.917	1.21	7.000	2.41	13.083	8.92	19.17	2.17
1.000	1.21	7.083	2.41	13.167	8.92	19.25	2.17
1.083	1.21	7.167	2.41	13.250	8.92	19.33	2.17
1.167	1.21	7.250	2.41	13.333	1.69	19.42	2.17
1.250	1.21	7.333	2.41	13.417	1.69	19.50	2.17
1.333	1.21	7.417	2.41	13.500	1.69	19.58	2.17
1.417	1.21	7.500	2.41	13.583	1.69	19.67	2.17
1.500	1.21	7.583	2.41	13.667	1.69	19.75	2.17
1.583	1.21	7.667	2.41	13.750	1.69	19.83	2.17
1.667	1.21	7.750	2.41	13.833	9.89	19.92	2.17
1.750	1.21	7.833	2.41	13.917	9.89	20.00	2.17
1.833	1.21	7.917	2.41	14.000	9.89	20.08	2.17
1.917	1.21	8.000	2.41	14.083	9.89	20.17	2.17
2.000	1.21	8.083	2.41	14.167	9.89	20.25	2.17
2.083	2.17	8.167	2.41	14.250	9.89	20.33	1.45
2.167	2.17	8.250	2.41	14.333	3.62	20.42	1.45
2.250	2.17	8.333	3.26	14.417	3.62	20.50	1.45
2.333	1.57	8.417	3.26	14.500	3.62	20.58	1.45
2.417	1.57	8.500	3.26	14.583	3.62	20.67	1.45
2.500	1.57	8.583	3.26	14.667	3.62	20.75	1.45
2.583	1.57	8.667	3.26	14.750	3.62	20.83	1.45
2.667	1.57	8.750	3.26	14.833	3.62	20.92	1.45
2.750	1.57	8.833	3.26	14.917	3.62	21.00	1.45
2.833	1.57	8.917	3.26	15.000	3.62	21.08	1.45
2.917	1.57	9.000	3.26	15.083	3.62	21.17	1.45
3.000	1.57	9.083	3.26	15.167	3.62	21.25	1.45
3.083	1.57	9.167	3.26	15.250	3.62	21.33	1.45
3.167	1.57	9.250	3.26	15.333	3.62	21.42	1.45
3.250	1.57	9.333	3.86	15.417	3.62	21.50	1.45
3.333	1.57	9.417	3.86	15.500	3.62	21.58	1.45
3.417	1.57	9.500	3.86	15.583	3.62	21.67	1.45
3.500	1.57	9.583	3.86	15.667	3.62	21.75	1.45
3.583	1.57	9.667	3.86	15.750	3.62	21.83	1.45
3.667	1.57	9.750	3.86	15.833	3.62	21.92	1.45
3.750	1.57	9.833	4.34	15.917	3.62	22.00	1.45
3.833	1.57	9.917	4.34	16.000	3.62	22.08	1.45
3.917	1.57	10.000	4.34	16.083	3.62	22.17	1.45
4.000	1.57	10.083	4.34	16.167	3.62	22.25	1.45
4.083	1.57	10.167	4.34	16.250	3.62	22.33	1.45
4.167	1.57	10.250	4.34	16.333	2.17	22.42	1.45
4.250	1.57	10.333	5.55	16.417	2.17	22.50	1.45
4.333	1.93	10.417	5.55	16.500	2.17	22.58	1.45
4.417	1.93	10.500	5.55	16.583	2.17	22.67	1.45
4.500	1.93	10.583	5.55	16.667	2.17	22.75	1.45
4.583	1.93	10.667	5.55	16.750	2.17	22.83	1.45
4.667	1.93	10.750	5.55	16.833	2.17	22.92	1.45
4.750	1.93	10.833	7.48	16.917	2.17	23.00	1.45
4.833	1.93	10.917	7.48	17.000	2.17	23.08	1.45
4.917	1.93	11.000	7.48	17.083	2.17	23.17	1.45
5.000	1.93	11.083	7.48	17.167	2.17	23.25	1.45
5.083	1.93	11.167	7.48	17.250	2.17	23.33	1.45
5.167	1.93	11.250	7.48	17.333	2.17	23.42	1.45
5.250	1.93	11.333	11.58	17.417	2.17	23.50	1.45
5.333	1.93	11.417	11.58	17.500	2.17	23.58	1.45
5.417	1.93	11.500	11.58	17.583	2.17	23.67	1.45
5.500	1.93	11.583	11.58	17.667	2.17	23.75	1.45
5.583	1.93	11.667	11.58	17.750	2.17	23.83	1.45
5.667	1.93	11.750	11.58	17.833	2.17	23.92	1.45
5.750	1.93	11.833	50.17	17.917	2.17	24.00	1.45
5.833	1.93	11.917	50.17	18.000	2.17	24.08	1.45
5.917	1.93	12.000	50.17	18.083	2.17	24.17	1.45
6.000	1.93	12.083	133.13	18.167	2.17	24.25	1.45
6.083	1.93	12.167	133.14	18.250	2.17		

```
Max.Eff.Inten.(mm/hr)=     133.14       137.25
          over (min)          5.00        15.00
Storage Coeff.  (min)=        5.54 (ii)   11.76 (ii)
Unit Hyd. Tpeak (min)=        5.00        15.00
Unit Hyd. peak  (cms)=        0.20         0.09
                                                    *TOTALS*
PEAK FLOW       (cms)=        5.66         2.51          7.931 (iii)
TIME TO PEAK    (hrs)=       12.25        12.33         12.25
RUNOFF VOLUME    (mm)=      119.60        78.37        101.05
TOTAL RAINFALL   (mm)=      120.60       120.60        120.60
RUNOFF COEFFICIENT   =        0.99         0.65          0.84

  (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
       CN*  =  77.0    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  (  0035)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0032):     3.80   1.253    12.25   107.51
     + ID2= 2 (  0034):    29.06   7.931    12.25   101.05
       ================================================
       ID = 3 (  0035):    32.86   9.184    12.25   101.79

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0033)|     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   |   0.4930      1.5666
                         0.0360     0.7150   |   0.7890      1.8478
                         0.0660     1.0737   |   1.0520      2.0613
                         0.2630     1.3645   |   1.3140      2.2797

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0035)     32.860     9.184     12.25     101.79
   OUTFLOW: ID= 1 (  0033)     32.860     1.051     13.00      99.23

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 11.45
                  TIME SHIFT OF PEAK FLOW         (min)= 45.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  2.0613

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

--------------------
| ADD HYD  (  0029)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0028):     1.13   0.360    12.25   102.96
     + ID2= 2 (  0033):    32.86   1.051    13.00    99.23
       ================================================
       ID = 3 (  0029):    33.99   1.080    12.92    99.36

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

--------------------
| ADD HYD  (  0029)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0029):    33.99   1.080    12.92    99.36
     + ID2= 2 (  0053):    41.43   0.987    13.92    48.41
       ================================================
       ID = 1 (  0029):    75.42   1.894    13.58    71.37

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

       V    V   I    SSSSS  U   U    A    L             (v 6.2.2015)
```

```
        V    V   I    SS     U   U   A A   L
         V  V    I     SS    U   U  AAAAA  L
         V  V    I      SS   U   U  A   A  L
          VV     I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\748f5c10-2ce8-4d03-ae46-6f53abc12995\scen
  Summary filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-
86e9-d1c81bbaf91e\748f5c10-2ce8-4d03-ae46-6f53abc12995\scen

DATE: 05-03-2024                          TIME: 01:44:31

USER:


COMMENTS: _____________________________________________________________

--------------------------------------------------------------------------------
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  ***********************************************
  ** SIMULATION : 06. 100-Year-24-Hour-SCS-Type **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\mmsingh\AppD
|                  |              ata\Local\Temp\
|                  |              3a0c766d-3ecf-4101-8ec5-64101323cb13\04046152
| Ptotal=133.60 mm |    Comments: 100-Year-24-Hour-SCS-Type-II
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	2.67	12.50	19.24	18.75	2.40
0.25	1.34	6.50	2.67	12.75	9.89	19.00	2.40
0.50	1.34	6.75	2.67	13.00	9.89	19.25	2.40
0.75	1.34	7.00	2.67	13.25	1.87	19.50	2.40
1.00	1.34	7.25	2.67	13.50	1.87	19.75	2.40
1.25	1.34	7.50	2.67	13.75	10.96	20.00	2.40
1.50	1.34	7.75	2.67	14.00	10.96	20.25	1.60
1.75	1.34	8.00	2.67	14.25	4.01	20.50	1.60
2.00	2.40	8.25	3.61	14.50	4.01	20.75	1.60
2.25	1.74	8.50	3.61	14.75	4.01	21.00	1.60
2.50	1.74	8.75	3.61	15.00	4.01	21.25	1.60
2.75	1.74	9.00	3.61	15.25	4.01	21.50	1.60
3.00	1.74	9.25	4.28	15.50	4.01	21.75	1.60

3.25	1.74	9.50	4.28	15.75	4.01	22.00	1.60
3.50	1.74	9.75	4.81	16.00	4.01	22.25	1.60
3.75	1.74	10.00	4.81	16.25	2.40	22.50	1.60
4.00	1.74	10.25	6.15	16.50	2.40	22.75	1.60
4.25	2.14	10.50	6.15	16.75	2.40	23.00	1.60
4.50	2.14	10.75	8.28	17.00	2.40	23.25	1.60
4.75	2.14	11.00	8.28	17.25	2.40	23.50	1.60
5.00	2.14	11.25	12.83	17.50	2.40	23.75	1.60
5.25	2.14	11.50	12.83	17.75	2.40	24.00	1.60
5.50	2.14	11.75	55.58	18.00	2.40		
5.75	2.14	12.00	147.49	18.25	2.40		
6.00	2.14	12.25	19.24	18.50	2.40		

CALIB					
NASHYD (0052)	Area	(ha)=	17.19	Curve Number	(CN)= 63.0
ID= 1 DT= 5.0 min	Ia	(mm)=	8.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=		0.98		

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	6.167	2.14	12.250	147.49	18.33	2.40
0.167	0.00	6.250	2.14	12.333	19.25	18.42	2.40
0.250	0.00	6.333	2.67	12.417	19.24	18.50	2.40
0.333	1.34	6.417	2.67	12.500	19.24	18.58	2.40
0.417	1.34	6.500	2.67	12.583	19.24	18.67	2.40
0.500	1.34	6.583	2.67	12.667	19.24	18.75	2.40
0.583	1.34	6.667	2.67	12.750	19.24	18.83	2.40
0.667	1.34	6.750	2.67	12.833	9.89	18.92	2.40
0.750	1.34	6.833	2.67	12.917	9.89	19.00	2.40
0.833	1.34	6.917	2.67	13.000	9.89	19.08	2.40
0.917	1.34	7.000	2.67	13.083	9.89	19.17	2.40
1.000	1.34	7.083	2.67	13.167	9.89	19.25	2.40
1.083	1.34	7.167	2.67	13.250	9.89	19.33	2.40
1.167	1.34	7.250	2.67	13.333	1.87	19.42	2.40
1.250	1.34	7.333	2.67	13.417	1.87	19.50	2.40
1.333	1.34	7.417	2.67	13.500	1.87	19.58	2.40
1.417	1.34	7.500	2.67	13.583	1.87	19.67	2.40
1.500	1.34	7.583	2.67	13.667	1.87	19.75	2.40
1.583	1.34	7.667	2.67	13.750	1.87	19.83	2.40
1.667	1.34	7.750	2.67	13.833	10.95	19.92	2.40
1.750	1.34	7.833	2.67	13.917	10.96	20.00	2.40
1.833	1.34	7.917	2.67	14.000	10.96	20.08	2.40
1.917	1.34	8.000	2.67	14.083	10.96	20.17	2.40
2.000	1.34	8.083	2.67	14.167	10.96	20.25	2.40
2.083	2.40	8.167	2.67	14.250	10.96	20.33	1.60
2.167	2.40	8.250	2.67	14.333	4.01	20.42	1.60
2.250	2.40	8.333	3.61	14.417	4.01	20.50	1.60
2.333	1.74	8.417	3.61	14.500	4.01	20.58	1.60
2.417	1.74	8.500	3.61	14.583	4.01	20.67	1.60
2.500	1.74	8.583	3.61	14.667	4.01	20.75	1.60
2.583	1.74	8.667	3.61	14.750	4.01	20.83	1.60
2.667	1.74	8.750	3.61	14.833	4.01	20.92	1.60
2.750	1.74	8.833	3.61	14.917	4.01	21.00	1.60
2.833	1.74	8.917	3.61	15.000	4.01	21.08	1.60
2.917	1.74	9.000	3.61	15.083	4.01	21.17	1.60
3.000	1.74	9.083	3.61	15.167	4.01	21.25	1.60
3.083	1.74	9.167	3.61	15.250	4.01	21.33	1.60
3.167	1.74	9.250	3.61	15.333	4.01	21.42	1.60
3.250	1.74	9.333	4.28	15.417	4.01	21.50	1.60
3.333	1.74	9.417	4.28	15.500	4.01	21.58	1.60
3.417	1.74	9.500	4.28	15.583	4.01	21.67	1.60
3.500	1.74	9.583	4.28	15.667	4.01	21.75	1.60
3.583	1.74	9.667	4.28	15.750	4.01	21.83	1.60
3.667	1.74	9.750	4.28	15.833	4.01	21.92	1.60
3.750	1.74	9.833	4.81	15.917	4.01	22.00	1.60
3.833	1.74	9.917	4.81	16.000	4.01	22.08	1.60
3.917	1.74	10.000	4.81	16.083	4.01	22.17	1.60
4.000	1.74	10.083	4.81	16.167	4.01	22.25	1.60
4.083	1.74	10.167	4.81	16.250	4.01	22.33	1.60
4.167	1.74	10.250	4.81	16.333	2.41	22.42	1.60
4.250	1.74	10.333	6.15	16.417	2.40	22.50	1.60
4.333	2.14	10.417	6.15	16.500	2.40	22.58	1.60
4.417	2.14	10.500	6.15	16.583	2.40	22.67	1.60
4.500	2.14	10.583	6.15	16.667	2.40	22.75	1.60
4.583	2.14	10.667	6.15	16.750	2.40	22.83	1.60
4.667	2.14	10.750	6.15	16.833	2.40	22.92	1.60
4.750	2.14	10.833	8.28	16.917	2.40	23.00	1.60
4.833	2.14	10.917	8.28	17.000	2.40	23.08	1.60
4.917	2.14	11.000	8.28	17.083	2.40	23.17	1.60
5.000	2.14	11.083	8.28	17.167	2.40	23.25	1.60
5.083	2.14	11.167	8.28	17.250	2.40	23.33	1.60
5.167	2.14	11.250	8.28	17.333	2.40	23.42	1.60
5.250	2.14	11.333	12.83	17.417	2.40	23.50	1.60
5.333	2.14	11.417	12.83	17.500	2.40	23.58	1.60
5.417	2.14	11.500	12.83	17.583	2.40	23.67	1.60
5.500	2.14	11.583	12.83	17.667	2.40	23.75	1.60
5.583	2.14	11.667	12.83	17.750	2.40	23.83	1.60
5.667	2.14	11.750	12.83	17.833	2.40	23.92	1.60
5.750	2.14	11.833	55.57	17.917	2.40	24.00	1.60
5.833	2.14	11.917	55.58	18.000	2.40	24.08	1.60
5.917	2.14	12.000	55.58	18.083	2.40	24.17	1.60
6.000	2.14	12.083	147.48	18.167	2.40	24.25	1.60
6.083	2.14	12.167	147.49	18.250	2.40		

Unit Hyd Qpeak (cms)= 0.670

PEAK FLOW (cms)= 0.797 (i)
TIME TO PEAK (hrs)= 13.167
RUNOFF VOLUME (mm)= 57.412
TOTAL RAINFALL (mm)= 133.600
RUNOFF COEFFICIENT = 0.430

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

ROUTE CHN(0040)			
IN= 2---> OUT= 1	Routing time step (min)'=	5.00	

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

Distance	Elevation	Manning
0.00	253.33	0.0800
4.07	253.22	0.0800
31.67	252.50	0.0800
80.33	251.02	0.0800

112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0052)	17.19	0.80	13.17	57.41	0.04	0.63
OUTFLOW: ID= 1 (0040)	17.19	0.69	13.67	57.41	0.03	0.63

| CALIB |		
| NASHYD (0050)|	Area (ha)= 24.24	Curve Number (CN)= 63.0
|ID= 1 DT= 5.0 min |	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 1.13	

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	6.167	2.14	12.250	147.49	18.33	2.40
0.167	0.00	6.250	2.14	12.333	19.25	18.42	2.40
0.250	0.00	6.333	2.67	12.417	19.24	18.50	2.40
0.333	1.34	6.417	2.67	12.500	19.24	18.58	2.40
0.417	1.34	6.500	2.67	12.583	19.24	18.67	2.40
0.500	1.34	6.583	2.67	12.667	19.24	18.75	2.40
0.583	1.34	6.667	2.67	12.750	19.24	18.83	2.40
0.667	1.34	6.750	2.67	12.833	9.89	18.92	2.40
0.750	1.34	6.833	2.67	12.917	9.89	19.00	2.40
0.833	1.34	6.917	2.67	13.000	9.89	19.08	2.40
0.917	1.34	7.000	2.67	13.083	9.89	19.17	2.40
1.000	1.34	7.083	2.67	13.167	9.89	19.25	2.40
1.083	1.34	7.167	2.67	13.250	9.89	19.33	2.40
1.167	1.34	7.250	2.67	13.333	1.87	19.42	2.40
1.250	1.34	7.333	2.67	13.417	1.87	19.50	2.40
1.333	1.34	7.417	2.67	13.500	1.87	19.58	2.40
1.417	1.34	7.500	2.67	13.583	1.87	19.67	2.40
1.500	1.34	7.583	2.67	13.667	1.87	19.75	2.40
1.583	1.34	7.667	2.67	13.750	1.87	19.83	2.40
1.667	1.34	7.750	2.67	13.833	10.95	19.92	2.40
1.750	1.34	7.833	2.67	13.917	10.96	20.00	2.40
1.833	1.34	7.917	2.67	14.000	10.96	20.08	2.40
1.917	1.34	8.000	2.67	14.083	10.96	20.17	2.40
2.000	1.34	8.083	2.67	14.167	10.96	20.25	2.40
2.083	2.40	8.167	2.67	14.250	10.96	20.33	1.60
2.167	2.40	8.250	2.67	14.333	4.01	20.42	1.60
2.250	2.40	8.333	3.61	14.417	4.01	20.50	1.60
2.333	1.74	8.417	3.61	14.500	4.01	20.58	1.60
2.417	1.74	8.500	3.61	14.583	4.01	20.67	1.60
2.500	1.74	8.583	3.61	14.667	4.01	20.75	1.60
2.583	1.74	8.667	3.61	14.750	4.01	20.83	1.60
2.667	1.74	8.750	3.61	14.833	4.01	20.92	1.60
2.750	1.74	8.833	3.61	14.917	4.01	21.00	1.60
2.833	1.74	8.917	3.61	15.000	4.01	21.08	1.60
2.917	1.74	9.000	3.61	15.083	4.01	21.17	1.60
3.000	1.74	9.083	3.61	15.167	4.01	21.25	1.60
3.083	1.74	9.167	3.61	15.250	4.01	21.33	1.60
3.167	1.74	9.250	3.61	15.333	4.01	21.42	1.60
3.250	1.74	9.333	4.28	15.417	4.01	21.50	1.60
3.333	1.74	9.417	4.28	15.500	4.01	21.58	1.60
3.417	1.74	9.500	4.28	15.583	4.01	21.67	1.60
3.500	1.74	9.583	4.28	15.667	4.01	21.75	1.60
3.583	1.74	9.667	4.28	15.750	4.01	21.83	1.60
3.667	1.74	9.750	4.28	15.833	4.01	21.92	1.60
3.750	1.74	9.833	4.81	15.917	4.01	22.00	1.60
3.833	1.74	9.917	4.81	16.000	4.01	22.08	1.60
3.917	1.74	10.000	4.81	16.083	4.01	22.17	1.60
4.000	1.74	10.083	4.81	16.167	4.01	22.25	1.60
4.083	1.74	10.167	4.81	16.250	4.01	22.33	1.60
4.167	1.74	10.250	4.81	16.333	2.41	22.42	1.60
4.250	1.74	10.333	6.15	16.417	2.40	22.50	1.60
4.333	2.14	10.417	6.15	16.500	2.40	22.58	1.60
4.417	2.14	10.500	6.15	16.583	2.40	22.67	1.60
4.500	2.14	10.583	6.15	16.667	2.40	22.75	1.60
4.583	2.14	10.667	6.15	16.750	2.40	22.83	1.60
4.667	2.14	10.750	6.15	16.833	2.40	22.92	1.60
4.750	2.14	10.833	8.28	16.917	2.40	23.00	1.60
4.833	2.14	10.917	8.28	17.000	2.40	23.08	1.60
4.917	2.14	11.000	8.28	17.083	2.40	23.17	1.60
5.000	2.14	11.083	8.28	17.167	2.40	23.25	1.60
5.083	2.14	11.167	8.28	17.250	2.40	23.33	1.60
5.167	2.14	11.250	8.28	17.333	2.40	23.42	1.60
5.250	2.14	11.333	12.83	17.417	2.40	23.50	1.60
5.333	2.14	11.417	12.83	17.500	2.40	23.58	1.60
5.417	2.14	11.500	12.83	17.583	2.40	23.67	1.60
5.500	2.14	11.583	12.83	17.667	2.40	23.75	1.60
5.583	2.14	11.667	12.83	17.750	2.40	23.83	1.60
5.667	2.14	11.750	12.83	17.833	2.40	23.92	1.60
5.750	2.14	11.833	55.57	17.917	2.40	24.00	1.60

5.833	2.14	11.917	55.58	18.000	2.40	24.08	1.60
5.917	2.14	12.000	55.58	18.083	2.40	24.17	1.60
6.000	2.14	12.083	147.48	18.167	2.40	24.25	1.60
6.083	2.14	12.167	147.49	18.250	2.40		

Unit Hyd Qpeak (cms)= 0.819

PEAK FLOW (cms)= 1.009 (i)
TIME TO PEAK (hrs)= 13.333
RUNOFF VOLUME (mm)= 57.412
TOTAL RAINFALL (mm)= 133.600
RUNOFF COEFFICIENT = 0.430

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

ROUTE CHN(0041)
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0050)	24.24	1.01	13.33	57.41	0.05	0.25
OUTFLOW: ID= 1 (0041)	24.24	0.57	14.58	57.38	0.04	0.20

ADD HYD (0053)|
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0040):	17.19	0.690	13.67	57.41
+ ID2= 2 (0041):	24.24	0.567	14.58	57.38
ID = 3 (0053):	41.43	1.195	13.92	57.39

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0028)| Area (ha)= 1.13
ID= 1 DT= 5.0 min	Total Imp(%)= 70.00 Dir. Conn.(%)= 58.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.79	0.34
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	86.79	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	6.167	2.14	12.250	147.49	18.33	2.40
0.167	0.00	6.250	2.14	12.333	19.25	18.42	2.40
0.250	0.00	6.333	2.67	12.417	19.24	18.50	2.40
0.333	1.34	6.417	2.67	12.500	19.24	18.58	2.40
0.417	1.34	6.500	2.67	12.583	19.24	18.67	2.40
0.500	1.34	6.583	2.67	12.667	19.24	18.75	2.40
0.583	1.34	6.667	2.67	12.750	19.24	18.83	2.40
0.667	1.34	6.750	2.67	12.833	9.89	18.92	2.40
0.750	1.34	6.833	2.67	12.917	9.89	19.00	2.40
0.833	1.34	6.917	2.67	13.000	9.89	19.08	2.40
0.917	1.34	7.000	2.67	13.083	9.89	19.17	2.40
1.000	1.34	7.083	2.67	13.167	9.89	19.25	2.40
1.083	1.34	7.167	2.67	13.250	9.89	19.33	2.40
1.167	1.34	7.250	2.67	13.333	1.87	19.42	2.40
1.250	1.34	7.333	2.67	13.417	1.87	19.50	2.40
1.333	1.34	7.417	2.67	13.500	1.87	19.58	2.40
1.417	1.34	7.500	2.67	13.583	1.87	19.67	2.40
1.500	1.34	7.583	2.67	13.667	1.87	19.75	2.40
1.583	1.34	7.667	2.67	13.750	1.87	19.83	2.40
1.667	1.34	7.750	2.67	13.833	10.95	19.92	2.40
1.750	1.34	7.833	2.67	13.917	10.96	20.00	2.40
1.833	1.34	7.917	2.67	14.000	10.96	20.08	2.40
1.917	1.34	8.000	2.67	14.083	10.96	20.17	2.40
2.000	1.34	8.083	2.67	14.167	10.96	20.25	2.40
2.083	2.40	8.167	2.67	14.250	10.96	20.33	1.60
2.167	2.40	8.250	2.67	14.333	4.01	20.42	1.60
2.250	2.40	8.333	3.61	14.417	4.01	20.50	1.60

2.333	1.74	8.417	3.61	14.500	4.01	20.58	1.60
2.417	1.74	8.500	3.61	14.583	4.01	20.67	1.60
2.500	1.74	8.583	3.61	14.667	4.01	20.75	1.60
2.583	1.74	8.667	3.61	14.750	4.01	20.83	1.60
2.667	1.74	8.750	3.61	14.833	4.01	20.92	1.60
2.750	1.74	8.833	3.61	14.917	4.01	21.00	1.60
2.833	1.74	8.917	3.61	15.000	4.01	21.08	1.60
2.917	1.74	9.000	3.61	15.083	4.01	21.17	1.60
3.000	1.74	9.083	3.61	15.167	4.01	21.25	1.60
3.083	1.74	9.167	3.61	15.250	4.01	21.33	1.60
3.167	1.74	9.250	3.61	15.333	4.01	21.42	1.60
3.250	1.74	9.333	4.28	15.417	4.01	21.50	1.60
3.333	1.74	9.417	4.28	15.500	4.01	21.58	1.60
3.417	1.74	9.500	4.28	15.583	4.01	21.67	1.60
3.500	1.74	9.583	4.28	15.667	4.01	21.75	1.60
3.583	1.74	9.667	4.28	15.750	4.01	21.83	1.60
3.667	1.74	9.750	4.28	15.833	4.01	21.92	1.60
3.750	1.74	9.833	4.81	15.917	4.01	22.00	1.60
3.833	1.74	9.917	4.81	16.000	4.01	22.08	1.60
3.917	1.74	10.000	4.81	16.083	4.01	22.17	1.60
4.000	1.74	10.083	4.81	16.167	4.01	22.25	1.60
4.083	1.74	10.167	4.81	16.250	4.01	22.33	1.60
4.167	1.74	10.250	4.81	16.333	2.41	22.42	1.60
4.250	1.74	10.333	6.15	16.417	2.40	22.50	1.60
4.333	2.14	10.417	6.15	16.500	2.40	22.58	1.60
4.417	2.14	10.500	6.15	16.583	2.40	22.67	1.60
4.500	2.14	10.583	6.15	16.667	2.40	22.75	1.60
4.583	2.14	10.667	6.15	16.750	2.40	22.83	1.60
4.667	2.14	10.750	6.15	16.833	2.40	22.92	1.60
4.750	2.14	10.833	8.28	16.917	2.40	23.00	1.60
4.833	2.14	10.917	8.28	17.000	2.40	23.08	1.60
4.917	2.14	11.000	8.28	17.083	2.40	23.17	1.60
5.000	2.14	11.083	8.28	17.167	2.40	23.25	1.60
5.083	2.14	11.167	8.28	17.250	2.40	23.33	1.60
5.167	2.14	11.250	8.28	17.333	2.40	23.42	1.60
5.250	2.14	11.333	12.83	17.417	2.40	23.50	1.60
5.333	2.14	11.417	12.83	17.500	2.40	23.58	1.60
5.417	2.14	11.500	12.83	17.583	2.40	23.67	1.60
5.500	2.14	11.583	12.83	17.667	2.40	23.75	1.60
5.583	2.14	11.667	12.83	17.750	2.40	23.83	1.60
5.667	2.14	11.750	12.83	17.833	2.40	23.92	1.60
5.750	2.14	11.833	55.57	17.917	2.40	24.00	1.60
5.833	2.14	11.917	55.58	18.000	2.40	24.08	1.60
5.917	2.14	12.000	55.58	18.083	2.40	24.17	1.60
6.000	2.14	12.083	147.48	18.167	2.40	24.25	1.60
6.083	2.14	12.167	147.49	18.250	2.40		

Max.Eff.Inten.(mm/hr)=	147.49	168.48	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.01 (ii)	6.65 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.31	0.14	
			TOTALS
PEAK FLOW (cms)=	0.27	0.14	0.404 (iii)
TIME TO PEAK (hrs)=	12.25	12.25	12.25
RUNOFF VOLUME (mm)=	132.60	91.78	115.45
TOTAL RAINFALL (mm)=	133.60	133.60	133.60
RUNOFF COEFFICIENT =	0.99	0.69	0.86

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0032)	Area (ha)=	3.80	
ID= 1 DT= 5.0 min	Total Imp(%)=	80.00	Dir. Conn.(%)= 60.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	6.167	2.14	12.250	147.49	18.33	2.40
0.167	0.00	6.250	2.14	12.333	19.25	18.42	2.40
0.250	0.00	6.333	2.67	12.417	19.24	18.50	2.40
0.333	1.34	6.417	2.67	12.500	19.24	18.58	2.40
0.417	1.34	6.500	2.67	12.583	19.24	18.67	2.40
0.500	1.34	6.583	2.67	12.667	19.24	18.75	2.40
0.583	1.34	6.667	2.67	12.750	19.24	18.83	2.40
0.667	1.34	6.750	2.67	12.833	9.89	18.92	2.40
0.750	1.34	6.833	2.67	12.917	9.89	19.00	2.40
0.833	1.34	6.917	2.67	13.000	9.89	19.08	2.40
0.917	1.34	7.000	2.67	13.083	9.89	19.17	2.40
1.000	1.34	7.083	2.67	13.167	9.89	19.25	2.40
1.083	1.34	7.167	2.67	13.250	9.89	19.33	2.40
1.167	1.34	7.250	2.67	13.333	1.87	19.42	2.40
1.250	1.34	7.333	2.67	13.417	1.87	19.50	2.40
1.333	1.34	7.417	2.67	13.500	1.87	19.58	2.40
1.417	1.34	7.500	2.67	13.583	1.87	19.67	2.40
1.500	1.34	7.583	2.67	13.667	1.87	19.75	2.40
1.583	1.34	7.667	2.67	13.750	1.87	19.83	2.40
1.667	1.34	7.750	2.67	13.833	10.95	19.92	2.40
1.750	1.34	7.833	2.67	13.917	10.96	20.00	2.40
1.833	1.34	7.917	2.67	14.000	10.96	20.08	2.40
1.917	1.34	8.000	2.67	14.083	10.96	20.17	2.40
2.000	1.34	8.083	2.67	14.167	10.96	20.25	2.40
2.083	2.40	8.167	2.67	14.250	10.96	20.33	1.60
2.167	2.40	8.250	2.67	14.333	4.01	20.42	1.60
2.250	2.40	8.333	3.61	14.417	4.01	20.50	1.60
2.333	1.74	8.417	3.61	14.500	4.01	20.58	1.60
2.417	1.74	8.500	3.61	14.583	4.01	20.67	1.60
2.500	1.74	8.583	3.61	14.667	4.01	20.75	1.60
2.583	1.74	8.667	3.61	14.750	4.01	20.83	1.60
2.667	1.74	8.750	3.61	14.833	4.01	20.92	1.60
2.750	1.74	8.833	3.61	14.917	4.01	21.00	1.60
2.833	1.74	8.917	3.61	15.000	4.01	21.08	1.60
2.917	1.74	9.000	3.61	15.083	4.01	21.17	1.60
3.000	1.74	9.083	3.61	15.167	4.01	21.25	1.60

3.083	1.74	9.167	3.61	15.250	4.01	21.33	1.60
3.167	1.74	9.250	3.61	15.333	4.01	21.42	1.60
3.250	1.74	9.333	4.28	15.417	4.01	21.50	1.60
3.333	1.74	9.417	4.28	15.500	4.01	21.58	1.60
3.417	1.74	9.500	4.28	15.583	4.01	21.67	1.60
3.500	1.74	9.583	4.28	15.667	4.01	21.75	1.60
3.583	1.74	9.667	4.28	15.750	4.01	21.83	1.60
3.667	1.74	9.750	4.28	15.833	4.01	21.92	1.60
3.750	1.74	9.833	4.81	15.917	4.01	22.00	1.60
3.833	1.74	9.917	4.81	16.000	4.01	22.08	1.60
3.917	1.74	10.000	4.81	16.083	4.01	22.17	1.60
4.000	1.74	10.083	4.81	16.167	4.01	22.25	1.60
4.083	1.74	10.167	4.81	16.250	4.01	22.33	1.60
4.167	1.74	10.250	4.81	16.333	2.41	22.42	1.60
4.250	1.74	10.333	6.15	16.417	2.40	22.50	1.60
4.333	2.14	10.417	6.15	16.500	2.40	22.58	1.60
4.417	2.14	10.500	6.15	16.583	2.40	22.67	1.60
4.500	2.14	10.583	6.15	16.667	2.40	22.75	1.60
4.583	2.14	10.667	6.15	16.750	2.40	22.83	1.60
4.667	2.14	10.750	6.15	16.833	2.40	22.92	1.60
4.750	2.14	10.833	8.28	16.917	2.40	23.00	1.60
4.833	2.14	10.917	8.28	17.000	2.40	23.08	1.60
4.917	2.14	11.000	8.28	17.083	2.40	23.17	1.60
5.000	2.14	11.083	8.28	17.167	2.40	23.25	1.60
5.083	2.14	11.167	8.28	17.250	2.40	23.33	1.60
5.167	2.14	11.250	8.28	17.333	2.40	23.42	1.60
5.250	2.14	11.333	12.83	17.417	2.40	23.50	1.60
5.333	2.14	11.417	12.83	17.500	2.40	23.58	1.60
5.417	2.14	11.500	12.83	17.583	2.40	23.67	1.60
5.500	2.14	11.583	12.83	17.667	2.40	23.75	1.60
5.583	2.14	11.667	12.83	17.750	2.40	23.83	1.60
5.667	2.14	11.750	12.83	17.833	2.40	23.92	1.60
5.750	2.14	11.833	55.57	17.917	2.40	24.00	1.60
5.833	2.14	11.917	55.58	18.000	2.40	24.08	1.60
5.917	2.14	12.000	55.58	18.083	2.40	24.17	1.60
6.000	2.14	12.083	147.48	18.167	2.40	24.25	1.60
6.083	2.14	12.167	147.49	18.250	2.40		

Max.Eff.Inten.(mm/hr)=	147.49	260.56	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.89 (ii)	6.78 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.28	0.14	
			TOTALS
PEAK FLOW (cms)=	0.93	0.47	1.404 (iii)
TIME TO PEAK (hrs)=	12.25	12.25	12.25
RUNOFF VOLUME (mm)=	132.60	101.68	120.23
TOTAL RAINFALL (mm)=	133.60	133.60	133.60
RUNOFF COEFFICIENT =	0.99	0.76	0.90

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB

STANDHYD (0034)	Area (ha)= 29.06
ID= 1 DT= 5.0 min	Total Imp(%)= 66.00 Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	6.167	2.14	12.250	147.49	18.33	2.40
0.167	0.00	6.250	2.14	12.333	19.25	18.42	2.40
0.250	0.00	6.333	2.67	12.417	19.24	18.50	2.40
0.333	1.34	6.417	2.67	12.500	19.24	18.58	2.40
0.417	1.34	6.500	2.67	12.583	19.24	18.67	2.40
0.500	1.34	6.583	2.67	12.667	19.24	18.75	2.40
0.583	1.34	6.667	2.67	12.750	19.24	18.83	2.40
0.667	1.34	6.750	2.67	12.833	9.89	18.92	2.40
0.750	1.34	6.833	2.67	12.917	9.89	19.00	2.40
0.833	1.34	6.917	2.67	13.000	9.89	19.08	2.40
0.917	1.34	7.000	2.67	13.083	9.89	19.17	2.40
1.000	1.34	7.083	2.67	13.167	9.89	19.25	2.40
1.083	1.34	7.167	2.67	13.250	9.89	19.33	2.40
1.167	1.34	7.250	2.67	13.333	1.87	19.42	2.40
1.250	1.34	7.333	2.67	13.417	1.87	19.50	2.40
1.333	1.34	7.417	2.67	13.500	1.87	19.58	2.40
1.417	1.34	7.500	2.67	13.583	1.87	19.67	2.40
1.500	1.34	7.583	2.67	13.667	1.87	19.75	2.40
1.583	1.34	7.667	2.67	13.750	1.87	19.83	2.40
1.667	1.34	7.750	2.67	13.833	10.95	19.92	2.40
1.750	1.34	7.833	2.67	13.917	10.96	20.00	2.40
1.833	1.34	7.917	2.67	14.000	10.96	20.08	2.40
1.917	1.34	8.000	2.67	14.083	10.96	20.17	2.40
2.000	1.34	8.083	2.67	14.167	10.96	20.25	2.40
2.083	2.40	8.167	2.67	14.250	10.96	20.33	1.60
2.167	2.40	8.250	2.67	14.333	4.01	20.42	1.60
2.250	2.40	8.333	3.61	14.417	4.01	20.50	1.60
2.333	1.74	8.417	3.61	14.500	4.01	20.58	1.60
2.417	1.74	8.500	3.61	14.583	4.01	20.67	1.60
2.500	1.74	8.583	3.61	14.667	4.01	20.75	1.60
2.583	1.74	8.667	3.61	14.750	4.01	20.83	1.60
2.667	1.74	8.750	3.61	14.833	4.01	20.92	1.60
2.750	1.74	8.833	3.61	14.917	4.01	21.00	1.60
2.833	1.74	8.917	3.61	15.000	4.01	21.08	1.60
2.917	1.74	9.000	3.61	15.083	4.01	21.17	1.60
3.000	1.74	9.083	3.61	15.167	4.01	21.25	1.60
3.083	1.74	9.167	3.61	15.250	4.01	21.33	1.60
3.167	1.74	9.250	3.61	15.333	4.01	21.42	1.60
3.250	1.74	9.333	4.28	15.417	4.01	21.50	1.60
3.333	1.74	9.417	4.28	15.500	4.01	21.58	1.60
3.417	1.74	9.500	4.28	15.583	4.01	21.67	1.60
3.500	1.74	9.583	4.28	15.667	4.01	21.75	1.60
3.583	1.74	9.667	4.28	15.750	4.01	21.83	1.60
3.667	1.74	9.750	4.28	15.833	4.01	21.92	1.60
3.750	1.74	9.833	4.81	15.917	4.01	22.00	1.60

3.833	1.74	9.917	4.81	16.000	4.01	22.08	1.60
3.917	1.74	10.000	4.81	16.083	4.01	22.17	1.60
4.000	1.74	10.083	4.81	16.167	4.01	22.25	1.60
4.083	1.74	10.167	4.81	16.250	4.01	22.33	1.60
4.167	1.74	10.250	4.81	16.333	2.41	22.42	1.60
4.250	1.74	10.333	6.15	16.417	2.40	22.50	1.60
4.333	2.14	10.417	6.15	16.500	2.40	22.58	1.60
4.417	2.14	10.500	6.15	16.583	2.40	22.67	1.60
4.500	2.14	10.583	6.15	16.667	2.40	22.75	1.60
4.583	2.14	10.667	6.15	16.750	2.40	22.83	1.60
4.667	2.14	10.750	6.15	16.833	2.40	22.92	1.60
4.750	2.14	10.833	8.28	16.917	2.40	23.00	1.60
4.833	2.14	10.917	8.28	17.000	2.40	23.08	1.60
4.917	2.14	11.000	8.28	17.083	2.40	23.17	1.60
5.000	2.14	11.083	8.28	17.167	2.40	23.25	1.60
5.083	2.14	11.167	8.28	17.250	2.40	23.33	1.60
5.167	2.14	11.250	8.28	17.333	2.40	23.42	1.60
5.250	2.14	11.333	12.83	17.417	2.40	23.50	1.60
5.333	2.14	11.417	12.83	17.500	2.40	23.58	1.60
5.417	2.14	11.500	12.83	17.583	2.40	23.67	1.60
5.500	2.14	11.583	12.83	17.667	2.40	23.75	1.60
5.583	2.14	11.667	12.83	17.750	2.40	23.83	1.60
5.667	2.14	11.750	12.83	17.833	2.40	23.92	1.60
5.750	2.14	11.833	55.57	17.917	2.40	24.00	1.60
5.833	2.14	11.917	55.58	18.000	2.40	24.08	1.60
5.917	2.14	12.000	55.58	18.083	2.40	24.17	1.60
6.000	2.14	12.083	147.48	18.167	2.40	24.25	1.60
6.083	2.14	12.167	147.49	18.250	2.40		

Max.Eff.Inten.(mm/hr)=	147.49	156.81	
over (min)	5.00	15.00	
Storage Coeff. (min)=	5.32 (ii)	10.31 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.21	0.09	
			TOTALS
PEAK FLOW (cms)=	6.30	3.01	9.064 (iii)
TIME TO PEAK (hrs)=	12.25	12.33	12.25
RUNOFF VOLUME (mm)=	132.60	90.06	113.46
TOTAL RAINFALL (mm)=	133.60	133.60	133.60
RUNOFF COEFFICIENT =	0.99	0.67	0.85

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0035)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0032):	3.80	1.404	12.25	120.23
+ ID2= 2 (0034):	29.06	9.064	12.25	113.46
ID = 3 (0035):	32.86	10.468	12.25	114.24

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0033)	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
IN= 2---> OUT= 1	OVERFLOW IS OFF			
DT= 5.0 min	0.0000	0.0000	0.4930	1.5666
	0.0360	0.7150	0.7890	1.8478
	0.0660	1.0737	1.0520	2.0613
	0.2630	1.3645	1.3140	2.2797

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0035)	32.860	10.468	12.25	114.24
OUTFLOW: ID= 1 (0033)	32.860	1.313	12.92	111.66

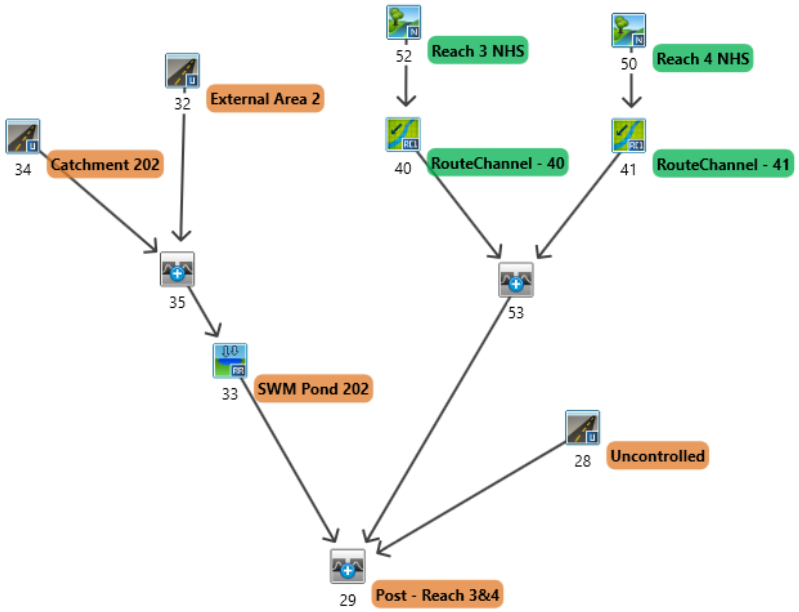
PEAK FLOW REDUCTION [Qout/Qin](%)= 12.54
TIME SHIFT OF PEAK FLOW (min)= 40.00
MAXIMUM STORAGE USED (ha.m.)= 2.2797

ADD HYD (0029)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0028):	1.13	0.404	12.25	115.45
+ ID2= 2 (0033):	32.86	1.313	12.92	111.66
ID = 3 (0029):	33.99	1.354	12.75	111.79

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0029)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0029):	33.99	1.354	12.75	111.79
+ ID2= 2 (0053):	41.43	1.195	13.92	57.39
ID = 1 (0029):	75.42	2.308	13.58	81.91

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.



SCHAEFFERS
CONSULTING ENGINEERS

Visual OTTHYMO™ Schematic

POST- DEVELOPMENT – REACH 3/4
2-100YR, CHICAGO

Job #: 5170	**Date: April 2024**

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

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


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DATE: 05-03-2024                          TIME: 01:44:31

USER:


COMMENTS: _____________________________________________________________

--------------------------------------------------------------------------------
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  ***********************************************
  ** SIMULATION : 19. 2yr 4hr 10min Chicago     **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 675.586
| Ptotal= 37.02 mm |                          B=   4.681
--------------------                          C=   0.780
                       used in:   INTENSITY =  A / (t + B)^C

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

      TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
       hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
      0.00     2.48 |  1.00    18.80 |'  2.00     5.75 |  3.00     2.94
      0.17     2.83 |  1.17    83.10 |'  2.17     4.91 |  3.17     2.74
      0.33     3.33 |  1.33    24.59 |'  2.33     4.30 |  3.33     2.56
      0.50     4.07 |  1.50    13.04 |'  2.50     3.84 |  3.50     2.41
      0.67     5.33 |  1.67     9.04 |'  2.67     3.48 |  3.67     2.28
      0.83     8.01 |  1.83     7.00 |'  2.83     3.18 |  3.83     2.16
```

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--------------------
| CALIB            |
| NASHYD   (  0052)|   Area    (ha)=  17.19   Curve Number    (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.98

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.48	1.083	18.80	2.083	5.75	3.08	2.94
0.167	2.48	1.167	18.80	2.167	5.75	3.17	2.94
0.250	2.83	1.250	83.10	2.250	4.91	3.25	2.74
0.333	2.83	1.333	83.10	2.333	4.91	3.33	2.74
0.417	3.33	1.417	24.59	2.417	4.30	3.42	2.56
0.500	3.33	1.500	24.59	2.500	4.30	3.50	2.56
0.583	4.07	1.583	13.04	2.583	3.84	3.58	2.41
0.667	4.07	1.667	13.04	2.667	3.84	3.67	2.41
0.750	5.33	1.750	9.04	2.750	3.48	3.75	2.28
0.833	5.33	1.833	9.04	2.833	3.48	3.83	2.28
0.917	8.01	1.917	7.00	2.917	3.18	3.92	2.16
1.000	8.01	2.000	7.00	3.000	3.18	4.00	2.16

```
     Unit Hyd Qpeak  (cms)=   0.670

     PEAK FLOW       (cms)=   0.081 (i)
     TIME TO PEAK    (hrs)=   2.750
     RUNOFF VOLUME    (mm)=   4.727
     TOTAL RAINFALL   (mm)=  37.024
     RUNOFF COEFFICIENT   =   0.128

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

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0040)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
              <------ DATA FOR SECTION (   1.1) ------>
              Distance      Elevation       Manning
                  0.00         253.33        0.0800
                  4.07         253.22        0.0800
                 31.67         252.50        0.0800
                 80.33         251.02        0.0800
                112.54         250.38    0.0800 /0.0300  Main Channel
                147.82         250.41    0.0300 /0.0800  Main Channel
                227.35         251.81        0.0800
                234.22         251.93        0.0800
                240.16         252.02        0.0800
                245.25         252.11        0.0800
                250.86         252.20        0.0800
                254.81         252.26        0.0800

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
```

0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

		<---- hydrograph ---->			<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2	(0052)	17.19	0.08	2.75	4.73	0.00	0.63
OUTFLOW: ID= 1	(0040)	17.19	0.07	3.33	4.73	0.00	0.63

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0050)|   Area    (ha)=  24.24   Curve Number    (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.13

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.48	1.083	18.80	2.083	5.75	3.08	2.94
0.167	2.48	1.167	18.80	2.167	5.75	3.17	2.94
0.250	2.83	1.250	83.10	2.250	4.91	3.25	2.74
0.333	2.83	1.333	83.10	2.333	4.91	3.33	2.74
0.417	3.33	1.417	24.59	2.417	4.30	3.42	2.56
0.500	3.33	1.500	24.59	2.500	4.30	3.50	2.56
0.583	4.07	1.583	13.04	2.583	3.84	3.58	2.41
0.667	4.07	1.667	13.04	2.667	3.84	3.67	2.41
0.750	5.33	1.750	9.04	2.750	3.48	3.75	2.28
0.833	5.33	1.833	9.04	2.833	3.48	3.83	2.28
0.917	8.01	1.917	7.00	2.917	3.18	3.92	2.16
1.000	8.01	2.000	7.00	3.000	3.18	4.00	2.16

```
    Unit Hyd Qpeak  (cms)=   0.819

    PEAK FLOW       (cms)=   0.104 (i)
    TIME TO PEAK    (hrs)=   3.000
    RUNOFF VOLUME    (mm)=   4.727
    TOTAL RAINFALL   (mm)=  37.024
    RUNOFF COEFFICIENT   =   0.128
```

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

| ROUTE CHN(0041)| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0050)	24.24	0.10	3.00	4.73	0.02	0.17
OUTFLOW: ID= 1 (0041)	24.24	0.06	4.67	4.69	0.02	0.17

| ADD HYD (0053)| 1 + 2 = 3 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0040):	17.19	0.073	3.33	4.73
+ ID2= 2 (0041):	24.24	0.059	4.67	4.69
ID = 3 (0053):	41.43	0.121	3.75	4.71

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB | STANDHYD (0028)| ID= 1 DT= 5.0 min |

Area (ha)= 1.13
Total Imp(%)= 70.00 Dir. Conn.(%)= 58.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.79	0.34
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	86.79	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.48	1.083	18.80	2.083	5.75	3.08	2.94
0.167	2.48	1.167	18.80	2.167	5.75	3.17	2.94
0.250	2.83	1.250	83.10	2.250	4.91	3.25	2.74
0.333	2.83	1.333	83.10	2.333	4.91	3.33	2.74
0.417	3.33	1.417	24.59	2.417	4.30	3.42	2.56
0.500	3.33	1.500	24.59	2.500	4.30	3.50	2.56
0.583	4.07	1.583	13.04	2.583	3.84	3.58	2.41
0.667	4.07	1.667	13.04	2.667	3.84	3.67	2.41
0.750	5.33	1.750	9.04	2.750	3.48	3.75	2.28
0.833	5.33	1.833	9.04	2.833	3.48	3.83	2.28
0.917	8.01	1.917	7.00	2.917	3.18	3.92	2.16
1.000	8.01	2.000	7.00	3.000	3.18	4.00	2.16

Max.Eff.Inten.	(mm/hr)=	83.10	28.21	
over	(min)	5.00	15.00	
Storage Coeff.	(min)=	2.53 (ii)	14.24 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	15.00	
Unit Hyd. peak	(cms)=	0.29	0.08	
				TOTALS
PEAK FLOW	(cms)=	0.15	0.02	0.157 (iii)
TIME TO PEAK	(hrs)=	1.33	1.50	1.33
RUNOFF VOLUME	(mm)=	36.02	12.77	26.25
TOTAL RAINFALL	(mm)=	37.02	37.02	37.02
RUNOFF COEFFICIENT	=	0.97	0.34	0.71

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB | STANDHYD (0032)| ID= 1 DT= 5.0 min |

Area (ha)= 3.80
Total Imp(%)= 80.00 Dir. Conn.(%)= 60.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.48	1.083	18.80	2.083	5.75	3.08	2.94
0.167	2.48	1.167	18.80	2.167	5.75	3.17	2.94
0.250	2.83	1.250	83.10	2.250	4.91	3.25	2.74
0.333	2.83	1.333	83.10	2.333	4.91	3.33	2.74
0.417	3.33	1.417	24.59	2.417	4.30	3.42	2.56
0.500	3.33	1.500	24.59	2.500	4.30	3.50	2.56
0.583	4.07	1.583	13.04	2.583	3.84	3.58	2.41
0.667	4.07	1.667	13.04	2.667	3.84	3.67	2.41
0.750	5.33	1.750	9.04	2.750	3.48	3.75	2.28
0.833	5.33	1.833	9.04	2.833	3.48	3.83	2.28
0.917	8.01	1.917	7.00	2.917	3.18	3.92	2.16
1.000	8.01	2.000	7.00	3.000	3.18	4.00	2.16

Max.Eff.Inten.	(mm/hr)=	83.10	68.00	
over	(min)	5.00	10.00	
Storage Coeff.	(min)=	3.64 (ii)	8.53 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	10.00	
Unit Hyd. peak	(cms)=	0.25	0.12	
				TOTALS
PEAK FLOW	(cms)=	0.50	0.10	0.577 (iii)
TIME TO PEAK	(hrs)=	1.33	1.42	1.33
RUNOFF VOLUME	(mm)=	36.02	16.45	28.19
TOTAL RAINFALL	(mm)=	37.02	37.02	37.02
RUNOFF COEFFICIENT	=	0.97	0.44	0.76

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0034)	Area (ha)= 29.06
ID= 1 DT= 5.0 min	Total Imp(%)= 66.00 Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.48	1.083	18.80	2.083	5.75	3.08	2.94
0.167	2.48	1.167	18.80	2.167	5.75	3.17	2.94
0.250	2.83	1.250	83.10	2.250	4.91	3.25	2.74
0.333	2.83	1.333	83.10	2.333	4.91	3.33	2.74
0.417	3.33	1.417	24.59	2.417	4.30	3.42	2.56
0.500	3.33	1.500	24.59	2.500	4.30	3.50	2.56
0.583	4.07	1.583	13.04	2.583	3.84	3.58	2.41
0.667	4.07	1.667	13.04	2.667	3.84	3.67	2.41
0.750	5.33	1.750	9.04	2.750	3.48	3.75	2.28
0.833	5.33	1.833	9.04	2.833	3.48	3.83	2.28
0.917	8.01	1.917	7.00	2.917	3.18	3.92	2.16
1.000	8.01	2.000	7.00	3.000	3.18	4.00	2.16

Max.Eff.Inten.	(mm/hr)=	83.10	25.24	
over	(min)	5.00	20.00	
Storage Coeff.	(min)=	6.69 (ii)	18.93 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	20.00	
Unit Hyd. peak	(cms)=	0.18	0.06	
				TOTALS
PEAK FLOW	(cms)=	3.02	0.37	3.137 (iii)
TIME TO PEAK	(hrs)=	1.33	1.58	1.33
RUNOFF VOLUME	(mm)=	36.02	12.20	25.30
TOTAL RAINFALL	(mm)=	37.02	37.02	37.02
RUNOFF COEFFICIENT	=	0.97	0.33	0.68

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0035)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0032):	3.80	0.577	1.33	28.19
	+ ID2= 2 (0034):	29.06	3.137	1.33	25.30
	ID = 3 (0035):	32.86	3.714	1.33	25.64

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0033)	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	0.4930	1.5666
	0.0360	0.7150	0.7890	1.8478
	0.0660	1.0737	1.0520	2.0613
	0.2630	1.3645	1.3140	2.2797

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

```
   INFLOW : ID= 2 (  0035)     32.860      3.714      1.33      25.64
   OUTFLOW: ID= 1 (  0033)     32.860      0.043      4.25      24.35

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.16
                  TIME SHIFT OF PEAK FLOW         (min)=175.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.8004

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

--------------------
| ADD HYD  (  0029)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0028):     1.13   0.157     1.33    26.25
     + ID2= 2 (  0033):    32.86   0.043     4.25    24.35
       ================================================
       ID = 3 (  0029):    33.99   0.169     1.33    24.42

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

--------------------
| ADD HYD  (  0029)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0029):    33.99   0.169     1.33    24.42
     + ID2= 2 (  0053):    41.43   0.121     3.75     4.71
       ================================================
       ID = 1 (  0029):    75.42   0.169     3.83    13.59

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
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DATE: 05-03-2024                          TIME: 01:44:31

USER:


COMMENTS: _____________________________________________________________

--------------------------------------------------------------------------------
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  ***********************************************
  ** SIMULATION : 20. 5yr 4hr 10min Chicago     **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 843.019
| Ptotal= 50.74 mm |                          B=   4.582
--------------------                          C=   0.763
                       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    3.62 |  1.00   25.63 |'  2.00    8.19 |  3.00    4.27
      0.17    4.12 |  1.17  109.11 |'  2.17    7.03 |  3.17    3.98
      0.33    4.82 |  1.33   33.27 |'  2.33    6.18 |  3.33    3.74
      0.50    5.85 |  1.50   18.03 |'  2.50    5.54 |  3.50    3.52
      0.67    7.60 |  1.67   12.66 |'  2.67    5.03 |  3.67    3.33
      0.83   11.26 |  1.83    9.89 |'  2.83    4.62 |  3.83    3.16

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0052)|   Area     (ha)=  17.19   Curve Number    (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.98

        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    3.62 | 1.083   25.63 | 2.083    8.19 |  3.08    4.27
     0.167    3.62 | 1.167   25.63 | 2.167    8.19 |  3.17    4.27
     0.250    4.12 | 1.250  109.10 | 2.250    7.03 |  3.25    3.98
     0.333    4.12 | 1.333  109.11 | 2.333    7.03 |  3.33    3.98
     0.417    4.82 | 1.417   33.27 | 2.417    6.18 |  3.42    3.74
     0.500    4.82 | 1.500   33.27 | 2.500    6.18 |  3.50    3.74
     0.583    5.85 | 1.583   18.03 | 2.583    5.54 |  3.58    3.52
     0.667    5.85 | 1.667   18.03 | 2.667    5.54 |  3.67    3.52
     0.750    7.60 | 1.750   12.66 | 2.750    5.03 |  3.75    3.33
     0.833    7.60 | 1.833   12.66 | 2.833    5.03 |  3.83    3.33
     0.917   11.26 | 1.917    9.89 | 2.917    4.62 |  3.92    3.16
     1.000   11.26 | 2.000    9.89 | 3.000    4.62 |  4.00    3.16

    Unit Hyd Qpeak  (cms)=   0.670
```

```
     PEAK FLOW       (cms)=   0.164 (i)
     TIME TO PEAK    (hrs)=   2.667
     RUNOFF VOLUME    (mm)=   9.519
     TOTAL RAINFALL   (mm)=  50.743
     RUNOFF COEFFICIENT   =   0.188

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

```
--------------------
| ROUTE CHN(  0040)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00         253.33        0.0800
                   4.07         253.22        0.0800
                  31.67         252.50        0.0800
                  80.33         251.02        0.0800
                 112.54         250.38    0.0800 /0.0300  Main Channel
                 147.82         250.41    0.0300 /0.0800  Main Channel
                 227.35         251.81        0.0800
                 234.22         251.93        0.0800
                 240.16         252.02        0.0800
                 245.25         252.11        0.0800
                 250.86         252.20        0.0800
                 254.81         252.26        0.0800

      <---------------------- TRAVEL TIME TABLE ----------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        0.10   250.48    .379E+04        2.1         0.63       30.46
        0.20   250.58    .945E+04        8.0         0.98       19.68
        0.30   250.68    .163E+05       17.1         1.21       15.91
        0.40   250.77    .244E+05       29.2         1.38       13.93
        0.50   250.87    .338E+05       44.4         1.52       12.68
        0.60   250.97    .443E+05       62.6         1.63       11.80
        0.70   251.07    .560E+05       84.0         1.73       11.12
        0.79   251.17    .688E+05      108.6         1.82       10.56
        0.89   251.27    .826E+05      136.4         1.91       10.10
        0.99   251.37    .975E+05      167.3         1.99        9.71
        1.09   251.47    .113E+06      201.6         2.06        9.37
        1.19   251.57    .130E+06      239.1         2.12        9.08
        1.29   251.67    .148E+06      280.0         2.19        8.82
        1.39   251.77    .167E+06      324.3         2.24        8.58
        1.49   251.87    .187E+06      372.0         2.30        8.38
        1.59   251.97    .208E+06      423.3         2.35        8.19
        1.69   252.07    .230E+06      478.2         2.40        8.02
        1.79   252.17    .253E+06      536.8         2.45        7.86
        1.89   252.26    .277E+06      599.1         2.50        7.72

                                  <---- hydrograph ---->   <-pipe / channel->
                               AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                               (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0052)    17.19     0.16    2.67   9.52       0.01      0.63
   OUTFLOW: ID= 1 (  0040)    17.19     0.15    3.25   9.52       0.01      0.63
```

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--------------------
| CALIB            |
| NASHYD   (  0050)|   Area     (ha)=  24.24   Curve Number    (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.13

        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    3.62 | 1.083   25.63 | 2.083    8.19 |  3.08    4.27
               0.167    3.62 | 1.167   25.63 | 2.167    8.19 |  3.17    4.27
               0.250    4.12 | 1.250  109.10 | 2.250    7.03 |  3.25    3.98
               0.333    4.12 | 1.333  109.11 | 2.333    7.03 |  3.33    3.98
               0.417    4.82 | 1.417   33.27 | 2.417    6.18 |  3.42    3.74
               0.500    4.82 | 1.500   33.27 | 2.500    6.18 |  3.50    3.74
               0.583    5.85 | 1.583   18.03 | 2.583    5.54 |  3.58    3.52
               0.667    5.85 | 1.667   18.03 | 2.667    5.54 |  3.67    3.52
               0.750    7.60 | 1.750   12.66 | 2.750    5.03 |  3.75    3.33
               0.833    7.60 | 1.833   12.66 | 2.833    5.03 |  3.83    3.33
               0.917   11.26 | 1.917    9.89 | 2.917    4.62 |  3.92    3.16
               1.000   11.26 | 2.000    9.89 | 3.000    4.62 |  4.00    3.16

     Unit Hyd Qpeak  (cms)=   0.819

     PEAK FLOW       (cms)=   0.211 (i)
     TIME TO PEAK    (hrs)=   2.917
     RUNOFF VOLUME    (mm)=   9.519
     TOTAL RAINFALL   (mm)=  50.743
     RUNOFF COEFFICIENT   =   0.188

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

```
--------------------
| ROUTE CHN(  0041)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00         253.97        0.0800
                  44.18         253.34        0.0800
                  72.75         252.34    0.0800 /0.0300  Main Channel
                  94.18         252.35        0.0300      Main Channel
                 117.64         252.31        0.0300      Main Channel
                 131.62         252.33    0.0300 /0.0800  Main Channel
                 138.41         252.72        0.0800
                 150.91         253.00        0.0800
                 172.41         253.50        0.0800
                 180.51         253.60        0.0800

      <---------------------- TRAVEL TIME TABLE ----------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        0.02   252.33    .386E+03        0.0         0.17      149.17
        0.09   252.40    .580E+04        2.2         0.57       44.29
        0.15   252.47    .122E+05        7.3         0.90       27.96
        0.22   252.53    .189E+05       14.6         1.17       21.61
        0.29   252.60    .259E+05       23.9         1.40       18.12
```

0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

		<---- hydrograph ---->			<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0050)	24.24	0.21	2.92	9.52	0.03	0.18
OUTFLOW:	ID= 1 (0041)	24.24	0.12	4.58	9.48	0.02	0.17

ADD HYD (0053)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0040):	17.19	0.147	3.25	9.52
+ ID2= 2 (0041):	24.24	0.120	4.58	9.48
ID = 3 (0053):	41.43	0.246	3.75	9.50

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0028)	Area (ha)= 1.13		
ID= 1 DT= 5.0 min	Total Imp(%)= 70.00	Dir. Conn.(%)= 58.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.79	0.34
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	86.79	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.62	1.083	25.63	2.083	8.19	3.08	4.27
0.167	3.62	1.167	25.63	2.167	8.19	3.17	4.27
0.250	4.12	1.250	109.10	2.250	7.03	3.25	3.98
0.333	4.12	1.333	109.11	2.333	7.03	3.33	3.98
0.417	4.82	1.417	33.27	2.417	6.18	3.42	3.74
0.500	4.82	1.500	33.27	2.500	6.18	3.50	3.74
0.583	5.85	1.583	18.03	2.583	5.54	3.58	3.52
0.667	5.85	1.667	18.03	2.667	5.54	3.67	3.52
0.750	7.60	1.750	12.66	2.750	5.03	3.75	3.33
0.833	7.60	1.833	12.66	2.833	5.03	3.83	3.33
0.917	11.26	1.917	9.89	2.917	4.62	3.92	3.16
1.000	11.26	2.000	9.89	3.000	4.62	4.00	3.16

Max.Eff.Inten.(mm/hr)=		109.11	60.16	
over (min)		5.00	15.00	
Storage Coeff. (min)=		2.27 (ii)	10.91 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.30	0.09	
				TOTALS
PEAK FLOW	(cms)=	0.20	0.03	0.214 (iii)
TIME TO PEAK	(hrs)=	1.33	1.50	1.33
RUNOFF VOLUME	(mm)=	49.74	21.95	38.06
TOTAL RAINFALL	(mm)=	50.74	50.74	50.74
RUNOFF COEFFICIENT	=	0.98	0.43	0.75

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0032)	Area (ha)= 3.80		
ID= 1 DT= 5.0 min	Total Imp(%)= 80.00	Dir. Conn.(%)= 60.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.62	1.083	25.63	2.083	8.19	3.08	4.27
0.167	3.62	1.167	25.63	2.167	8.19	3.17	4.27
0.250	4.12	1.250	109.10	2.250	7.03	3.25	3.98
0.333	4.12	1.333	109.11	2.333	7.03	3.33	3.98
0.417	4.82	1.417	33.27	2.417	6.18	3.42	3.74
0.500	4.82	1.500	33.27	2.500	6.18	3.50	3.74
0.583	5.85	1.583	18.03	2.583	5.54	3.58	3.52
0.667	5.85	1.667	18.03	2.667	5.54	3.67	3.52
0.750	7.60	1.750	12.66	2.750	5.03	3.75	3.33
0.833	7.60	1.833	12.66	2.833	5.03	3.83	3.33
0.917	11.26	1.917	9.89	2.917	4.62	3.92	3.16
1.000	11.26	2.000	9.89	3.000	4.62	4.00	3.16

Max.Eff.Inten.(mm/hr)=		109.11	111.54
over (min)		5.00	10.00
Storage Coeff. (min)=		3.26 (ii)	7.65 (ii)

Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.27	0.13	
			TOTALS
PEAK FLOW (cms)=	0.67	0.17	0.805 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	49.74	27.01	40.65
TOTAL RAINFALL (mm)=	50.74	50.74	50.74
RUNOFF COEFFICIENT =	0.98	0.53	0.80

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0034)	Area (ha)= 29.06		
ID= 1 DT= 5.0 min	Total Imp(%)= 66.00	Dir. Conn.(%)= 55.00	
	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	19.18	9.88	
Dep. Storage (mm)=	1.00	5.00	
Average Slope (%)=	1.00	2.00	
Length (m)=	440.15	40.00	
Mannings n =	0.013	0.250	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.62	1.083	25.63	2.083	8.19	3.08	4.27
0.167	3.62	1.167	25.63	2.167	8.19	3.17	4.27
0.250	4.12	1.250	109.10	2.250	7.03	3.25	3.98
0.333	4.12	1.333	109.11	2.333	7.03	3.33	3.98
0.417	4.82	1.417	33.27	2.417	6.18	3.42	3.74
0.500	4.82	1.500	33.27	2.500	6.18	3.50	3.74
0.583	5.85	1.583	18.03	2.583	5.54	3.58	3.52
0.667	5.85	1.667	18.03	2.667	5.54	3.67	3.52
0.750	7.60	1.750	12.66	2.750	5.03	3.75	3.33
0.833	7.60	1.833	12.66	2.833	5.03	3.83	3.33
0.917	11.26	1.917	9.89	2.917	4.62	3.92	3.16
1.000	11.26	2.000	9.89	3.000	4.62	4.00	3.16

Max.Eff.Inten.(mm/hr)=	109.11	54.27	
over (min)	5.00	20.00	
Storage Coeff. (min)=	6.00 (ii)	15.02 (ii)	
Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	0.19	0.07	
			TOTALS
PEAK FLOW (cms)=	4.12	0.73	4.376 (iii)
TIME TO PEAK (hrs)=	1.33	1.58	1.33
RUNOFF VOLUME (mm)=	49.74	21.15	36.88
TOTAL RAINFALL (mm)=	50.74	50.74	50.74
RUNOFF COEFFICIENT =	0.98	0.42	0.73

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0035)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0032):	3.80	0.805	1.33	40.65
+ ID2= 2 (0034):	29.06	4.376	1.33	36.88
ID = 3 (0035):	32.86	5.181	1.33	37.31

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0033)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.4930	1.5666
	0.0360	0.7150	0.7890	1.8478
	0.0660	1.0737	1.0520	2.0613
	0.2630	1.3645	1.3140	2.2797

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0035)	32.860	5.181	1.33	37.31
OUTFLOW: ID= 1 (0033)	32.860	0.116	4.17	35.59

PEAK FLOW REDUCTION [Qout/Qin](%)= 2.24
TIME SHIFT OF PEAK FLOW (min)=170.00
MAXIMUM STORAGE USED (ha.m.)= 1.1474

ADD HYD (0029)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0028):	1.13	0.214	1.33	38.06
+ ID2= 2 (0033):	32.86	0.116	4.17	35.59
ID = 3 (0029):	33.99	0.231	1.33	35.67

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0029)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0029):	33.99	0.231	1.33	35.67
+ ID2= 2 (0053):	41.43	0.246	3.75	9.50
ID = 1 (0029):	75.42	0.366	4.00	21.29

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

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

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Output filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\b0013f3a-c877-4cc3-8aae-91f6b9dc5541\scen
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DATE: 05-03-2024 TIME: 01:44:32

USER:

COMMENTS: _____

**** SIMULATION : 21. 10yr 4hr 10min Chicago ****

| CHICAGO STORM | Ptotal= 59.75 mm |

IDF curve parameters: A= 976.898
B= 4.745
C= 0.760
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	4.32	1.00	30.34	2.00	9.74	3.00	5.10
0.17	4.92	1.17	126.38	2.17	8.37	3.17	4.75
0.33	5.74	1.33	39.32	2.33	7.37	3.33	4.46
0.50	6.98	1.50	21.40	2.50	6.60	3.50	4.20
0.67	9.05	1.67	15.05	2.67	6.00	3.67	3.98
0.83	13.39	1.83	11.76	2.83	5.50	3.83	3.78

| CALIB | NASHYD (0052) | ID= 1 DT= 5.0 min |

Area (ha)= 17.19 Curve Number (CN)= 63.0
Ia (mm)= 8.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.98

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	4.32	1.083	30.34	2.083	9.74	3.08	5.10
0.167	4.32	1.167	30.34	2.167	9.74	3.17	5.10
0.250	4.92	1.250	126.38	2.250	8.37	3.25	4.75
0.333	4.92	1.333	126.38	2.333	8.37	3.33	4.75
0.417	5.74	1.417	39.32	2.417	7.37	3.42	4.46
0.500	5.74	1.500	39.32	2.500	7.37	3.50	4.46
0.583	6.98	1.583	21.40	2.583	6.60	3.58	4.20
0.667	6.98	1.667	21.40	2.667	6.60	3.67	4.20
0.750	9.05	1.750	15.05	2.750	6.00	3.75	3.98
0.833	9.05	1.833	15.05	2.833	6.00	3.83	3.98
0.917	13.39	1.917	11.76	2.917	5.50	3.92	3.78
1.000	13.39	2.000	11.76	3.000	5.50	4.00	3.78

Unit Hyd Qpeak (cms)= 0.670

PEAK FLOW (cms)= 0.231 (i)
TIME TO PEAK (hrs)= 2.667
RUNOFF VOLUME (mm)= 13.328
TOTAL RAINFALL (mm)= 59.749
RUNOFF COEFFICIENT = 0.223

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

| ROUTE CHN(0040) | IN= 2---> OUT= 1 |

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

		<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (	0052)	17.19	0.23	2.67	13.33	0.01	0.63
OUTFLOW: ID= 1 (	0040)	17.19	0.21	3.25	13.33	0.01	0.63

CALIB	NASHYD (0050)	ID= 1 DT= 5.0 min

Area (ha)= 24.24 Curve Number (CN)= 63.0
Ia (mm)= 8.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.13

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	4.32	1.083	30.34	2.083	9.74	3.08	5.10
0.167	4.32	1.167	30.34	2.167	9.74	3.17	5.10
0.250	4.92	1.250	126.38	2.250	8.37	3.25	4.75
0.333	4.92	1.333	126.38	2.333	8.37	3.33	4.75
0.417	5.74	1.417	39.32	2.417	7.37	3.42	4.46
0.500	5.74	1.500	39.32	2.500	7.37	3.50	4.46
0.583	6.98	1.583	21.40	2.583	6.60	3.58	4.20
0.667	6.98	1.667	21.40	2.667	6.60	3.67	4.20
0.750	9.05	1.750	15.05	2.750	6.00	3.75	3.98
0.833	9.05	1.833	15.05	2.833	6.00	3.83	3.98
0.917	13.39	1.917	11.76	2.917	5.50	3.92	3.78
1.000	13.39	2.000	11.76	3.000	5.50	4.00	3.78

Unit Hyd Qpeak (cms)= 0.819

PEAK FLOW (cms)= 0.297 (i)
TIME TO PEAK (hrs)= 2.917

RUNOFF VOLUME (mm)= 13.328
TOTAL RAINFALL (mm)= 59.749
RUNOFF COEFFICIENT = 0.223

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

ROUTE CHN(0041)	IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

		<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (	0050)	24.24	0.30	2.92	13.33	0.03	0.18
OUTFLOW: ID= 1 (	0041)	24.24	0.17	4.58	13.29	0.02	0.18

ADD HYD (0053)	1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)

```
       ID1= 1 (  0040):    17.19   0.207     3.25    13.33
     + ID2= 2 (  0041):    24.24   0.169     4.58    13.29
       ================================================
       ID = 3 (  0053):    41.43   0.347     3.67    13.31

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

```
--------------------
| CALIB            |
| STANDHYD (  0028)|   Area    (ha)=   1.13
|ID= 1 DT= 5.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  58.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.79         0.34
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      86.79        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	4.32	1.083	30.34	2.083	9.74	3.08	5.10
0.167	4.32	1.167	30.34	2.167	9.74	3.17	5.10
0.250	4.92	1.250	126.38	2.250	8.37	3.25	4.75
0.333	4.92	1.333	126.38	2.333	8.37	3.33	4.75
0.417	5.74	1.417	39.32	2.417	7.37	3.42	4.46
0.500	5.74	1.500	39.32	2.500	7.37	3.50	4.46
0.583	6.98	1.583	21.40	2.583	6.60	3.58	4.20
0.667	6.98	1.667	21.40	2.667	6.60	3.67	4.20
0.750	9.05	1.750	15.05	2.750	6.00	3.75	3.98
0.833	9.05	1.833	15.05	2.833	6.00	3.83	3.98
0.917	13.39	1.917	11.76	2.917	5.50	3.92	3.78
1.000	13.39	2.000	11.76	3.000	5.50	4.00	3.78

```
     Max.Eff.Inten.(mm/hr)=     126.38        79.03
               over (min)          5.00        10.00
     Storage Coeff.  (min)=       2.14 (ii)    7.07 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.31         0.14
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.23         0.06       0.274 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42        1.33
     RUNOFF VOLUME    (mm)=      58.75        28.59       46.08
     TOTAL RAINFALL   (mm)=      59.75        59.75       59.75
     RUNOFF COEFFICIENT   =       0.98         0.48        0.77

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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--------------------
| CALIB            |
| STANDHYD (  0032)|   Area    (ha)=   3.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  60.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.04         0.76
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     159.16        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	4.32	1.083	30.34	2.083	9.74	3.08	5.10
0.167	4.32	1.167	30.34	2.167	9.74	3.17	5.10
0.250	4.92	1.250	126.38	2.250	8.37	3.25	4.75
0.333	4.92	1.333	126.38	2.333	8.37	3.33	4.75
0.417	5.74	1.417	39.32	2.417	7.37	3.42	4.46
0.500	5.74	1.500	39.32	2.500	7.37	3.50	4.46
0.583	6.98	1.583	21.40	2.583	6.60	3.58	4.20
0.667	6.98	1.667	21.40	2.667	6.60	3.67	4.20
0.750	9.05	1.750	15.05	2.750	6.00	3.75	3.98
0.833	9.05	1.833	15.05	2.833	6.00	3.83	3.98
0.917	13.39	1.917	11.76	2.917	5.50	3.92	3.78
1.000	13.39	2.000	11.76	3.000	5.50	4.00	3.78

```
     Max.Eff.Inten.(mm/hr)=     126.38       142.62
               over (min)          5.00        10.00
     Storage Coeff.  (min)=       3.07 (ii)    7.22 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.27         0.14
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.78         0.22       0.962 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42        1.33
     RUNOFF VOLUME    (mm)=      58.75        34.43       49.02
     TOTAL RAINFALL   (mm)=      59.75        59.75       59.75
     RUNOFF COEFFICIENT   =       0.98         0.58        0.82

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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| CALIB            |
| STANDHYD (  0034)|   Area    (ha)=  29.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  66.00   Dir. Conn.(%)=  55.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      19.18         9.88
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     440.15        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	4.32	1.083	30.34	2.083	9.74	3.08	5.10
0.167	4.32	1.167	30.34	2.167	9.74	3.17	5.10
0.250	4.92	1.250	126.38	2.250	8.37	3.25	4.75
0.333	4.92	1.333	126.38	2.333	8.37	3.33	4.75
0.417	5.74	1.417	39.32	2.417	7.37	3.42	4.46
0.500	5.74	1.500	39.32	2.500	7.37	3.50	4.46
0.583	6.98	1.583	21.40	2.583	6.60	3.58	4.20
0.667	6.98	1.667	21.40	2.667	6.60	3.67	4.20
0.750	9.05	1.750	15.05	2.750	6.00	3.75	3.98
0.833	9.05	1.833	15.05	2.833	6.00	3.83	3.98
0.917	13.39	1.917	11.76	2.917	5.50	3.92	3.78
1.000	13.39	2.000	11.76	3.000	5.50	4.00	3.78

			TOTALS
Max.Eff.Inten.(mm/hr)=	126.38	71.62	
over (min)	5.00	15.00	
Storage Coeff. (min)=	5.66 (ii)	13.73 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.20	0.08	
PEAK FLOW (cms)=	4.86	1.05	5.382 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.33
RUNOFF VOLUME (mm)=	58.75	27.65	44.75
TOTAL RAINFALL (mm)=	59.75	59.75	59.75
RUNOFF COEFFICIENT =	0.98	0.46	0.75

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 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 (0035)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0032):	3.80	0.962	1.33	49.02
	+ ID2= 2 (0034):	29.06	5.382	1.33	44.75
	ID = 3 (0035):	32.86	6.344	1.33	45.25

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0033) 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	0.4930	1.5666
	0.0360	0.7150	0.7890	1.8478
	0.0660	1.0737	1.0520	2.0613
	0.2630	1.3645	1.3140	2.2797

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0035)		32.860	6.344	1.33	45.25
OUTFLOW: ID= 1 (0033)		32.860	0.235	4.08	43.43

PEAK FLOW REDUCTION [Qout/Qin](%)= 3.71
TIME SHIFT OF PEAK FLOW (min)=165.00
MAXIMUM STORAGE USED (ha.m.)= 1.3246

ADD HYD (0029)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0028):	1.13	0.274	1.33	46.08
	+ ID2= 2 (0033):	32.86	0.235	4.08	43.43
	ID = 3 (0029):	33.99	0.295	1.33	43.52

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0029)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1	ID1= 3 (0029):	33.99	0.295	1.33	43.52
	+ ID2= 2 (0053):	41.43	0.347	3.67	13.31
	ID = 1 (0029):	75.42	0.589	3.83	26.92

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\mmsingh\AppData\Local\Civica\VH5\8b6a24ee-1200-4210-86e9-d1c81bbaf91e\05a0eb97-2673-4fd4-8345-d1379c81fdd2\scen
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DATE: 05-03-2024 TIME: 01:44:31

USER:

COMMENTS: _____

**** SIMULATION : 22. 25yr 4hr 10min Chicago ****

CHICAGO STORM	Ptotal= 70.85 mm

IDF curve parameters: A=1133.123
B= 4.734
C= 0.756
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	5.20	1.00	35.94	2.00	11.65	3.00	6.12
0.17	5.91	1.17	148.26	2.17	10.02	3.17	5.71
0.33	6.90	1.33	46.49	2.33	8.83	3.33	5.36
0.50	8.36	1.50	25.43	2.50	7.92	3.50	5.05
0.67	10.82	1.67	17.93	2.67	7.20	3.67	4.79
0.83	15.97	1.83	14.05	2.83	6.61	3.83	4.55

CALIB NASHYD (0052)	ID= 1 DT= 5.0 min

Area (ha)= 17.19 Curve Number (CN)= 63.0
Ia (mm)= 8.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.98

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	5.20	1.083	35.94	2.083	11.65	3.08	6.12
0.167	5.20	1.167	35.94	2.167	11.65	3.17	6.12
0.250	5.91	1.250	148.26	2.250	10.02	3.25	5.71
0.333	5.91	1.333	148.26	2.333	10.02	3.33	5.71
0.417	6.90	1.417	46.49	2.417	8.83	3.42	5.36
0.500	6.90	1.500	46.49	2.500	8.83	3.50	5.36
0.583	8.36	1.583	25.43	2.583	7.92	3.58	5.05
0.667	8.36	1.667	25.43	2.667	7.92	3.67	5.05
0.750	10.82	1.750	17.93	2.750	7.20	3.75	4.79
0.833	10.82	1.833	17.93	2.833	7.20	3.83	4.79
0.917	15.97	1.917	14.05	2.917	6.61	3.92	4.55
1.000	15.97	2.000	14.05	3.000	6.61	4.00	4.55

Unit Hyd Qpeak (cms)= 0.670

PEAK FLOW (cms)= 0.326 (i)
TIME TO PEAK (hrs)= 2.667
RUNOFF VOLUME (mm)= 18.629
TOTAL RAINFALL (mm)= 70.848
RUNOFF COEFFICIENT = 0.263

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

ROUTE CHN(0040)	IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0052)	17.19	0.33	2.67	18.63	0.02	0.63
OUTFLOW: ID= 1 (0040)	17.19	0.29	3.25	18.63	0.01	0.63

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0050)|   Area    (ha)=  24.24   Curve Number    (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.13

        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	5.20	1.083	35.94	2.083	11.65	3.08	6.12
0.167	5.20	1.167	35.94	2.167	11.65	3.17	6.12
0.250	5.91	1.250	148.26	2.250	10.02	3.25	5.71
0.333	5.91	1.333	148.26	2.333	10.02	3.33	5.71
0.417	6.90	1.417	46.49	2.417	8.83	3.42	5.36
0.500	6.90	1.500	46.49	2.500	8.83	3.50	5.36
0.583	8.36	1.583	25.43	2.583	7.92	3.58	5.05
0.667	8.36	1.667	25.43	2.667	7.92	3.67	5.05
0.750	10.82	1.750	17.93	2.750	7.20	3.75	4.79
0.833	10.82	1.833	17.93	2.833	7.20	3.83	4.79
0.917	15.97	1.917	14.05	2.917	6.61	3.92	4.55
1.000	15.97	2.000	14.05	3.000	6.61	4.00	4.55

```
     Unit Hyd Qpeak  (cms)=   0.819

     PEAK FLOW       (cms)=   0.418 (i)
     TIME TO PEAK    (hrs)=   2.833
     RUNOFF VOLUME    (mm)=  18.629
     TOTAL RAINFALL   (mm)=  70.848
     RUNOFF COEFFICIENT   =   0.263

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

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0041)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
              <------ DATA FOR SECTION (   1.1) ------>
              Distance      Elevation       Manning
                  0.00        253.97        0.0800
                 44.18        253.34        0.0800
                 72.75        252.34    0.0800 /0.0300  Main Channel
                 94.18        252.35        0.0300      Main Channel
                117.64        252.31        0.0300      Main Channel
                131.62        252.33    0.0300 /0.0800  Main Channel
                138.41        252.72        0.0800
                150.91        253.00        0.0800
                172.41        253.50        0.0800
                180.51        253.60        0.0800

     <---------------------- TRAVEL TIME TABLE ----------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.02   252.33    .386E+03        0.0         0.17     149.17
       0.09   252.40    .580E+04        2.2         0.57      44.29
       0.15   252.47    .122E+05        7.3         0.90      27.96
       0.22   252.53    .189E+05       14.6         1.17      21.61
       0.29   252.60    .259E+05       23.9         1.40      18.12
       0.35   252.67    .333E+05       35.0         1.59      15.86
       0.42   252.73    .409E+05       47.8         1.77      14.27
       0.49   252.80    .490E+05       62.2         1.93      13.13
       0.55   252.87    .576E+05       78.3         2.06      12.25
       0.62   252.93    .667E+05       96.1         2.19      11.57
       0.69   253.00    .762E+05      115.4         2.30      11.01
       0.75   253.07    .863E+05      136.5         2.40      10.54
       0.82   253.13    .969E+05      159.1         2.49      10.15
       0.89   253.20    .108E+06      183.3         2.58       9.81
       0.95   253.27    .119E+06      209.2         2.66       9.51
       1.02   253.33    .131E+06      236.7         2.73       9.26
       1.09   253.40    .144E+06      265.1         2.79       9.06
       1.15   253.47    .157E+06      295.3         2.85       8.88
       1.22   253.54    .172E+06      327.0         2.89       8.75

                                    <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.  MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)     (m)      (m/s)
   INFLOW : ID= 2 (  0050)   24.24     0.42    2.83  18.63      0.03      0.19
   OUTFLOW: ID= 1 (  0041)   24.24     0.24    4.50  18.59      0.03      0.18

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

--------------------
| ADD HYD  (  0053)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0040):    17.19   0.290     3.25    18.63
      + ID2= 2 (  0041):    24.24   0.239     4.50    18.59
        ================================================
        ID = 3 (  0053):    41.43   0.491     3.67    18.61

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0028)|   Area    (ha)=   1.13
|ID= 1 DT= 5.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  58.00
--------------------

                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.79          0.34
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=      86.79         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	5.20	1.083	35.94	2.083	11.65	3.08	6.12
0.167	5.20	1.167	35.94	2.167	11.65	3.17	6.12
0.250	5.91	1.250	148.26	2.250	10.02	3.25	5.71
0.333	5.91	1.333	148.26	2.333	10.02	3.33	5.71

0.417	6.90	1.417	46.49	2.417	8.83	3.42	5.36
0.500	6.90	1.500	46.49	2.500	8.83	3.50	5.36
0.583	8.36	1.583	25.43	2.583	7.92	3.58	5.05
0.667	8.36	1.667	25.43	2.667	7.92	3.67	5.05
0.750	10.82	1.750	17.93	2.750	7.20	3.75	4.79
0.833	10.82	1.833	17.93	2.833	7.20	3.83	4.79
0.917	15.97	1.917	14.05	2.917	6.61	3.92	4.55
1.000	15.97	2.000	14.05	3.000	6.61	4.00	4.55

Max.Eff.Inten.(mm/hr)=	148.26	104.32		
over (min)	5.00	10.00		
Storage Coeff. (min)=	2.00 (ii)	6.64 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.31	0.14		
			TOTALS	
PEAK FLOW (cms)=	0.27	0.07	0.331 (iii)	
TIME TO PEAK (hrs)=	1.33	1.42	1.33	
RUNOFF VOLUME (mm)=	69.85	37.26	56.16	
TOTAL RAINFALL (mm)=	70.85	70.85	70.85	
RUNOFF COEFFICIENT =	0.99	0.53	0.79	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0032)
ID= 1 DT= 5.0 min

Area (ha)= 3.80
Total Imp(%)= 80.00 Dir. Conn.(%)= 60.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	5.20	1.083	35.94	2.083	11.65	3.08	6.12
0.167	5.20	1.167	35.94	2.167	11.65	3.17	6.12
0.250	5.91	1.250	148.26	2.250	10.02	3.25	5.71
0.333	5.91	1.333	148.26	2.333	10.02	3.33	5.71
0.417	6.90	1.417	46.49	2.417	8.83	3.42	5.36
0.500	6.90	1.500	46.49	2.500	8.83	3.50	5.36
0.583	8.36	1.583	25.43	2.583	7.92	3.58	5.05
0.667	8.36	1.667	25.43	2.667	7.92	3.67	5.05
0.750	10.82	1.750	17.93	2.750	7.20	3.75	4.79
0.833	10.82	1.833	17.93	2.833	7.20	3.83	4.79
0.917	15.97	1.917	14.05	2.917	6.61	3.92	4.55
1.000	15.97	2.000	14.05	3.000	6.61	4.00	4.55

Max.Eff.Inten.(mm/hr)=	148.26	183.38		
over (min)	5.00	10.00		
Storage Coeff. (min)=	2.88 (ii)	6.77 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.28	0.14		
			TOTALS	
PEAK FLOW (cms)=	0.92	0.29	1.165 (iii)	
TIME TO PEAK (hrs)=	1.33	1.42	1.33	
RUNOFF VOLUME (mm)=	69.85	43.95	59.49	
TOTAL RAINFALL (mm)=	70.85	70.85	70.85	
RUNOFF COEFFICIENT =	0.99	0.62	0.84	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0034)
ID= 1 DT= 5.0 min

Area (ha)= 29.06
Total Imp(%)= 66.00 Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	5.20	1.083	35.94	2.083	11.65	3.08	6.12
0.167	5.20	1.167	35.94	2.167	11.65	3.17	6.12
0.250	5.91	1.250	148.26	2.250	10.02	3.25	5.71
0.333	5.91	1.333	148.26	2.333	10.02	3.33	5.71
0.417	6.90	1.417	46.49	2.417	8.83	3.42	5.36
0.500	6.90	1.500	46.49	2.500	8.83	3.50	5.36
0.583	8.36	1.583	25.43	2.583	7.92	3.58	5.05
0.667	8.36	1.667	25.43	2.667	7.92	3.67	5.05
0.750	10.82	1.750	17.93	2.750	7.20	3.75	4.79
0.833	10.82	1.833	17.93	2.833	7.20	3.83	4.79
0.917	15.97	1.917	14.05	2.917	6.61	3.92	4.55
1.000	15.97	2.000	14.05	3.000	6.61	4.00	4.55

Max.Eff.Inten.(mm/hr)=	148.26	94.98		
over (min)	5.00	15.00		
Storage Coeff. (min)=	5.31 (ii)	10.28 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	0.21	0.09		
			TOTALS	
PEAK FLOW (cms)=	5.80	1.58	6.641 (iii)	
TIME TO PEAK (hrs)=	1.33	1.50	1.33	
RUNOFF VOLUME (mm)=	69.85	36.16	54.69	

```
     TOTAL RAINFALL   (mm)=      70.85        70.85          70.85
     RUNOFF COEFFICIENT   =       0.99         0.51           0.77


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    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  (  0035)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0032):     3.80   1.165     1.33    59.49
      + ID2= 2 (  0034):    29.06   6.641     1.33    54.69
        ====================================================
        ID = 3 (  0035):    32.86   7.806     1.33    55.24

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0033)|     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   |   0.4930     1.5666
                          0.0360     0.7150   |   0.7890     1.8478
                          0.0660     1.0737   |   1.0520     2.0613
                          0.2630     1.3645   |   1.3140     2.2797

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0035)     32.860     7.806      1.33      55.24
   OUTFLOW: ID= 1 (  0033)     32.860     0.419      3.75      53.38

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  5.37
                  TIME SHIFT OF PEAK FLOW         (min)=145.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.5016

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

--------------------
| ADD HYD  (  0029)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0028):     1.13   0.331     1.33    56.16
      + ID2= 2 (  0033):    32.86   0.419     3.75    53.38
        ====================================================
        ID = 3 (  0029):    33.99   0.433     3.67    53.47

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

--------------------
| ADD HYD  (  0029)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0029):    33.99   0.433     3.67    53.47
      + ID2= 2 (  0053):    41.43   0.491     3.67    18.61
        ====================================================
        ID = 1 (  0029):    75.42   0.924     3.67    34.32

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

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

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


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DATE: 05-03-2024                          TIME: 01:44:31

USER:



COMMENTS: _____________________________________________________________

--------------------------------------------------------------------------------
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  ***********************************************
  ** SIMULATION : 23. 50yr 4hr 10min Chicago    **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1251.473
| Ptotal= 79.52 mm |                          B=   4.847
--------------------                          C=   0.753
                       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	5.91	1.00	40.47	2.00	13.20	3.00	6.95
0.17	6.71	1.17	164.13	2.17	11.36	3.17	6.49
0.33	7.83	1.33	52.28	2.33	10.01	3.33	6.09
0.50	9.48	1.50	28.71	2.50	8.98	3.50	5.74
0.67	12.26	1.67	20.28	2.67	8.17	3.67	5.44
0.83	18.07	1.83	15.90	2.83	7.50	3.83	5.17

CALIB					
NASHYD (0052)	Area	(ha)= 17.19	Curve Number	(CN)= 63.0	
ID= 1 DT= 5.0 min	Ia	(mm)= 8.00	# of Linear Res.	(N)= 3.00	
	U.H. Tp	(hrs)= 0.98			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.91	1.083	40.47	2.083	13.20	3.08	6.95
0.167	5.91	1.167	40.47	2.167	13.20	3.17	6.95
0.250	6.71	1.250	164.13	2.250	11.36	3.25	6.49
0.333	6.71	1.333	164.13	2.333	11.36	3.33	6.49
0.417	7.83	1.417	52.28	2.417	10.01	3.42	6.09
0.500	7.83	1.500	52.28	2.500	10.01	3.50	6.09
0.583	9.48	1.583	28.71	2.583	8.98	3.58	5.74
0.667	9.48	1.667	28.71	2.667	8.98	3.67	5.74
0.750	12.26	1.750	20.28	2.750	8.17	3.75	5.44
0.833	12.26	1.833	20.28	2.833	8.17	3.83	5.44
0.917	18.07	1.917	15.90	2.917	7.50	3.92	5.17
1.000	18.07	2.000	15.90	3.000	7.50	4.00	5.17

Unit Hyd Qpeak (cms)= 0.670

PEAK FLOW (cms)= 0.406 (i)
TIME TO PEAK (hrs)= 2.667
RUNOFF VOLUME (mm)= 23.178
TOTAL RAINFALL (mm)= 79.522
RUNOFF COEFFICIENT = 0.291

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

ROUTE CHN(0040)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

		<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2	(0052)	17.19	0.41	2.67	23.18	0.02	0.63
OUTFLOW: ID= 1	(0040)	17.19	0.36	3.17	23.18	0.02	0.63

CALIB					
NASHYD (0050)	Area	(ha)= 24.24	Curve Number	(CN)= 63.0	
ID= 1 DT= 5.0 min	Ia	(mm)= 8.00	# of Linear Res.	(N)= 3.00	
	U.H. Tp	(hrs)= 1.13			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.91	1.083	40.47	2.083	13.20	3.08	6.95
0.167	5.91	1.167	40.47	2.167	13.20	3.17	6.95
0.250	6.71	1.250	164.13	2.250	11.36	3.25	6.49
0.333	6.71	1.333	164.13	2.333	11.36	3.33	6.49
0.417	7.83	1.417	52.28	2.417	10.01	3.42	6.09
0.500	7.83	1.500	52.28	2.500	10.01	3.50	6.09
0.583	9.48	1.583	28.71	2.583	8.98	3.58	5.74
0.667	9.48	1.667	28.71	2.667	8.98	3.67	5.74
0.750	12.26	1.750	20.28	2.750	8.17	3.75	5.44
0.833	12.26	1.833	20.28	2.833	8.17	3.83	5.44
0.917	18.07	1.917	15.90	2.917	7.50	3.92	5.17
1.000	18.07	2.000	15.90	3.000	7.50	4.00	5.17

Unit Hyd Qpeak (cms)= 0.819

```
     PEAK FLOW       (cms)=   0.522 (i)
     TIME TO PEAK    (hrs)=   2.833
     RUNOFF VOLUME    (mm)=  23.178
     TOTAL RAINFALL   (mm)=  79.522
     RUNOFF COEFFICIENT   =   0.291

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

```
--------------------
| ROUTE CHN(  0041)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00         253.97        0.0800
                  44.18         253.34        0.0800
                  72.75         252.34    0.0800 /0.0300  Main Channel
                  94.18         252.35        0.0300      Main Channel
                 117.64         252.31        0.0300      Main Channel
                 131.62         252.33    0.0300 /0.0800  Main Channel
                 138.41         252.72        0.0800
                 150.91         253.00        0.0800
                 172.41         253.50        0.0800
                 180.51         253.60        0.0800

      <---------------------- TRAVEL TIME TABLE ----------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)       (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.02   252.33    .386E+03       0.0          0.17     149.17
       0.09   252.40    .580E+04       2.2          0.57      44.29
       0.15   252.47    .122E+05       7.3          0.90      27.96
       0.22   252.53    .189E+05      14.6          1.17      21.61
       0.29   252.60    .259E+05      23.9          1.40      18.12
       0.35   252.67    .333E+05      35.0          1.59      15.86
       0.42   252.73    .409E+05      47.8          1.77      14.27
       0.49   252.80    .490E+05      62.2          1.93      13.13
       0.55   252.87    .576E+05      78.3          2.06      12.25
       0.62   252.93    .667E+05      96.1          2.19      11.57
       0.69   253.00    .762E+05     115.4          2.30      11.01
       0.75   253.07    .863E+05     136.5          2.40      10.54
       0.82   253.13    .969E+05     159.1          2.49      10.15
       0.89   253.20    .108E+06     183.3          2.58       9.81
       0.95   253.27    .119E+06     209.2          2.66       9.51
       1.02   253.33    .131E+06     236.7          2.73       9.26
       1.09   253.40    .144E+06     265.1          2.79       9.06
       1.15   253.47    .157E+06     295.3          2.85       8.88
       1.22   253.54    .172E+06     327.0          2.89       8.75

                                 <---- hydrograph ---->   <-pipe / channel->
                            AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                            (ha)    (cms)   (hrs)   (mm)      (m)       (m/s)
   INFLOW : ID= 2 (  0050)   24.24     0.52    2.83  23.18      0.03      0.20
   OUTFLOW: ID= 1 (  0041)   24.24     0.30    4.42  23.14      0.03      0.19
```

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```
| ADD HYD  (  0053)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0040):    17.19    0.362     3.17    23.18
     + ID2= 2 (  0041):    24.24    0.301     4.42    23.14
       ================================================
       ID = 3 (  0053):    41.43    0.616     3.67    23.16

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

```
--------------------
| CALIB            |
| STANDHYD (  0028)|   Area     (ha)=   1.13
|ID= 1 DT= 5.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  58.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.79         0.34
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      86.79        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     5.91 | 1.083    40.47 | 2.083    13.20 |  3.08     6.95
               0.167     5.91 | 1.167    40.47 | 2.167    13.20 |  3.17     6.95
               0.250     6.71 | 1.250   164.13 | 2.250    11.36 |  3.25     6.49
               0.333     6.71 | 1.333   164.13 | 2.333    11.36 |  3.33     6.49
               0.417     7.83 | 1.417    52.28 | 2.417    10.01 |  3.42     6.09
               0.500     7.83 | 1.500    52.28 | 2.500    10.01 |  3.50     6.09
               0.583     9.48 | 1.583    28.71 | 2.583     8.98 |  3.58     5.74
               0.667     9.48 | 1.667    28.71 | 2.667     8.98 |  3.67     5.74
               0.750    12.26 | 1.750    20.28 | 2.750     8.17 |  3.75     5.44
               0.833    12.26 | 1.833    20.28 | 2.833     8.17 |  3.83     5.44
               0.917    18.07 | 1.917    15.90 | 2.917     7.50 |  3.92     5.17
               1.000    18.07 | 2.000    15.90 | 3.000     7.50 |  4.00     5.17

     Max.Eff.Inten.(mm/hr)=     164.13       124.14
               over (min)          5.00        10.00
     Storage Coeff.  (min)=      1.92 (ii)    6.37 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.31         0.15
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.30         0.09        0.374 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.42         1.33
     RUNOFF VOLUME    (mm)=     78.52        44.32        64.15
     TOTAL RAINFALL   (mm)=     79.52        79.52        79.52
     RUNOFF COEFFICIENT   =      0.99         0.56         0.81

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN* = 77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
```

```
--------------------
| CALIB            |
| STANDHYD (  0032)|   Area    (ha)=   3.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  60.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.04         0.76
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     159.16        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    5.91 | 1.083   40.47 | 2.083   13.20 |  3.08    6.95
              0.167    5.91 | 1.167   40.47 | 2.167   13.20 |  3.17    6.95
              0.250    6.71 | 1.250  164.13 | 2.250   11.36 |  3.25    6.49
              0.333    6.71 | 1.333  164.13 | 2.333   11.36 |  3.33    6.49
              0.417    7.83 | 1.417   52.28 | 2.417   10.01 |  3.42    6.09
              0.500    7.83 | 1.500   52.28 | 2.500   10.01 |  3.50    6.09
              0.583    9.48 | 1.583   28.71 | 2.583    8.98 |  3.58    5.74
              0.667    9.48 | 1.667   28.71 | 2.667    8.98 |  3.67    5.74
              0.750   12.26 | 1.750   20.28 | 2.750    8.17 |  3.75    5.44
              0.833   12.26 | 1.833   20.28 | 2.833    8.17 |  3.83    5.44
              0.917   18.07 | 1.917   15.90 | 2.917    7.50 |  3.92    5.17
              1.000   18.07 | 2.000   15.90 | 3.000    7.50 |  4.00    5.17

     Max.Eff.Inten.(mm/hr)=     164.13       214.59
               over (min)          5.00        10.00
     Storage Coeff.  (min)=       2.77 (ii)    6.50 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.28         0.14
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.02         0.34      1.317 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42       1.33
     RUNOFF VOLUME    (mm)=      78.52        51.61      67.75
     TOTAL RAINFALL   (mm)=      79.52        79.52      79.52
     RUNOFF COEFFICIENT   =       0.99         0.65       0.85

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------
| CALIB            |
| STANDHYD (  0034)|   Area    (ha)=  29.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  66.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      19.18         9.88
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     440.15        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    5.91 | 1.083   40.47 | 2.083   13.20 |  3.08    6.95
              0.167    5.91 | 1.167   40.47 | 2.167   13.20 |  3.17    6.95
              0.250    6.71 | 1.250  164.13 | 2.250   11.36 |  3.25    6.49
              0.333    6.71 | 1.333  164.13 | 2.333   11.36 |  3.33    6.49
              0.417    7.83 | 1.417   52.28 | 2.417   10.01 |  3.42    6.09
              0.500    7.83 | 1.500   52.28 | 2.500   10.01 |  3.50    6.09
              0.583    9.48 | 1.583   28.71 | 2.583    8.98 |  3.58    5.74
              0.667    9.48 | 1.667   28.71 | 2.667    8.98 |  3.67    5.74
              0.750   12.26 | 1.750   20.28 | 2.750    8.17 |  3.75    5.44
              0.833   12.26 | 1.833   20.28 | 2.833    8.17 |  3.83    5.44
              0.917   18.07 | 1.917   15.90 | 2.917    7.50 |  3.92    5.17
              1.000   18.07 | 2.000   15.90 | 3.000    7.50 |  4.00    5.17

     Max.Eff.Inten.(mm/hr)=     164.13       113.34
               over (min)          5.00        10.00
     Storage Coeff.  (min)=       5.10 (ii)    9.87 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.21         0.11
                                                      *TOTALS*
     PEAK FLOW       (cms)=       6.49         2.01      8.106 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42       1.33
     RUNOFF VOLUME    (mm)=      78.52        43.11      62.59
     TOTAL RAINFALL   (mm)=      79.52        79.52      79.52
     RUNOFF COEFFICIENT   =       0.99         0.54       0.79

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    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  (  0035)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0032):     3.80    1.317     1.33    67.75
     + ID2= 2 (  0034):    29.06    8.106     1.33    62.59
       ==========================================================
       ID = 3 (  0035):    32.86    9.423     1.33    63.19

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------
| RESERVOIR(  0033)|     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    |   0.4930      1.5666
```

```
                        0.0360     0.7150   |   0.7890      1.8478
                        0.0660     1.0737   |   1.0520      2.0613
                        0.2630     1.3645   |   1.3140      2.2797

                              AREA      QPEAK     TPEAK       R.V.
                              (ha)      (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0035)     32.860      9.423      1.33      63.19
   OUTFLOW: ID= 1 (  0033)     32.860      0.566      3.25      61.30

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  6.01
                  TIME SHIFT OF PEAK FLOW         (min)=115.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.6360

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

--------------------
| ADD HYD  (  0029)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0028):     1.13   0.374     1.33    64.15
     + ID2= 2 (  0033):    32.86   0.566     3.25    61.30
       ================================================
       ID = 3 (  0029):    33.99   0.586     3.17    61.39

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

--------------------
| ADD HYD  (  0029)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0029):    33.99   0.586     3.17    61.39
     + ID2= 2 (  0053):    41.43   0.616     3.67    23.16
       ================================================
       ID = 1 (  0029):    75.42   1.196     3.50    40.39

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
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86e9-d1c81bbaf91e\efe5c9e2-d5dd-4116-bcb6-05a27901b31d\scen


DATE: 05-03-2024                          TIME: 01:44:32

USER:


COMMENTS: _____________________________________________________________

--------------------------------------------------------------------------------
------------------------
  ***********************************************
  ** SIMULATION : 24. 100yr 4hr 10min Chicago   **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1383.628
| Ptotal= 87.42 mm |                          B=   4.905
--------------------                          C=   0.754
                       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    6.48 |  1.00   44.58 |  2.00   14.50 |  3.00    7.63
     0.17    7.36 |  1.17  180.44 |  2.17   12.47 |  3.17    7.11
     0.33    8.59 |  1.33   57.61 |  2.33   10.99 |  3.33    6.68
     0.50   10.41 |  1.50   31.60 |  2.50    9.86 |  3.50    6.29
     0.67   13.47 |  1.67   22.30 |  2.67    8.96 |  3.67    5.96
     0.83   19.87 |  1.83   17.48 |  2.83    8.23 |  3.83    5.67

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0052)|   Area     (ha)=  17.19   Curve Number    (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.98

        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    6.48 | 1.083   44.58 | 2.083   14.50 |  3.08    7.63
    0.167    6.48 | 1.167   44.58 | 2.167   14.50 |  3.17    7.63
    0.250    7.36 | 1.250  180.44 | 2.250   12.47 |  3.25    7.11
    0.333    7.36 | 1.333  180.44 | 2.333   12.47 |  3.33    7.11
    0.417    8.59 | 1.417   57.61 | 2.417   10.99 |  3.42    6.68
    0.500    8.59 | 1.500   57.61 | 2.500   10.99 |  3.50    6.68
    0.583   10.41 | 1.583   31.60 | 2.583    9.86 |  3.58    6.29
```

0.667	10.41	1.667	31.60	2.667	9.86	3.67	6.29
0.750	13.47	1.750	22.30	2.750	8.96	3.75	5.96
0.833	13.47	1.833	22.30	2.833	8.96	3.83	5.96
0.917	19.87	1.917	17.48	2.917	8.23	3.92	5.67
1.000	19.87	2.000	17.48	3.000	8.23	4.00	5.67

Unit Hyd Qpeak (cms)= 0.670

PEAK FLOW (cms)= 0.487 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 27.593
TOTAL RAINFALL (mm)= 87.421
RUNOFF COEFFICIENT = 0.316

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

ROUTE CHN(0040)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.33	0.0800	
4.07	253.22	0.0800	
31.67	252.50	0.0800	
80.33	251.02	0.0800	
112.54	250.38	0.0800 /0.0300	Main Channel
147.82	250.41	0.0300 /0.0800	Main Channel
227.35	251.81	0.0800	
234.22	251.93	0.0800	
240.16	252.02	0.0800	
245.25	252.11	0.0800	
250.86	252.20	0.0800	
254.81	252.26	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	250.48	.379E+04	2.1	0.63	30.46
0.20	250.58	.945E+04	8.0	0.98	19.68
0.30	250.68	.163E+05	17.1	1.21	15.91
0.40	250.77	.244E+05	29.2	1.38	13.93
0.50	250.87	.338E+05	44.4	1.52	12.68
0.60	250.97	.443E+05	62.6	1.63	11.80
0.70	251.07	.560E+05	84.0	1.73	11.12
0.79	251.17	.688E+05	108.6	1.82	10.56
0.89	251.27	.826E+05	136.4	1.91	10.10
0.99	251.37	.975E+05	167.3	1.99	9.71
1.09	251.47	.113E+06	201.6	2.06	9.37
1.19	251.57	.130E+06	239.1	2.12	9.08
1.29	251.67	.148E+06	280.0	2.19	8.82
1.39	251.77	.167E+06	324.3	2.24	8.58
1.49	251.87	.187E+06	372.0	2.30	8.38
1.59	251.97	.208E+06	423.3	2.35	8.19
1.69	252.07	.230E+06	478.2	2.40	8.02
1.79	252.17	.253E+06	536.8	2.45	7.86
1.89	252.26	.277E+06	599.1	2.50	7.72

<---- hydrograph ----> <-pipe / channel->

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0052)	17.19	0.49	2.58	27.59	0.02	0.63
OUTFLOW: ID= 1 (0040)	17.19	0.43	3.17	27.59	0.02	0.63

CALIB	
NASHYD (0050)	Area (ha)= 24.24 Curve Number (CN)= 63.0
ID= 1 DT= 5.0 min	Ia (mm)= 8.00 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 1.13

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	6.48	1.083	44.58	2.083	14.50	3.08	7.63
0.167	6.48	1.167	44.58	2.167	14.50	3.17	7.63
0.250	7.36	1.250	180.44	2.250	12.47	3.25	7.11
0.333	7.36	1.333	180.44	2.333	12.47	3.33	7.11
0.417	8.59	1.417	57.61	2.417	10.99	3.42	6.68
0.500	8.59	1.500	57.61	2.500	10.99	3.50	6.68
0.583	10.41	1.583	31.60	2.583	9.86	3.58	6.29
0.667	10.41	1.667	31.60	2.667	9.86	3.67	6.29
0.750	13.47	1.750	22.30	2.750	8.96	3.75	5.96
0.833	13.47	1.833	22.30	2.833	8.96	3.83	5.96
0.917	19.87	1.917	17.48	2.917	8.23	3.92	5.67
1.000	19.87	2.000	17.48	3.000	8.23	4.00	5.67

Unit Hyd Qpeak (cms)= 0.819

PEAK FLOW (cms)= 0.625 (i)
TIME TO PEAK (hrs)= 2.833
RUNOFF VOLUME (mm)= 27.593
TOTAL RAINFALL (mm)= 87.421
RUNOFF COEFFICIENT = 0.316

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

ROUTE CHN(0041)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
0.00	253.97	0.0800	
44.18	253.34	0.0800	
72.75	252.34	0.0800 /0.0300	Main Channel
94.18	252.35	0.0300	Main Channel
117.64	252.31	0.0300	Main Channel
131.62	252.33	0.0300 /0.0800	Main Channel
138.41	252.72	0.0800	
150.91	253.00	0.0800	
172.41	253.50	0.0800	
180.51	253.60	0.0800	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.02	252.33	.386E+03	0.0	0.17	149.17
0.09	252.40	.580E+04	2.2	0.57	44.29
0.15	252.47	.122E+05	7.3	0.90	27.96
0.22	252.53	.189E+05	14.6	1.17	21.61
0.29	252.60	.259E+05	23.9	1.40	18.12
0.35	252.67	.333E+05	35.0	1.59	15.86
0.42	252.73	.409E+05	47.8	1.77	14.27
0.49	252.80	.490E+05	62.2	1.93	13.13
0.55	252.87	.576E+05	78.3	2.06	12.25
0.62	252.93	.667E+05	96.1	2.19	11.57
0.69	253.00	.762E+05	115.4	2.30	11.01
0.75	253.07	.863E+05	136.5	2.40	10.54
0.82	253.13	.969E+05	159.1	2.49	10.15
0.89	253.20	.108E+06	183.3	2.58	9.81
0.95	253.27	.119E+06	209.2	2.66	9.51
1.02	253.33	.131E+06	236.7	2.73	9.26
1.09	253.40	.144E+06	265.1	2.79	9.06
1.15	253.47	.157E+06	295.3	2.85	8.88
1.22	253.54	.172E+06	327.0	2.89	8.75

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
		<---- hydrograph ---->				<-pipe / channel->	
INFLOW :	ID= 2 (0050)	24.24	0.62	2.83	27.59	0.04	0.21
OUTFLOW:	ID= 1 (0041)	24.24	0.36	4.33	27.56	0.03	0.19

ADD HYD (0053)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0040):	17.19	0.433	3.17	27.59
	+ ID2= 2 (0041):	24.24	0.362	4.33	27.56
	ID = 3 (0053):	41.43	0.742	3.58	27.57

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB STANDHYD (0028) | Area (ha)= 1.13
ID= 1 DT= 5.0 min | Total Imp(%)= 70.00 Dir. Conn.(%)= 58.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.79	0.34
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	86.79	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	6.48	1.083	44.58	2.083	14.50	3.08	7.63
0.167	6.48	1.167	44.58	2.167	14.50	3.17	7.63
0.250	7.36	1.250	180.44	2.250	12.47	3.25	7.11
0.333	7.36	1.333	180.44	2.333	12.47	3.33	7.11
0.417	8.59	1.417	57.61	2.417	10.99	3.42	6.68
0.500	8.59	1.500	57.61	2.500	10.99	3.50	6.68
0.583	10.41	1.583	31.60	2.583	9.86	3.58	6.29
0.667	10.41	1.667	31.60	2.667	9.86	3.67	6.29
0.750	13.47	1.750	22.30	2.750	8.96	3.75	5.96
0.833	13.47	1.833	22.30	2.833	8.96	3.83	5.96
0.917	19.87	1.917	17.48	2.917	8.23	3.92	5.67
1.000	19.87	2.000	17.48	3.000	8.23	4.00	5.67

				TOTALS
Max.Eff.Inten.	(mm/hr)=	180.44	144.30	
over	(min)	5.00	10.00	
Storage Coeff.	(min)=	1.85 (ii)	6.13 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	10.00	
Unit Hyd. peak	(cms)=	0.32	0.15	
PEAK FLOW	(cms)=	0.33	0.10	0.418 (iii)
TIME TO PEAK	(hrs)=	1.33	1.42	1.33
RUNOFF VOLUME	(mm)=	86.42	50.93	71.51
TOTAL RAINFALL	(mm)=	87.42	87.42	87.42
RUNOFF COEFFICIENT	=	0.99	0.58	0.82

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB STANDHYD (0032) | Area (ha)= 3.80
ID= 1 DT= 5.0 min | Total Imp(%)= 80.00 Dir. Conn.(%)= 60.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	6.48	1.083	44.58	2.083	14.50	3.08	7.63
0.167	6.48	1.167	44.58	2.167	14.50	3.17	7.63
0.250	7.36	1.250	180.44	2.250	12.47	3.25	7.11
0.333	7.36	1.333	180.44	2.333	12.47	3.33	7.11
0.417	8.59	1.417	57.61	2.417	10.99	3.42	6.68
0.500	8.59	1.500	57.61	2.500	10.99	3.50	6.68
0.583	10.41	1.583	31.60	2.583	9.86	3.58	6.29
0.667	10.41	1.667	31.60	2.667	9.86	3.67	6.29
0.750	13.47	1.750	22.30	2.750	8.96	3.75	5.96

```
              0.833   13.47 | 1.833   22.30 | 2.833    8.96 |  3.83    5.96
              0.917   19.87 | 1.917   17.48 | 2.917    8.23 |  3.92    5.67
              1.000   19.87 | 2.000   17.48 | 3.000    8.23 |  4.00    5.67

     Max.Eff.Inten.(mm/hr)=     180.44       246.12
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       2.67 (ii)    6.26 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.29         0.15
                                                        *TOTALS*
     PEAK FLOW       (cms)=       1.12         0.39          1.472 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42           1.33
     RUNOFF VOLUME    (mm)=      86.42        58.70          75.33
     TOTAL RAINFALL   (mm)=      87.42        87.42          87.42
     RUNOFF COEFFICIENT   =       0.99         0.67           0.86

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0034)|   Area    (ha)=  29.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  66.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      19.18         9.88
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     440.15        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    6.48 | 1.083   44.58 | 2.083   14.50 |  3.08    7.63
               0.167    6.48 | 1.167   44.58 | 2.167   14.50 |  3.17    7.63
               0.250    7.36 | 1.250  180.44 | 2.250   12.47 |  3.25    7.11
               0.333    7.36 | 1.333  180.44 | 2.333   12.47 |  3.33    7.11
               0.417    8.59 | 1.417   57.61 | 2.417   10.99 |  3.42    6.68
               0.500    8.59 | 1.500   57.61 | 2.500   10.99 |  3.50    6.68
               0.583   10.41 | 1.583   31.60 | 2.583    9.86 |  3.58    6.29
               0.667   10.41 | 1.667   31.60 | 2.667    9.86 |  3.67    6.29
               0.750   13.47 | 1.750   22.30 | 2.750    8.96 |  3.75    5.96
               0.833   13.47 | 1.833   22.30 | 2.833    8.96 |  3.83    5.96
               0.917   19.87 | 1.917   17.48 | 2.917    8.23 |  3.92    5.67
               1.000   19.87 | 2.000   17.48 | 3.000    8.23 |  4.00    5.67

     Max.Eff.Inten.(mm/hr)=     180.44       132.05
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       4.91 (ii)    9.51 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.22         0.12
                                                        *TOTALS*
     PEAK FLOW       (cms)=       7.21         2.38          9.138 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42           1.33
     RUNOFF VOLUME    (mm)=      86.42        49.63          69.87
     TOTAL RAINFALL   (mm)=      87.42        87.42          87.42
     RUNOFF COEFFICIENT   =       0.99         0.57           0.80

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    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  (  0035)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0032):     3.80   1.472     1.33    75.33
     + ID2= 2 (  0034):    29.06   9.138     1.33    69.87
       ================================================
       ID = 3 (  0035):    32.86  10.610     1.33    70.50

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0033)|     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   |   0.4930      1.5666
                          0.0360     0.7150   |   0.7890      1.8478
                          0.0660     1.0737   |   1.0520      2.0613
                          0.2630     1.3645   |   1.3140      2.2797

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
    INFLOW : ID= 2 (  0035)     32.860    10.610      1.33      70.50
    OUTFLOW: ID= 1 (  0033)     32.860     0.704      3.00      68.59

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  6.64
                   TIME SHIFT OF PEAK FLOW          (min)=100.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  1.7672

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

--------------------
| ADD HYD  (  0029)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0028):     1.13   0.418     1.33    71.51
     + ID2= 2 (  0033):    32.86   0.704     3.00    68.59
       ================================================
       ID = 3 (  0029):    33.99   0.728     3.00    68.69

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

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--------------------
| ADD HYD  (  0029)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0029):    33.99   0.728     3.00    68.69
      + ID2= 2 (  0053):    41.43   0.742     3.58    27.57
        ==========================================================
        ID = 1 (  0029):    75.42   1.453     3.42    46.10

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

 FINISH
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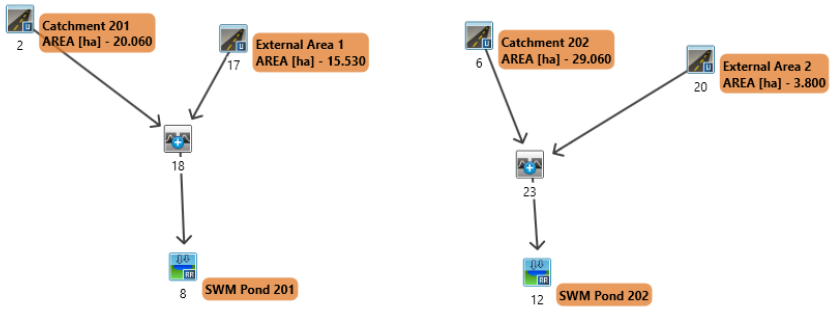

SCHAEFFERS CONSULTING ENGINEERS

Visual OTTHYMO™ Schematic

POST- DEVELOPMENT – REGIONAL

Job #: 5170 | **Date: May 2024**

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

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


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DATE: 05-10-2024                          TIME: 10:06:56

USER:


COMMENTS: _____________________________________________________________


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  ***********************************************
  ** SIMULATION : Hazel                        **
  ***********************************************


---------------------
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| Ptotal=212.00 mm  |    Comments: Hazel
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                TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                 hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
               0.00     6.00 |  3.00    13.00 |  6.00    23.00 |  9.00    53.00
               1.00     4.00 |  4.00    17.00 |  7.00    13.00 | 10.00    38.00
               2.00     6.00 |  5.00    13.00 |  8.00    13.00 | 11.00    13.00

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

---------------------
| CALIB             |
| STANDHYD (  0006)|   Area     (ha)=  29.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  66.00   Dir. Conn.(%)=  55.00
---------------------
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	19.18	9.88
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	440.15	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	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.	(mm/hr)=	53.00	68.88	
over	(min)	10.00	20.00	
Storage Coeff.	(min)=	8.01 (ii)	16.21 (ii)	
Unit Hyd. Tpeak	(min)=	10.00	20.00	
Unit Hyd. peak	(cms)=	0.13	0.06	
				TOTALS
PEAK FLOW	(cms)=	2.35	1.82	4.171 (iii)
TIME TO PEAK	(hrs)=	10.00	10.00	10.00
RUNOFF VOLUME	(mm)=	211.00	186.93	200.17
TOTAL RAINFALL	(mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT	=	1.00	0.88	0.94

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 89.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0020)	Area (ha)= 3.80
ID= 1 DT= 5.0 min	Total Imp(%)= 80.00 Dir. Conn.(%)= 60.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.04	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	159.16	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	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00

```
              2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
              3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00       105.09
               over (min)         5.00        15.00
     Storage Coeff.  (min)=       4.35 (ii)   11.27 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.23         0.09
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.34         0.22        0.556 (iii)
     TIME TO PEAK    (hrs)=      10.00        10.00        10.00
     RUNOFF VOLUME    (mm)=     211.00       194.90       204.56
     TOTAL RAINFALL   (mm)=     212.00       212.00       212.00
     RUNOFF COEFFICIENT   =       1.00         0.92         0.96

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  89.0    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  (  0023)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0020):      3.80   0.556    10.00   204.56
      + ID2= 2 (  0006):     29.06   4.171    10.00   200.17
        ================================================
        ID = 3 (  0023):     32.86   4.727    10.00   200.68

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0012)|     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   |   0.7890     1.8478
                           0.0360     0.7150   |   1.0520     2.0613
                           0.0660     1.0737   |   1.3140     2.2797
                           0.2630     1.3645   |   4.1600     2.8300
                           0.4930     1.5666   |   0.0000     0.0000

                                 AREA     QPEAK     TPEAK       R.V.
                                 (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0023)     32.860     4.727     10.00     200.68
   OUTFLOW: ID= 1 (  0012)     32.860     3.844     10.33     198.40

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 81.32
                  TIME SHIFT OF PEAK FLOW         (min)= 20.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  2.7694

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--------------------
| CALIB            |
| STANDHYD (  0017)|   Area    (ha)=  15.53
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  49.00

--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.09         5.44
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     321.77        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    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
         0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
         0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
         0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
         0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
         0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
         0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
         0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
         0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
         0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
         0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
         1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
         1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
         1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
         1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
         1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
         1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
         1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
         1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
         1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
         1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
         1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
         1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
         2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
         2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
         2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
         2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
         2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
         2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
         2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
         2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
         2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
         2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
         2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
         2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
         3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00        76.05
               over (min)         5.00        15.00
     Storage Coeff.  (min)=       6.64 (ii)   14.51 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.18         0.08
                                                        *TOTALS*
     PEAK FLOW       (cms)=       1.12         1.12         2.244 (iii)
     TIME TO PEAK    (hrs)=      10.00        10.00        10.00
     RUNOFF VOLUME    (mm)=     211.00       189.04       199.80
     TOTAL RAINFALL   (mm)=     212.00       212.00       212.00
```

```
     RUNOFF COEFFICIENT   =       1.00         0.89          0.94


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  89.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0002)|   Area    (ha)=  20.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  56.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      13.44         6.62
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     365.70        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    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
 0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
 0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
 0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
 0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
 0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
 0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
 0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
 0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
 0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
 0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
 1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
 1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
 1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
 1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
 1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
 1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
 1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
 1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
 1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
 1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
 1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
 1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
 2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
 2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
 2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
 2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
 2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
 2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
 2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
 2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
 2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
 2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
 2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
 2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
 3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00        69.41
               over (min)         5.00        20.00
     Storage Coeff.  (min)=       7.17 (ii)   15.34 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=       0.17         0.07
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.65         1.24         2.889 (iii)
     TIME TO PEAK    (hrs)=      10.00        10.00          10.00
     RUNOFF VOLUME    (mm)=     211.00       187.10         200.48
     TOTAL RAINFALL   (mm)=     212.00       212.00         212.00
     RUNOFF COEFFICIENT   =       1.00         0.88          0.95


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  89.0    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  (  0018)|
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
--------------------          (ha)     (cms)     (hrs)      (mm)
        ID1= 1 (  0017):     15.53    2.244     10.00    199.80
      + ID2= 2 (  0002):     20.06    2.889     10.00    200.48
        ================================================
        ID = 3 (  0018):     35.59    5.133     10.00    200.18

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0008)|     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    |   0.7160     2.0238
                           0.0360     0.7282    |   0.9550     2.2595
                           0.0600     1.1698    |   1.1940     2.5034
                           0.2380     1.4871    |   4.2400     3.1000
                           0.4480     1.7011    |   0.0000     0.0000

                                 AREA     QPEAK     TPEAK       R.V.
                                 (ha)     (cms)     (hrs)       (mm)
    INFLOW : ID= 2 (  0018)     35.590     5.133     10.00     200.18
    OUTFLOW: ID= 1 (  0008)     35.590     4.197     10.25     197.61

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 81.78
                    TIME SHIFT OF PEAK FLOW          (min)= 15.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  3.0921

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 FINISH
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APPENDIX E: Engineering Drawings

MAPLEVIEW DRIVE EAST

PROPOSED CULVERT

WATER SERVICE TO BE PROVIDED FROM WATERMAIN (B.O.) ON MAPLEVIEW DRIVE EAST

BLOCK 77
ROAD WIDENING
0.29HA

EX. 1500ø CSP CULVERT CROSSING IN INV. 245.12 OUT INV. 244.79

SANDY COVE ESTATES INC. BY TATHAM ENGINEERING. FOR DETAILS REFER TO SITE PLAN APPROVAL DRAWINGS BY TATHAM ENGINEERING, FILE NO. 420406-2.

SANDY COVE CREEK ALIGNMENT BY TATHAM ENGINEERING

BLOCK 58
MEDIUM DENSITY
134 UNITS

BLOCK 63
PARKETTE
0.11HA

BLOCK 59
FUTURE DEVELOPMENT
1.84HA

BLOCK 69
PUMPING STATION
0.17HA

BLOCK 67
NATURAL HERITAGE SYSTEM
1.29HA

BLOCK 1
LOW DENSITY RESIDENTIAL

BLOCK 49
STREET TOWNHOUSES
40 UNITS

BLOCK 66
NATURAL HERITAGE SYSTEM
1.93HA

PROP. 65.2m+-3.0mø1.5m CONC. BOX CULVERT IN INV. 247.24 OUT INV. 247.01

PROP. 55.4m+-3.0mø1.5m CONC. BOX CULVERT IN INV. 250.01 OUT INV. 249.78

BLOCK 64
STORMWATER MANAGEMENT
2.92HA

WET CELL

SEDIMENT DRYING AREA

FILTER BED

BLOCK 2
LOW DENSITY RESIDENTIAL

BLOCK 8
LOW DENSITY RESIDENTIAL

BLOCK 14
LOW DENSITY RESIDENTIAL

BLOCK 16
LOW DENSITY RESIDENTIAL

BLOCK 15
LOW DENSITY RESIDENTIAL

BLOCK 4
LOW DENSITY RESIDENTIAL

BLOCK 5
LOW DENSITY RESIDENTIAL

BLOCK 9
LOW DENSITY RESIDENTIAL

BLOCK 62
PARKETTE
0.39HA

BLOCK 11
LOW DENSITY RESIDENTIAL

BLOCK 7
LOW DENSITY RESIDENTIAL

BLOCK 10
LOW DENSITY RESIDENTIAL

BLOCK 12
LOW DENSITY RESIDENTIAL

BLOCK 17
LOW DENSITY RESIDENTIAL

STORMCEPTOR

BLOCK 70
TO BE DETERMINED
0.21HA

EXT. SAN#1
19.8 ha

EXT. STM#1
15.53 ha
C=0.66

BLOCK 3
LOW DENSITY RESIDENTIAL

BLOCK 18
LOW DENSITY RESIDENTIAL

BLOCK 71
WALKWAY
0.02HA

BLOCK 22
LOW DENSITY RESIDENTIAL

BLOCK 19
LOW DENSITY RESIDENTIAL

BLOCK 72
WALKWAY
0.02HA

BLOCK 21
LOW DENSITY RESIDENTIAL

BLOCK 20
LOW DENSITY RESIDENTIAL

BLOCK 78
ROAD WIDENING
1.26HA

BLOCK 68
NATURAL HERITAGE SYSTEM
22.19HA

BLOCK 65
STORMWATER MANAGEMENT
2.63HA

BLOCK 23
LOW DENSITY RESIDENTIAL

FOREBAY

BLOCK 24
LOW DENSITY RESIDENTIAL

BLOCK 26
LOW DENSITY RESIDENTIAL

BLOCK 27
LOW DENSITY RESIDENTIAL

BLOCK 25
LOW DENSITY RESIDENTIAL

BLOCK 31
LOW DENSITY RESIDENTIAL

BLOCK 29
LOW DENSITY RESIDENTIAL

BLOCK 28
LOW DENSITY RESIDENTIAL

BLOCK 30
LOW DENSITY RESIDENTIAL

BLOCK 34
LOW DENSITY RESIDENTIAL

BLOCK 32
LOW DENSITY RESIDENTIAL

BLOCK 33
LOW DENSITY RESIDENTIAL

BLOCK 35
LOW DENSITY RESIDENTIAL

BLOCK 37
LOW DENSITY RESIDENTIAL

BLOCK 73
WALKWAY
0.02HA

BLOCK 41
LOW DENSITY RESIDENTIAL

BLOCK 42
LOW DENSITY RESIDENTIAL

BLOCK 38
LOW DENSITY RESIDENTIAL

BLOCK 39
LOW DENSITY RESIDENTIAL

BLOCK 40
LOW DENSITY RESIDENTIAL

BLOCK 61
PARK
2.43HA

BLOCK 60
SCHOOL
2.29HA

BLOCK 52
REAR LANE TOWNHOUSES
28 UNITS

BLOCK 56
B2B TOWNHOUSES
32 UNITS

BLOCK 45
LOW DENSITY RESIDENTIAL

BLOCK 44
LOW DENSITY RESIDENTIAL

BLOCK 43
LOW DENSITY RESIDENTIAL

BLOCK 46
LOW DENSITY RESIDENTIAL

BLOCK 48
LOW DENSITY RESIDENTIAL

BLOCK 47
LOW DENSITY RESIDENTIAL

BLOCK 36
LOW DENSITY RESIDENTIAL

BLOCK 57
B2B TOWNHOUSES
34 UNITS

BLOCK 53
REAR LANE TOWNHOUSES
25 UNITS

BLOCK 54
B2B TOWNHOUSES
32 UNITS

BLOCK 55
B2B TOWNHOUSES
28 UNITS

BLOCK 50
REAR LANE TOWNHOUSES
22 UNITS

BLOCK 51
REAR LANE TOWNHOUSES
23 UNITS

BLOCK 74
WALKWAY
0.03HA

BLOCK 76
WALKWAY
0.02HA

BLOCK 75
WALKWAY
0.02HA

BLOCK 79
ROAD WIDENING
0.41HA

EXT. STM#2
3.80 ha
C=0.75

EXT. SAN#2
TBD

RETAINING WALL HT:1.01m
RETAINING WALL HT: 3.17m
RETAINING WALL HT: 2.99m
RETAINING WALL HT:1.15m
RETAINING WALL HT: 0.26m
RETAINING WALL HT: 2.89m
RETAINING WALL HT:1.73m

STREET A
STREET B
STREET D
STREET E
STREET F
STREET G
STREET H
STREET I
STREET J
STREET K
STREET L
STREET M
STREET N
LANE A
LANE B
LANE C
LANE D
LANE E

EXISTING REGIONAL FLOODLINE
EXISTING 100 YEAR FLOODLINE

WATER SERVICE TO BE PROVIDED FROM WATERMAIN (B.O.) ON 20TH SIDEROAD

42m OF EXISTING DITCH TO BE RE-GRADED

EX. CULVERT CROSSING IN INV. 246.17 OUT INV. 246.10

TO BE REPLACED WITH DOUBLE UPSIZED CULVERTS 1.8mx1.2m

PROPOSED CULVERT

PROPOSED TWIN WATERMAIN

WATER SERVICE TO BE PROVIDED FROM WATERMAIN (B.O.) ON 20TH SIDEROAD

PROPOSED CULVERT

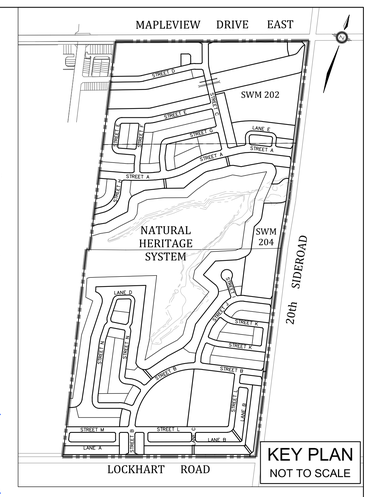
PROPOSED CULVERT

LOCKHART ROAD

20th SIDEROAD

ORIGINAL ROAD ALLOWANCE BETWEEN CONCESSIONS 10 AND 11 (KNOWN AS LOCKHART ROAD)

KEY PLAN
NOT TO SCALE



LEGEND

- PROPOSED STORM MANHOLE
- PROPOSED SANITARY MANHOLE
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED SUBDIVISION WATERMAIN
- PROPOSED EXTERNAL WATERMAIN
- EXISTING CONTOUR AND ELEVATION
- EXISTING GROUNDWATER CONTOUR AND ELEVATION
- LIMIT OF SUBDIVISION
- OVERLAND FLOW ROUTE
- EXISTING ELEVATION
- × 278.60 PROPOSED ELEVATION
- PROPOSED INFILTRATION TRENCHES

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN.
2. WASTERWATER SYSTEMS, STORMWATER SYSTEMS, INCLUDING LOW IMPACT DEVELOPMENT FACILITIES, AND WATER DISTRIBUTION AND TRANSMISSION SYSTEMS TO BE DESIGNED IN ACCORDANCE WITH CITY OF BARRIE INFRASTRUCTURE STANDARDS.
3. REFER TO THE CITY OF BARRIE ROADWAY LIGHTING POLICIES IN THE RIGHT-OF-WAY INFRASTRUCTURE STANDARD AND ASSOCIATED BSD'S FOR LIGHT STANDARD AND POLE BASE LOCATION AND DEPTH.
4. REFER TO RIGHT-OF-WAY INFRASTRUCTURE STANDARD FOR PAVEMENT DESIGN METHODOLOGY.
5. TREES TO BE PLACED IN LOCATIONS APPROVED BY THE PARKS, PLANNING, AND DEVELOPMENT BRANCH. (SEE P1315)

Barrie

CROSS-SECTION
20.0m LOCAL ROAD
RESIDENTIAL

REV No. 2 | DATE: APR 2024 | SCALE: N.T.S | R302(MOD.)

NO.	REVISIONS	DATE	APPROVED

SCHAEFFERS
CONSULTING ENGINEERS
SCHAEFFER & ASSOCIATES LTD.
6 Ronrose Drive, Concord, Ontario L4K 4R3
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Fax: (905) 738-6875
E-mail: design@schaeffers.com

CITY OF BARRIE
ACCEPTED
DATE. . . . . .
. . . . . DIRECTOR OF ENGINEERING

MAPLEVIEW DRIVE EAST AND 20TH SIDEROAD RESIDENTIAL SUBDIVISION

PRELIMINARY GRADING AND SERVICING PLAN

Barrie
ENGINEERING DEPARTMENT

SCALE 1:1250	VERT.	PROJECT NO. 5170
DESIGN: AC	DRAWN: AC	SHEET NO. GR/SS-1
REVIEWED: NL	DATE: JANUARY 2024	

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REFER TO PROJECT "417427" FROM TATHAM ENGINEERING FOR CHANNEL INFORMATION

PROP. 53.4m-3.0mx2.1mø CONC. BOX CULVERT @ 1.70% IN INV. 250.93 OUT INV. 250.01

TOP OF BANK

BOTTOM OF BANK

MAX 2.5:1

MAX 2.75:1

MAX 2.75:1

MAX 2.75:1

TOP OF BANK

BOTTOM OF BANK

TOP OF BANK

TOP OF BANK

2%

2%

2%

EMERGENCY SPILLWAY

15m-400ø CSP @ 0.5% CULVERT INV. 249.68 OBV. 249.60 TOP. 250.50

INV. 247.00

5.0m WIDE ACCESS ROAD

5.0m WIDE ACCESS ROAD

100YR. W.L. 250.00

P.P. W.L. 248.00

FOREBAY

DESIGN SPILLWAY

DESIGN SPILLWAY

WET CELL

SWM POND 201

SEDIMENT DRYING AREA 1670m²

FILTER BED 2,300m²

P.P. W.L. 248.00

100YR. W.L. 250.00

TOP OF FILTER BED 248.60

BOTTOM OF FILTER BED 248.00

INV. 247.90

INV. 247.50

INV. 247.10

INV. 247.15

CONTROL STRUCTURE

3.0m BUFFER

3.0m BUFFER

3.0m BUFFER

LANE E

STREET C

20th SIDEROAD

MAPLEVIEW DRIVE EAST

LOCKHART ROAD

SWM 202

SWM 204

NATURAL HERITAGE SYSTEM

PROP. SITE

20th SIDEROAD

KEY PLAN
NOT TO SCALE

LEGEND

- 5.0m WIDE MAINTENANCE ACCESS ROAD 300mm DEPTH OF 50mm CRUSHER-RUN LIMESTONE
- RIP-RAP STONE WASHED IN WITH TOPSOIL AND SEEDED, PLACED ON TOP OF 270R TERRAFIX FILTER CLOTH OR APPROVED EQUAL.
- RIP-RAP STONE (150mm MIN.) ON TOP OF 270R TERRAFIX FILTER CLOTH OR APPROVED EQUAL
- FILTER BED AREA
- SEDIMENT DRYING AREA
- 255.70 DENOTES PROPOSED STREET GRADE
- 252.92 DENOTES PROPOSED SWM POND GRADE
- 210.0 DENOTES EXISTING GROUND CONTOUR LINE
- 210.0 DENOTES EXISTING GROUNDWATER CONTOUR LINE
- DENOTES PROP. SWM POND BOTTOM
- DENOTES NORMAL WATER LEVEL (PERMANENT POOL)
- DENOTES 100 YR. W.L. CONTOUR LINE
- DENOTES SAFETY STATION
- DENOTES FOREBAY DEWATERING SUMP (BSD-81)
- DENOTES SWING GATE (BSD-1216)
- DENOTES SWM FACILITY WARNING SIGN (D787)

DESCRIPTION	AREA/VOLUME PROVIDED (m^2)	AREA/VOLUME REQUIRED (m^2)
PERM. POOL (EL.246.00-EL.248.00)	10,700 m^3	6,252 m^3
100YR W.L. (EL.248.00-EL.250.00)	26,200 m^3	25,034 m^3
FILTER BED AREA	2,300 m^2	2,095 m^2
SEDIMENT DRYING AREA	1,650 m^2	1,610 m^2

FOR DISCUSSION PURPOSE

NO.	REVISIONS	DATE	APPROVED

SCHAEFFERS CONSULTING ENGINEERS
SCHAEFFER & ASSOCIATES LTD.
6 Ronrose Drive, Concord, Ontario L4K 4R3
Tel: (905) 738-6100
Fax: (905) 738-6875
E-mail: design@schaeffers.com

CITY OF BARRIE
ACCEPTED
DATE. . . . . .
. . . . . .
DIRECTOR OF ENGINEERING

MAPLEVIEW DRIVE EAST AND 20TH SIDEROAD RESIDENTIAL SUBDIVISION
SWM POND 201
PLAN - OPTION 3

Barrie
ENGINEERING DEPARTMENT

SCALE HOR. 1:500	VERT. 1:500	PROJECT NO.	5170
DESIGN T.O.	DRAWN C.P	SHEET NO.	SWM-201
REVIEWED T.O.	DATE MAY 2023		

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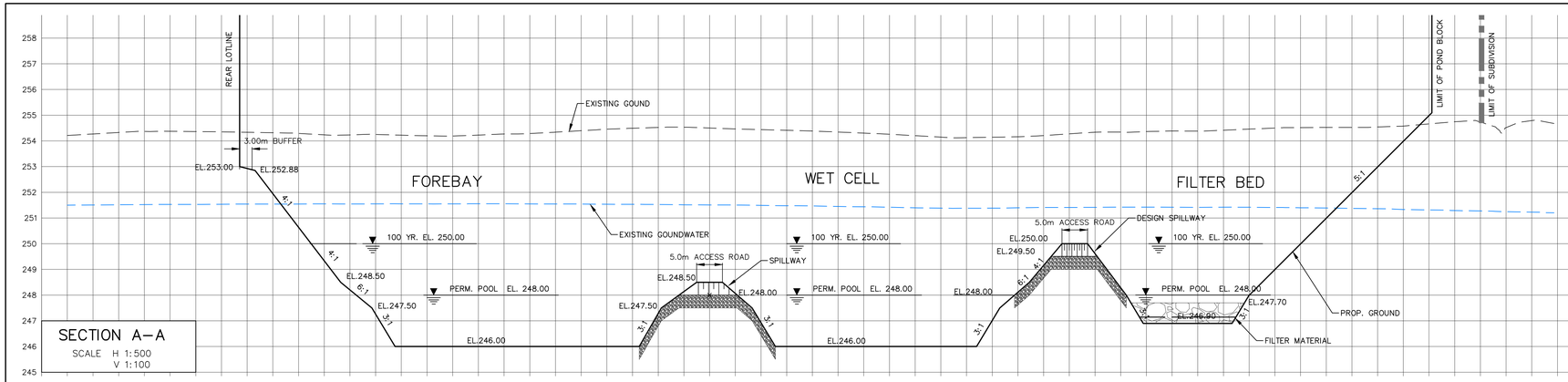

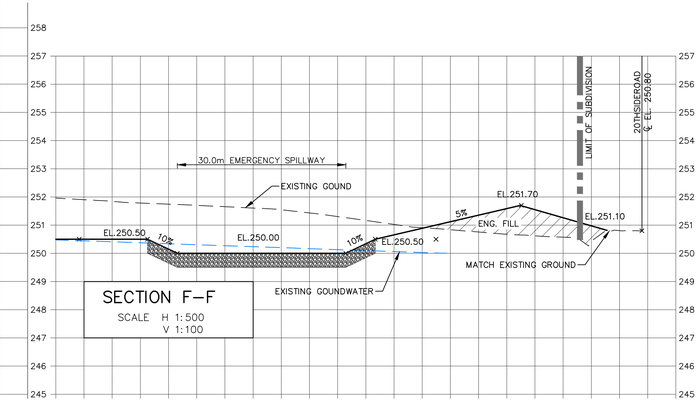

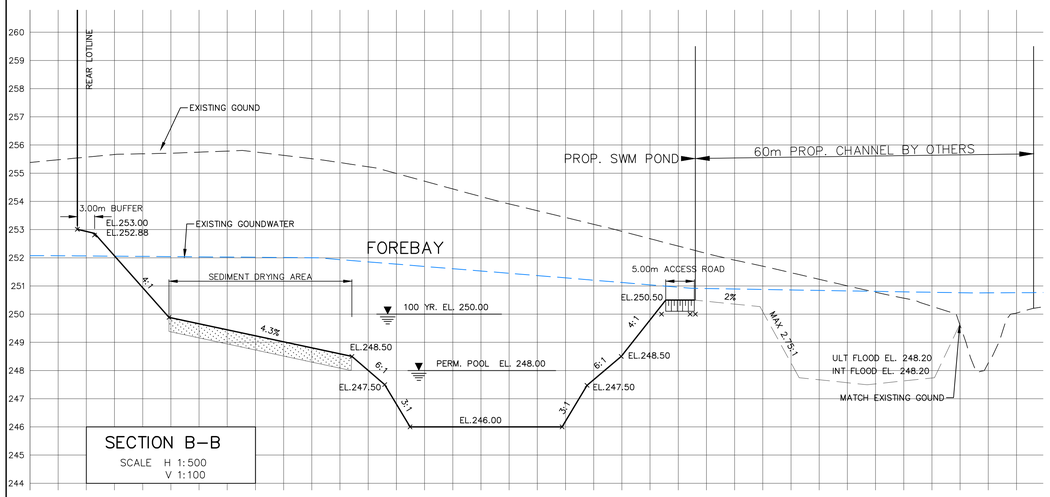

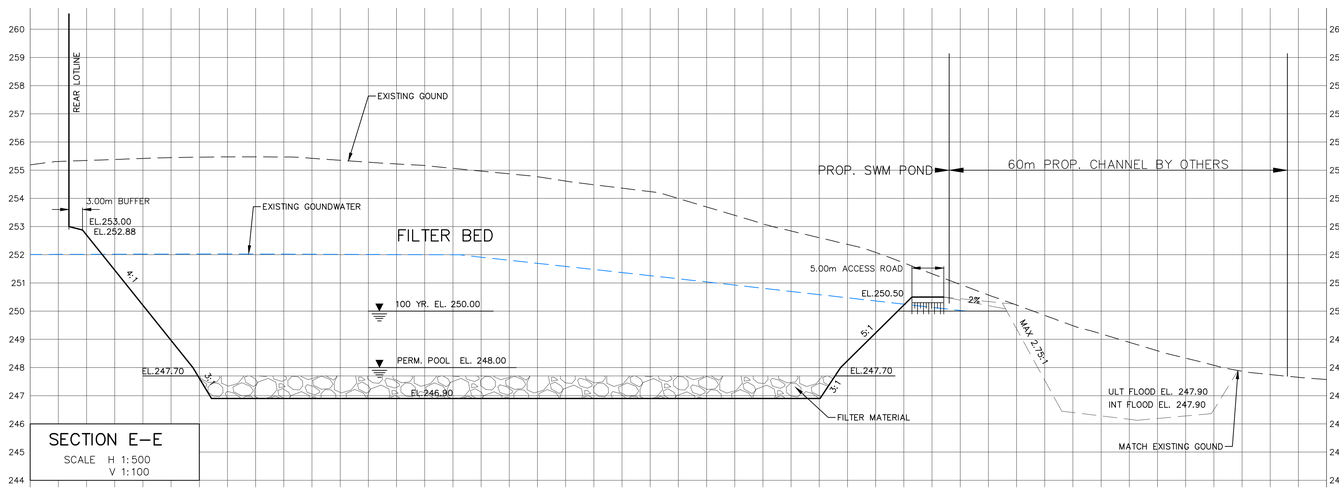

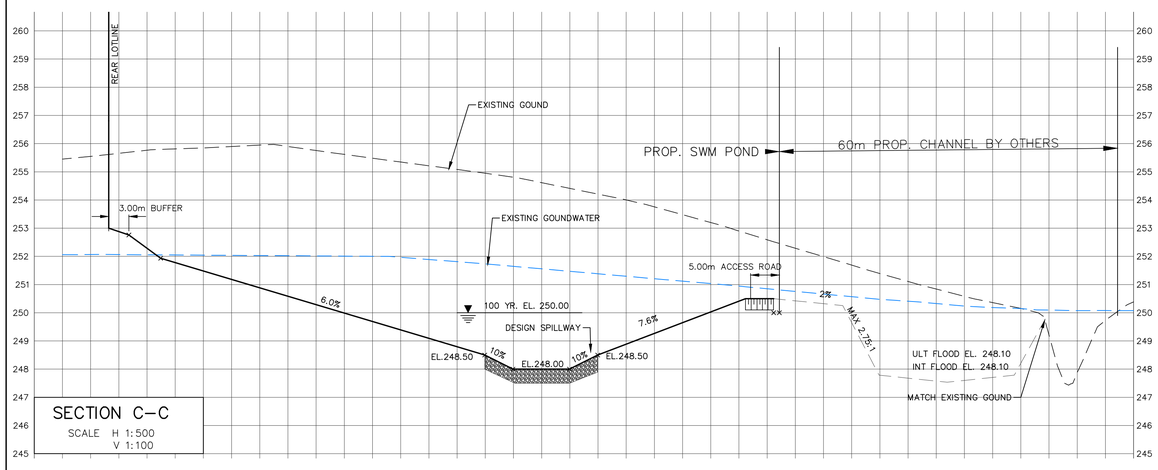

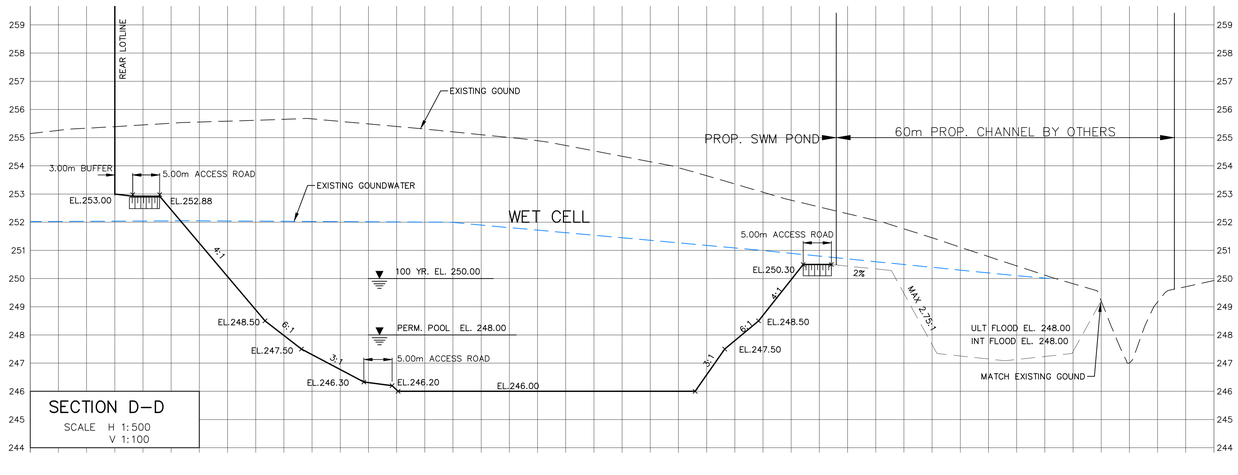

NO.	REVISIONS	DATE	APPROVED

SCHAEFFERS
CONSULTING ENGINEERS
SCHAEFFER & ASSOCIATES LTD.
6 Ronrose Drive, Concord,
Ontario L4K 4R3
Tel: (905) 738-6100
Fax: (905) 738-6875
E-mail:
design@schaeffers.com

CITY OF BARRIE
ACCEPTED
DATE. . . . . .
. . . . . .
DIRECTOR OF ENGINEERING

MAPLEVIEW DRIVE EAST AND 20TH SIDEROAD RESIDENTIAL SUBDIVISION

CROSS SECTION FOR SWM POND 201

Barrie
ENGINEERING DEPARTMENT

SCALE HOR.		VERT.	
DESIGN	T.O.	DRAWN	C.P.
REVIEWED	T.O.	DATE	MAY 2023

PROJECT NO. 5170
SHEET NO.

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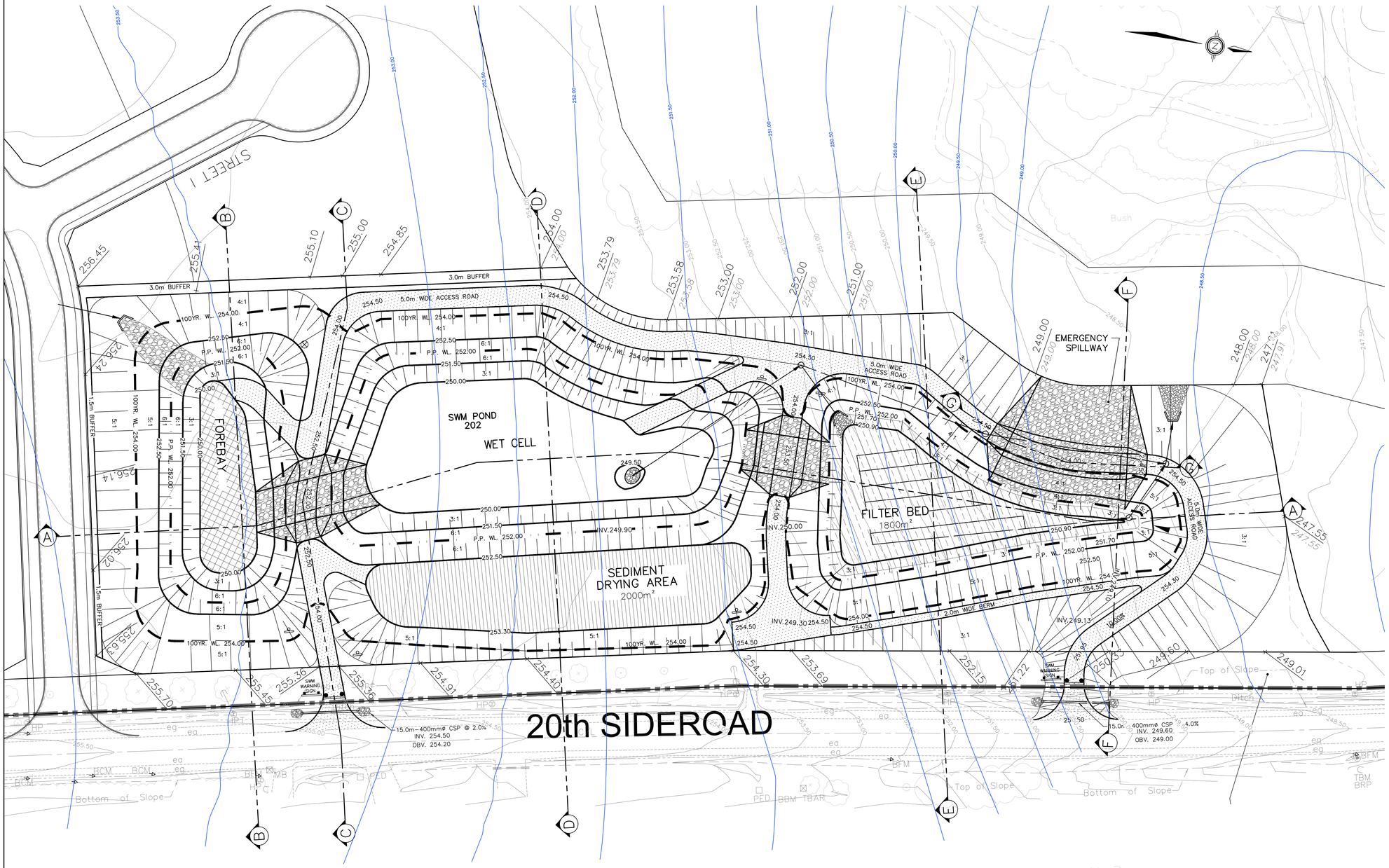

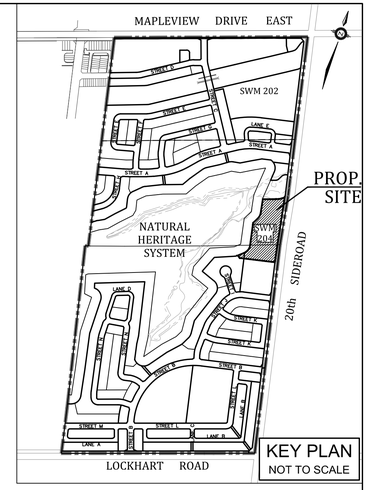

LEGEND

- 5.0m WIDE MAINTENANCE ACCESS ROAD 300mm DEPTH OF 50mm CRUSHER-RUN LIMESTONE
- RIP-RAP STONE WASHED IN WITH TOPSOIL AND SEEDED, PLACED ON TOP OF 270R TERRAFIX FILTER CLOTH OR APPROVED EQUAL.
- RIP-RAP STONE (150mm MIN.) ON TOP OF 270R TERRAFIX FILTER CLOTH OR APPROVED EQUAL
- 255.70 — DENOTES PROPOSED STREET GRADE
- 252.92 — DENOTES PROPOSED SWM POND GRADE
- 210.0 — DENOTES EXISTING GROUND ELEV.
- 210.0 — DENOTES EXISTING GROUNDWATER ELEV.
- DENOTES PROP. SWM POND BOTTOM
- DENOTES NORMAL WATER LEVEL (PERMANENT POOL)
- DENOTES 100 YR. W.L. CONTOUR LINE
- DENOTES SAFETY STATION
- DENOTES FOREBAY DEWATERING SUMP (BSD-81)
- DENOTES SWING GATE (BSD-1216)
- DENOTES SWM FACILITY WARNING SIGN (D787)

DESCRIPTION	AREA/VOLUME PROVIDED (m^2)	AREA/VOLUME REQUIRED (m^2)
PERM. POOL (EL.250.00-EL.252.00)	9,400 m^3	5,296 m^3
100YR W.L. (EL.252.00-EL.254.00)	24,000 m^3	22,797 m^3
FILTER BED AREA	1,800 m^2	1,800 m^2
SEDIMENT DRYING AREA	2,000 m^2	1,570 m^2

NO.	REVISIONS	DATE	APPROVED

SCHAEFFERS CONSULTING ENGINEERS
SCHAEFFER & ASSOCIATES LTD.
6 Ronrose Drive, Concord, Ontario L4K 4R3
Tel: (905) 738-6100
Fax: (905) 738-6875
E-mail: design@schaeffers.com

CITY OF BARRIE
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DATE. . . . . .
. . . . . DIRECTOR OF ENGINEERING

MAPLEVIEW DRIVE EAST AND 20TH SIDEROAD RESIDENTIAL SUBDIVISION
SWM POND 202
OPTION 3
PLAN VIEW

Barrie
ENGINEERING DEPARTMENT

SCALE HOR. 1:500	VERT. 1:500	PROJECT NO.	5170
DESIGN T.O.	DRAWN C.P	SHEET NO.	SWM-202
REVIEWED T.O.	DATE MAY 2023		

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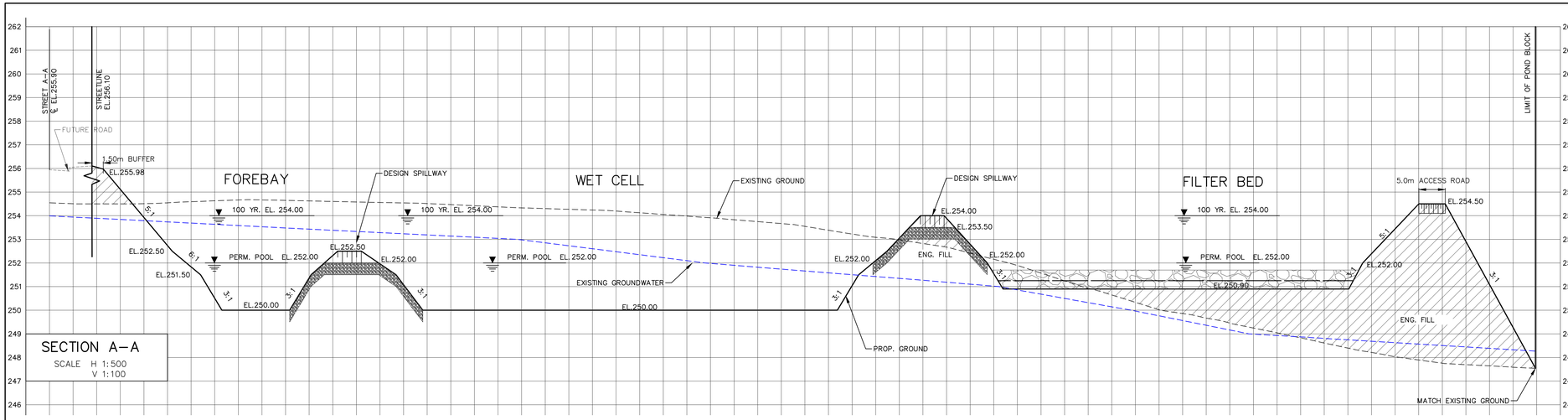
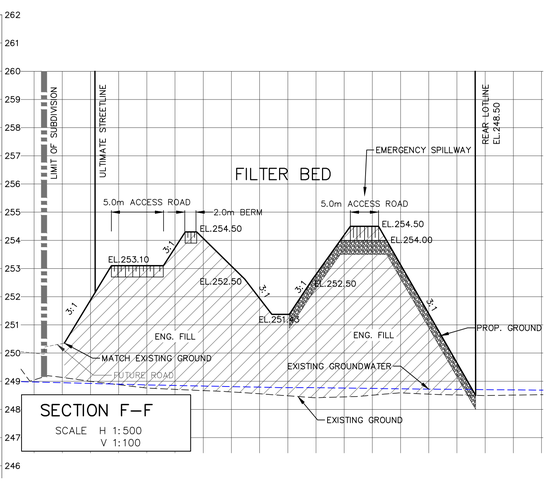
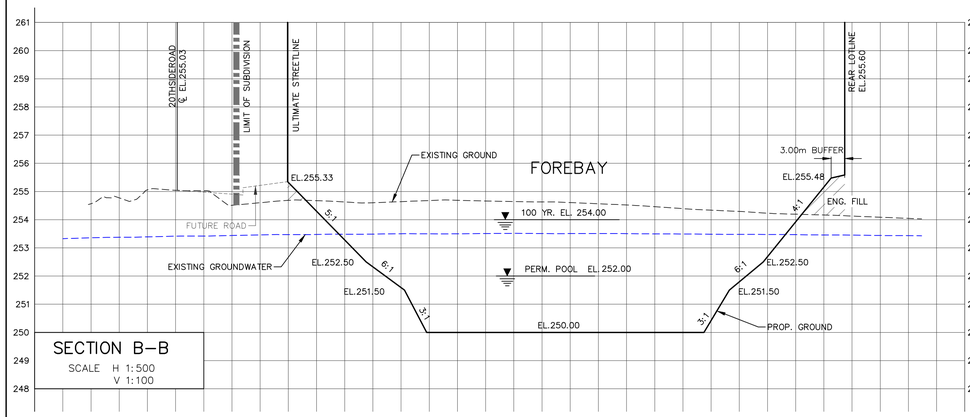


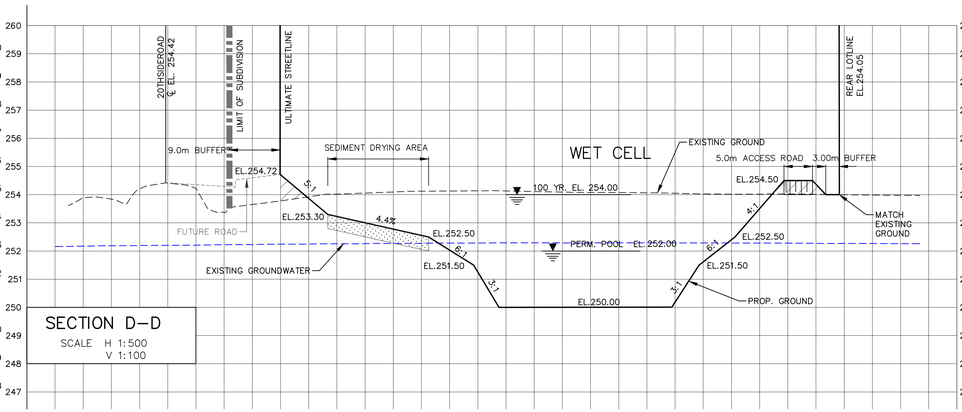
SECTION A–A
SCALE H 1:500
V 1:100



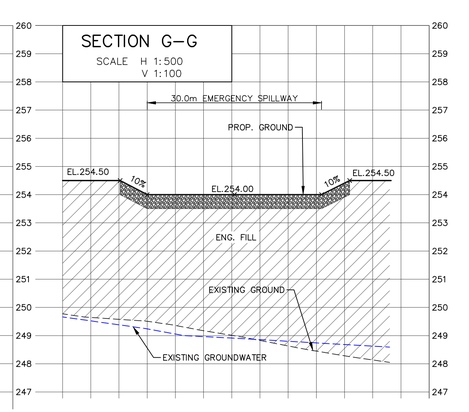
SECTION F–F
SCALE H 1:500
V 1:100

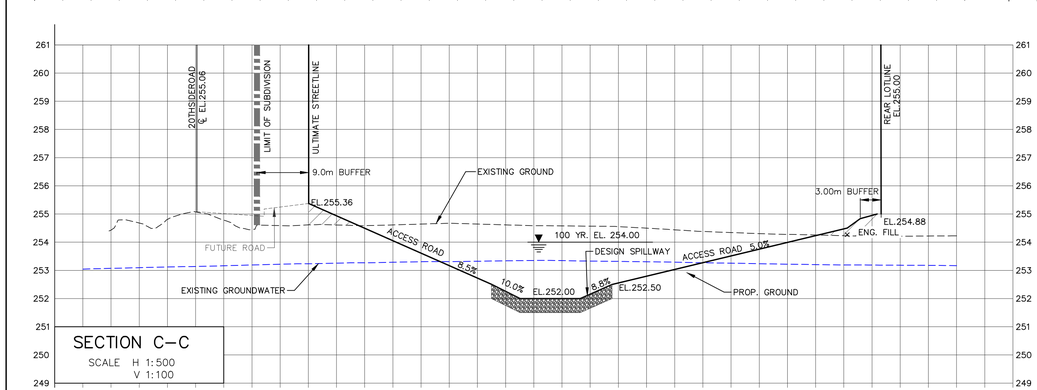


SECTION B–B
SCALE H 1:500
V 1:100

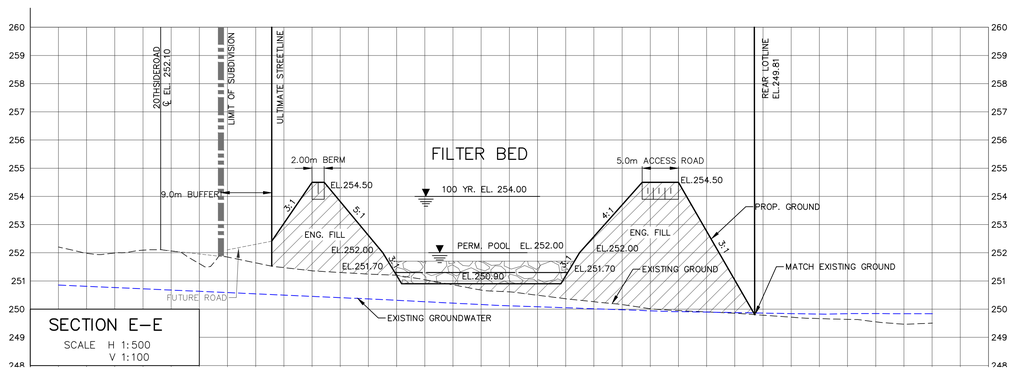


SECTION D–D
SCALE H 1:500
V 1:100





SECTION C–C
SCALE H 1:500
V 1:100



SECTION E–E
SCALE H 1:500
V 1:100

NO.	REVISIONS	DATE	APPROVED

SCHAEFFERS
CONSULTING ENGINEERS
SCHAEFFER & ASSOCIATES LTD.

6 Ronrose Drive, Concord,
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design@schaeffers.com

CITY OF BARRIE
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DATE. . . . . .
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DIRECTOR OF ENGINEERING

MAPLEVIEW DRIVE EAST AND 20TH SIDEROAD RESIDENTIAL SUBDIVISION

CROSS SECTION FOR SWM POND 202

Barrie
ENGINEERING DEPARTMENT

SCALE HOR.	VERT.	PROJECT NO.	5170
DESIGN T.O.	DRAWN C.P.	SHEET NO.	
REVIEWED T.O.	DATE MAY 2023		

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