# FUNCTIONAL STORMWATER MANAGEMENT PLANS

## West Vaughan Employment Area

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# 1.0 Background

## 1.1. Study Area

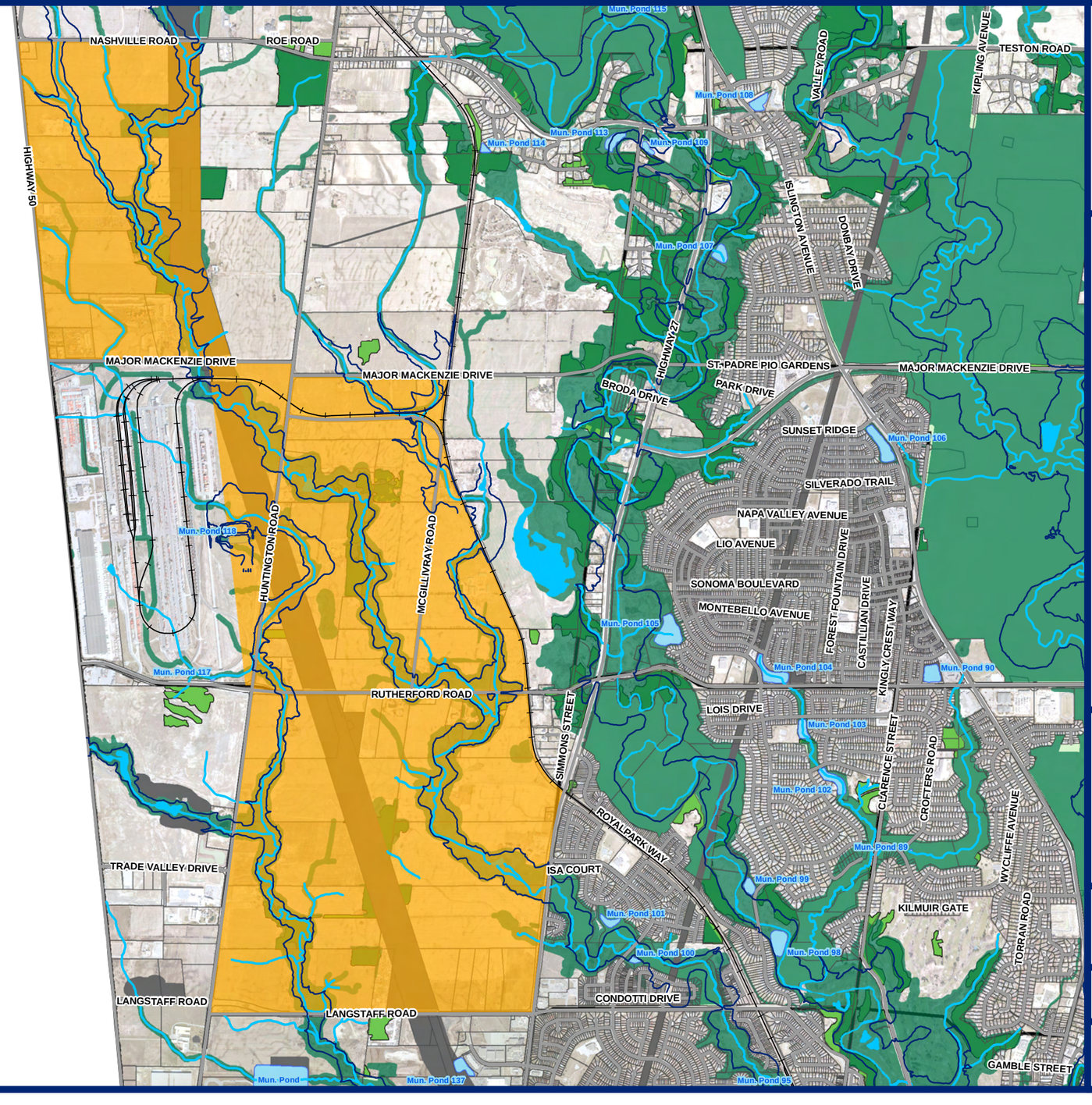
The West Vaughan Employment Area (WVEA) covers approximately 986 ha and includes Block 59, Block 60, the eastern portion of Block 65, and the west half of Block 66. The Plan Area boundary is shown on **Figure 1-1**. The area is very close in proximity to the Canadian Pacific Intermodal, which is located in the western portion of Block 65.

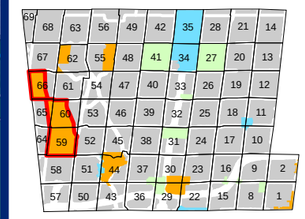
## 1.2. Existing Reports

In preparing this report, the following reports are referenced:

- Stormwater Management Planning and Design Manual (SWMP), Ministry of the Environment (MOE), 2003;
- Design Criteria and Standard Drawings (CVDC), City of Vaughan Engineering Department, March 2004;
- City-Wide Drainage and Stormwater Management Criteria Study, Clarifica Inc., August 2009;
- Rainbow Creek Master Drainage Plan, Cosburn Patterson Wardman Ltd., December 1989;
- Digital Floodline Mapping for the Rainbow Creek Subwatershed Summary Report, Hatch Acres, June 2006;
- Humber River Watershed Hydrology Update, Aquafor Beech Ltd., November 2002;
- Official Plan, City of Vaughan, September 2010;
- The WVEA Plan: Secondary Plan for the West Vaughan Employment Area, Urban Strategies Inc., September 2010;
- Stormwater Management Criteria, Toronto and Region Conservation Authority, August 2012; and,
- Rainbow Creek Update Study (DRAFT), Cole Engineering, January 2013.

# Location Plan | West Vaughan Employment Area




## Legend

- TRCA Existing Floodlines
- Watercourse
- Secondary Plan Area
- Existing SWM Pond
- Infrastructure and Utilities
- Natural Areas
- TRCA Property
- Forested Area

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November 2013

Location Plan

SCALE 1:12,000
0 115 230 460 690 920 Meters

FIGURE
**1-1**

# 2.0 Existing Conditions

## 2.1. Existing Landuse

The existing land use is primarily agricultural, with several parcels of rural residential development and storage yards for trucking companies. There is no existing stormwater management (SWM) infrastructure in the area.

## 2.2. Site Land Cover and Soils

Soil in the Plan Area is predominantly Peel clay. The Hydrologic Soil Group is determined to be type D. A small pocket of Berrien sandy loam (HSG AB) is present along the Canadian Pacific Railway (CPR), between Martin Grove Road and McGillivray Road. The land cover and soil conditions of the site were established using Ontario Soils Mapping.

## 2.3. Existing Storm Drainage

The WVEA is in the Rainbow Creek subwatershed, which is part of the Humber River Watershed. Stormwater in the WVEA flows overland to either Rainbow Creek or Robinson Creek which converge to the south of the site to form Plunkett Creek. Rainbow Creek flows through the WVEA from the west and flows southeast to exit the WVEA through a 27 m single span bridge under Langstaff Road, east of Huntington Road. The east and west branches of Robison Creek flow through the WVEA from the northwest and northeast respectively and converge south of Rutherford Road. Robison Creek then flows south to exit the WVEA at a box culvert under Highway 27, north of Sanremo Court. Rainbow Creek and Robinson Creek converge in the Woodbridge neighbourhood of Vaughan, located to the southeast of the WVEA.

# 3.0 Proposed Conditions

It is expected that any and all developable land within the WVEA will be developed for employment uses, as per the 2010 Vaughan OPA. It is also expected that lands within the hydro corridor that runs along the plan area will be developed as storage yards and parking lots. The City's OP allows for development of lands within hydro corridors, with the condition that the development has the approval of the City and the utility owner.

## 3.1. Proposed Land Use

Properties fronting existing arterial roads, such as Rutherford Road, Major Mackenzie Drive, Highway 50, Nashville Road, Huntington Road, and Highway 27 are proposed to be developed as prestige employment lands. The WVEA Secondary Plan requires this type of employment lands to have a minimum of 15% of landscaped areas. The rest of the properties will be developed as general employment lands, requiring a minimum of 10% of landscaped areas. Taking the roads into consideration, it is likely that the imperviousness of developed lands within WVEA after full development will be approximately 90%.

## 3.2. Proposed Hydrological Conditions

A hydrologic model using Visual OTTHYMO v2.4 (VO2) was created for the post-development site conditions using the TRCA's 12-hour AES storm. Values for percent imperviousness of the catchments were determined based on the maximum allowable lot coverage of 90% for general employment and 85% for prestige employment, as outlined in the WVEA Secondary Plan. Curve Numbers for pervious areas in the post-development scenario are based on the CN value for pasture, using the hydrologic soil group C for topsoil. The curve number value was taken from the Ontario Soils Map and MTO Design Charts 1.08 and 1.09, which can be found in **Appendix A**.

The post-development drainage areas are shown in **Figure 3-1**, **Figure 3-2**, and **Figure 3-3** respectively. Due to the size of the model, input parameters for the post-development VO2 model are located in **Appendix B**.

## 3.3. Stormwater Management Criteria

Stormwater runoff from properties within the WVEA Secondary Plan Area discharges to one (1) of Robinson Creek or Rainbow Creek, both of which are TRCA-regulated watercourses. As such, it is recommended that SWM controls be implemented as part of the development process to meet TRCA's SWM criteria. SWM criteria recommended to be applied to this site are summarized below:

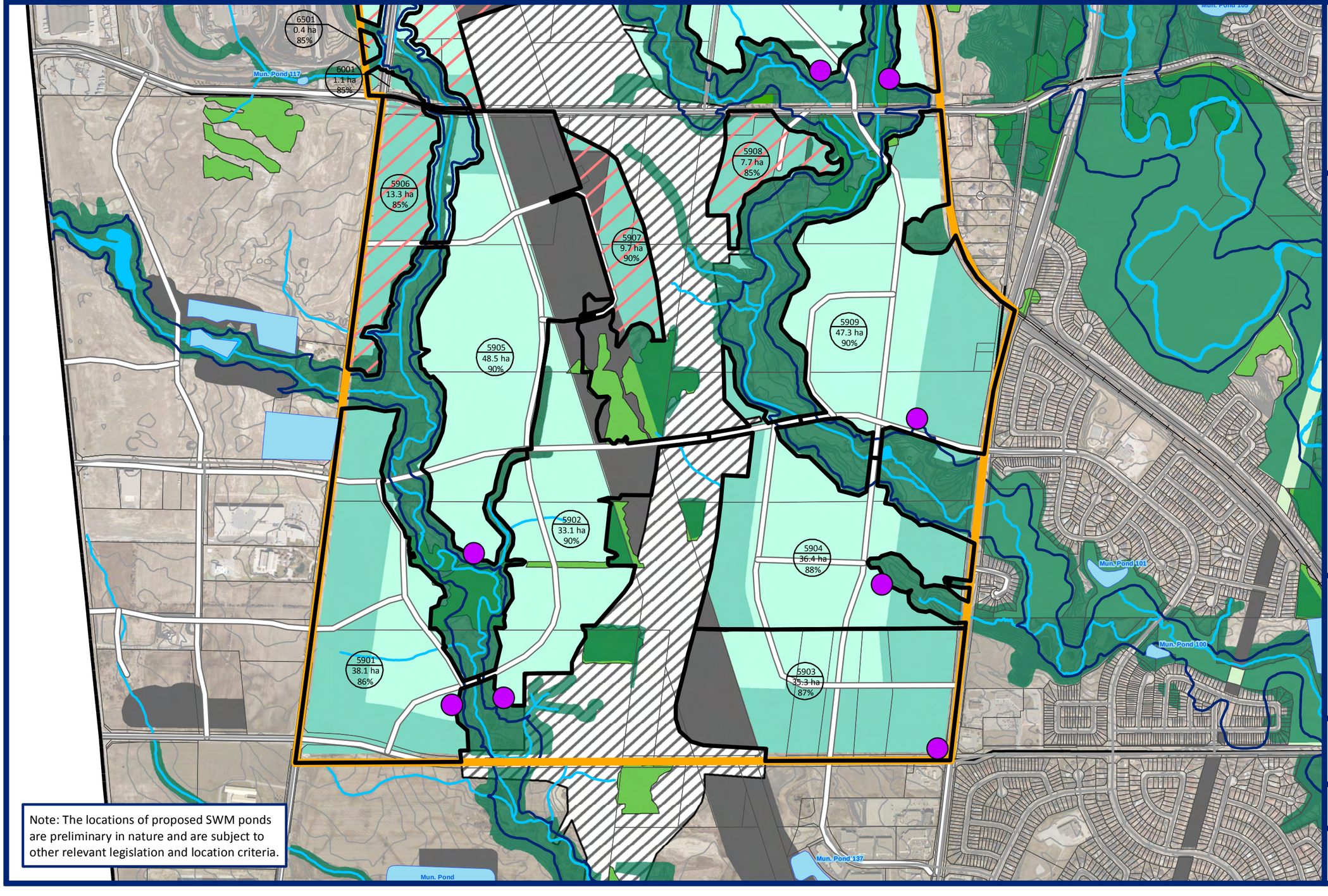
- **Quantity Control**: Post-development peak flow rates are to be controlled to the pre-development unit flow rates for Humber River Sub-Basin 36 (Equation F);
- **Quality Control**: Stormwater is to be treated to Enhanced Protection levels as defined in the MOE SWM Planning and Design Manual (2003);
- **Erosion Control**: 5 mm of on-site retention is to be provided for all storm events for the purpose of erosion control; and,
- **Water Balance**: Provide best efforts to maintain existing water balance using low impact development practices.

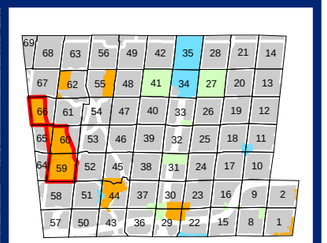
To encourage the use of sustainable development technologies, all agencies recommend the use of Low Impact Development (LID) Practices. A feasibility analysis of LID strategies for the WVEA is included in **Section 3.8** of this report. The use of these LIDs will assist in meeting SWM requirements.

Grading of proposed roads and properties within the WVEA Plan Area must also conform to existing City Engineering Standards. These include (but are not limited to):

- Minor storm sewer systems along proposed roads will be designed to convey the 5-year storm event from road allowances;
- Major system flows must be safely conveyed within streets, open channels, storm sewers, and walkways;
- The combination of the major system and minor system are to be designed to safely convey the Regional Storm; and,
- The City's maximum depths of flow for the major overland flow are not to be exceeded:
  - Maximum of 0.20m above the crown of the road for local roads;
  - Maximum of 0.10m above the crown of the road for collector roads; and,
  - Maximum of the crown of the road for arterial roads.

# Post-Development Drainage Area Plan | WVEA (Block 59)




## Legend

- TRCA Existing Floodlines
- Watercourse
- Existing and Approved SWM Ponds
- Proposed SWM Ponds
- Areas with Lot Level Controls
- Proposed Roads
- Natural Areas
- TRCA Property
- Forested Area

**Proposed Land Use**

- Private Open Spaces
- General Employment
- Prestige Employment
- Infrastructure and Utilities
- Hwy 427 Planned Extension

Note: The locations of proposed SWM ponds are preliminary in nature and are subject to other relevant legislation and location criteria.

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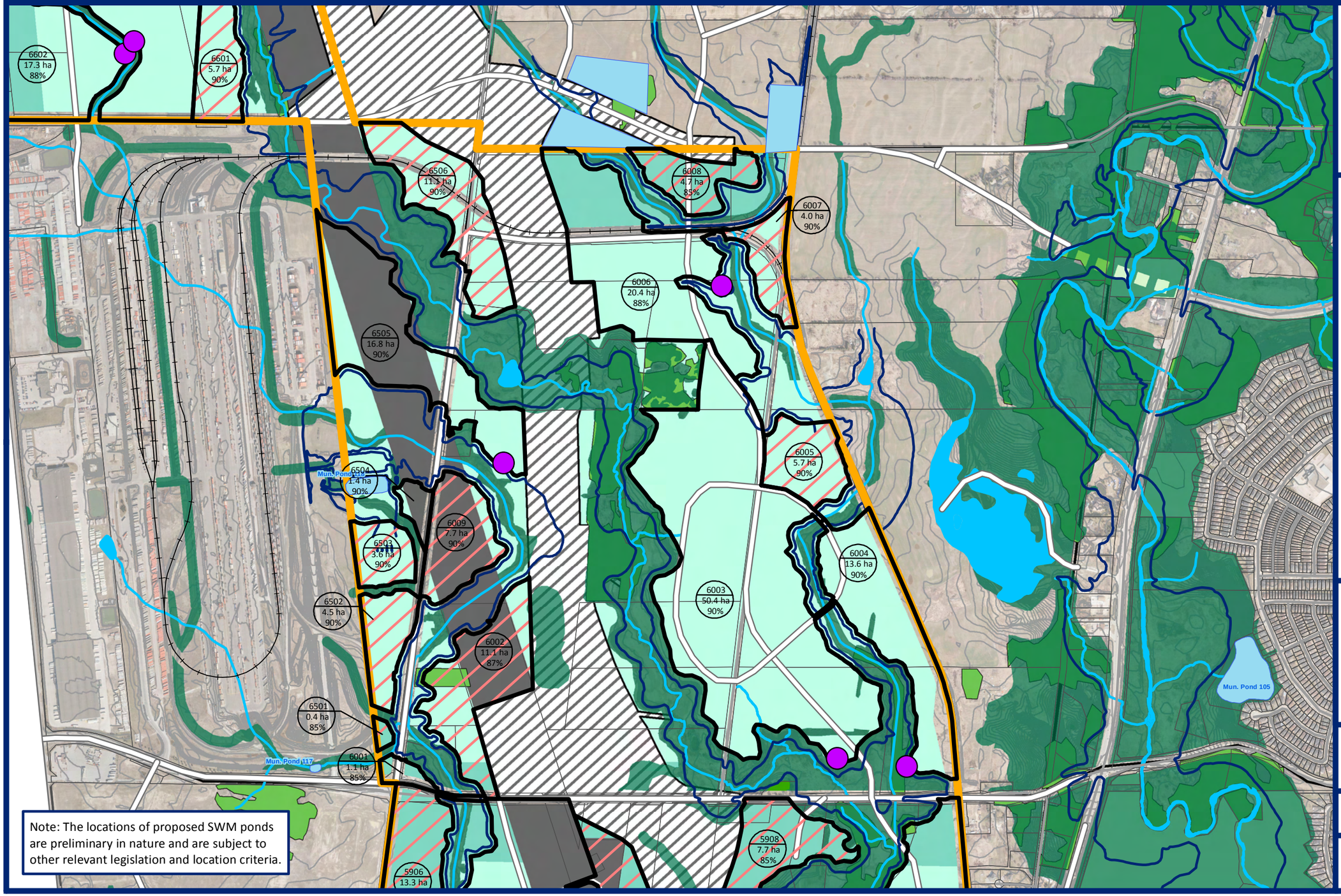
Post-Development Drainage Area Plan

SCALE 1:12,000
0 37.5 75 150 225 300 Meters

FIGURE
**3-1**

# Post-Development Drainage Area Plan | WVEA (Block 60 and 65)

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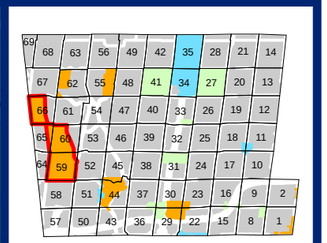


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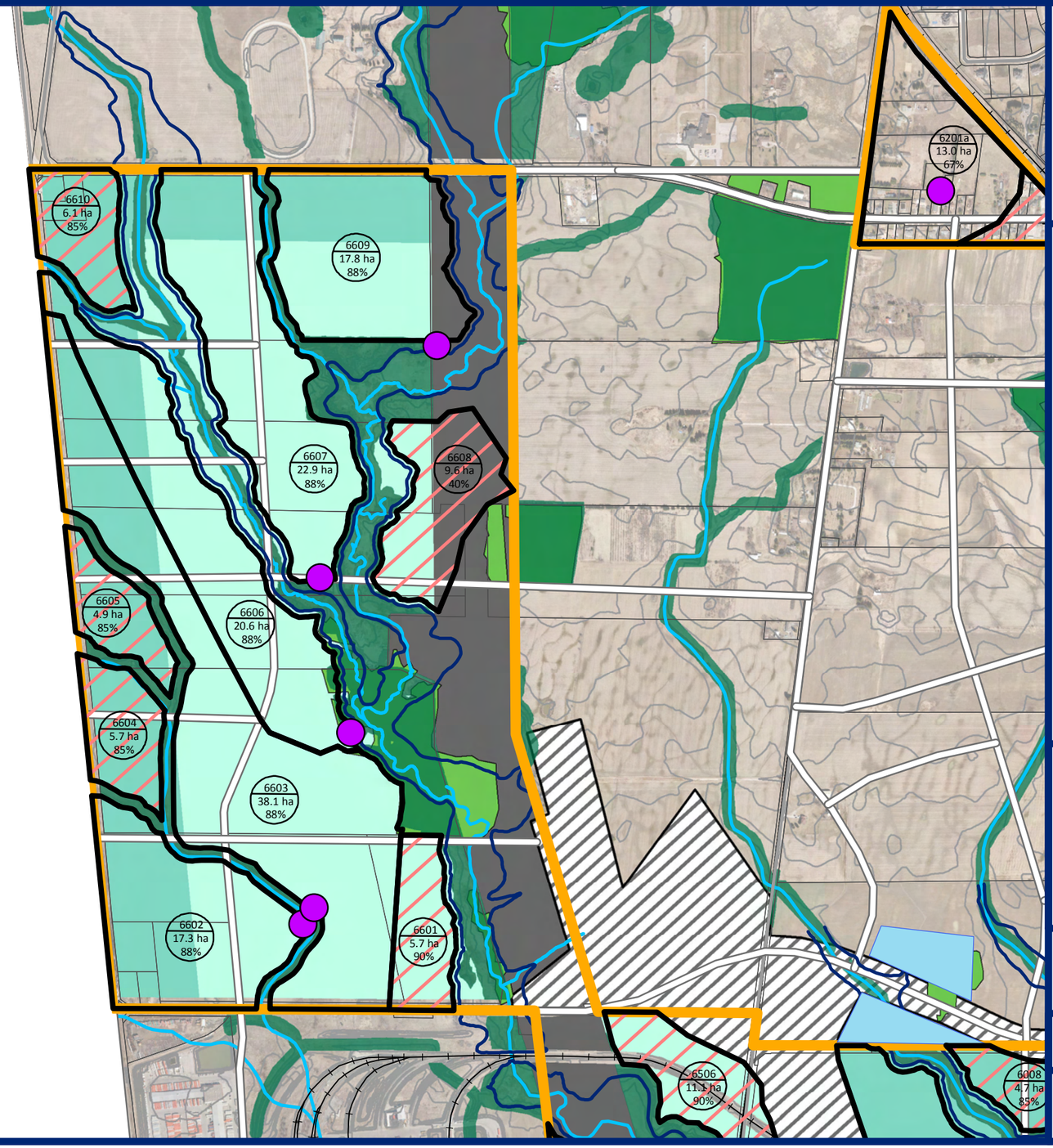
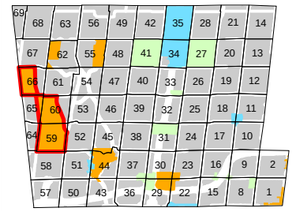
Post-Development Drainage Area Plan

SCALE 1:12,000
0 37.5 75 150 225 300 Meters

FIGURE
**3-2**

# Post-Development Drainage Area Plan | WVEA (Block 66)




## Legend

- TRCA Existing Floodlines
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Post-Development Drainage Area Plan

SCALE 1:12,000
0 37.5 75 150 225 300 Meters

FIGURE
**3-3**

Note: The locations of proposed SWM ponds are preliminary in nature and are subject to other relevant legislation and location criteria.

## 3.4. Stormwater Quantity Control

Post-development peak flows are to be controlled to the Humber River Unit Flow Rate targets for Sub-basin 36, shown below in **Table 3-1**. A map showing the location of the Sub-basins within the Humber River Water Shed is located in **Appendix B**.

**Table 3-1 – TRCA Unit Flow Rates for Rainbow Creek (per Sub-basin 36)**

| Storm Event | Unit Flow Rate* |
|---|---|
| 2-year | Q = 9.506 - 0.719*ln(A) |
| 5-year | Q = 14.652 - 1.136*ln(A) |
| 10-year | Q = 17.957 - 1.373*ln(A) |
| 25-year | Q = 22.639 - 1.741*ln(A) |
| 50-year | Q = 26.566 - 2.082*ln(A) |
| 100-year | Q = 29.912 - 2.316*ln(A) |
| *Where "Q" is the target unit flow rate in L/s/ha and "A" is the pre-development drainage area in hectares | |

The 12-hour AES storm was used to determine storage requirements for each of the proposed SWM controls. Results from the hydrology modeling are summarized in **Appendix C** and a copy of the post-development VO2 model for the WVEA is located on the CD included with this report.

Quantity control for WVEA is to be provided primarily by SWM ponds, the possible locations of which are outlined in **Figure 3-1**, **Figure 3-2**, and **Figure 3-3**. The locations of these ponds are approximate and could change at the block plan stage. In sites where there are no opportunities to outlet to a SWM pond, quantity control shall provided by lot level controls. Target peak flows and storage requirements for each catchment area are summarized in **Appendix C**.

## 3.5. Stormwater Quality Control

Stormwater treatment in any redevelopment areas must meet Enhanced (Level 1) Protection criteria (80% TSS removal) as defined by the MOE SWMP Manual (2003). For sites discharging into SWM ponds, quality control is to be provided at the ponds. Ponds are to be designed as wet ponds with forebays and permanent pools sized according to the MOE SWMP Manual. Sites not discharging to SWM ponds must meet the quality control requirement through an integrated treatment train approach including Low Impact Development (LID) Practices and the use of oil-grit separators. It must be noted that currently the TRCA recognizes oil-grit separators as having 50% TSS removal efficiency. Because of this fact, it is recommended that oil-grit separators be used as part of a treatment train approach.

## 3.6. Erosion Control

Erosion control must be provided in WVEA to mitigate possible erosion impacts of development on Rainbow Creek. The TRCA requires a minimum of 5 mm on-site retention for all storm events for sites with only on-site controls, and a minimum 24 or 48-drawdown time for SWM ponds. However, findings of the recent Rainbow Creek Master Plan Update Study, by Cole Engineering dated January 2012 (**Volume III** of this report), recommends a minimum 5 mm on-site retention for all sites discharging to Rainbow Creek. Refer to **Table 3-2** below.

**Table 3-2 – Erosion Control Requirements for Rainbow Creek**

| SWM Control | TRCA Requirement | Rainbow Creek Master Plan Update Recommendations |
|---|---|---|
| SWM Pond | Minimum 24 or 48-hour drawdown time | Minimum 5 mm on-site retention |
| On-site Controls | Minimum 5 mm on-site retention | Minimum 5 mm on-site retention |

Sites within WVEA must adhere to the erosion control requirements of the Rainbow Creek Master Plan Update Study, by Cole Engineering dated January 2012 (**Volume III** of this report), which supersedes the general TRCA requirement for erosion control. The report finds that the 5 mm on-site retention requirement results in less erosion exceedance hours in Rainbow Creek when compared to the TRCA's 24- and 48-hour drawdown time requirement. Thus, all sites within the Plan Area must adhere to this requirement and provide a minimum of 5 mm on-site retention for all storm events. This onsite retention can also be used towards the water balance requirements for the site. Refer to **Table 3-4** in **Section 3.8** of this report for information on how this 5mm on-site retention can be achieved.

## 3.7. Water Balance

The WVEA is classified as a low volume groundwater recharge area by the TRCA, an area for which matching pre-development infiltration rates may not be required. Soils information for this area was taken from the Soil Survey of York County, report No. 19 of the Ontario Soil Survey, Agriculture Canada – Research Branch in conjunction with the Ontario Ministry of Agriculture and Fodd, 1953. Peel clay soil, (Hydrologic Soil Group (HSG) D) is present throughout the plan area. A small pocket of Berrien sandy loam (HSG AB) is present along the CP Railway, between Martin Grove Road and McGillivray Road. The effectiveness of infiltration controls will be limited in most of this area due to the predominantly silty clay soils. Confirmation of the soil type and corresponding infiltration values must be provided during the Block Plan design of each site and the TRCA should be consulted for specific water balance requirements in this area.

The Thornthwaite and Mather water balance method, outlined in Chapter 3 of the MOE's SWM Planning and Design Manual, was used to calculate the infiltration and evapotranspiration deficits in the post-development scenario. Soil types, vegetation, topography, and annual precipitation are considered with the water balance method. The result of the exercise is summarized below in **Table 3-3**.

**Table 3-3 – Water Balance Analysis**

| Parameters | Existing Water Balance (11.6% impervious area) | | Post-development Water Balance (87.5% impervious area) | | Change in Volume |
|---|---|---|---|---|---|
| | Pervious Area | Impervious Area | Pervious Area | Impervious Area | |
| Area (ha) | 552.4 | 21 | 71.6 | 501.8 | - |
| Precipitation (mm)* | 798 | 798 | 798 | 798 | - |
| Evapotranspiration (mm) | 543 | 239.4 | 531 | 239.4 | - |
| Surplus (mm) | 255 | 558.6 | 267 | 558.6 | - |
| Total Infiltration (mm) | 102 | 0 | 106.8 | 0 | - |

| Parameters | Existing Water Balance (11.6% impervious area) | | Post-development Water Balance (87.5% impervious area) | | Change in Volume |
|---|---|---|---|---|---|
| | Pervious Area | Impervious Area | Pervious Area | Impervious Area | |
| Total Runoff (mm) | 153 | 558.6 | 160.2 | 558.6 | - |
| Runoff ($m^3$) | 962,478 | | 2,917,758 | | **+1,955,280** |
| Evapotranspiration ($m^3$) | 3,049,806 | | 1,581,505 | | **-1,468,301** |
| Infiltration ($m^3$) | 563,448 | | 76,469 | | **-486,979** |

*The yearly precipitation data used in the water balance analysis was obtained from the National Climate Data and Information Archive for Woodbridge, located immediately east of West Vaughan Employment Area.
**Evapotranspiration is assumed to be 30% of precipitation for highly urbanized areas, as per the *Low-Impact Development Design Strategies: An Integrated Design Approach*, *Prince George's County, Maryland (1999).*

As shown, the proposed development will significantly increase annual runoff volumes from the Plan Area, as well as significantly reduce the amount of infiltration into the soil.

Because WVEA is located in an area classified as a low volume recharge area by the TRCA, meeting pre-development water balance may not be feasible or required. During the Block Plan design stage, geotechnical investigations will be required in order to confirm soils in the area and investigate opportunities for increasing infiltration. The TRCA should be consulted to refine the site specific water balance requirements during Block Plan design.

## 3.8. Low Impact Development Considerations

Low Impact Design (LID) practices are recommended where possible in order to provide more effective stormwater quality and erosion controls, reduce the size of end-of-pipe controls, and help maintain the existing water balance. In addition, LID practices are required for sites not outletting to SWM facilities in order to improve water quality by developing an integrated treatment train approach to SWM. The LID practices are typically categorized as lot level, conveyance, or end-of-pipe controls. The MOE SWMP (2003) suggests several LID practices for application at the lot level, in the conveyance system, or for multiple lot small drainage areas (less than 2 ha.). Potential lot level / conveyance LID practices for the development are listed in **Table 3-4** below for water quality, quantity, erosion and water balance controls.

**Table 3-4 – Lot Level / Conveyance LID Analysis**

| LID | Primary Objective | Feasibility | Rationale |
|---|---|---|---|
| **Lot Level / Conveyance Storage Controls** | | | |
| Rooftop Storage | Peak Flow Control | Feasible, Limited in areas | ▪ Assists quantity control.<br>▪ Large industrial and commercial buildings with flat roofs to provide storage.<br>▪ Use may be limited by the MTO within 400 m of the proposed extension of Hwy 427. |
| Parking Lot Storage | Peak Flow Control | Feasible | ▪ Employment and commercial areas will have large parking lot areas available for storage. |
| Superpipe Storage | Peak Flow Control | Possible | ▪ Possible, will require further study and consideration. |

| LID | Primary Objective | Feasibility | Rationale |
|---|---|---|---|
| **Lot Level / Conveyance Storage Controls** | | | |
| Rear Yard Storage | Peak Flow Control | Not Feasible | ▪ Yard areas will be very limited in employment areas.<br>▪ Clay soil limits infiltration, unmanaged ponded water will be unacceptable. |
| Direct Roof Leaders to Soakaway Pits, Cisterns, or Rain Barrels (Rainwater Harvesting) | Water Balance | Feasible | ▪ Cisterns can be used for watering lawns and other secondary uses. |
| **Lot Level / Conveyance Infiltration Controls** | | | |
| Reduced Lot Grading | Water Balance | Not Feasible | ▪ Undesirable or unmanaged ponded water in private properties will not be acceptable. |
| Green Roof | Water Balance, Water Quality, Water Quantity | Feasible | ▪ Large industrial and commercial buildings with flat roofs provides great opportunity for green roofs. |
| Infiltration Trenches | Water Balance | Not Feasible | ▪ Clay soil limits infiltration. |
| Grassed or Dry Swales | Water Balance, Water Quality | Feasible, Limited | ▪ Road-side swales provide some pollutant removal and provide small amounts of infiltration and aesthetics. |
| Rain Garden | Water Balance | Not Feasible | ▪ Clay soil limits infiltration. |
| Pervious Pipe Systems | Water Balance | Not Feasible | ▪ Clay soil limits infiltration. |
| Vegetated Filter Strips | Water Balance, Water Quality | Not Feasible | ▪ Vegetated filter strips are impractical in intensely developed areas as they consume large amounts of space. |
| Stream and Valley Corridor Buffer Strips | Water Balance, Water Quality | Feasible | ▪ Applicable in small areas where stream corridors are still intact.<br>▪ Opportunity to allow buffer between streams and development to preserve stream ecology. |

**Table 3.4 – Lot Level / Conveyance LID Analysis (Continued)**

| LID | Primary Objective | Feasibility | Rationale |
|---|---|---|---|
| Permeable Pavement | Water Balance | Not Feasible | ▪ Clay soil limits infiltration. |
| **End-of-Pipe Controls** | | | |
| Wet Ponds | Water Balance, Water Quality | Feasible | ▪ Cost-effective way to provide storage and manage peak flows. |
| Dry Ponds | Water Balance | Feasible | ▪ Cost-effective way to provide storage and manage peak flows. |
| Wetlands | Water Balance | Not Feasible | ▪ Require large wetland and buffer area to be productive. |
| Infiltration Basin | Water Balance | Not Feasible | ▪ Clay soil limits infiltration. |

With proposed commercial and industrial development in WVEA, there is an opportunity to provide rooftop storage. Roof leaders should connect to pervious areas or underground infiltration chambers to reduce runoff from the sites and increase local infiltration. Underground storage or parking lot ponding could provide additional storage reducing the required size of the ponds, and thus maximize the developable lands.

With clay soil present in WVEA, lot level infiltration controls are not suitable for most areas, however as WVEA is a green field development; LID practices which are not infiltration based could be implemented throughout the Plan Area to improve the runoff quality from the site.

# 4.0 Conclusions and Recommendations

Development of the West Vaughan Employment Area will result in impervious areas, thus altering existing hydrological conditions of the site. SWM measures are necessary to mitigate the negative effects of development – such as increasing runoff, decreasing runoff quality, and increasing erosion risks. The SWM plan presented for the WVEA will allow development of the secondary plan area while meeting the SWM criteria for this area. The plan includes the following SWM practices:

- **Quantity Control** – Unit flow rates can be achieved through the use of SWM ponds and onsite storage. Approximate locations for SWM ponds are shown on **Figure 1-1**.
- **Quality Control** – 80% TSS removal can be achieved through the use of wet ponds (for sites outletting to SWM ponds) or through an integrated treatment train approach including Low Impact Development (LID) Practices and the use of oil-grit separators (for site not outletting to SWM ponds).
- **Erosion Control** – In order to provide erosion control the first 5 mm of rainfall should be retained on site. This water may be infiltrated or used for irrigation or other gray water applications.
- **Water Balance** – A best effort should be made to match the existing water balance for the site. Specific requirements may vary from site to site depending on the natural soil type. The soil type for each site should be verified prior to detailed design and the TRCA should be consulted regarding specific water balance requirements for that site.

# APPENDIX A
# MTO Design Charts

## Design Chart 1.08: Hydrologic Soil Groups (Continued)

**- Based on Soil Texture**

| | |
|---|---|
| Sands, Sandy Loams and Gravels | |
| - overlying sand, gravel or limestone bedrock, very well drained | A |
| - ditto, imperfectly drained | AB |
| - shallow, overlying Precambrian bedrock or clay subsoil | B |
| Medium to Coarse Loams | |
| - overlying sand, gravel or limestone, well drained | AB |
| - shallow, overlying Precambrian bedrock or clay subsoil | B |
| Medium Textured Loams | |
| - shallow, overlying limestone bedrock | B |
| - overlying medium textured subsoil | BC |
| Silt Loams, Some Loams | |
| - with good internal drainage | BC |
| - with slow internal drainage and good external drainage | C |
| Clays, Clay Loams, Silty Clay Loams | |
| - with good internal drainage | C |
| - with imperfect or poor external drainage | C |
| - with slow internal drainage and good external drainage | D |

Source: U.S. Department of Agriculture (1972)

## Design Chart 1.09: Soil/Land Use Curve Numbers

| Land Use | Treatment or Practice | Hydrologic Condition[4] | Hydrologic Soil Group | | | |
|---|---|---|---|---|---|---|
| | | | A | B | C | D |
| Fallow | Straight row | — | 77 | 86 | 91 | 94 |
| Row crops | " | Poor | 72 | 81 | 88 | 91 |
| | " | Good | 67 | 78 | 85 | 89 |
| | Contoured | Poor | 70 | 79 | 84 | 88 |
| | " | Good | 65 | 75 | 82 | 86 |
| | " and terraced | Poor | 66 | 74 | 8 | 82 |
| | " " " | Good | 62 | 71 | 78 | 81 |
| Small grain | Straight row | Poor | 65 | 76 | 84 | 88 |
| | | Good | 63 | 75 | 83 | 87 |
| | Contoured | Poor | 63 | 74 | 82 | 85 |
| | | Good | 61 | 73 | 81 | 84 |
| | " and terraced | Poor | 61 | 72 | 79 | 82 |
| | | Good | 59 | 70 | 78 | 81 |
| Close-seeded legumes[2] or rotation meadow | Straight row | Poor | 66 | 77 | 85 | 89 |
| | " " | Good | 58 | 72 | 81 | 85 |
| | Contoured | Poor | 64 | 75 | 83 | 85 |
| | " | Good | 55 | 69 | 78 | 83 |
| | " and terraced | Poor | 63 | 73 | 80 | 83 |
| | " and terraced | Good | 51 | 67 | 76 | 80 |
| Pasture or range | | Poor | 68 | 79 | 86 | 89 |
| | | Fair | 49 | 69 | 79 | 84 |
| | Contoured | Good | 39 | 61 | 74 | 80 |
| | " | Poor | 47 | 67 | 81 | 88 |
| | " | Fair | 25 | 59 | 75 | 83 |
| | | Good | 6 | 35 | 70 | 79 |
| Meadow | | Good | 30 | 58 | 71 | 78 |
| Woods | | Poor | 45 | 66 | 77 | 83 |
| | | Fair | 36 | 60 | 73 | 79 |
| | | Good | 25 | 55 | 70 | 77 |
| Farmsteads | | — | 59 | 74 | 82 | 86 |
| | | — | 72 | 82 | 87 | 89 |
| | | — | 74 | 84 | 90 | 92 |

For average anticedent soil moisture condition (AMC II)
[2] Close-drilled or broadcast.

[4] The hydrologic condition of cropland is good if a good crop rotation practice is used; it is poor if one crop is grown continuously.

Source: U.S. Department of Agriculture (1972)

## Design Chart 1.09: Soil Conservation Service Curve Numbers (Continued)

| Land Use or Surface | Hydrologic Soil Group | | | | | | |
|---|---|---|---|---|---|---|---|
| | A | AB | B | BC | C | CD | D |
| Fallow (special cases only) | 77 | 82 | 86 | 89 | 91 | 93 | 94 |
| Crop and other improved land | 66** (62) | 70** (68) | 74 | 78 | 82 | 84 | 86 AMC I |
| Pasture & other unimproved land | 58* (38) | 62* (51) | 65 | 71 | 76 | 79 | 81 |
| Woodlots and forest | 50* (30) | 54* (44) | 58 | 65 | 71 | 74 | 77 |
| Impervious areas (paved) | | | | | | | 98 |
| Bare bedrock draining directly to stream by surface flow | | | | | | | 98 |
| Bare bedrock draining indirectly to stream as groundwater (usual case) | | | | | | | 70 |
| Lakes and wetlands | | | | | | | 50 |

Notes

(i) All values are based on AMC II except those marked by * (AMC III) or ** (mean of AMC II and AMC III).

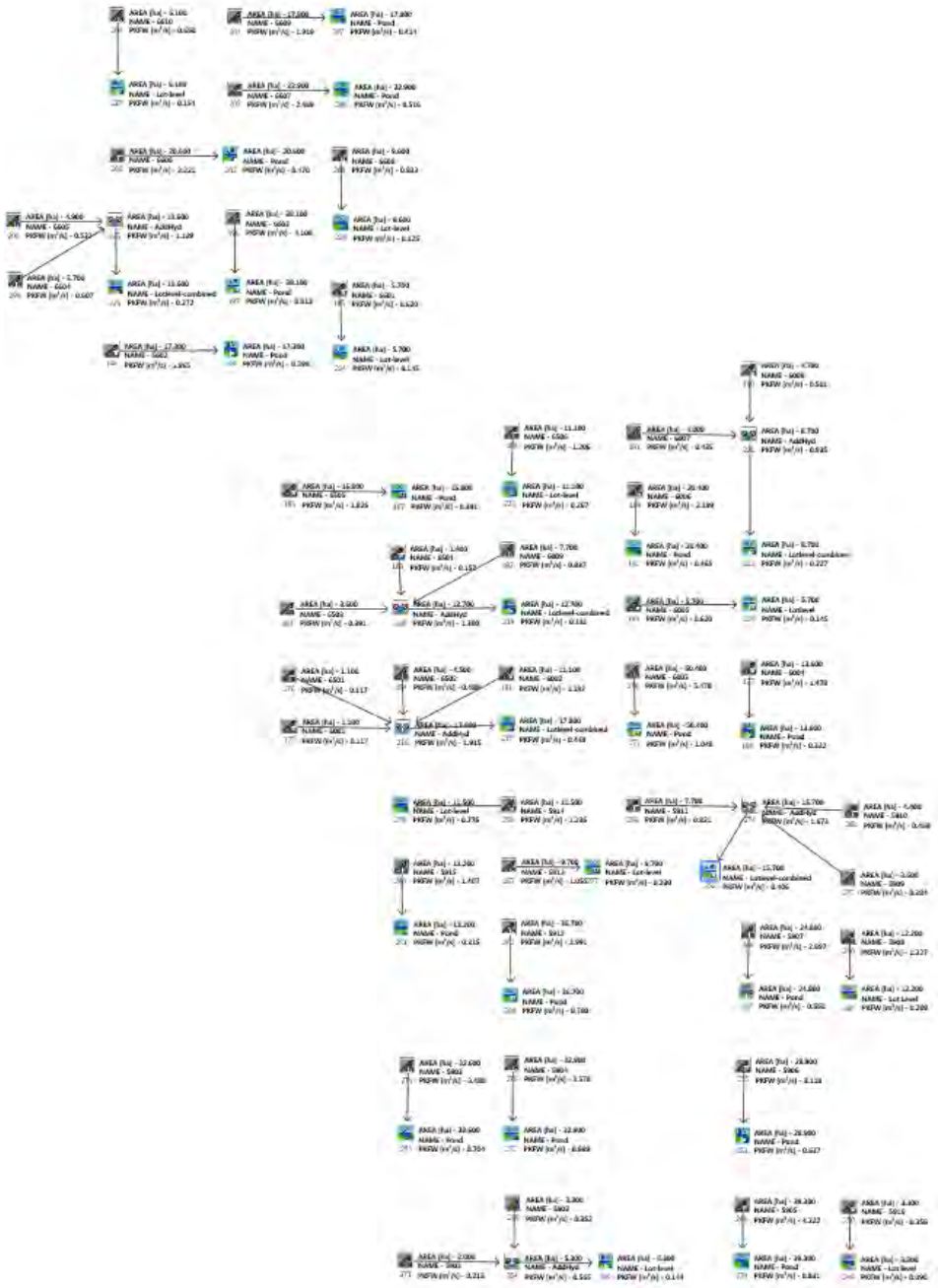
(ii) Values in brackets are AMC II and are to be used only for special cases.

(iii) Table is not applicable to frozen soils or to periods in which snowmelt contributes to runoff.

# APPENDIX B
# VO2 Model Input Parameters

**W11-259**
Functional Servicing
West Vaughan Employment Area
Post-Development Model
November 2013

## VO2 Model Schematic



Post-development VO2 Model Input

| SWM Strategy | Catchment | Drainage Area (ha) | CN value | XIMP | TIMP |
|---|---|---|---|---|---|
| SWM Pond | 5901 | 36.2 | 74 | 0.86 | 0.86 |
| SWM Pond | 5902 | 33.1 | 74 | 0.9 | 0.9 |
| SWM Pond | 5903 | 35.3 | 74 | 0.87 | 0.87 |
| SWM Pond | 5904 | 36.4 | 74 | 0.88 | 0.88 |
| SWM Pond | 5905 | 48.5 | 74 | 0.89 | 0.89 |
| Lot Level | 5906 | 13.3 | 74 | 0.85 | 0.85 |
| Lot Level | 5907 | 9.74 | 74 | 0.9 | 0.9 |
| Lot Level | 5908 | 7.69 | 74 | 0.85 | 0.85 |
| SWM Pond | 5909 | 47.3 | 74 | 0.89 | 0.89 |
| Lot Level | 6001 | 1.1 | 74 | 0.85 | 0.85 |
| Lot Level | 6002 | 11.1 | 74 | 0.87 | 0.87 |
| SWM Pond | 6003 | 50.4 | 74 | 0.9 | 0.9 |
| SWM Pond | 6004 | 13.6 | 74 | 0.9 | 0.9 |
| Lot Level | 6005 | 5.7 | 74 | 0.9 | 0.9 |
| SWM Pond | 6006 | 20.4 | 74 | 0.88 | 0.88 |
| Lot Level | 6007 | 4 | 74 | 0.9 | 0.9 |
| Lot Level | 6008 | 4.7 | 74 | 0.85 | 0.85 |
| Lot Level | 6009 | 7.7 | 74 | 0.9 | 0.9 |
| Lot Level | 6501 | 1.1 | 74 | 0.85 | 0.85 |
| Lot Level | 6502 | 4.5 | 74 | 0.9 | 0.9 |
| Lot Level | 6503 | 3.6 | 74 | 0.9 | 0.9 |
| Lot Level | 6504 | 1.4 | 74 | 0.9 | 0.9 |
| SWM Pond | 6505 | 16.8 | 74 | 0.9 | 0.9 |
| Lot Level | 6506 | 11.1 | 74 | 0.9 | 0.9 |
| Lot Level | 6601 | 5.7 | 74 | 0.9 | 0.9 |
| SWM Pond | 6602 | 17.3 | 74 | 0.88 | 0.88 |
| SWM Pond | 6603 | 38.1 | 74 | 0.88 | 0.88 |
| Lot Level | 6604 | 5.7 | 74 | 0.85 | 0.85 |
| Lot Level | 6605 | 4.9 | 74 | 0.85 | 0.85 |
| SWM Pond | 6606 | 20.6 | 74 | 0.88 | 0.88 |
| SWM Pond | 6607 | 22.9 | 74 | 0.88 | 0.88 |
| Lot Level | 6608 | 9.6 | 74 | 0.4 | 0.4 |
| SWM Pond | 6609 | 17.8 | 74 | 0.88 | 0.88 |
| Lot Level | 6610 | 6.1 | 74 | 0.85 | 0.85 |

# APPENDIX C
# VO2 Results Summary

**Post-development Peak Flows for Catchment 5901**

| Storm Event | Area (ha) | Uncontrolled Post-Development Peak Flow ($m^3/s$) | Controlled Post-Development Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
|---|---|---|---|---|
| 2 | 36.2 | 1.773 | 0.244 | 9,700 |
| 5 | 36.2 | 2.324 | 0.367 | 12,500 |
| 10 | 36.2 | 2.698 | 0.451 | 14,300 |
| 25 | 36.2 | 3.169 | 0.568 | 16,700 |
| 50 | 36.2 | 3.519 | 0.656 | 18,700 |
| 100 | 36.2 | 3.87 | 0.737 | 20,100 |

**Post-development Peak Flows for Catchment 5902**

| Storm Event | Area (ha) | Uncontrolled Post-Development Peak Flow ($m^3/s$) | Controlled Post-Development Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
|---|---|---|---|---|
| 2 | 33.1 | 1.665 | 0.224 | 9,200 |
| 5 | 33.1 | 2.175 | 0.342 | 11,800 |
| 10 | 33.1 | 2.519 | 0.415 | 13,500 |
| 25 | 33.1 | 2.953 | 0.528 | 15,700 |
| 50 | 33.1 | 3.275 | 0.619 | 17,200 |
| 100 | 33.1 | 3.598 | 0.699 | 18,800 |

**Post-development Peak Flows for Catchment 5903**

| Storm Event | Area (ha) | Uncontrolled Post-Development Peak Flow ($m^3/s$) | Controlled Post-Development Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
|---|---|---|---|---|
| 2 | 35.3 | 1.741 | 0.235 | 9,600 |
| 5 | 35.3 | 2.280 | 0.346 | 12,400 |
| 10 | 35.3 | 2.645 | 0.440 | 14,100 |
| 25 | 35.3 | 3.105 | 0.550 | 16,400 |
| 50 | 35.3 | 3.447 | 0.646 | 18,100 |
| 100 | 35.3 | 3.790 | 0.727 | 19,700 |

**Post-development Peak Flows for Catchment 5904**

| Storm Event | Area (ha) | Uncontrolled Post-Development Peak Flow ($m^3/s$) | Controlled Post-Development Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
|---|---|---|---|---|
| 2 | 36.4 | 1.807 | 0.240 | 10,000 |
| 5 | 36.4 | 2.365 | 0.357 | 12,900 |
| 10 | 36.4 | 2.742 | 0.456 | 14,700 |
| 25 | 36.4 | 3.217 | 0.572 | 17,000 |
| 50 | 36.4 | 3.570 | 0.657 | 18,800 |
| 100 | 36.4 | 3.924 | 0.752 | 20,500 |

**Post-development Peak Flows for Catchment 5905**

| Storm Event | Area (ha) | Uncontrolled Post-Development Peak Flow ($m^3/s$) | Controlled Post-Development Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
|---|---|---|---|---|
| 2 | 48.5 | 2.424 | 0.315 | 13,500 |
| 5 | 48.5 | 3.169 | 0.475 | 17,300 |
| 10 | 48.5 | 3.672 | 0.584 | 19,800 |
| 25 | 48.5 | 4.307 | 0.743 | 23,000 |
| 50 | 48.5 | 4.778 | 0.861 | 25,300 |
| 100 | 48.5 | 5.250 | 0.981 | 27,600 |

**Post-development Peak Flows for Catchment 5906**

| Storm Event | Area (ha) | Uncontrolled Post-Development Peak Flow ($m^3/s$) | Controlled Post-Development Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
|---|---|---|---|---|
| 2 | 13.3 | 0.647 | 0.096 | 3,500 |
| 5 | 13.3 | 0.849 | 0.144 | 4,500 |
| 10 | 13.3 | 0.986 | 0.178 | 5,100 |
| 25 | 13.3 | 1.159 | 0.226 | 6,000 |
| 50 | 13.3 | 1.287 | 0.264 | 6,600 |
| 100 | 13.3 | 1.416 | 0.299 | 7,200 |

**Post-development Peak Flows for Catchment 5907**

| Storm Event | Area (ha) | Uncontrolled Post-Development Peak Flow ($m^3/s$) | Controlled Post-Development Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
|---|---|---|---|---|
| 2 | 9.7 | 0.490 | 0.069 | 2,700 |
| 5 | 9.7 | 0.640 | 0.111 | 3,400 |
| 10 | 9.7 | 0.741 | 0.138 | 3,900 |
| 25 | 9.7 | 0.869 | 0.171 | 4,500 |
| 50 | 9.7 | 0.964 | 0.205 | 4,900 |
| 100 | 9.7 | 1.059 | 0.232 | 5,400 |

**Post-development Peak Flows for Catchments 6001, 6501, 6502, 6002**

| Storm Event | Area (ha) | Uncontrolled Post-Development Peak Flow ($m^3/s$) | Controlled Post-Development Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
|---|---|---|---|---|
| 2 | 17.8 | 0.881 | 0.140 | 4,600 |
| 5 | 17.8 | 1.153 | 0.220 | 6,000 |
| 10 | 17.8 | 1.337 | 0.265 | 6,800 |
| 25 | 17.8 | 1.570 | 0.337 | 7,900 |
| 50 | 17.8 | 1.742 | 0.398 | 8,600 |
| 100 | 17.8 | 1.915 | 0.448 | 9,400 |

**Post-development Peak Flows for Catchment 5908**

| Storm Event | Area (ha) | Uncontrolled Post-Development Peak Flow ($m^3/s$) | Controlled Post-Development Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
|---|---|---|---|---|
| 2 | 7.7 | 0.374 | 0.058 | 2,000 |
| 5 | 7.7 | 0.491 | 0.087 | 2,600 |
| 10 | 7.7 | 0.570 | 0.108 | 2,900 |
| 25 | 7.7 | 0.670 | 0.135 | 3,400 |
| 50 | 7.7 | 0.744 | 0.160 | 3,700 |
| 100 | 7.7 | 0.819 | 0.186 | 4,100 |

**Post-development Peak Flows for Catchment 6003**

| Storm Event | Area (ha) | Uncontrolled Post-Development Peak Flow ($m^3/s$) | Controlled Post-Development Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
|---|---|---|---|---|
| 2 | 50.4 | 2.536 | 0.335 | 14,100 |
| 5 | 50.4 | 3.312 | 0.513 | 18,000 |
| 10 | 50.4 | 3.836 | 0.631 | 20,600 |
| 25 | 50.4 | 4.497 | 0.792 | 23,900 |
| 50 | 50.4 | 4.987 | 0.926 | 26,300 |
| 100 | 50.4 | 5.478 | 1.048 | 28,700 |

**Post-development Peak Flows for Catchment 5909**

| Storm Event | Area (ha) | Uncontrolled Post-Development Peak Flow ($m^3/s$) | Controlled Post-Development Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
|---|---|---|---|---|
| 2 | 47.3 | 2.364 | 0.301 | 13,300 |
| 5 | 47.3 | 3.091 | 0.460 | 17,000 |
| 10 | 47.3 | 3.581 | 0.571 | 19,400 |
| 25 | 47.3 | 4.200 | 0.724 | 22,500 |
| 50 | 47.3 | 4.660 | 0.837 | 24,700 |
| 100 | 47.3 | 5.120 | 0.959 | 27,000 |

**Post-development Peak Flows for Catchment 6004**

| Storm Event | Area (ha) | Uncontrolled Post-Development Peak Flow ($m^3/s$) | Controlled Post-Development Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
|---|---|---|---|---|
| 2 | 13.6 | 0.684 | 0.110 | 3,600 |
| 5 | 13.6 | 0.894 | 0.158 | 4,700 |
| 10 | 13.6 | 1.035 | 0.194 | 5,400 |
| 25 | 13.6 | 1.213 | 0.242 | 6,200 |
| 50 | 13.6 | 1.346 | 0.283 | 6,800 |
| 100 | 13.6 | 1.478 | 0.322 | 7,400 |

**Post-development Peak Flows for Catchment 6005**

| Storm Event | Area (ha) | Uncontrolled Post-Development Peak Flow ($m^3/s$) | Controlled Post-Development Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
|---|---|---|---|---|
| 2 | 5.7 | 0.287 | 0.047 | 1,500 |
| 5 | 5.7 | 0.375 | 0.069 | 1,900 |
| 10 | 5.7 | 0.434 | 0.085 | 2,200 |
| 25 | 5.7 | 0.509 | 0.109 | 2,600 |
| 50 | 5.7 | 0.564 | 0.131 | 2,800 |
| 100 | 5.7 | 0.620 | 0.145 | 3,100 |

**Post-development Peak Flows for Catchment 6006**

| Storm Event | Area (ha) | Uncontrolled Post-Development Peak Flow ($m^3/s$) | Controlled Post-Development Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
|---|---|---|---|---|
| 2 | 20.4 | 1.013 | 0.149 | 5,500 |
| 5 | 20.4 | 1.325 | 0.229 | 7,000 |
| 10 | 20.4 | 1.537 | 0.279 | 8,000 |
| 25 | 20.4 | 1.803 | 0.355 | 9,300 |
| 50 | 20.4 | 2.001 | 0.409 | 10,200 |
| 100 | 20.4 | 2.199 | 0.465 | 11,100 |

**Post-development Peak Flows for Catchment 6007, 6008**

| Storm Event | Area (ha) | Uncontrolled Post-Development Peak Flow ($m^3/s$) | Controlled Post-Development Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
|---|---|---|---|---|
| 2 | 8.7 | 0.430 | 0.069 | 2,300 |
| 5 | 8.7 | 0.563 | 0.112 | 2,900 |
| 10 | 8.7 | 0.653 | 0.139 | 3,300 |
| 25 | 8.7 | 0.766 | 0.175 | 3,800 |
| 50 | 8.7 | 0.851 | 0.202 | 4,200 |
| 100 | 8.7 | 0.935 | 0.227 | 4,500 |

**Post-development Peak Flows for Catchment 6503, 6504, 6009**

| Storm Event | Area (ha) | Uncontrolled Post-Development Peak Flow ($m^3/s$) | Controlled Post-Development Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
|---|---|---|---|---|
| 2 | 12.7 | 0.639 | 0.102 | 3,400 |
| 5 | 12.7 | 0.835 | 0.163 | 4,300 |
| 10 | 12.7 | 0.967 | 0.196 | 4,900 |
| 25 | 12.7 | 1.133 | 0.250 | 5,700 |
| 50 | 12.7 | 1.257 | 0.289 | 6,200 |
| 100 | 12.7 | 1.380 | 0.331 | 6,800 |

**Post-development Peak Flows for Catchment 6505**

| Storm Event | Area (ha) | Uncontrolled Post-Development Peak Flow ($m^3/s$) | Controlled Post-Development Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
|---|---|---|---|---|
| 2 | 16.8 | 0.845 | 0.125 | 4,600 |
| 5 | 16.8 | 1.104 | 0.189 | 5,800 |
| 10 | 16.8 | 1.279 | 0.232 | 6,700 |
| 25 | 16.8 | 1.499 | 0.295 | 7,800 |
| 50 | 16.8 | 1.662 | 0.348 | 8,500 |
| 100 | 16.8 | 1.826 | 0.391 | 9,300 |

**Post-development Peak Flows for Catchment 6506**

| Storm Event | Area (ha) | Uncontrolled Post-Development Peak Flow ($m^3/s$) | Controlled Post-Development Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
|---|---|---|---|---|
| 2 | 11.1 | 0.559 | 0.085 | 3,000 |
| 5 | 11.1 | 0.729 | 0.129 | 3,800 |
| 10 | 11.1 | 0.845 | 0.158 | 4,400 |
| 25 | 11.1 | 0.990 | 0.203 | 5,100 |
| 50 | 11.1 | 1.098 | 0.237 | 5,600 |
| 100 | 11.1 | 1.206 | 0.267 | 6,100 |

**Post-development Peak Flows for Catchment 6601**

| Storm Event | Area (ha) | Uncontrolled Post-Development Peak Flow ($m^3/s$) | Controlled Post-Development Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
|---|---|---|---|---|
| 2 | 5.7 | 0.287 | 0.047 | 1,500 |
| 5 | 5.7 | 0.375 | 0.069 | 1,900 |
| 10 | 5.7 | 0.434 | 0.085 | 2,200 |
| 25 | 5.7 | 0.509 | 0.109 | 2,600 |
| 50 | 5.7 | 0.564 | 0.131 | 2,800 |
| 100 | 5.7 | 0.620 | 0.145 | 3,100 |

**Post-development Peak Flows for Catchment 6602**

| Storm Event | Area (ha) | Uncontrolled Post-Development Peak Flow ($m^3/s$) | Controlled Post-Development Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
|---|---|---|---|---|
| 2 | 17.3 | 0.859 | 0.125 | 4,600 |
| 5 | 17.3 | 1.124 | 0.194 | 5,900 |
| 10 | 17.3 | 1.303 | 0.239 | 6,800 |
| 25 | 17.3 | 1.529 | 0.305 | 7,900 |
| 50 | 17.3 | 1.697 | 0.354 | 8,700 |
| 100 | 17.3 | 1.865 | 0.399 | 9,400 |

**Post-development Peak Flows for Catchment 6603**

| Storm Event | Area (ha) | Uncontrolled Post-Development Peak Flow ($m^3/s$) | Controlled Post-Development Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
|---|---|---|---|---|
| 2 | 38.1 | 1.892 | 0.259 | 10,400 |
| 5 | 38.1 | 2.475 | 0.400 | 13,300 |
| 10 | 38.1 | 2.870 | 0.491 | 15,200 |
| 25 | 38.1 | 3.367 | 0.614 | 17,700 |
| 50 | 38.1 | 3.737 | 0.719 | 19,400 |
| 100 | 38.1 | 4.108 | 0.813 | 21,200 |

**Post-development Peak Flows for Catchment 6604, 6605**

| Storm Event | Area (ha) | Uncontrolled Post-Development Peak Flow ($m^3/s$) | Controlled Post-Development Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
|---|---|---|---|---|
| 2 | 10.6 | 0.516 | 0.087 | 2,700 |
| 5 | 10.6 | 0.677 | 0.131 | 3,400 |
| 10 | 10.6 | 0.786 | 0.163 | 3,900 |
| 25 | 10.6 | 0.924 | 0.206 | 4,600 |
| 50 | 10.6 | 1.026 | 0.238 | 5,000 |
| 100 | 10.6 | 1.129 | 0.272 | 5,500 |

**Post-development Peak Flows for Catchment 6606**

| Storm Event | Area (ha) | Uncontrolled Post-Development Peak Flow ($m^3/s$) | Controlled Post-Development Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
|---|---|---|---|---|
| 2 | 20.6 | 1.023 | 0.147 | 5,500 |
| 5 | 20.6 | 1.338 | 0.230 | 9,100 |
| 10 | 20.6 | 1.552 | 0.285 | 8,100 |
| 25 | 20.6 | 1.821 | 0.358 | 9,400 |
| 50 | 20.6 | 2.020 | 0.419 | 10,300 |
| 100 | 20.6 | 2.221 | 0.470 | 11,300 |

**Post-development Peak Flows for Catchment 6607**

| Storm Event | Area (ha) | Uncontrolled Post-Development Peak Flow ($m^3/s$) | Controlled Post-Development Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
|---|---|---|---|---|
| 2 | 22.9 | 1.137 | 0.165 | 6,200 |
| 5 | 22.9 | 1.488 | 0.253 | 7,900 |
| 10 | 22.9 | 1.725 | 0.310 | 9,000 |
| 25 | 22.9 | 2.024 | 0.392 | 10,500 |
| 50 | 22.9 | 2.246 | 0.459 | 11,500 |
| 100 | 22.9 | 2.469 | 0.516 | 12,600 |

**Post-development Peak Flows for Catchment 6608**

| Storm Event | Area (ha) | Uncontrolled Post-Development Peak Flow ($m^3/s$) | Controlled Post-Development Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
|---|---|---|---|---|
| 2 | 9.6 | 0.322 | 0.038 | 1,700 |
| 5 | 9.6 | 0.449 | 0.061 | 2,300 |
| 10 | 9.6 | 0.539 | 0.073 | 2,700 |
| 25 | 9.6 | 0.655 | 0.094 | 3,200 |
| 50 | 9.6 | 0.743 | 0.110 | 3,600 |
| 100 | 9.6 | 0.833 | 0.125 | 4,100 |

**Post-development Peak Flows for Catchment 6609**

| Storm Event | Area (ha) | Uncontrolled Post-Development Peak Flow ($m^3/s$) | Controlled Post-Development Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
|---|---|---|---|---|
| 2 | 17.8 | 0.884 | 0.127 | 4,800 |
| 5 | 17.8 | 1.156 | 0.199 | 6,100 |
| 10 | 17.8 | 1.341 | 0.245 | 7,000 |
| 25 | 17.8 | 1.573 | 0.310 | 8,100 |
| 50 | 17.8 | 1.746 | 0.367 | 8,900 |
| 100 | 17.8 | 1.919 | 0.414 | 9,700 |

**Post-development Peak Flows for Catchment 6610**

| Storm Event | Area (ha) | Uncontrolled Post-Development Peak Flow ($m^3/s$) | Controlled Post-Development Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
|---|---|---|---|---|
| 2 | 6.1 | 0.297 | 0.048 | 1,500 |
| 5 | 6.1 | 0.389 | 0.076 | 2,000 |
| 10 | 6.1 | 0.452 | 0.093 | 2,300 |
| 25 | 6.1 | 0.531 | 0.115 | 2,600 |
| 50 | 6.1 | 0.590 | 0.138 | 2,900 |
| 100 | 6.1 | 0.650 | 0.154 | 3,200 |

# FUNCTIONAL STORMWATER MANAGEMENT PLANS

## Kleinburg / Nashville Development Area

# Table of Contents

## LIST OF FIGURES



## LIST OF TABLES



## LIST OF APPENDICES

# 1.0 Background

## 1.1. Study Area

The Kleinburg-Nashville Secondary Plan Area consists of three (3) separate communities located in Blocks 55 and 62 in the City of Vaughan (the City). The location of the Secondary Plan Area is shown on **Figure 1-1**.

The study area bounded by the Canadian Pacific Railway (CPR) line to the north and east, Huntington Road to the west, and Nashville Road to the south will be referred to as the Village of Nashville herein. The study area bounded by Huntington Road to the west, CPR to the south, a tributary to the Humber River to the east and Kirby Road to the north will be referred to as Huntington Road Community herein. The study area bounded a tributary to the Humber River to the west, Kirby Road to the north, Kipling Avenue to the east and open area to the south will be referred to as Kipling Avenue Community herein. The existing conditions for each area will be discussed in the following sections.

## 1.2. Existing Development and Storm Drainage

### 1.2.1. Village of Nashville

The majority of the Village of Nashville is still used for agriculture, primarily pasture. Existing development within the Village of Nashville consists of single family residential homes fronting onto Nashville Road and Huntington Road. Currently, flow from the Village of Nashville is conveyed overland to roadside ditches along Nashville Road, Huntington Road, and the CPR ditch. Ultimately, all flows discharge to Rainbow Creek. There are no existing storm sewers. The pre-development drainage area plan is illustrated on **Figure 1-2**.

### 1.2.2. Huntington Road Community

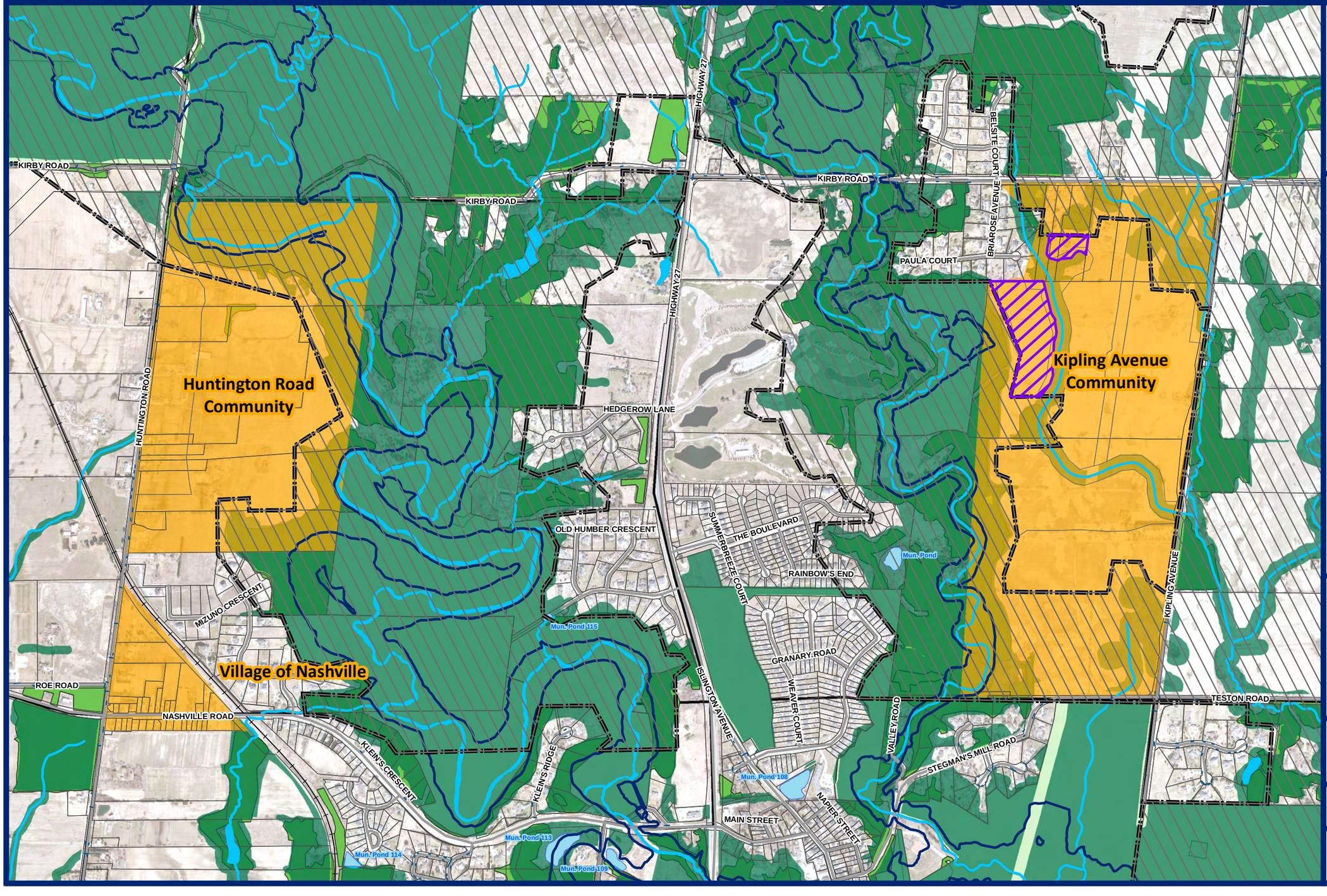
Existing development within the Huntington Road Community consists of single family residential homes fronting onto Huntington Road, north of the CPR. There are no existing storm sewers in the area. Currently, flow from the Huntington Community flows overland to either Rainbow Creek to the west or the Main Humber to the east. The pre-development drainage area plan is illustrated on **Figure 1-2**.

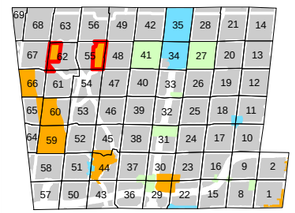
### 1.2.3. Kipling Avenue Community

Existing development within the Kipling Avenue Community consists mostly of undeveloped lands. There are no existing storm sewers within the Kipling Avenue Community. Flow from the site generally discharges to the east and south.

Currently, there are no stormwater management (SWM) practices in place to provide quality, quantity or erosion control to the site. The existing topography of the site has a general slope towards the west and conveys stormwater by overland flow to the adjacent watercourse. The pre-development drainage area plans are provided as **Figure 1-3**.

# Location Plan | Kleinburg-Nashville




## Legend

- Special Study Area
- Green Belt Plan Area
- Secondary Plan Area
- TRCA Existing Floodlines
- Watercourse
- Existing SWM Pond
- Natural Areas
- TRCA Property
- Forested Area

VAUGHAN

COLE ENGINEERING
Experience Enhancing Excellence

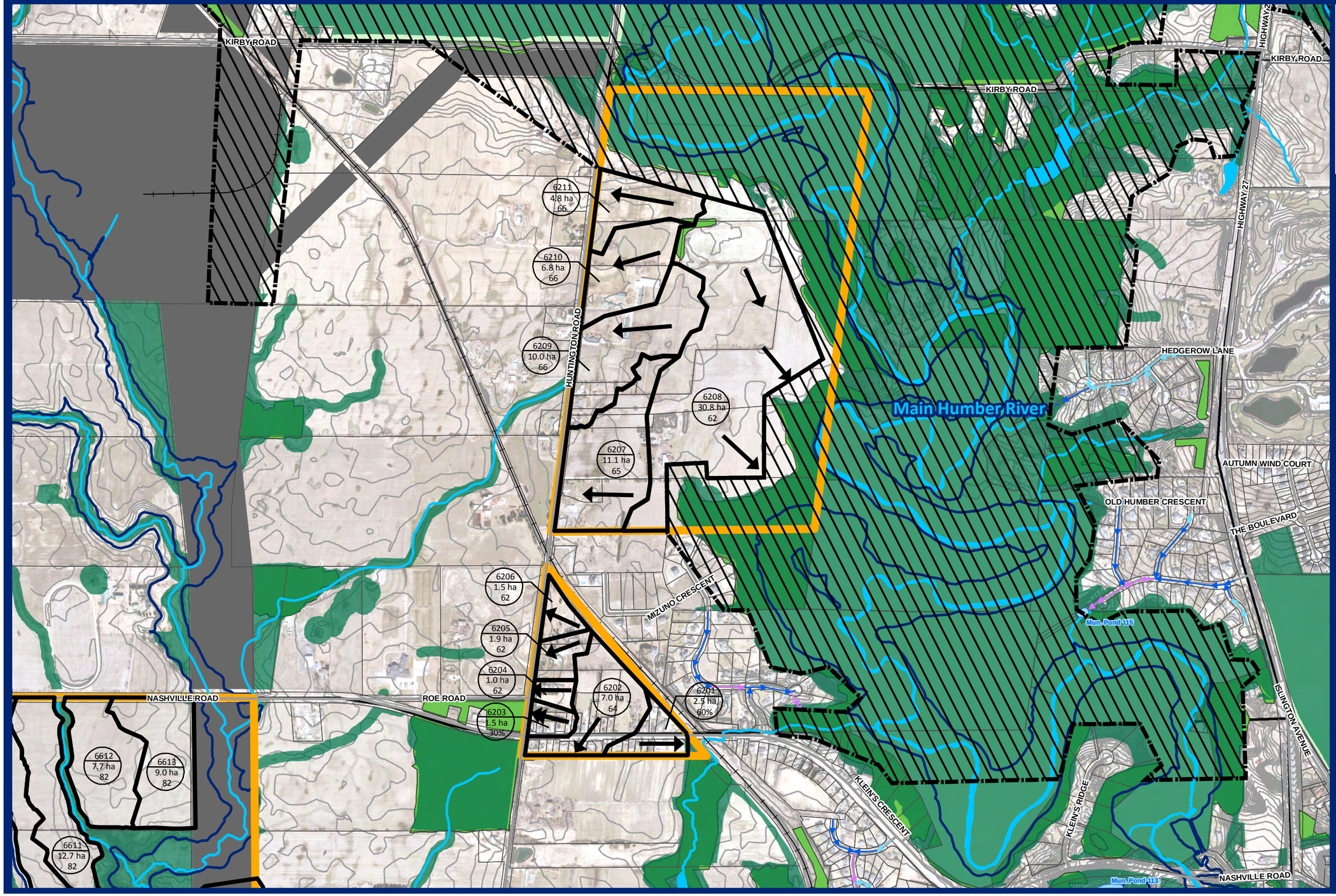
**Kleinburg-Nashville Functional SWM Plan**
November 2013

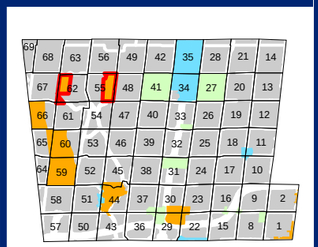
Location Plan

SCALE 1:15,000
0 50 100 200 300 400 Meters

FIGURE
**1-1**

# Existing Conditions Drainage Area Plan | Kleinburg-Nashville




## Legend

- Green Belt Plan Area
- TRCA Existing Floodlines
- Watercourse
- Existing and Approved SWM Ponds
- Natural Areas
- TRCA Property
- Forested Area
- Infrastructure and Utilities

**Storm Sewers**

**Diameter (mm)**

- 0 - 375
- 375 - 600
- 600 - 1200
- 1200 - 3660

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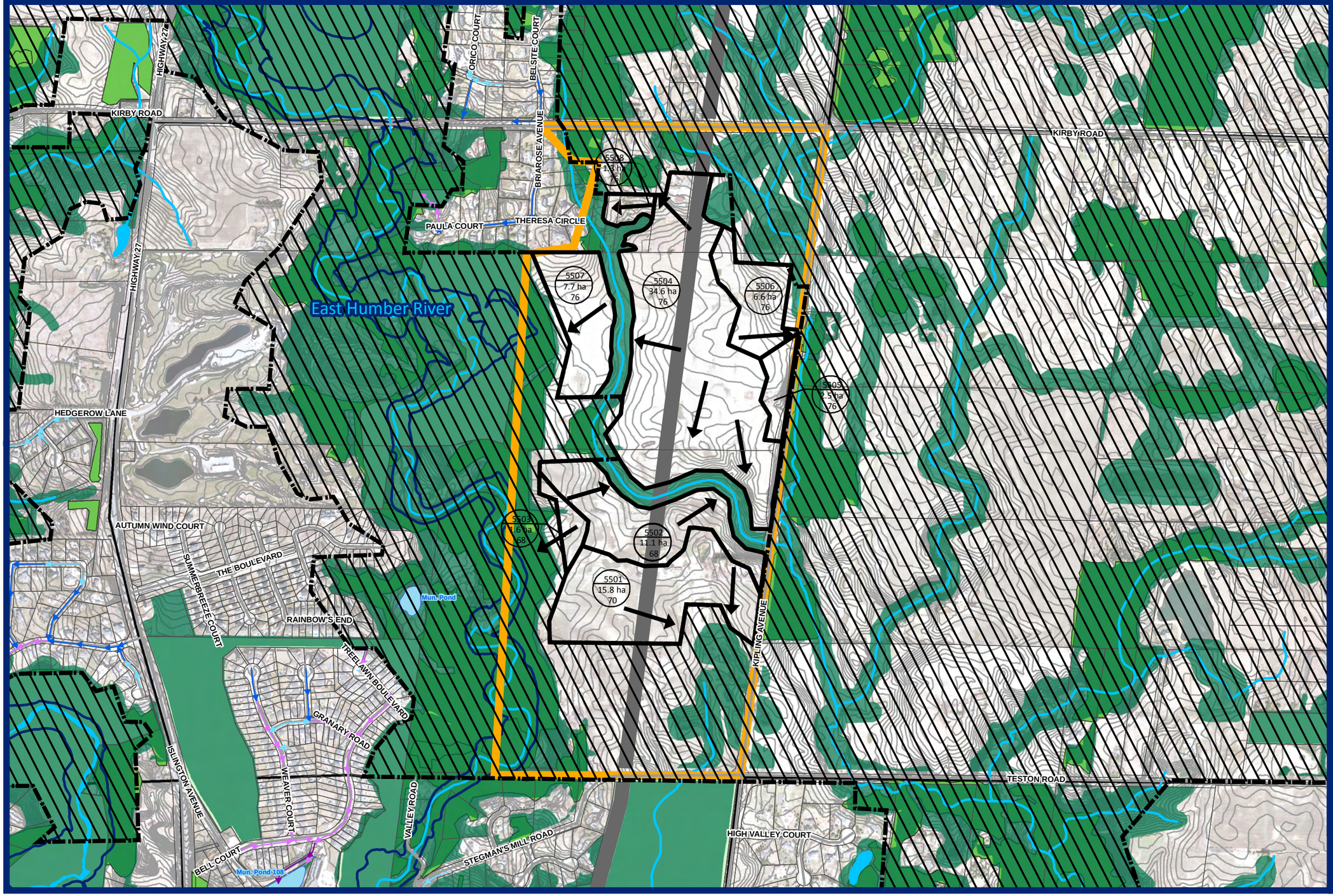
**Kleinburg-Nashville Functional SWM Plan**
November 2013

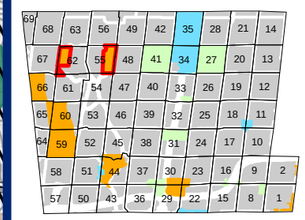
Existing Conditions Drainage Area Plan

SCALE 1:12,000
0 40 80 160 240 320 Meters

FIGURE
**1-2**

# Existing Conditions Drainage Area Plan | Kleinburg-Nashville



## Legend

- Green Belt Plan Area
- TRCA Existing Floodline
- Watercourse
- Existing and Approved SWM Ponds
- Natural Areas
- TRCA Property
- Forested Area
- Infrastructure and Utilities

**Storm Sewers**

**Diameter (mm)**

- 0 - 375
- 375 - 600
- 600 - 1200
- 1200 - 3660

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**Kleinburg-Nashville Functional SWM Plan**
November 2013

Existing Conditions Drainage Area Plan

SCALE 1:12,000
0 40 80 160 240 320 Meters

FIGURE **1-3**

## 1.3. Existing Reports

In preparing this report, the following reports are referenced:

- Stormwater Management Planning (SWMP) and Design Manual, Ministry of the Environment (MOE), 2003;
- Design Criteria and Standard Drawings (CVDC), City Engineering Department, March 2004;
- City-Wide Drainage and SWM Criteria Study, Clarifica Inc., August 2009;
- Rainbow Creek Master Drainage Plan, Cosburn Patterson Wardman Ltd., December 1989;
- Humber River Watershed Hydrology Update, Aquafor Beech Ltd., November 2002;
- Official Plan (OP), City of Vaughan, September 2010;
- North Kleinburg-Nashville: Secondary Plan, The Planning Partnership, September 2010;
- SWM Criteria, Toronto and Region Conservation Authority (TRCA), August 2012;
- Master Environmental and Servicing Plan: Nashville Heights, Schaeffers Consulting Engineers, December 2010; and,
- Rainbow Creek Update Study (DRAFT), Cole Engineering, January 2013.

## 1.4. Proposed Major and Minor Storm Drainage Systems

The design of all proposed major storm drainage system will be based on the City's Standard Guidelines and will adhere to the following design considerations:

- All storm events greater than a 5-year return storm will be conveyed by predefined overland flow routes within the road allowances or through walkways and easements. Continuity of overland flow routes from external developments / areas will be maintained;
- The City's maximum velocities and depths of flow for the major overland flow systems will not be exceeded and the maximum depth of ponding will be the lesser of 0.20 m above the crown of road or the water level up to the right-of-way limit; and,
- Emergency overland flow routes will be designed to ensure an effective means of safe conveyance of stormwater away from buildings and property during major storms and in the event of an unforeseen underground sewer blockage.

### 1.4.1. Village of Nashville

The proposed minor storm sewer system will be designed to convey the 5-year storm event. Surface runoff along the proposed roads will be conveyed via a roadside curb and gutter system and captured by a series of street catchbasins that are directed into the piped sewer system. It is noted that the Village of Nashville is included as an external area in the Block 61 Master Environmental and Servicing Plan report (Block 61 Report) dated December 2009 by Schaeffers Consulting Engineers. As such, the piped sewer system will outlet to the future storm sewer system within Block 61 and ultimately controlled by SWM Pond 2 of the Block 61 Report. Drainage to the east contributes to a minor wetland area, to which flows must be maintained during proposed conditions.

### 1.4.2. Huntington Road Community

The proposed minor storm sewer system will be designed to convey the 5-year storm event. Surface runoff along the proposed roads will be conveyed via a roadside curb and gutter system and captured by a series of street catchbasins that are directed into the piped sewer system. The piped sewer system will outlet to the proposed stormwater management facilities (SWMF) within the Huntington Road Community and ultimately discharge to the Main Humber River or to Rainbow Creek. The drainage divide is shown in **Figure 1-2**.

### 1.4.3. Kipling Avenue Community

The proposed minor storm sewer system will be designed to convey the 5-year storm event. Surface runoff along the proposed roads will be conveyed via a roadside curb and gutter system and captured by a series of street catchbasins that are directed into the piped sewer system. The piped sewer system will outlet to the proposed SWMF within the Kipling Avenue Community and ultimately discharge to two (2) unnamed tributaries of the East Humber River.

# 2.0 Stormwater Management

The proposed development should meet Province of Ontario standards as set out in the MOE 2003 SWMP and Design Manual, standards set by the City, and the TRCA. It is noted that the Village of Nashville is adjacent to the CPR and as such may require input from CPR. However, flows from the Village of Nashville are not proposed to discharge to the CPR system and therefore should not be an issue.

## 2.1. Stormwater Management Criteria

General SWM criteria to be applied to this site are as follows:

- **Erosion Control**: Provide minimum 5 mm on-site retention for all storm events;
- **Quality Control**: Stormwater is to be treated to enhanced protection levels as defined in the MOE SWMP and Design Manual (2003); and,
- **Water Balance**: Best efforts to maintain existing water balance is expected.

Quantity control criteria will vary depending on the receiving watercourse:

- Sites discharging to the main branch of the East or Main Humber River requires no quantity control;
- Sites discharging to Rainbow Creek are to control post-development peak flow rates to the pre-development TRCA unit flow rate targets for Sub-basin 36; and,
- Sites discharging east across Kipling Avenue to a tributary of the East Humber River are to control post-development peak flow rates to the pre-development TRCA unit flow rate targets for Sub-basin 19A.

A map showing the Humber River Sub-basins and their unit flow rate equations is located in **Appendix A**

To encourage the use of sustainable development technologies, all agencies recommend the use of Best Management Practices (BMPs). A feasibility analysis of BMP strategies recommended for the site is discussed in **Section 3.0** of this report. The use of these BMPs will assist in meeting SWM requirements.

## 2.2. Village of Nashville

### 2.2.1. Existing Hydrologic Conditions

The majority of the Village of Nashville is still used for agriculture, primarily pasture. Existing development within the Village of Nashville consists of single family residential homes fronting onto Nashville Road and Huntington Road. The Village of Nashville site drains to three (3) separate locations. As illustrated on **Figure 1-2**, Catchment Areas 6203, 6204, 6205 and 6206 drain towards four (4) existing culverts along Huntington Road while Areas 6202 drains south to Block 61, and 6201 drains east along the CPR ditch to an area designated as a wetland by the TRCA.

### 2.2.2. Target Flows

Under developed conditions the drainage divide in the Village of Nashville will be maintained. Drainage Area 6201b will continue to drain to the wetland area in order to maintain the hydrologic cycle of this protected area. Runoff from this area must meet existing conditions. The target flow rates for Area 6201b were calculated using Visual OTTHYMO v2.4 (VO2). The following design parameters were used for the VO2 model:

- **Soils**: The soil in this area consists of primarily Brighton sandy loam and pasture with some row crops. Confirmation of the soil type and corresponding curve number values must be provided during detailed design;
- **Curve Number**: The curve number value is based off the Ontario Soils Map and Ministry of Transportation (MTO) Design Charts 1.08 and 1.09, which can be found in **Appendix B**; and,
- Bases on existing development it was estimated that the total imperviousness is 60% (TIMP) and a directly connected imperviousness of 60% (XIMP).

Target peak flows for Area 6201b are listed below in **Table 2.1**. A model schematic for the Kleinburg-Nashville Secondary Plan Area pre-development model is located in **Appendix C**, a copy of the pre-development VO2 model can be found on the CD included with this report.

**Table 2.1 – Target Flows for Area 6201b**

| Storm Event (yr) | Allowable Peak Flow ($m^3/s$) |
|---|---|
| 2 | 0.093 |
| 5 | 0.125 |
| 10 | 0.148 |
| 25 | 0.177 |
| 50 | 0.199 |
| 100 | 0.222 |

Runoff from the remaining area will drain south to the proposed pond within Block 61. The Village of Nashville site must conform to the Block 61 Report for quantity and quality control. The Block 61 Report assumes that the Village of Nashville will discharge to SWM Pond 2 within Block 61. As flow is being diverted from the watercourses west of Huntington Road (south of the CPR) it is recommended that an ecological study be completed to verify that flow is not required west of the Village of Nashville.

Target flows for the remaining area were taken from the *Master Environmental and Servicing Plan: Nashville Heights*, Schaeffers Consulting Engineers, December 2010. Below in **Table 2.2** summarizes the target flows for the Village of Nashville.

**Table 2.2 – Target Flows for Area 6201a**

| Storm Event (yr) | Allowable Peak Flow ($m^3/s$) |
|---|---|
| 2 | 0.488 |
| 5 | 0.700 |
| 10 | 0.830 |
| 25 | 1.083 |
| 50 | 1.234 |
| 100 | 1.388 |

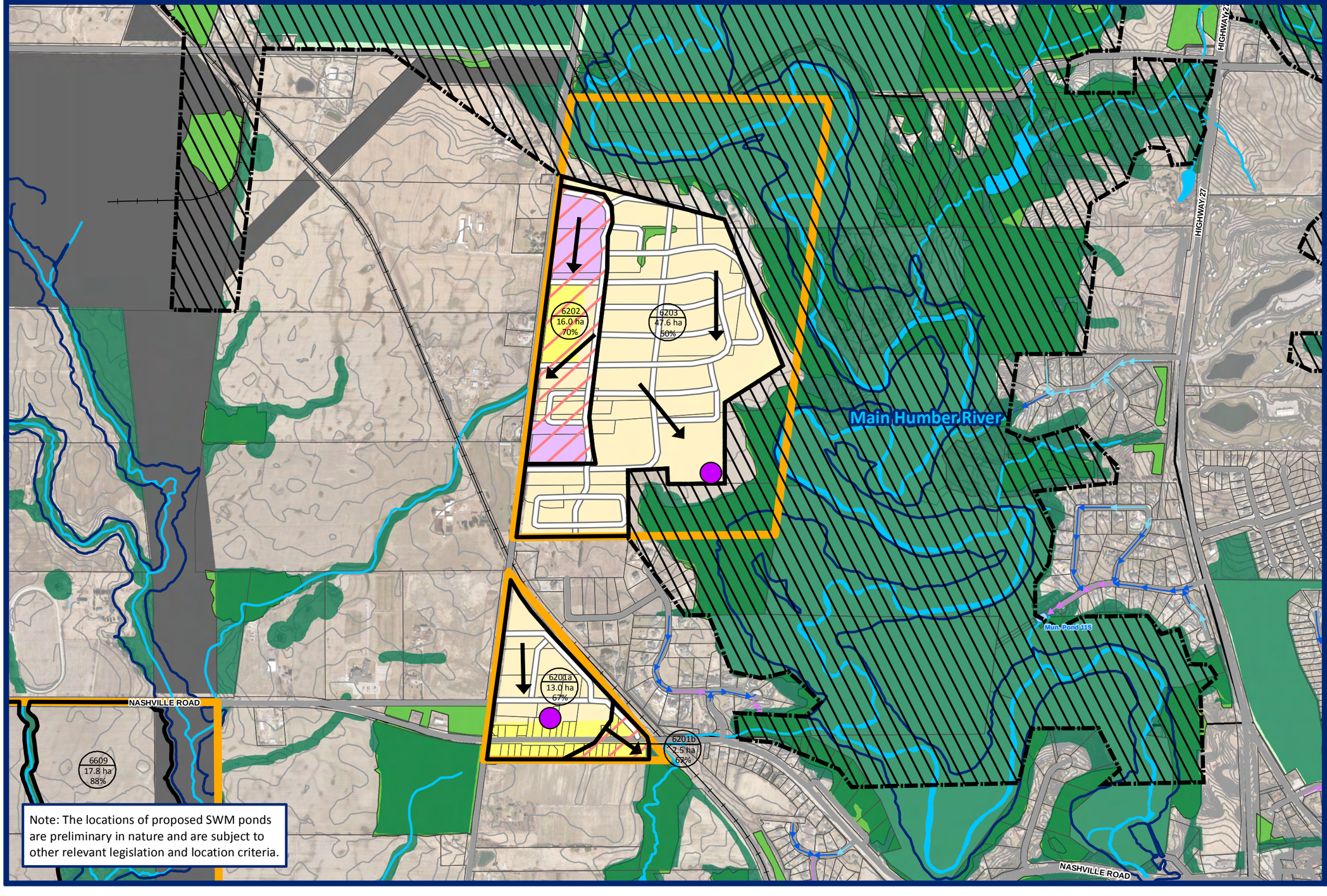
### 2.2.3. Proposed Hydrologic Conditions

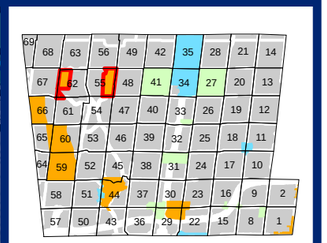
The Secondary Plan for the Village of Nashville shows development as primarily low-rise residential with low-rise mixed use development along Nashville Road. Individual drainage areas and outlet locations change from pre-development to post-development as some drainage areas have been combined to account for redirecting proposed drainage to the SWM pond. The proposed drainage areas are described below in **Table 2.3** and shown in **Figure 2-1**.

**Table 2.3 – Post-Development Drainage Areas**

| Pre-Development Catchment Name | Pre-Development Drainage Area (ha) | Post-Development Catchment Name | Post-Development Drainage Area (ha) | Drain to Proposed SWM Pond |
|---|---|---|---|---|
| 6202 | 7.1 | 6201a | 13.0 | Yes |
| 6203 | 1.4 | | | |
| 6204 | 1.0 | | | |
| 6205 | 1.9 | | | |
| 6206 | 1.5 | | | |
| 6201b | 2.5 | 6201b | 2.5 | No |

# Post-Development Drainage Area Plan | Kleinburg-Nashville




## Legend

- Green Belt Plan Area
- TRCA Existing Floodlines
- Watercourse
- Existing and Approved SWM Ponds
- Proposed SWM Ponds
- Areas with Lot Level Controls
- Proposed Roads
- Natural Areas
- TRCA Property
- Forested Area
- Infrastructure and Utilities

**Proposed Land Use**

- Parks
- Private Open Spaces
- Low-Rise Residential
- Low-Rise Mixed Use
- Schools

**Storm Sewers**

**Diameter (mm)**

- 0 - 375
- 375 - 600
- 600 - 1200
- 1200 - 3660

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November 2013

Post-Development Drainage Area Plan

SCALE 1:12,000
0 37.5 75 150 225 300 Meters

FIGURE **2-1**

### 2.2.4. Stormwater Quantity Control

Quantity control for the site will be provided by a combination of the active storage of a SWM pond and onsite controls. VO2 was used to size the active storage required to control post-development peak runoff rates to the approved runoff rates for the 12-hour AES storm.

The following design parameters were used for the VO2 model:

- **Soils**: The soil in this area consists of primarily Brighton sandy loam and pasture with some row crops. Confirmation of the soil type and corresponding curve number values must be provided during detailed design.
- **Curve Number**: The curve number value is based off the Ontario Soils Map and MTO Design Charts 1.08 and 1.09, which can be found in **Appendix B**.
- It is assumed that the development within the Village of Nashville will consist of an average imperviousness of 67% (TIMP) and a directly connected imperviousness of 67% (XIMP).

Existing conditions flow rates were used to size the onsite controls for lands draining to the west. Allowable release rates to Pond 2, in Black 61, were used to size the SWMF for areas draining to the south. The input parameters for the STANDHYD commands are shown below in **Table 2.4**.

**Table 2.4 – Post-Development Input Parameters (STANDHYD Commands)**

| Catchment | Drainage Area (ha) | XIMP | TIMP | CN | Drain to SWM Pond |
|---|---|---|---|---|---|
| 6201a | 13.0 | 0.67 | 0.67 | 70 | Yes |
| 6201b | 2.5 | 0.67 | 0.67 | 70 | No |

Storm data for the 2 to 100-year 12-hour AES storms were analysed to calculate the required quantity control storage. Model results, including required storage volumes, are shown below in **Table 2.5**. A model schematic for the Kleinburg-Nashville Secondary Plan Area post-development model (**Table 2.6**) is located in **Appendix C,** a copy of the post-development VO2 model can be found on the CD included with this report.

**Table 2.5 – Post-Development Model Results for Area 6201a (12-Hour AES Storms)**

| Storm Event | Post-Development Peak Flow ($m^3/s$) | Target Peak Flow ($m^3/s$) | VO2 Storage Required ($m^3$) |
|---|---|---|---|
| 2 | 0.486 | 0.488 | 500 |
| 5 | 0.683 | 0.700 | 600 |
| 10 | 0.791 | 0.830 | 700 |
| 25 | 0.959 | 1.083 | 700 |
| 50 | 1.074 | 1.234 | 700 |
| 100 | 1.257 | 1.388 | 700 |

**Table 2.6 – Post-Development Model Results for Area 6201b (12-Hour AES Storms)**

| Storm Event | Post-Development Peak Flow ($m^3/s$) | Target Peak Flow ($m^3/s$) | VO2 Storage Required ($m^3$) |
|---|---|---|---|
| 2 | 0.093 | 0.093 | 100 |
| 5 | 0.125 | 0.125 | 100 |
| 10 | 0.139 | 0.148 | 200 |
| 25 | 0.174 | 0.177 | 200 |
| 50 | 0.192 | 0.199 | 200 |
| 100 | 0.215 | 0.222 | 300 |

The storage volume shown is the amount required to match allowable peak flows through any proposed combination of SWM pond or onsite storage. The site is predominantly residential properties with no rooftop or parking lot storage capacity, therefore storage in a SWM pond likely is the most feasible option.

The allowable release rates to the Block 61 SWM Pond 2 to the south may change through the course of Block Plan approvals and detailed design. The designer should consult the most recent Block 61 SWM Report by Schaeffers Consulting Engineers to ascertain the exact allowable release rates from the site which the SWM Pond 2 has been designed to accommodate. The total storage volume required for areas draining to the Block 61 Pond 2 is approximately 700 $m^3$. This storage volume can be accommodated through the use of a SWM pond or onsite storage controls.

Alternatively, quantity control for the Village of Nashville may be accommodated in the Block 61 Pond 2, provided the downstream system has the capacity to convey uncontrolled runoff to the pond. Consolidation of the two (2) ponds would likely reduce the total capital and maintenance costs associated with the ponds. It is recommended that the option of retrofitting SWM Pond 2 in Block 61 to support the proposed development in the Village of Nashville be examined during detailed design.

If, during consultation with the City, the TRCA, and the Block 61 landowner, it is found that a separate pond for Village of Nashville is preferred to a retrofit, then the proposed pond must provide control to reduce the post-development peak flows to those identified in the most recent Block 61 Pond 2 design.

It is noted that the pond is slightly oversized. The VO2 model assumes all areas contributing to the ponds do not have onsite controls and all quantity controls are provided by the pond. Supporting calculations are to be provided during detailed design, if an alternative approach is presented, which would meet the quantity control requirements set by the TRCA. As such, some refinements to the SWM pond block may result through detailed design.

As a controlled pond outlet structure would be required, a concrete structure with multiple weirs and orifices is proposed to control the outflow from the pond. Weir and orifice sizes shall be determined during detailed design.

The area draining to the wetland is not large enough to support a SWM pond. For this area a dry pond or onsite storage is recommended in order to provide quantity control. The TRCA should be consulted prior to designing this area in order to establish specific requirements for runoff to the wetland.

### 2.2.5. Stormwater Quality Control

Stormwater treatment must meet Enhanced Protection Criteria as defined by the MOE SWMP and Design Manual (2003). Quality control for the proposed development can be provided by wet ponds (for Area) or a combination of oil / grit separator (OGS) structures and other approved alternative methods. If the SWM pond for the area is to be a wet pond, the minimum permanent pool volume shall be sized according to calculations outlined in Table 3.2 of the MOE SWMP and Design Manual (2003), to achieve an enhanced level protection for the proposed site conditions. **Table 2.7** below presents the quality sizing for a wet pond to provide quality controls. The proposed site catchments that do not drain to a SWM wet pond must be treated by other approved stormwater quality treatment methods to achieve enhanced level protection. Alternative stormwater quality control practices must be proven to satisfy the MOE requirement of Enhanced Level (80% TSS removal) treatment. OGSs and other mechanical treatment facilities must be sized to the manufacturer's specifications and be part of a treatment train approach for SWM.

**Table 2.7 – Post-Development Quality Control Sizing**

| Catchment | Drainage Area (ha) | TIMP | Permanent Pool Volume ($m^3$) | Detention Volume ($m^3$) | Sediment Loading ($m^3$/yr) | SWMP Cleanout Frequency (yrs) |
|---|---|---|---|---|---|---|
| 6201a | 13.0 | 70.0% | 2,405 | 520 | 36.4 | 11 |

It is recommended that quality treatment for Catchment 6201a be provided by a wet pond, as a SWM pond is proposed as the most feasible options for quantity control. Should quantity control be provided through a retrofit of Pond 2 in Block 61 it is recommended that the pond be analyzed for quality treatment capacity in order to consolidate SWM works. This may require some retrofitting of the permanent pool, forebay and outlet structure for Pond 2.

Catchment 6201b must outlet to the wetland located to the southeast of the site; however, a SWM pond would not be practical for such a small area. It is recommended that an OGS be implemented as part of an integrated treatment train approach for quality treatment of runoff discharging to the southeast corner of the site from Catchment 6201b.

### 2.2.6. Erosion Controls

Erosion control criteria for sites outletting to the Rainbow Creek Watershed are taken from the Draft Rainbow Creek Update Study (Volume III of this Report). The criteria is for 5 mm onsite retention and not extended detention in SWMF. However, the TRCA must be contacted to discern if a more detailed erosion assessment is required for the downstream watercourse.

Methods for achieving 5 mm onsite retention for the residential sites include, but are not limited to, rain gardens, infiltration basins / swales, cisterns, etc. Commercial and institutional sites may also use rooftop storage to evaporation, pervious depression storage, as well as the methods recommended for residential sites.

The extra storage volumes required for erosion control are not included in the quantity control volume, and would therefore, be in addition to the storage volumes listed in **Table 2.5** and **Table 2.6**.

### 2.2.7. Water Balance

Currently, the village of Nashville consists of a single road, on which fronts a series of open residential lots, while the remainder of the area consists of agricultural lands. Future development in this area will be low-rise residential and low-rise mixed use, increasing the impervious area as described in **Section 2.2.3**.

Water balance calculations were done to determine the infiltration deficit and increase in runoff volume caused by the proposed development of the Village of Nashville. An increase in impervious surface equates to a decrease in infiltration, and could be balanced by on-site infiltration controls to match post-development infiltration volumes to existing levels. Increasing the impervious surface also increase the volume of runoff from the site, this can be balanced by retaining and reusing water on site. The TRCA requires the retention of 5 mm of every rainfall event as a minimum criteria for erosion control. This onsite retention can be through infiltration or reusing water and can contribute to maintaining the overall water balance for a site.

Water balance for the Village of Nashville was calculated using the Thornthwaite and Mather Water Balance Method, outlined in Chapter 3 of the MOE's SWMP and Design Manual. The water balance method estimates yearly evapotranspiration, infiltration, and runoff volumes based on soil types, vegetation cover, topography, and annual precipitation. The results from the water balance analysis are summarized below in **Table 2.8**.

**Table 2.8 – Water Balance Analysis for Village of Nashville**

| | Existing Water Balance | | Post-development Water Balance | | Post-development with 5 mm additional infiltration | |
|---|---|---|---|---|---|---|
| | **Pervious Area** | **Impervious Area** | **Pervious Area** | **Impervious Area** | **Pervious Area** | **Impervious Area** |
| Area (ha) | 12.15 | 3.25 | 4.7 | 10.705 | 4.7 | 10.705 |
| Precipitation (mm)* | 940 | 940 | 940 | 940 | 940 | 940 |
| ET (mm)** | 530 | 329 | 520 | 329 | 520 | 329 |
| Surplus (mm) | 410 | 611 | 420 | 611 | 420 | 611 |
| Total Infiltration (mm) | 287 | 0 | 294 | 0 | 294 | 0 |
| Total Runoff (mm) | 123 | 611 | 126 | 611 | 126 | 611 |
| 5 mm onsite retention | | | | | 34,265 | |
| | | | **Total** | **Change in Volume** | **Total** | **Change in Volume** |
| Runoff ($m^3$) | **34,802** | | **71,330** | **36,528** | **37,065** | **2,263** |
| Evapotranspiration ($m^3$) | **75,088** | | **59,659** | **-15,429** | **59,659** | **-15,429** |
| Infiltration ($m^3$) | **34,871** | | **13,818** | **-21,053** | **48,083** | **13,212** |

*The yearly precipitation data used in the water balance analysis was obtained from the National Climate Data and Information Archive for Woodbridge, the nearest weather station.
**Evapotranspiration is assumed to be 35% of precipitation for residential areas, as per the *Low-Impact Development Design Strategies: An Integrated Design Approach, Prince George's County, Maryland (1999).*

Water balance calculations indicate that with the 5 mm of onsite retention an additional 2,263 $m^3$/year of onsite retention must be provided within the Village of Nashville after development, in order to match existing runoff volumes from the site. The results also show that infiltration of 5 mm of rainfall under post-development conditions will increase annual infiltration by 13,212 $m^3$ when compared to existing conditions.

Due to the well-draining soil within the Village of Nashville, infiltration measures can be utilized to mitigate the water balance deficit created through development of the site. It may be possible to combine the erosion control criteria to serve a dual purpose of reducing erosion potential and promoting infiltration. As previously mentioned, the TRCA requires a minimum of 5 mm on-site retention of runoff from all storm events. It is proposed that the first 5 mm of rainfall be directed to infiltration controls, which would reduce the erosion potential as well as improve the water balance of the site. During the detailed design stage, geotechnical investigations will be required along with consultation with the TRCA to refine the site specific water balance requirements.

## 2.3. Huntington Road Community

### 2.3.1. Existing Hydrologic Conditions

The Huntington Road community consists of single family residential homes with no current SWM controls for water quantity or quality. The Huntington Road Community drains to five (5) separate discharge points. As illustrated on **Figure 1-2**, Catchment Areas 6207, 6209, 6210 and 6211 drain west to Rainbow Creek through four (4) existing culverts along Huntington Road while Area 6208 drains east to the Main Humber River.

### 2.3.2. Target Flow Rates

The target flow rates for future development shall follow the guidelines set by the SWM Criteria Document (TRCA, 2012). The target stormwater quantity control release rate criteria are ultimately dependant upon the existing drainage outlet location and specific sub-basin. The catchments outletting to the Huntington Road culverts currently discharge to the Rainbow Creek Subwatershed. Future development in the Plan Area that will continue to discharge to the Rainbow Creek Subwatershed will have to control post-development peak flows to Sub-basin 36 unit flow rates. Catchment 6208 discharges directly overland into the Humber River as part of Sub-basin 13, which does not require quantity controls. The future development outlet target flow rates are provided in **Table 2.9**. A map showing the Humber River Sub-basins and their unit flow rate equations is located in **Appendix A**.

**Table 2.9 – Site Outlet Target Flow Rates**

| Outlet Location | Catchment | Area (ha) | Quantity Control Criteria | Peak Flow ($m^3/s$) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 2-year | 5-year | 10-year | 25-year | 50-year | 100-year |
| Huntington Road / Rainbow Creek | 6207 | 10.0 | Unit Flow Rate | 0.229 | 0.350 | 0.431 | 0.606 | 0.631 | 0.714 |
| | 6209 | 6.8 | | | | | | | |
| | 6210 | 4.8 | | | | | | | |
| | 6211 | 11.1 | | | | | | | |
| Humber River | 6208 | 30.8 | No Controls | n/a | n/a | n/a | n/a | n/a | n/a |

### 2.3.3. Proposed Hydrologic Conditions

Under developed conditions the Huntington Road community is divided into two (2) catchment areas, Catchment 6202 represents the drainage to the east, consisting of residential, institutional and commercial developments. Drainage from 6202 will discharge to the culverts at Huntington Road, ultimately contributing to the Rainbow Creek Subwatershed. Catchment 6203 will consist of mostly residential lots draining east, discharging directly to the Main Humber River.

Individual drainage areas and outlet locations change from existing to post-development conditions. Most of Area 6207 and part of 6209, 6210, 6211 Area diverted to the east, draining to the Main Humber River. The proposed drainage areas are described below in **Table 2.10** and shown in **Figure 2-1**.

**Table 2.10 – Post-Development Drainage Areas**

| Outlet | Pre-Development | | Post-Development | |
|---|---|---|---|---|
| | Catchment Name | Drainage Area (ha) | Catchment Name | Drainage Area (ha) |
| Rainbow Creek | 6207,6209, 6210, 6211 | 32.7 | 6202 | 15.6 |
| Main Humber River | 6208 | 30.8 | 6203 | 48.0 |

Catchment 6202 represents the drainage to the west, consisting of mixed-use of residential, institutional and commercial. Drainage from 6202 will discharge to the culverts at Huntington Road, ultimately contributing to the Rainbow Creek Subwatershed. Catchment 6203 will consist of mostly residential lots draining east, discharging directly to the Main Humber River.

During development of the Huntington Road Secondary Plan community, existing drainage patterns on adjacent properties will not be altered and stormwater runoff from the development will not be directed to drain onto adjacent properties. Refer to the post-development drainage area **Figure 2-1**.

### 2.3.4. Stormwater Quantity Control

Drainage discharging east to the Main Humber River, as part of Sub-basin 13, does not require quantity controls of the 2 to 100-year storms. Quantity control for Area 6202, which drains to Rainbow Creek, will be provided by onsite controls. VO2 was used to size the active storage required to control post-development peak runoff rates to the unit flow rates for the 12-hour AES storm.

The following design parameters were used for the VO2 model:

- The soil in this area consists of primarily Brighton sandy loam and pasture with some row crops. Confirmation of the soil type and corresponding curve number values must be provided during detailed design;
- The curve number value is based off the Ontario Soils Map and MTO Design Charts 1.08 and 1.09, provided in **Appendix B**; and,
- Values for percent imperviousness of the site were based on the City's Standard Guidelines for single family residential dwellings. The imperviousness is calculated assuming a runoff coefficient of 0.20 for pervious areas and 0.90 for impervious areas.

Unit flow rates for Rainbow Creek, Sub-basin 36, were used to size the onsite controls for lands draining to the west. The input parameters for the STANDHYD commands are shown below in **Table 2.11**.

**Table 2.11 – Post-Development Input Parameters (STANDHYD Commands)**

| Catchment | Drainage Area (ha) | XIMP | TIMP | CN | Drain to SWM Pond |
|---|---|---|---|---|---|
| 6202 | 15.6 | 70.0% | 70.0% | 66 | Yes |
| 6203 | 48.0 | 50.0% | 50.0% | 62 | No |

Post development controls are required for catchments draining west to Huntington Road, as described in **Section 2.1**. The storage required to meet target flow rates for Catchment 6202 are shown below in **Table 2.12**. A model schematic for the Kleinburg-Nashville Secondary Plan Area Post-Development Model is located in **Appendix C,** a copy of the Post-Development VO2 Model can be found on the CD included with this report.

**Table 2.12 – Post-Development Quantity Control Sizing for Catchment 6202**

| Storm Event | Controlled Post-Development Peak Flow ($m^3/s$) | Target Peak Flow ($m^3/s$) | VO2 Storage Required ($m^3$) |
|---|---|---|---|
| 2 year | 0.225 | 0.229 | 2,600 |
| 5 year | 0.339 | 0.350 | 3,300 |
| 10 year | 0.418 | 0.431 | 3,800 |
| 25 year | 0.604 | 0.606 | 4,400 |
| 50 year | 0.625 | 0.631 | 4,900 |
| 100 year | 0.700 | 0.714 | 5,300 |

The flow rate and storage volumes shown for this catchment are designed to control runoff to the unit flow rates for Sub-basin 36. Storage for onsite controls can be attained through the use of a combination of rooftop, parking lot and underground storage. There is no storage required for Catchment 6203 as the runoff discharges directly to the Main Humber River, which does not require any quantity control.

The storage volumes provided are estimates only and include the storage required for the regulatory storms (2 to 100-year, 12-hour AES). The SWM storage requirements and control methods may be refined through detailed design. If an alternative approach is proposed for quantity control supporting calculations are to be provided showing that the approach meets quantity control requirements set by the TRCA.

### 2.3.5. Stormwater Quality Control

Stormwater treatment must meet Enhanced Protection Criteria as defined by the MOE SWMP and Design Manual (2003). Quality control for the proposed development can be provided by wet ponds or a combination of OGS structures and other approved alternative methods.

For Area 6203 it is recommended that water quality protection be provided by a wet pond sized according to calculations outlined in Table 3.2 of the MOE SWMP and Design Manual (2003), to achieve enhanced level protection for the proposed site conditions. **Table 2.13** below presents the quality sizing for a wet pond for Area 6203. Although no quantity control is required for this area it is recommended that a wet pond be provided for water quality and erosion control. The proposed development is mostly low-rise residential with urban streets, which does not offer many opportunities for alternative methods of water quality protection.

**Table 2.13 – Post-Development Quality Control Sizing**

| Catchment | Drainage Area (ha) | TIMP | Permanent Pool Volume ($m^3$) | Detention Volume ($m^3$) | Sediment Loading ($m^3$/yr) | SWMP Cleanout Frequency (yrs) |
|---|---|---|---|---|---|---|
| 6203 | 48.0 | 50.0% | 6,592 | 1,920 | 76.8 | 14 |

The proposed site catchments that do not drain to a SWM wet pond must be treated by other approved stormwater quality treatment methods to achieve enhanced level protection. The quality control sizing presented above is based on the use of a SWM pond; however, other treatment methods may be proposed if they are proven to satisfy the MOE requirement of Enhanced Level (80% TSS removal) treatment.

It is recommended that quality treatment for Catchments 6202 use OGSs as part of an integrated treatment train approach for water quality protection. For smaller catchments OGS units are generally less expensive than a SWM pond, specifically for operational and maintenance costs. Catchment 6202 also consists of valuable lands that border Huntington Road, which would be better utilized as development rather than a SWM block. OGSs and other mechanical treatment facilities must be sized to the manufacturer's specifications.

### 2.3.6. Erosion Controls

Erosion control criteria for sites outletting to the Rainbow Creek Watershed are taken from the Draft Rainbow Creek Update Study (Volume III of this Report). The criteria is for 5 mm onsite retention and no extended detention in SWMF. However, the TRCA must be contacted to discern if an erosion assessment is required for the downstream watercourse.

For catchments outletting to the Main Humber River, erosion control criteria are outlined in the TRCA SWM Criteria (2012). For the catchments draining to the SWM ponds, extended detention of the 25 mm 4-hour Chicago Storm for a minimum of 24 hours is required. However, the TRCA must be contacted to discern if an erosion assessment is required for the downstream watercourse, in which case a detention time of 48 hours or more may be required.

It is required by the TRCA that all catchments provide onsite retention of a minimum of the first 5 mm of all storms. Methods for achieving 5 mm onsite retention for the residential sites include rain gardens, infiltration basins / swales, cisterns, etc. Commercial and institutional sites may also use rooftop storage-to-evaporation; pervious depression storage and water re-use for irrigation or gray water systems.

The extra storage volumes required for erosion control are not included in the volume requirements presented in quantity control section above, and would therefore be in addition and above such storage volumes.

### 2.3.7. Water Balance

Existing conditions within the Huntington Road Community consists of mostly farmland and pasture with several residential dwellings. Future development in this area will be mostly residential subdivisions, with some commercial lots along Huntington Road and some institutional lands (school), as described in **Section 2.3.3**.

Water balance calculations were done to determine the infiltration deficit and increase in runoff volume caused by the proposed development of the Huntington Road Community. An increase in impervious surface equates to a decrease in infiltration, and could be balanced by on-site infiltration controls to match post-development infiltration volumes to existing levels. Increasing the impervious surface also increase the volume of runoff from the site, this can be balanced by retaining and reusing water on site. The TRCA requires the retention of 5 mm of every rainfall event as minimum criteria for erosion control. This onsite retention can be through infiltration or reusing water and can contribute to maintaining the overall water balance for a site.

Water balance for the Huntington Road Community was calculated using the Thornthwaite and Mather Water Balance Method, outlined in Chapter 3 of the MOE's SWMP and Design Manual (2003). The water balance method estimates yearly evapotranspiration, infiltration, and runoff volumes based on soil types, vegetation cover, topography, and annual precipitation. Refer to the MOE SWMP and Design Manual outlining the water balance method.

The results from the existing and post-development water balance analysis are summarized below in **Table 2.14**.

**Table 2.14 – Water Balance Analysis for Huntington Road Community**

| | Existing Water Balance | | Post-development Water Balance | | Post-development with 5 mm additional infiltration | |
|---|---|---|---|---|---|---|
| | **Pervious Area** | **Impervious Area** | **Pervious Area** | **Impervious Area** | **Pervious Area** | **Impervious Area** |
| Area (ha) | 60.325 | 3.175 | 28.74 | 34.764 | 28.74 | 34.764 |
| Precipitation (mm)* | 940 | 940 | 940 | 940 | 940 | 940 |
| ET (mm)** | 525 | 329 | 520 | 329 | 520 | 329 |
| Surplus (mm) | 415 | 611 | 420 | 611 | 420 | 611 |
| Total Infiltration (mm) | 291 | 0 | 294 | 0 | 294 | 0 |
| Total Runoff (mm) | 125 | 611 | 126 | 611 | 126 | 611 |
| Onsite retention (mm) | | | | | 223 | 223 |
| | | | **Total** | **Change in Volume** | **Total** | **Change in Volume** |
| Onsite Retention ($m^3$) | N/A | | N/A | | 141,288 | |
| **Runoff ($m^3$)** | **94,806** | | **248,620** | **+153,815** | **107,332** | **+12,526** |
| **Evapotranspiration ($m^3$)** | **327,152** | | **263,822** | **-63,330** | **263,822** | **-63,330** |
| **Infiltration ($m^3$)** | **175,546** | | **84,496** | **-91,050** | **225,784** | **+50,238** |

*The yearly precipitation data used in the water balance analysis was obtained from the National Climate Data and Information Archive for Woodbridge, the nearest weather station.
**Evapotranspiration is assumed to be 35% of precipitation for residential areas, as per the *Low-Impact Development Design Strategies: An Integrated Design Approach, Prince George's County, Maryland (1999).*

Water balance calculations indicate that infiltrating the full 5 mm of onsite retention will result in a 29% increase in infiltration and a 13% reduction of runoff volume when compared to existing conditions. Due to the well-draining soil within the Huntington Road Community, infiltration measures can be utilized to mitigate the water balance deficit created through development of the site. It may be possible to combine the erosion control criteria to serve a dual purpose of reducing erosion potential and promoting infiltration. As previously mentioned, the TRCA requires a minimum of 5 mm on-site retention of runoff from all storm events. It is proposed that the first 5 mm of rainfall be directed to infiltration controls, which would reduce the erosion potential as well as improve the water balance of the site. During the detailed design stage, geotechnical investigations will be required along with consultation with the TRCA to refine the site specific water balance requirements.

## 2.4. Kipling Avenue Community

### 2.4.1. Existing Hydrologic Conditions

Currently the Kipling Avenue Community consists of agricultural lands with open, cultivated fields and no SWM controls for water quantity or quality. The majority of the Kipling Avenue Community site drains to two (2) separate tributaries of the East Humber River, with two (2) small areas draining west and south to the East Humber River. As illustrated on **Figure 1-3**, Catchment Areas 5502, 5504, 5507 and 5508 drain to an intermittent swale that crosses the site to the east and outlets through an existing culvert under Kipling Avenue. Catchment Area 5501 drains south to an existing culvert crossing Teston Road, and Area 5503 drains directly west into the East Humber River. Catchments 5505 and 5506 drain east to a roadside ditch along Kipling Avenue, flow then passed under Kipling Avenue through an existing culvert to the east roadside ditch which outlets to a tributary of the East Humber River.

### 2.4.2. Target Flow Rates

Runoff from the site discharges to either the East Humber River or to a Tributary of the East Humber River. Catchment discharging directly to the East Humber River are part of Sub-basin 18 and do not require quantity controls, as outlined in the DRAFT SWM Criteria Document (TRCA, 2012). Catchments currently discharging to the Kipling Avenue ditch and to the intermittent channel which crosses the site ultimately outlet to a tributary of the East Humber River are part of Sub-basin 19. Future developments in Sub-basin 19A are to be controlled to Sub-basin 19A unit flow rates.

A map showing the Humber River Sub-basins and their unit flow rate equations is located in **Appendix A**. **Table 2.15** below describes the pre-development target flows.

**Table 2.15 – Pre-Development Target Flows**

| Outlet Location | Catchment | Area (ha) | Control Criteria | Peak Flow ($m^3/s$) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 2-year | 5-year | 10-year | 25-year | 50-year | 100-year |
| Teston Road | 5501 | 15.8 | No control | n/a | n/a | n/a | n/a | n/a | n/a |
| Intermittent Channel | 5502 | 11.1 | Unit Flow Rate | .037 | 0.060 | 0.075 | 0.095 | 0.111 | 0.129 |
| East Humber River | 5503 | 1.6 | No control | n/a | n/a | n/a | n/a | n/a | n/a |
| Intermittent Channel | 5504 | 34.6 | Unit Flow Rate | 0.119 | 0.189 | 0.238 | 0.302 | 0.354 | 0.410 |
| Kipling Road | 5505 | 2.5 | Unit Flow Rate | | | | | | |
| Kipling Road | 5506 | 6.6 | Unit Flow Rate | | | | | | |
| Intermittent Channel | 5508 | 1.3 | Unit Flow Rate | | | | | | |
| Intermittent Channel | 5507 | 7.7 | Unit Flow Rate | 0.027 | 0.044 | 0.055 | 0.069 | 0.081 | 0.094 |

The 12-hour AES storms used in the analysis were provided by the TRCA.

### 2.4.3. Proposed Hydrologic Conditions

The Kipling Avenue Community will be developed as a residential subdivision with single family homes, the drainage areas will be slightly modified due to road layouts and grading. Area 5503 will be combined with Area 5502 and Area 5504 will be divided along the Hydro Corridor. Area 5506 and 5505 will be combined with the east half of Area 5504. Catchment 5507 represents the Hydro Corridor north of the tributary, which will remain undeveloped, but will still contribute flows to the north SWM Pond. The Hydro Corridor to the south of the tributary is accounted for in the Catchment Areas of 5502, discharging to the south SWM pond. **Table 2.16** below shows the changes in the area draining to each outlet point and **Figure 2-2** shows the post-development drainage areas.

**Table 2.16 – Post-Development Drainage Areas**

| Pre-Development Catchment Name | Pre-Development Drainage Area (ha) | Post-Development Catchment Name | Post-Development Drainage Area (ha) | Drain to Proposed SWM Pond |
|---|---|---|---|---|
| 5501 | 15.8 | 5501 | 14.2 | No |
| 5502 + 5503 | 11.1 + 1.6 | 5502 | 14.3 | Yes |
| 5504 | 22.4 | 5504 | 16.8 | Yes |
| | | 5507 | 4.8 | Yes |
| | | 5503 | 22.4 | Yes |
| 5505 | 2.5 | | | |
| 5506 | 6.6 | | | |
| 5507 | 7.7 | 5505 | 7.7 | Yes |
| 5508 | 1.3 | 5506 | 1.3 | No |

During development of the Kleinburg-Nashville Secondary Plan Communities, existing drainage patterns on adjacent properties will not be altered and stormwater runoff from the development will not be directed to drain onto adjacent properties. The external drainage areas to the north, which currently contribute flows through the site, will remain unaltered and allowed to pass through the site to the culvert at Kipling Avenue Drainage from the site area will be accommodated by three (3) wet ponds located near the natural drainage outlets for the site. Refer to the post-developments drainage area **Figure 2-2**.

### 2.4.4. Stormwater Quantity Control

Quantity control for the site will be provided by three (3) wet ponds located in Catchment 5502 (South Pond), Catchment 5505 (West Pond) and Catchment 5503 (North Pond). VO2 was used to size the active storage required to control post-development peak runoff rates to the pre-development runoff rates for the 12-hour AES storm.

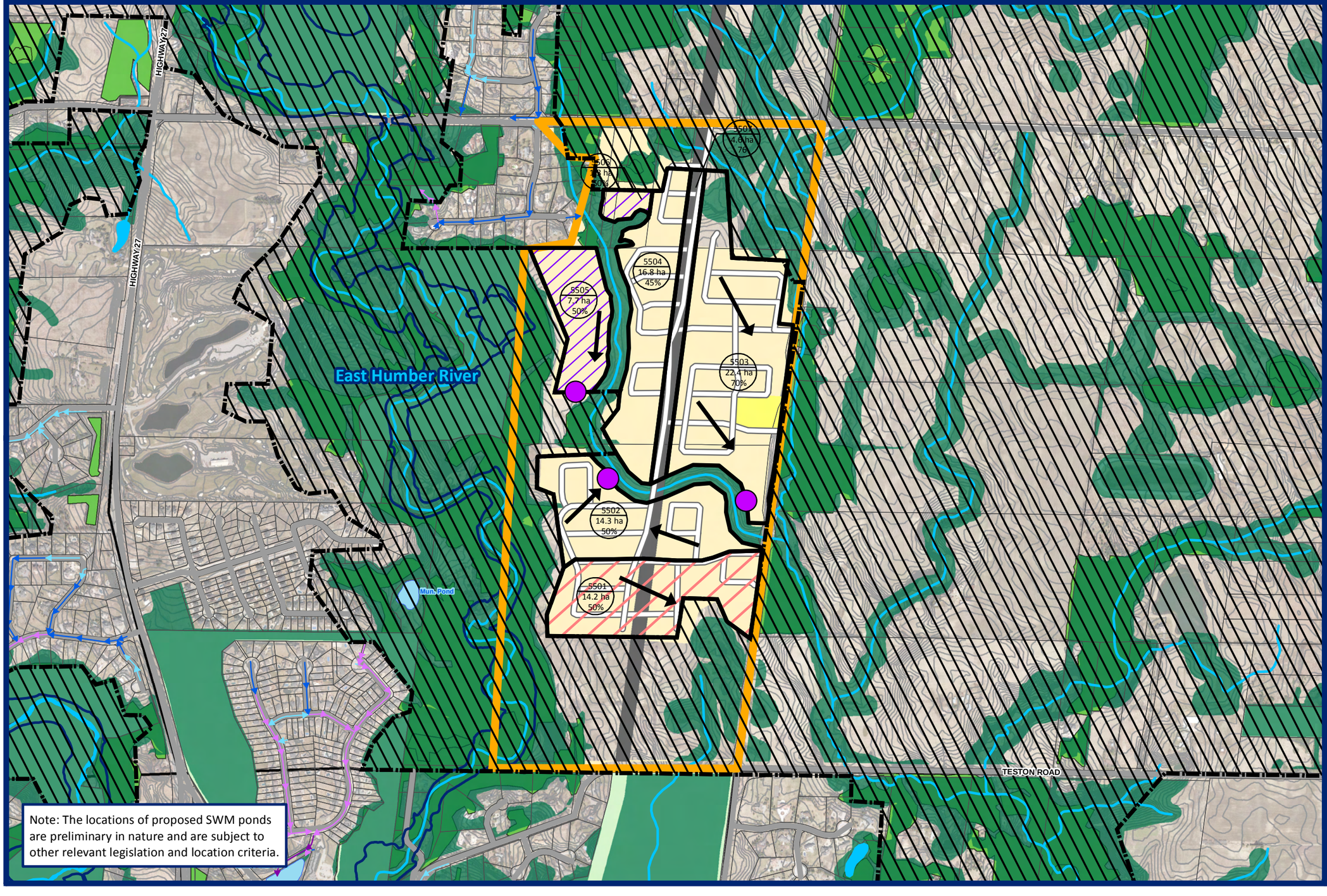
The following design parameters were used for the VO2 model:

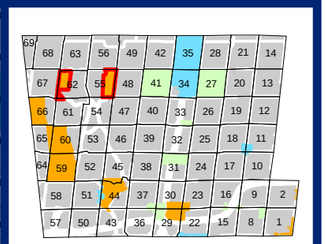
- The soils in this area mainly consist of Pontypool sandy loam with portions of the site containing King clay loam. Confirmation of the soil type and corresponding curve number values must be provided during detailed design;

- The curve number value is based off the Ontario Soils Map and MTO Design Charts 1.08 and 1.09, provided in **Appendix B**; and,
- Values for percent imperviousness of the site were based on the City's Standard Guidelines for single family residential dwellings. The imperviousness is calculated assuming a runoff coefficient of 0.20 for pervious areas and 0.90 for impervious areas.

Unit flow rates for East Humber River Sub-basin 19A, were used to size the onsite controls for lands draining to the west. The input parameters for the STANDHYD commands are shown in **Table 2.17**.

# Post-Development Drainage Area Plan | Kleinburg-Nashville



## Legend

- Green Belt Plan Area
- TRCA Existing Floodline
- Watercourse
- Special Study Area
- Existing and Approved SWM Ponds
- Proposed SWM Ponds
- Areas with Lot Level Controls
- Proposed Roads
- Natural Areas
- TRCA Property
- Forested Area
- Infrastructure and Utilities

**Proposed Land Use**

- Parks
- Private Open Spaces
- Low-Rise Residential
- Low-Rise Mixed Use

**Storm Sewers**

**Diameter (mm)**

- 0 - 375
- 375 - 600
- 600 - 1200
- 1200 - 3660

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**Kleinburg-Nashville Functional SWM Plan**
November 2013

Post-Development Drainage Area Plan

SCALE 1:12,000
0 45 90 180 270 360 Metres

FIGURE
**2-2**

Values for percent imperviousness of the site were based on the City's Standard Guidelines for single family residential dwellings. The imperviousness is calculated assuming a runoff coefficient of 0.20 for pervious areas and 0.90 for impervious areas. The input parameters for the V02 model hydrograph commands are shown below in **Table 2.17**.

**Table 2.17 – Post-Development Input Parameters (STANDHYD Commands)**

| Catchment | Drainage Area (ha) | XIMP | TIMP | CN | Drain to SWM Pond |
|---|---|---|---|---|---|
| 5501 | 14.2 | 50.0% | 50.0% | 85 | No |
| 5502 | 14.3 | 50.0% | 50.0% | 85 | South Pond |
| 5503 | 22.4 | 60.0% | 70.0% | 85 | North Pond |
| 5504 | 16.8 | 40.0% | 40.0% | 85 | North Pond |
| 5505 | 7.7 | 50.0% | 50.0% | 85 | West Pond |
| 5506 | 1.3 | 50.0% | 50.0% | 85 | No |
| 5507 | 4.8 | Tp = 0.35 | | 76 | North Pond |

Storm data for the 2 to 100-year 12-hour AES storms were analysed to calculate the required quantity control storage. Model results, including required storage volumes, are shown below in **Table 2.18**. A model schematic for the Kleinburg-Nashville Secondary Plan Area post-development model is located in **Appendix C**, a copy of the post-development VO2 model can be found on the CD included with this report.

**Table 2.18 – Post-Development Quantity Control Sizing**

| Design Event | South Pond | | | West Pond | | | North Pond | | |
|---|---|---|---|---|---|---|---|---|---|
| | Post-Dev. Peak Flow ($m^3/s$) | Target Peak Flow ($m^3/s$) | Storage Required ($m^3$) | Post-Dev. Peak Flow ($m^3/s$) | Target Peak Flow ($m^3/s$) | Storage Required ($m^3$) | Post-Dev. Peak Flow ($m^3/s$) | Target Peak Flow ($m^3/s$) | Storage Required ($m^3$) |
| 2 | 0.553 | 0.037 | 3500 | 0.300 | 0.027 | 2000 | 1.638 | 0.100 | 10000 |
| 5 | 0.763 | 0.060 | 5000 | 0.414 | 0.044 | 2600 | 2.270 | 0.170 | 1400 |
| 10 | 0.908 | 0.075 | 6000 | 0.492 | 0.055 | 3000 | 2.708 | 0.190 | 1500 |
| 25 | 1.095 | 0.095 | 7000 | 0.593 | 0.069 | 3600 | 3.269 | 0.250 | 1800 |
| 50 | 1.234 | 0.111 | 7700 | 0.668 | 0.081 | 4000 | 3.691 | 0.320 | 2100 |
| 100 | 1.375 | 0.129 | 8500 | 0.744 | 0.094 | 4500 | 4.116 | 0.380 | 2400 |

The proposed North Pond is designed to over control flows from Areas 5303 and 5304 in order to compensate for Area 5506, which drains uncontrolled to the existing drainage swale.

Drainage to the south does not require controls; therefore, it is not accounted for or included in the target flow rates or storage volumes used. The total volume used for storage attenuation of runoff to pre-development area unit flow rates for Sub-basin 19 is approximately 15 400 $m^3$, which equates to approximately 280 m3/ha.

It is suggested that the designer explore the possibility of consolidating drainage from Catchment 5505 into one of the proposed SWM ponds for the adjacent catchments, if proposed re-grading allows. Supporting calculations are to be provided during detailed design, if an alternative approach is presented, which would meet the quantity control requirements set by the TRCA. As such, some refinements to the SWM pond blocks may result through detailed design.

### 2.4.5. Stormwater Quality Control

Stormwater treatment must meet Enhanced Protection Criteria as defined by the MOE SWMP and Design Manual (2003). Quality control for the proposed development can be provided by wet ponds or a combination of OGS structures and other approved alternative methods. If SWM ponds are to be wet ponds, the minimum permanent pool volume of each pond shall be sized according to calculations outlined in Table 3.2 of the MOE SWMP and Design Manual (2003), to achieve enhanced level protection for the proposed site conditions. The proposed site catchments that do not drain to a SWM wet pond must be treated by other approved stormwater quality treatment methods to achieve enhanced level protection.

**Table 2.19** below presents the quality sizing for each catchment if proposed quality controls are to be wet SWM ponds.

**Table 2.19 – Post-Development Quality Control Sizing**

| Catchment | Drainage Area (ha) | TIMP | Permanent Pool Volume ($m^3$) | Detention Volume ($m^3$) | Sediment Loading ($m^3$/yr) | SWMP Cleanout Frequency (yrs) |
|---|---|---|---|---|---|---|
| 5501 | 14.2 | 55.0% | 2,130 | 568 | 26.98 | 13 |
| 5502 | 14.3 | 55.0% | 2,145 | 572 | 27.17 | 13 |
| 5503, 5504, 5507 | 44.0 | 55.0% | 6,600 | 1,760 | 83.60 | 13 |
| 5505 | 7.7 | 55.0% | 1,155 | 308 | 14.63 | 13 |

The quality control sizing presented above is based on the use SWM ponds; however, other treatment methods may be proposed if they are proven to satisfy the MOE requirement of Enhanced Level (80% TSS removal) treatment. OGSs and other mechanical treatment facilities must be sized to the manufacturer's specifications and be part of an integrated treatment train approach for stormwater quality control.

Area 5506 is not large enough to support a wet pond for quality control and does not require a pond for quantity control; it is therefore, recommended that water quality treatment be accomplished through the use of an OGS, as part of an integrated treatment train approach for stormwater quality control. For all other areas wet SWM ponds are recommended for quality control, as they are the most cost effective option for residential subdivisions.

### 2.4.6. Erosion Controls

Erosion control criteria are outlined in the TRCA SWM Criteria (2012). For the catchments draining to the SWM ponds, extended detention of the 25 mm 4-hour Chicago Storm for a minimum of 24 hours is required. However, the TRCA must be contacted to discern if an erosion assessment is required for the downstream watercourse, in which case a detention time of 48-hours or more may be required.

It is required by the TRCA that all catchments provide onsite retention of a minimum of the first 5 mm of all storms. Methods for achieving 5 mm onsite retention for the residential sites include rain gardens, infiltration basins / swales, cisterns, etc. Any option that prevents the first 5 mm of rainfall from leaving the site as runoff will meet the onsite retention requirement. The extra storage volumes required for the 25 mm storm and the first 5 mm of runoff are not included in the quantity control volume requirements presented in quantity control sections above, and would therefore, be in addition and above such storage volumes.

### 2.4.7. Kipling Avenue Community

Existing conditions within the Kipling Avenue Community land area consist of agricultural lands, predominately row crops. Future development indicates the area being used for residential development. The predominant soil type in the area is a mix of sandy loam and clay loam. The results from the existing and post-development water balance analysis are summarized below in **Table 2.20**.

**Table 2.20 – Water Balance Analysis for Kipling Avenue Community**

| | Existing Water Balance | | Post-development Water Balance | | Post-development with 5 mm additional infiltration | |
|---|---|---|---|---|---|---|
| | **Pervious Area** | **Impervious Area** | **Pervious Area** | **Impervious Area** | **Pervious Area** | **Impervious Area** |
| Area (ha) | 79.6 | 1.6 | 40.3 | 40.9 | 40.3 | 40.9 |
| Precipitation (mm)* | 940 | 940 | 940 | 940 | 940 | 940 |
| ET (mm)** | 543 | 329 | 515 | 329 | 515 | 329 |
| Surplus (mm) | 397 | 611 | 425 | 611 | 425 | 611 |
| Total Infiltration (mm) | 159 | 0 | 170 | 0 | 170 | 0 |
| Total Runoff (mm) | 238 | 611 | 255 | 611 | 255 | 611 |
| Onsite retention (mm) | - | - | - | - | 223 | 223 |
| | | | **Total** | **Change in Volume** | **Total** | **Change in Volume** |
| Onsite Retention ($m^3$) | N/A | | N/A | | 141,288 | |
| **Runoff (m3)** | **199,314** | | **352,806** | **153,493** | **172,136** | **-27,177** |
| **Evapotranspiration (m3)** | **437,441** | | **342,032** | **-95,409** | **342,032** | **-95,409** |
| **Infiltration (m3)** | **126,526** | | **68,442** | **-58,084** | **249,112** | **+122,586** |

*The yearly precipitation data used in the water balance analysis was obtained from the National Climate Data and Information Archive for Woodbridge, the nearest weather station.
**Evapotranspiration is assumed to be 35% of precipitation for residential areas, as per the *Low-Impact Development Design Strategies: An Integrated Design Approach, Prince George's County, Maryland (1999).*

Water balance calculations indicate that infiltrating the full 5 mm of onsite retention will result in a 96% increase in infiltration and a 14% reduction of runoff volume when compared to existing conditions. Due to the well-draining soil within the Kipling Avenue Community, infiltration measures can be utilized to mitigate the water balance deficit created through development of the site. It may be possible to combine the erosion control criteria to serve a dual purpose of reducing erosion potential and promoting infiltration. As previously mentioned, the TRCA requires a minimum of 5 mm on-site retention of runoff from all storm events. It is proposed that the first 5 mm of rainfall be directed to infiltration controls, which would reduce the erosion potential as well as improve the water balance of the site. During the detailed design stage, geotechnical investigations will be required along with consultation with the TRCA to refine the site specific water balance requirements.

# 3.0 Low Impact Development Considerations

Low impact development (LID) practices are recommended where possible in order to reduce the peak flows from a developed area. In addition, LID practices can improve water quality by developing an integrated treatment train approach on a site-specific basis. The LID practices are typically categorized as lot level, conveyance, or end-of-pipe controls.

The MOE SWMP and Design Manual (2003) suggests several LID practices for application at the lot level, in the conveyance system, or for multiple lot small drainage areas (less than 2 ha.). Potential lot level / conveyance LID practices for the development are listed below in **Table 3.1** for water quality, quantity, erosion and water balance controls.

**Table 3.1 – Lot Level / Conveyance LID Analysis**

| BMP | Primary Objective | Feasibility | Rationale |
|---|---|---|---|
| **Storage Controls** | | | |
| Rooftop Storage | Peak Flow Control | Feasible, Limited | ▪ To assist with quantity control.<br>▪ Acceptable in mixed use and school parking lots.<br>▪ Rooftop storage on single family homes is unfeasible. |
| Parking Lot Storage | Peak Flow Control | Feasible | ▪ To assist with quantity control.<br>▪ Acceptable in mixed use and school.<br>▪ Majority of area is residential with no parking lots. |
| Superpipe Storage | Peak Flow Control | Feasible | ▪ To assist with quantity control.<br>▪ May be able to integrate into storm sewers.<br>▪ Utilize space in boulevards. |
| Rear Yard Storage | Peak Flow Control | Not Feasible | ▪ Undesirable or unmanaged ponded water will not be acceptable on residential lands. |
| **Infiltration Controls** | | | |
| Reduced Lot Grading | Water Balance | Feasible | ▪ Reduced lot grading will be implemented where available.<br>▪ Lot grading must still adhere to City Standards. |
| Green Roof | Water Balance<br>Water Quantity<br>Water Quality | Feasible, Limited | ▪ Green roofs will be difficult to enforce and maintain on private residential lots.<br>▪ Can be installed on schools and commercial areas. |

| BMP | Primary Objective | Feasibility | Rationale |
|---|---|---|---|
| Direct Roof Leaders to Soakaway Pits, Cisterns, or Rain Barrels (Rainwater Harvesting) | Water Balance | Feasible | ▪ Tentative depending on site layout design.<br>▪ Dependent on neighbourhood co-operation and implementation. |
| Infiltration Trenches | Water Balance | Feasible | ▪ Recommended but dependent on site layout design and soil analysis. |
| Grassed Swales | Water Balance<br>Water Quality | Feasible | ▪ Space limitations in residential development must be considered. |
| Rain Garden | Water Balance<br>Water Quality | Feasible | ▪ Tentative depending on site layout design, space restrictions, and neighbourhood approval. |
| Pervious Pipe System | Water Balance | Possible | ▪ Tentative depending on site layout design. |

A geotechnical report is to be provided at the detailed design stage to confirm the feasibility of the BMP.

# 4.0 Conclusions and Recommendations

Development of the Kleinburg-Nashville Secondary Plan Area will result in an increase in impervious areas, thus altering existing hydrological conditions of the site. SWM measures are necessary to mitigate the negative effects of development – such as increasing runoff, decreasing runoff quality, and increasing erosion risks. The SWM plan presented for the Kleinburg-Nashville Secondary Plan Area will allow development of the Secondary Plan Area while meeting the SWM criteria for this area. The plan includes the following SWM practices:

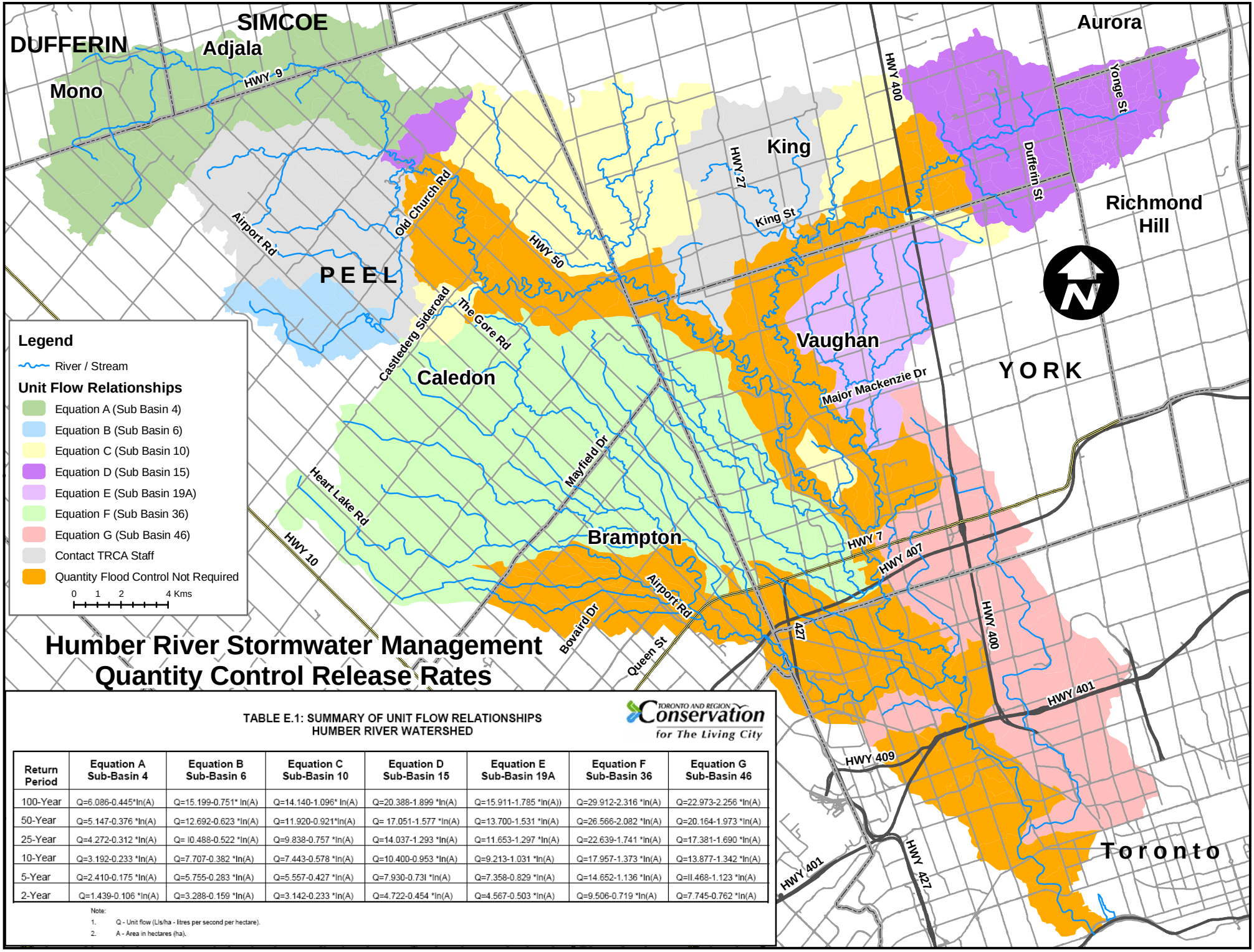
- **Quantity Control**: The following quantity control requirements should be applied:
  - Sites discharging to the main branch of the East or Main Humber River requires no quantity control;
  - Sites discharging to Rainbow Creek are to control post-development peak flow rates to the pre-development TRCA unit flow rate targets for Sub-basin 36; and,
  - Sites discharging east across Kipling Avenue to a tributary of the East Humber River are to control post-development peak flow rates to the pre-development TRCA unit flow rate targets for Sub-basin 19A.

Unit flow rates can be achieved through the use of SWM ponds and onsite storage. Approximate locations for SWM ponds are shown on **Figure 2-2**.

- **Quality Control**: 80% TSS removal can be achieved through the use of wet ponds (for sites outletting to SWM ponds) or through an integrated treatment train approach including LID practices and the use of OGS (for site not outletting to SWM ponds);
- **Erosion Control**: The following erosion control criteria should be applied:
  - For sites discharging to Rainbow Creek the first 5 mm of rainfall should be retained onsite, with no extended detention in SWMF;

  - For all other sites in the Kleinburg-Nashville Secondary Plan Area the erosion control criteria is extended detention of the 25 mm 4-hour Chicago Storm for a minimum of 24-hours; and,
  - In addition the TRCA requires the The TRCA requires the retention of 5 mm of every rainfall event. This water may be infiltrated or used for irrigation or other gray water applications.
- **Water Balance**: Given the permeability of the soils in most of the Kleinburg-Nashville Secondary Plan Area it should be possible to match the existing water balance for the site. Specific requirements may vary from site to site depending on the natural soil type. The soil type for each site should be verified prior to detailed design and the TRCA should be consulted regarding specific water balance requirements for that site.

# APPENDIX A
# Humber River Unit Flow Rates




# Humber River Stormwater Management Quantity Control Release Rates

TABLE E.1: SUMMARY OF UNIT FLOW RELATIONSHIPS
HUMBER RIVER WATERSHED

| Return Period | Equation A Sub-Basin 4 | Equation B Sub-Basin 6 | Equation C Sub-Basin 10 | Equation D Sub-Basin 15 | Equation E Sub-Basin 19A | Equation F Sub-Basin 36 | Equation G Sub-Basin 46 |
|---|---|---|---|---|---|---|---|
| 100-Year | Q=6.086-0.445*ln(A) | Q=15.199-0.751* ln(A) | Q=14.140-1.096* ln(A) | Q=20.388-1.899 *ln(A) | Q=15.911-1.785 *ln(A)) | Q=29.912-2.316 *ln(A) | Q=22.973-2.256 *ln(A) |
| 50-Year | Q=5.147-0.376 *ln(A) | Q=12.692-0.623 *ln(A) | Q=11.920-0.921*ln(A) | Q= 17.051-1.577 *ln(A) | Q=13.700-1.531 *ln(A) | Q=26.566-2.082 *ln(A) | Q=20.164-1.973 *ln(A) |
| 25-Year | Q=4.272-0.312 *ln(A) | Q= l0.488-0.522 *ln(A) | Q=9.838-0.757 *ln(A) | Q=14.037-1.293 *ln(A) | Q=11.653-1.297 *ln(A) | Q=22.639-1.741 *ln(A) | Q=17.381-1.690 *ln(A) |
| 10-Year | Q=3.192-0.233 *ln(A) | Q=7.707-0.382 *ln(A) | Q=7.443-0.578 *ln(A) | Q=10.400-0.953 *ln(A) | Q=9.213-1.031 *ln(A) | Q=17.957-1.373 *ln(A) | Q=13.877-1.342 *ln(A) |
| 5-Year | Q=2.410-0.175 *ln(A) | Q=5.755-0.283 *ln(A) | Q=5.557-0.427 *ln(A) | Q=7.930-0.73l *ln(A) | Q=7.358-0.829 *ln(A) | Q=14.652-1.136 *ln(A) | Q=ll.468-1.123 *ln(A) |
| 2-Year | Q=1.439-0.106 *ln(A) | Q=3.288-0.159 *ln(A) | Q=3.142-0.233 *ln(A) | Q=4.722-0.454 *ln(A) | Q=4.567-0.503 *ln(A) | Q=9.506-0.719 *ln(A) | Q=7.745-0.762 *ln(A) |

Note:
1. Q - Unit flow (Lls/ha - litres per second per hectare).
2. A - Area in hectares (ha).

TORONTO AND REGION Conservation for The Living City

# APPENDIX B
# MTO Design Charts

## Design Chart 1.08: Hydrologic Soil Groups (Continued)

**- Based on Soil Texture**

| | |
|---|---|
| Sands, Sandy Loams and Gravels | |
| - overlying sand, gravel or limestone bedrock, very well drained | A |
| - ditto, imperfectly drained | AB |
| - shallow, overlying Precambrian bedrock or clay subsoil | B |
| Medium to Coarse Loams | |
| - overlying sand, gravel or limestone, well drained | AB |
| - shallow, overlying Precambrian bedrock or clay subsoil | B |
| Medium Textured Loams | |
| - shallow, overlying limestone bedrock | B |
| - overlying medium textured subsoil | BC |
| Silt Loams, Some Loams | |
| - with good internal drainage | BC |
| - with slow internal drainage and good external drainage | C |
| Clays, Clay Loams, Silty Clay Loams | |
| - with good internal drainage | C |
| - with imperfect or poor external drainage | C |
| - with slow internal drainage and good external drainage | D |

Source: U.S. Department of Agriculture (1972)

## Design Chart 1.09: Soil/Land Use Curve Numbers

| Land Use | Treatment or Practice | Hydrologic Condition[4] | Hydrologic Soil Group | | | |
|---|---|---|---|---|---|---|
| | | | A | B | C | D |
| Fallow | Straight row | — | 77 | 86 | 91 | 94 |
| Row crops | " | Poor | 72 | 81 | 88 | 91 |
| | " | Good | 67 | 78 | 85 | 89 |
| | Contoured | Poor | 70 | 79 | 84 | 88 |
| | " | Good | 65 | 75 | 82 | 86 |
| | " and terraced | Poor | 66 | 74 | 8 | 82 |
| | " " " | Good | 62 | 71 | 78 | 81 |
| Small grain | Straight row | Poor | 65 | 76 | 84 | 88 |
| | | Good | 63 | 75 | 83 | 87 |
| | Contoured | Poor | 63 | 74 | 82 | 85 |
| | | Good | 61 | 73 | 81 | 84 |
| | " and terraced | Poor | 61 | 72 | 79 | 82 |
| | | Good | 59 | 70 | 78 | 81 |
| Close-seeded legumes[2] or rotation meadow | Straight row | Poor | 66 | 77 | 85 | 89 |
| | " " | Good | 58 | 72 | 81 | 85 |
| | Contoured | Poor | 64 | 75 | 83 | 85 |
| | " | Good | 55 | 69 | 78 | 83 |
| | " and terraced | Poor | 63 | 73 | 80 | 83 |
| | " and terraced | Good | 51 | 67 | 76 | 80 |
| Pasture or range | | Poor | 68 | 79 | 86 | 89 |
| | | Fair | 49 | 69 | 79 | 84 |
| | Contoured | Good | 39 | 61 | 74 | 80 |
| | " | Poor | 47 | 67 | 81 | 88 |
| | " | Fair | 25 | 59 | 75 | 83 |
| | | Good | 6 | 35 | 70 | 79 |
| Meadow | | Good | 30 | 58 | 71 | 78 |
| Woods | | Poor | 45 | 66 | 77 | 83 |
| | | Fair | 36 | 60 | 73 | 79 |
| | | Good | 25 | 55 | 70 | 77 |
| Farmsteads | | — | 59 | 74 | 82 | 86 |
| | | — | 72 | 82 | 87 | 89 |
| | | — | 74 | 84 | 90 | 92 |

For average anticedent soil moisture condition (AMC II)
[2] Close-drilled or broadcast.

[4] The hydrologic condition of cropland is good if a good crop rotation practice is used; it is poor if one crop is grown continuously.

Source: U.S. Department of Agriculture (1972)

## Design Chart 1.09: Soil Conservation Service Curve Numbers (Continued)

| Land Use or Surface | Hydrologic Soil Group | | | | | | |
|---|---|---|---|---|---|---|---|
| | A | AB | B | BC | C | CD | D |
| Fallow (special cases only) | 77 | 82 | 86 | 89 | 91 | 93 | 94 |
| Crop and other improved land | 66** (62) | 70** (68) | 74 | 78 | 82 | 84 | 86 AMC I |
| Pasture & other unimproved land | 58* (38) | 62* (51) | 65 | 71 | 76 | 79 | 81 |
| Woodlots and forest | 50* (30) | 54* (44) | 58 | 65 | 71 | 74 | 77 |
| Impervious areas (paved) | | | | | | | 98 |
| Bare bedrock draining directly to stream by surface flow | | | | | | | 98 |
| Bare bedrock draining indirectly to stream as groundwater (usual case) | | | | | | | 70 |
| Lakes and wetlands | | | | | | | 50 |

Notes

(i) All values are based on AMC II except those marked by * (AMC III) or ** (mean of AMC II and AMC III).

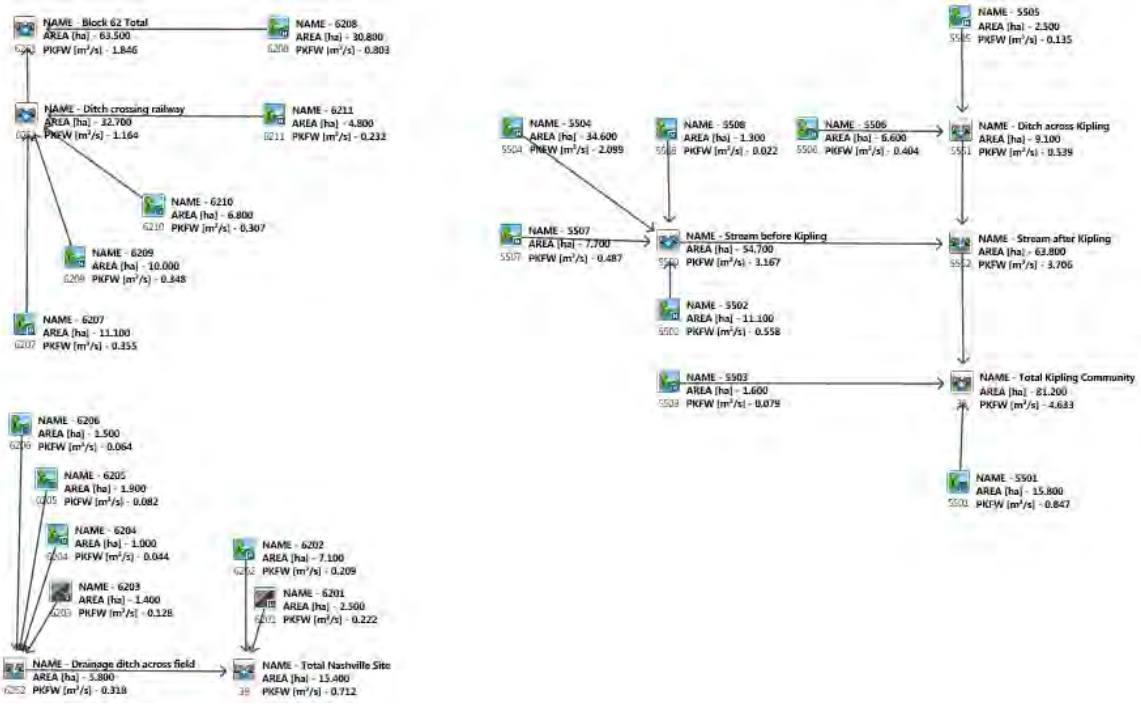
(ii) Values in brackets are AMC II and are to be used only for special cases.

(iii) Table is not applicable to frozen soils or to periods in which snowmelt contributes to runoff.

# APPENDIX C
# Pre and Post-Development Model Schematics

**W11-259**
Functional Servicing
Kleinburg-Nashville Secondary Plan Area
Pre-Development Model
November 2013

## VO2 Model Schematic



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

       V    V   I    SSSSS  U   U    A    L
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        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    Company
        OOO     T      T    H   H    Y    M   M   OOO                Serial

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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 3.0\VO2\voin.dat
  Output  filename: C:\Users\BAbadi\AppData\Local\Temp\e8badc81-9aa9-46ad-ba9e-
b53b8a08e161\Scenario.out
  Summary filename: C:\Users\BAbadi\AppData\Local\Temp\e8badc81-9aa9-46ad-ba9e-
b53b8a08e161\Scenario.sum


DATE: 02/05/2013                          TIME: 09:45:54

USER:


COMMENTS: _____________________________________________________


--------------------------------------------------------------------------------------------------
-----
  ****************************
  ** SIMULATION NUMBER:   8 **
  ****************************


-------------------
|    READ STORM     |    Filename: C:\Users\BAbadi\AppD
|                   |              ata\Local\Temp\
|                   |              e8badc81-9aa9-46ad-ba9e-b53b8a08e161\167c4e4c
| Ptotal= 42.00 mm  |    Comments: 2yr/12hr
-------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.25    0.00 |  3.50    7.14 |  6.75    2.94 | 10.00    0.42
                0.50    0.42 |  3.75    7.14 |  7.00    2.94 | 10.25    0.42
                0.75    0.42 |  4.00    7.14 |  7.25    2.94 | 10.50    0.42
                1.00    0.42 |  4.25    7.14 |  7.50    1.68 | 10.75    0.42
                1.25    0.42 |  4.50   19.32 |  7.75    1.68 | 11.00    0.42
                1.50    0.42 |  4.75   19.32 |  8.00    1.68 | 11.25    0.42
                1.75    0.42 |  5.00   19.32 |  8.25    1.68 | 11.50    0.42
                2.00    0.42 |  5.25   19.32 |  8.50    0.84 | 11.75    0.42
                2.25    0.42 |  5.50    5.46 |  8.75    0.84 | 12.00    0.42
                2.50    2.52 |  5.75    5.46 |  9.00    0.84 | 12.25    0.42
                2.75    2.52 |  6.00    5.46 |  9.25    0.84 |
                3.00    2.52 |  6.25    5.46 |  9.50    0.42 |
                3.25    2.52 |  6.50    2.94 |  9.75    0.42 |

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

-------------------
| CALIB             |
| NASHYD    (6208)  |   Area    (ha)=  30.80   Curve Number   (CN)= 62.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.85

     Unit Hyd Qpeak  (cms)=   1.384

     PEAK FLOW       (cms)=   0.187 (i)
     TIME TO PEAK    (hrs)=   6.000
     RUNOFF VOLUME    (mm)=   7.102
     TOTAL RAINFALL   (mm)=  42.000
     RUNOFF COEFFICIENT   =   0.169

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

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

-------------------
| CALIB             |
| NASHYD    (6209)  |   Area    (ha)=  10.00   Curve Number   (CN)= 66.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.63

     Unit Hyd Qpeak  (cms)=   0.606

     PEAK FLOW       (cms)=   0.083 (i)
     TIME TO PEAK    (hrs)=   5.500
     RUNOFF VOLUME    (mm)=   8.143
     TOTAL RAINFALL   (mm)=  42.000
     RUNOFF COEFFICIENT   =   0.194

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

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

-------------------
| CALIB             |
| NASHYD    (6207)  |   Area    (ha)=  11.10   Curve Number   (CN)= 65.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.69

     Unit Hyd Qpeak  (cms)=   0.614

     PEAK FLOW       (cms)=   0.084 (i)
     TIME TO PEAK    (hrs)=   5.750
     RUNOFF VOLUME    (mm)=   7.869
     TOTAL RAINFALL   (mm)=  42.000
     RUNOFF COEFFICIENT   =   0.187

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

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

-------------------
| CALIB             |
| NASHYD    (6211)  |   Area    (ha)=   4.80   Curve Number   (CN)= 66.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.22

     Unit Hyd Qpeak  (cms)=   0.833

     PEAK FLOW       (cms)=   0.059 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=   7.539
     TOTAL RAINFALL   (mm)=  42.000
     RUNOFF COEFFICIENT   =   0.180

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

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

-------------------
| CALIB             |
| NASHYD    (6210)  |   Area    (ha)=   6.80   Curve Number   (CN)= 66.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.36

     Unit Hyd Qpeak  (cms)=   0.721

     PEAK FLOW       (cms)=   0.075 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=   8.047
     TOTAL RAINFALL   (mm)=  42.000
     RUNOFF COEFFICIENT   =   0.192

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

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

-------------------
| ADD HYD   (6251)  |
|   1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
-------------------            (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (6207):    11.10   0.084     5.75     7.87
        + ID2= 2 (6209):    10.00   0.083     5.50     8.14
          ==========================================
          ID = 3 (6251):    21.10   0.167     5.50     8.00

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

-------------------
| ADD HYD   (6251)  |
|   3 +  2 =  1     |          AREA    QPEAK    TPEAK     R.V.
-------------------            (ha)    (cms)    (hrs)     (mm)
```

```
          ID1= 3 (6251):    21.10   0.167     5.50     8.00
        + ID2= 2 (6210):     6.80   0.075     5.25     8.05
          ================================================
          ID = 1 (6251):    27.90   0.232     5.50     8.01

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (6251) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (6251):    27.90   0.232     5.50     8.01
        + ID2= 2 (6211):     4.80   0.059     5.25     7.54
          ================================================
          ID = 3 (6251):    32.70   0.276     5.25     7.94

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (6253) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (6208):    30.80   0.187     6.00     7.10
        + ID2= 2 (6251):    32.70   0.276     5.25     7.94
          ================================================
          ID = 3 (6253):    63.50   0.436     5.50     7.53

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (5501) |   Area     (ha)=  15.80   Curve Number   (CN)= 70.0
|ID= 1 DT=15.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.21

     Unit Hyd Qpeak  (cms)=   2.874

     PEAK FLOW       (cms)=   0.225 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=   8.560
     TOTAL RAINFALL   (mm)=  42.000
     RUNOFF COEFFICIENT   =   0.204

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (5502) |   Area     (ha)=  11.10   Curve Number   (CN)= 68.0
|ID= 1 DT=15.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.20

     Unit Hyd Qpeak  (cms)=   2.120

     PEAK FLOW       (cms)=   0.146 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=   7.847
     TOTAL RAINFALL   (mm)=  42.000
     RUNOFF COEFFICIENT   =   0.187

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (5504) |   Area     (ha)=  34.60   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.35

     Unit Hyd Qpeak  (cms)=   3.776

     PEAK FLOW       (cms)=   0.568 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  11.507
     TOTAL RAINFALL   (mm)=  42.000
     RUNOFF COEFFICIENT   =   0.274

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (5507) |   Area     (ha)=   7.70   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.22

     Unit Hyd Qpeak  (cms)=   1.337

     PEAK FLOW       (cms)=   0.138 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  10.796
     TOTAL RAINFALL   (mm)=  42.000
     RUNOFF COEFFICIENT   =   0.257

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (5508) |   Area     (ha)=   1.30   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.08

     Unit Hyd Qpeak  (cms)=   0.621

     PEAK FLOW       (cms)=   0.006 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=   2.774
     TOTAL RAINFALL   (mm)=  42.000
     RUNOFF COEFFICIENT   =   0.066

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

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

--------------------
| ADD HYD   (5550) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (5502):    11.10   0.146     5.25     7.85
        + ID2= 2 (5504):    34.60   0.568     5.25    11.51
          ================================================
          ID = 3 (5550):    45.70   0.714     5.25    10.62

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (5550) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (5550):    45.70   0.714     5.25    10.62
        + ID2= 2 (5507):     7.70   0.138     5.25    10.80
          ================================================
          ID = 1 (5550):    53.40   0.851     5.25    10.64

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (5550) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (5550):    53.40   0.851     5.25    10.64
        + ID2= 2 (5508):     1.30   0.006     5.25     2.77
          ================================================
          ID = 3 (5550):    54.70   0.858     5.25    10.46

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (5505) |   Area     (ha)=   2.50   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.15

     Unit Hyd Qpeak  (cms)=   0.637

     PEAK FLOW       (cms)=   0.039 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=   8.911
     TOTAL RAINFALL   (mm)=  42.000
     RUNOFF COEFFICIENT   =   0.212
```

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

```
| CALIB                |
| NASHYD    (5506) |   Area    (ha)=   6.60   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
                     |   U.H. Tp(hrs)=   0.19

     Unit Hyd Qpeak  (cms)=   1.327

     PEAK FLOW       (cms)=   0.115 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  10.272
     TOTAL RAINFALL   (mm)=  42.000
     RUNOFF COEFFICIENT   =   0.245

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

```
| ADD HYD   (5551) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
                             (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (5505):     2.50   0.039     5.25     8.91
        + ID2= 2 (5506):     6.60   0.115     5.25    10.27
          ================================================
          ID = 3 (5551):     9.10   0.154     5.25     9.90

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

```
| ADD HYD   (5552) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
                             (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (5550):    54.70   0.858     5.25    10.46
        + ID2= 2 (5551):     9.10   0.154     5.25     9.90
          ================================================
          ID = 3 (5552):    63.80   1.012     5.25    10.38

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

```
| CALIB                |
| NASHYD    (5503) |   Area    (ha)=   1.60   Curve Number   (CN)= 68.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
                     |   U.H. Tp(hrs)=   0.19

     Unit Hyd Qpeak  (cms)=   0.322

     PEAK FLOW       (cms)=   0.021 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=   7.692
     TOTAL RAINFALL   (mm)=  42.000
     RUNOFF COEFFICIENT   =   0.183

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

```
| ADD HYD   (0038) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
                             (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (5501):    15.80   0.225     5.25     8.56
        + ID2= 2 (5503):     1.60   0.021     5.25     7.69
          ================================================
          ID = 3 (0038):    17.40   0.245     5.25     8.48

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

```
| ADD HYD   (0038) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
                             (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0038):    17.40   0.245     5.25     8.48
        + ID2= 2 (5552):    63.80   1.012     5.25    10.38
          ================================================
          ID = 1 (0038):    81.20   1.257     5.25     9.97
```

NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| CALIB                |
| NASHYD    (6206) |   Area    (ha)=   1.50   Curve Number   (CN)= 62.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
                     |   U.H. Tp(hrs)=   0.30

     Unit Hyd Qpeak  (cms)=   0.191

     PEAK FLOW       (cms)=   0.015 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=   6.920
     TOTAL RAINFALL   (mm)=  42.000
     RUNOFF COEFFICIENT   =   0.165

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

```
| CALIB                |
| NASHYD    (6205) |   Area    (ha)=   1.90   Curve Number   (CN)= 62.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
                     |   U.H. Tp(hrs)=   0.26

     Unit Hyd Qpeak  (cms)=   0.279

     PEAK FLOW       (cms)=   0.020 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=   6.799
     TOTAL RAINFALL   (mm)=  42.000
     RUNOFF COEFFICIENT   =   0.162

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

```
| CALIB                |
| NASHYD    (6204) |   Area    (ha)=   1.00   Curve Number   (CN)= 62.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
                     |   U.H. Tp(hrs)=   0.25

     Unit Hyd Qpeak  (cms)=   0.153

     PEAK FLOW       (cms)=   0.011 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=   6.755
     TOTAL RAINFALL   (mm)=  42.000
     RUNOFF COEFFICIENT   =   0.161

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

```
| CALIB                |
| STANDHYD  (6203) |   Area    (ha)=   1.40
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  30.00

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.42          0.98
     Dep. Storage     (mm)=      1.00          1.50
     Average Slope     (%)=      1.00          1.50
     Length            (m)=     96.61         40.00
     Mannings n             =    0.013         0.250

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

                    ---- TRANSFORMED HYETOGRAPH ----
  TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
   hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
 0.083     0.00 | 3.167     2.52 | 6.250     5.46 |  9.33     0.42
 0.167     0.00 | 3.250     2.52 | 6.333     2.94 |  9.42     0.42
 0.250     0.00 | 3.333     7.14 | 6.417     2.94 |  9.50     0.42
 0.333     0.42 | 3.417     7.14 | 6.500     2.94 |  9.58     0.42
 0.417     0.42 | 3.500     7.14 | 6.583     2.94 |  9.67     0.42
 0.500     0.42 | 3.583     7.14 | 6.667     2.94 |  9.75     0.42
 0.583     0.42 | 3.667     7.14 | 6.750     2.94 |  9.83     0.42
 0.667     0.42 | 3.750     7.14 | 6.833     2.94 |  9.92     0.42
 0.750     0.42 | 3.833     7.14 | 6.917     2.94 | 10.00     0.42
 0.833     0.42 | 3.917     7.14 | 7.000     2.94 | 10.08     0.42
 0.917     0.42 | 4.000     7.14 | 7.083     2.94 | 10.17     0.42
 1.000     0.42 | 4.083     7.14 | 7.167     2.94 | 10.25     0.42
 1.083     0.42 | 4.167     7.14 | 7.250     2.94 | 10.33     0.42
 1.167     0.42 | 4.250     7.14 | 7.333     1.68 | 10.42     0.42
```

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

| | | | | |
|---|---|---|---|---|
| Max.Eff.Inten.(mm/hr)= | | 19.32 | 11.36 | |
| over (min) | | 5.00 | 25.00 | |
| Storage Coeff. (min)= | | 4.83 (ii) | 23.19 (ii) | |
| Unit Hyd. Tpeak (min)= | | 5.00 | 25.00 | |
| Unit Hyd. peak (cms)= | | 0.22 | 0.05 | |
| | | | | *TOTALS* |
| PEAK FLOW | (cms)= | 0.02 | 0.02 | 0.046 (iii) |
| TIME TO PEAK | (hrs)= | 5.25 | 5.33 | 5.25 |
| RUNOFF VOLUME | (mm)= | 41.00 | 19.22 | 25.75 |
| TOTAL RAINFALL | (mm)= | 42.00 | 42.00 | 42.00 |
| RUNOFF COEFFICIENT | = | 0.98 | 0.46 | 0.61 |

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

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

---

| ADD HYD (6252) | | | | | |
|---|---|---|---|---|---|
| 1 + 2 = 3 | | AREA | QPEAK | TPEAK | R.V. |
| | | (ha) | (cms) | (hrs) | (mm) |
| | ID1= 1 (6203): | 1.40 | 0.046 | 5.25 | 25.75 |
| + | ID2= 2 (6204): | 1.00 | 0.011 | 5.25 | 6.75 |
| | ID = 3 (6252): | 2.40 | 0.057 | 5.25 | 17.83 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

| ADD HYD (6252) | | | | | |
|---|---|---|---|---|---|
| 3 + 2 = 1 | | AREA | QPEAK | TPEAK | R.V. |
| | | (ha) | (cms) | (hrs) | (mm) |
| | ID1= 3 (6252): | 2.40 | 0.057 | 5.25 | 17.83 |
| + | ID2= 2 (6205): | 1.90 | 0.020 | 5.25 | 6.80 |
| | ID = 1 (6252): | 4.30 | 0.077 | 5.25 | 12.96 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

| ADD HYD (6252) | | | | | |
|---|---|---|---|---|---|
| 1 + 2 = 3 | | AREA | QPEAK | TPEAK | R.V. |
| | | (ha) | (cms) | (hrs) | (mm) |
| | ID1= 1 (6252): | 4.30 | 0.077 | 5.25 | 12.96 |
| + | ID2= 2 (6206): | 1.50 | 0.015 | 5.25 | 6.92 |
| | ID = 3 (6252): | 5.80 | 0.093 | 5.25 | 11.40 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

| CALIB |
|---|

| NASHYD (6202) | Area (ha)= 7.10 Curve Number (CN)= 64.0 |
|---|---|
| ID= 1 DT=15.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00 |
| | U.H. Tp(hrs)= 0.76 |

NOTE: RAINFALL WAS TRANSFORMED TO 15.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|---|---|---|---|---|---|---|---|
| 0.250 | 0.00 | 3.500 | 7.14 | 6.750 | 2.94 | 10.00 | 0.42 |
| 0.500 | 0.42 | 3.750 | 7.14 | 7.000 | 2.94 | 10.25 | 0.42 |
| 0.750 | 0.42 | 4.000 | 7.14 | 7.250 | 2.94 | 10.50 | 0.42 |
| 1.000 | 0.42 | 4.250 | 7.14 | 7.500 | 1.68 | 10.75 | 0.42 |
| 1.250 | 0.42 | 4.500 | 19.32 | 7.750 | 1.68 | 11.00 | 0.42 |
| 1.500 | 0.42 | 4.750 | 19.32 | 8.000 | 1.68 | 11.25 | 0.42 |
| 1.750 | 0.42 | 5.000 | 19.32 | 8.250 | 1.68 | 11.50 | 0.42 |
| 2.000 | 0.42 | 5.250 | 19.32 | 8.500 | 0.84 | 11.75 | 0.42 |
| 2.250 | 0.42 | 5.500 | 5.46 | 8.750 | 0.84 | 12.00 | 0.42 |
| 2.500 | 2.52 | 5.750 | 5.46 | 9.000 | 0.84 | 12.25 | 0.42 |
| 2.750 | 2.52 | 6.000 | 5.46 | 9.250 | 0.84 | | |
| 3.000 | 2.52 | 6.250 | 5.46 | 9.500 | 0.42 | | |
| 3.250 | 2.52 | 6.500 | 2.94 | 9.750 | 0.42 | | |

Unit Hyd Qpeak (cms)= 0.357

PEAK FLOW (cms)= 0.050 (i)
TIME TO PEAK (hrs)= 5.750
RUNOFF VOLUME (mm)= 7.605
TOTAL RAINFALL (mm)= 42.000
RUNOFF COEFFICIENT = 0.181

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

---

| CALIB | | |
|---|---|---|
| STANDHYD (6201) | Area (ha)= 2.50 | |
| ID= 1 DT=15.0 min | Total Imp(%)= 60.00 | Dir. Conn.(%)= 60.00 |

| | | IMPERVIOUS | PERVIOUS (i) |
|---|---|---|---|
| Surface Area | (ha)= | 1.50 | 1.00 |
| Dep. Storage | (mm)= | 1.00 | 1.50 |
| Average Slope | (%)= | 1.00 | 2.20 |
| Length | (m)= | 129.10 | 50.00 |
| Mannings n | = | 0.013 | 0.250 |

| | | | | |
|---|---|---|---|---|
| Max.Eff.Inten.(mm/hr)= | | 19.32 | 6.23 | |
| over (min) | | 15.00 | 30.00 | |
| Storage Coeff. (min)= | | 5.75 (ii) | 29.55 (ii) | |
| Unit Hyd. Tpeak (min)= | | 15.00 | 30.00 | |
| Unit Hyd. peak (cms)= | | 0.10 | 0.04 | |
| | | | | *TOTALS* |
| PEAK FLOW | (cms)= | 0.08 | 0.01 | 0.093 (iii) |
| TIME TO PEAK | (hrs)= | 5.25 | 5.50 | 5.25 |
| RUNOFF VOLUME | (mm)= | 41.00 | 10.98 | 28.98 |
| TOTAL RAINFALL | (mm)= | 42.00 | 42.00 | 42.00 |
| RUNOFF COEFFICIENT | = | 0.98 | 0.26 | 0.69 |

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (0039) | | | | | |
|---|---|---|---|---|---|
| 1 + 2 = 3 | | AREA | QPEAK | TPEAK | R.V. |
| | | (ha) | (cms) | (hrs) | (mm) |
| | ID1= 1 (6201): | 2.50 | 0.093 | 5.25 | 28.98 |
| + | ID2= 2 (6202): | 7.10 | 0.050 | 5.75 | 7.60 |
| | ID = 3 (0039): | 9.60 | 0.131 | 5.25 | 13.17 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

| ADD HYD (0039) | | | | | |
|---|---|---|---|---|---|
| 3 + 2 = 1 | | AREA | QPEAK | TPEAK | R.V. |
| | | (ha) | (cms) | (hrs) | (mm) |

```
   ID1= 3 (0039):     9.60   0.131     5.25    13.17
 + ID2= 2 (6252):     5.80   0.093     5.25    11.40
   ================================================
   ID = 1 (0039):    15.40   0.224     5.25    12.50

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

---

```
 ****************************
 ** SIMULATION NUMBER:  10 **
 ****************************


-------------------
|    READ STORM    |    Filename: C:\Users\BAbadi\AppD
|                  |              ata\Local\Temp\
|                  |              e8badc81-9aa9-46ad-ba9e-b53b8a08e161\69d1ef82
| Ptotal= 54.38 mm |    Comments: 5yr/12hr
-------------------
```

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|---|---|---|---|---|---|---|---|
| 0.25 | 0.00 | 3.50 | 9.25 | 6.75 | 3.81 | 10.00 | 0.54 |
| 0.50 | 0.54 | 3.75 | 9.25 | 7.00 | 3.81 | 10.25 | 0.54 |
| 0.75 | 0.54 | 4.00 | 9.25 | 7.25 | 3.81 | 10.50 | 0.54 |
| 1.00 | 0.54 | 4.25 | 9.25 | 7.50 | 2.18 | 10.75 | 0.54 |
| 1.25 | 0.54 | 4.50 | 25.02 | 7.75 | 2.18 | 11.00 | 0.54 |
| 1.50 | 0.54 | 4.75 | 25.02 | 8.00 | 2.18 | 11.25 | 0.54 |
| 1.75 | 0.54 | 5.00 | 25.02 | 8.25 | 2.18 | 11.50 | 0.54 |
| 2.00 | 0.54 | 5.25 | 25.02 | 8.50 | 1.09 | 11.75 | 0.54 |
| 2.25 | 0.54 | 5.50 | 7.07 | 8.75 | 1.09 | 12.00 | 0.54 |
| 2.50 | 3.26 | 5.75 | 7.07 | 9.00 | 1.09 | 12.25 | 0.54 |
| 2.75 | 3.26 | 6.00 | 7.07 | 9.25 | 1.09 | | |
| 3.00 | 3.26 | 6.25 | 7.07 | 9.50 | 0.54 | | |
| 3.25 | 3.26 | 6.50 | 3.81 | 9.75 | 0.54 | | |

---

```
-------------------
| CALIB            |
| NASHYD    (6208) |   Area    (ha)=  30.80   Curve Number   (CN)= 62.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.85

     Unit Hyd Qpeak  (cms)=   1.384

     PEAK FLOW       (cms)=   0.318 (i)
     TIME TO PEAK    (hrs)=   5.750
     RUNOFF VOLUME    (mm)=  11.885
     TOTAL RAINFALL   (mm)=  54.380
     RUNOFF COEFFICIENT   =   0.219

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

---

```
-------------------
| CALIB            |
| NASHYD    (6209) |   Area    (ha)=  10.00   Curve Number   (CN)= 66.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.63

     Unit Hyd Qpeak  (cms)=   0.606

     PEAK FLOW       (cms)=   0.141 (i)
     TIME TO PEAK    (hrs)=   5.500
     RUNOFF VOLUME    (mm)=  13.508
     TOTAL RAINFALL   (mm)=  54.380
     RUNOFF COEFFICIENT   =   0.248

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

---

```
-------------------
| CALIB            |
| NASHYD    (6207) |   Area    (ha)=  11.10   Curve Number   (CN)= 65.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.69

     Unit Hyd Qpeak  (cms)=   0.614

     PEAK FLOW       (cms)=   0.142 (i)
     TIME TO PEAK    (hrs)=   5.500
     RUNOFF VOLUME    (mm)=  13.085
     TOTAL RAINFALL   (mm)=  54.380
     RUNOFF COEFFICIENT   =   0.241

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

---

```
-------------------
| CALIB            |
| NASHYD    (6211) |   Area    (ha)=   4.80   Curve Number   (CN)= 66.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.22

     Unit Hyd Qpeak  (cms)=   0.833

     PEAK FLOW       (cms)=   0.098 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  12.506
     TOTAL RAINFALL   (mm)=  54.380
     RUNOFF COEFFICIENT   =   0.230

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

---

```
-------------------
| CALIB            |
| NASHYD    (6210) |   Area    (ha)=   6.80   Curve Number   (CN)= 66.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.36

     Unit Hyd Qpeak  (cms)=   0.721

     PEAK FLOW       (cms)=   0.126 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  13.349
     TOTAL RAINFALL   (mm)=  54.380
     RUNOFF COEFFICIENT   =   0.245

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

---

```
-------------------
| ADD HYD   (6251) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (6207):    11.10   0.142     5.50    13.08
       + ID2= 2 (6209):    10.00   0.141     5.50    13.51
         ================================================
         ID = 3 (6251):    21.10   0.283     5.50    13.29

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

---

```
-------------------
| ADD HYD   (6251) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
         ID1= 3 (6251):    21.10   0.283     5.50    13.29
       + ID2= 2 (6210):     6.80   0.126     5.25    13.35
         ================================================
         ID = 1 (6251):    27.90   0.390     5.50    13.30

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

---

```
-------------------
| ADD HYD   (6251) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (6251):    27.90   0.390     5.50    13.30
       + ID2= 2 (6211):     4.80   0.098     5.25    12.51
         ================================================
         ID = 3 (6251):    32.70   0.469     5.25    13.18

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

---

```
-------------------
| ADD HYD   (6253) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (6208):    30.80   0.318     5.75    11.89
       + ID2= 2 (6251):    32.70   0.469     5.25    13.18
         ================================================
         ID = 3 (6253):    63.50   0.740     5.50    12.55

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

```
| CALIB              |
| NASHYD    (5501) |   Area    (ha)=  15.80   Curve Number   (CN)= 70.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.21

     Unit Hyd Qpeak  (cms)=   2.874

     PEAK FLOW       (cms)=   0.366 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  14.054
     TOTAL RAINFALL   (mm)=  54.380
     RUNOFF COEFFICIENT   =   0.258

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

```
| CALIB              |
| NASHYD    (5502) |   Area    (ha)=  11.10   Curve Number   (CN)= 68.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.20

     Unit Hyd Qpeak  (cms)=   2.120

     PEAK FLOW       (cms)=   0.239 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  12.953
     TOTAL RAINFALL   (mm)=  54.380
     RUNOFF COEFFICIENT   =   0.238

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

```
| CALIB              |
| NASHYD    (5504) |   Area    (ha)=  34.60   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.35

     Unit Hyd Qpeak  (cms)=   3.776

     PEAK FLOW       (cms)=   0.922 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  18.537
     TOTAL RAINFALL   (mm)=  54.380
     RUNOFF COEFFICIENT   =   0.341

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

```
| CALIB              |
| NASHYD    (5507) |   Area    (ha)=   7.70   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.22

     Unit Hyd Qpeak  (cms)=   1.337

     PEAK FLOW       (cms)=   0.220 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  17.393
     TOTAL RAINFALL   (mm)=  54.380
     RUNOFF COEFFICIENT   =   0.320

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

```
| CALIB              |
| NASHYD    (5508) |   Area    (ha)=   1.30   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.08

     Unit Hyd Qpeak  (cms)=   0.621

     PEAK FLOW       (cms)=   0.010 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=   4.468
     TOTAL RAINFALL   (mm)=  54.380
     RUNOFF COEFFICIENT   =   0.082

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

```
| ADD HYD   (5550) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (5502):    11.10   0.239     5.25    12.95
        + ID2= 2 (5504):    34.60   0.922     5.25    18.54
          ================================================
          ID = 3 (5550):    45.70   1.161     5.25    17.18

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

```
| ADD HYD   (5550) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (5550):    45.70   1.161     5.25    17.18
        + ID2= 2 (5507):     7.70   0.220     5.25    17.39
          ================================================
          ID = 1 (5550):    53.40   1.381     5.25    17.21

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

```
| ADD HYD   (5550) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (5550):    53.40   1.381     5.25    17.21
        + ID2= 2 (5508):     1.30   0.010     5.25     4.47
          ================================================
          ID = 3 (5550):    54.70   1.391     5.25    16.91

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

```
| CALIB              |
| NASHYD    (5505) |   Area    (ha)=   2.50   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.15

     Unit Hyd Qpeak  (cms)=   0.637

     PEAK FLOW       (cms)=   0.062 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  14.356
     TOTAL RAINFALL   (mm)=  54.380
     RUNOFF COEFFICIENT   =   0.264

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

```
| CALIB              |
| NASHYD    (5506) |   Area    (ha)=   6.60   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.19

     Unit Hyd Qpeak  (cms)=   1.327

     PEAK FLOW       (cms)=   0.183 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  16.548
     TOTAL RAINFALL   (mm)=  54.380
     RUNOFF COEFFICIENT   =   0.304

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

```
| ADD HYD   (5551) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (5505):     2.50   0.062     5.25    14.36
        + ID2= 2 (5506):     6.60   0.183     5.25    16.55
          ================================================
          ID = 3 (5551):     9.10   0.245     5.25    15.95

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

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

-------------------
| ADD HYD   (5552) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (5550):    54.70   1.391     5.25    16.91
       + ID2= 2 (5551):     9.10   0.245     5.25    15.95
         ================================================
         ID = 3 (5552):    63.80   1.636     5.25    16.77

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (5503)  |   Area    (ha)=   1.60   Curve Number   (CN)= 68.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.19

     Unit Hyd Qpeak  (cms)=   0.322

     PEAK FLOW       (cms)=   0.034 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  12.696
     TOTAL RAINFALL   (mm)=  54.380
     RUNOFF COEFFICIENT   =   0.233

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

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

-------------------
| ADD HYD   (0038) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (5501):    15.80   0.366     5.25    14.05
       + ID2= 2 (5503):     1.60   0.034     5.25    12.70
         ================================================
         ID = 3 (0038):    17.40   0.400     5.25    13.93

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

-------------------
| ADD HYD   (0038) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
         ID1= 3 (0038):    17.40   0.400     5.25    13.93
       + ID2= 2 (5552):    63.80   1.636     5.25    16.77
         ================================================
         ID = 1 (0038):    81.20   2.036     5.25    16.16

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (6206)  |   Area    (ha)=   1.50   Curve Number   (CN)= 62.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.30

     Unit Hyd Qpeak  (cms)=   0.191

     PEAK FLOW       (cms)=   0.026 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  11.582
     TOTAL RAINFALL   (mm)=  54.380
     RUNOFF COEFFICIENT   =   0.213

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

-------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (6205)  |   Area    (ha)=   1.90   Curve Number   (CN)= 62.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.26

     Unit Hyd Qpeak  (cms)=   0.279

     PEAK FLOW       (cms)=   0.034 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  11.379
     TOTAL RAINFALL   (mm)=  54.380
     RUNOFF COEFFICIENT   =   0.209

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

-------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (6204)  |   Area    (ha)=   1.00   Curve Number   (CN)= 62.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.25

     Unit Hyd Qpeak  (cms)=   0.153

     PEAK FLOW       (cms)=   0.018 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  11.305
     TOTAL RAINFALL   (mm)=  54.380
     RUNOFF COEFFICIENT   =   0.208

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

-------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD  (6203)  |   Area    (ha)=   1.40
|ID= 1 DT= 5.0 min  |   Total Imp(%)=  30.00   Dir. Conn.(%)=  30.00
-------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.42         0.98
     Dep. Storage     (mm)=      1.00         1.50
     Average Slope     (%)=      1.00         1.50
     Length            (m)=     96.61        40.00
     Mannings n           =     0.013        0.250

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

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

     Max.Eff.Inten.(mm/hr)=      25.02        16.68
           over (min)            5.00        25.00
     Storage Coeff.  (min)=      4.36 (ii)   20.10 (ii)
     Unit Hyd. Tpeak (min)=      5.00        25.00
     Unit Hyd. peak  (cms)=      0.23         0.05

                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.03         0.04      0.066 (iii)
     TIME TO PEAK    (hrs)=      5.17         5.33       5.25
```

```
     RUNOFF VOLUME    (mm)=      53.38        28.62          36.04
     TOTAL RAINFALL   (mm)=      54.38        54.38          54.38
     RUNOFF COEFFICIENT   =       0.98         0.53           0.66

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

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

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

-------------------
| ADD HYD   (6252) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (6203):     1.40   0.066     5.25    36.04
       + ID2= 2 (6204):     1.00   0.018     5.25    11.30
         ================================================
         ID = 3 (6252):     2.40   0.084     5.25    25.73

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

-------------------
| ADD HYD   (6252) |
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 3 (6252):     2.40   0.084     5.25    25.73
       + ID2= 2 (6205):     1.90   0.034     5.25    11.38
         ================================================
         ID = 1 (6252):     4.30   0.118     5.25    19.39

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

-------------------
| ADD HYD   (6252) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (6252):     4.30   0.118     5.25    19.39
       + ID2= 2 (6206):     1.50   0.026     5.25    11.58
         ================================================
         ID = 3 (6252):     5.80   0.144     5.25    17.37

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (6202)  |   Area    (ha)=   7.10   Curve Number   (CN)= 64.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.76

        NOTE:  RAINFALL WAS TRANSFORMED TO  15.0 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
  0.250    0.00 | 3.500    9.25 | 6.750    3.81 | 10.00    0.54
  0.500    0.54 | 3.750    9.25 | 7.000    3.81 | 10.25    0.54
  0.750    0.54 | 4.000    9.25 | 7.250    3.81 | 10.50    0.54
  1.000    0.54 | 4.250    9.25 | 7.500    2.18 | 10.75    0.54
  1.250    0.54 | 4.500   25.02 | 7.750    2.18 | 11.00    0.54
  1.500    0.54 | 4.750   25.02 | 8.000    2.18 | 11.25    0.54
  1.750    0.54 | 5.000   25.02 | 8.250    2.18 | 11.50    0.54
  2.000    0.54 | 5.250   25.02 | 8.500    1.09 | 11.75    0.54
  2.250    0.54 | 5.500    7.07 | 8.750    1.09 | 12.00    0.54
  2.500    3.26 | 5.750    7.07 | 9.000    1.09 | 12.25    0.54
  2.750    3.26 | 6.000    7.07 | 9.250    1.09 |
  3.000    3.26 | 6.250    7.07 | 9.500    0.54 |
  3.250    3.26 | 6.500    3.81 | 9.750    0.54 |

     Unit Hyd Qpeak  (cms)=   0.357

     PEAK FLOW       (cms)=   0.084 (i)
     TIME TO PEAK    (hrs)=   5.750
     RUNOFF VOLUME    (mm)=  12.673
     TOTAL RAINFALL   (mm)=  54.380
     RUNOFF COEFFICIENT   =   0.233

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD  (6201)  |   Area    (ha)=   2.50
|ID= 1 DT=15.0 min  |   Total Imp(%)=  60.00   Dir. Conn.(%)=  60.00
-------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.50         1.00
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.20
     Length            (m)=     129.10        50.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      25.02         9.80
               over (min)        15.00        30.00
     Storage Coeff.  (min)=       5.18 (ii)   25.04 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.11         0.04

                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.10         0.02     0.125 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25      5.25
     RUNOFF VOLUME    (mm)=      53.38        17.29     38.94
     TOTAL RAINFALL   (mm)=      54.38        54.38     54.38
     RUNOFF COEFFICIENT   =       0.98         0.32      0.72

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  70.0    Ia = Dep. 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   (0039) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (6201):     2.50   0.125     5.25    38.94
       + ID2= 2 (6202):     7.10   0.084     5.75    12.67
         ================================================
         ID = 3 (0039):     9.60   0.192     5.25    19.51

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

-------------------
| ADD HYD   (0039) |
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 3 (0039):     9.60   0.192     5.25    19.51
       + ID2= 2 (6252):     5.80   0.144     5.25    17.37
         ================================================
         ID = 1 (0039):    15.40   0.336     5.25    18.71

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:  12 **
  ****************************


-------------------
|    READ STORM     |    Filename: C:\Users\BAbadi\AppD
|                   |              ata\Local\Temp\
|                   |              e8badc81-9aa9-46ad-ba9e-b53b8a08e161\708f929a
| Ptotal= 62.71 mm  |    Comments: 10yr/12hr
-------------------

   TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
    hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
  0.25    0.00 |  3.50   10.66 |  6.75    4.39 | 10.00    0.63
  0.50    0.63 |  3.75   10.66 |  7.00    4.39 | 10.25    0.63
  0.75    0.63 |  4.00   10.66 |  7.25    4.39 | 10.50    0.63
  1.00    0.63 |  4.25   10.66 |  7.50    2.51 | 10.75    0.63
  1.25    0.63 |  4.50   28.84 |  7.75    2.51 | 11.00    0.63
  1.50    0.63 |  4.75   28.84 |  8.00    2.51 | 11.25    0.63
  1.75    0.63 |  5.00   28.84 |  8.25    2.51 | 11.50    0.63
  2.00    0.63 |  5.25   28.84 |  8.50    1.25 | 11.75    0.63
  2.25    0.63 |  5.50    8.15 |  8.75    1.25 | 12.00    0.63
  2.50    3.76 |  5.75    8.15 |  9.00    1.25 | 12.25    0.63
  2.75    3.76 |  6.00    8.15 |  9.25    1.25 |
```

```
              3.00    3.76 |  6.25    8.15 |  9.50    0.63 |
              3.25    3.76 |  6.50    4.39 |  9.75    0.63 |
```

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-------------------
| CALIB           |
| NASHYD    (6208) |   Area    (ha)=  30.80   Curve Number   (CN)= 62.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.85

     Unit Hyd Qpeak  (cms)=   1.384

     PEAK FLOW       (cms)=   0.421 (i)
     TIME TO PEAK    (hrs)=   5.750
     RUNOFF VOLUME    (mm)=  15.600
     TOTAL RAINFALL   (mm)=  62.710
     RUNOFF COEFFICIENT   =   0.249

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

--------------------------------------------------------------------------------
-------------------
| CALIB           |
| NASHYD    (6209) |   Area    (ha)=  10.00   Curve Number   (CN)= 66.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.63

     Unit Hyd Qpeak  (cms)=   0.606

     PEAK FLOW       (cms)=   0.186 (i)
     TIME TO PEAK    (hrs)=   5.500
     RUNOFF VOLUME    (mm)=  17.635
     TOTAL RAINFALL   (mm)=  62.710
     RUNOFF COEFFICIENT   =   0.281

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

--------------------------------------------------------------------------------
-------------------
| CALIB           |
| NASHYD    (6207) |   Area    (ha)=  11.10   Curve Number   (CN)= 65.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.69

     Unit Hyd Qpeak  (cms)=   0.614

     PEAK FLOW       (cms)=   0.188 (i)
     TIME TO PEAK    (hrs)=   5.500
     RUNOFF VOLUME    (mm)=  17.106
     TOTAL RAINFALL   (mm)=  62.710
     RUNOFF COEFFICIENT   =   0.273

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

--------------------------------------------------------------------------------
-------------------
| CALIB           |
| NASHYD    (6211) |   Area    (ha)=   4.80   Curve Number   (CN)= 66.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.22

     Unit Hyd Qpeak  (cms)=   0.833

     PEAK FLOW       (cms)=   0.127 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  16.326
     TOTAL RAINFALL   (mm)=  62.710
     RUNOFF COEFFICIENT   =   0.260

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

--------------------------------------------------------------------------------
-------------------
| CALIB           |
| NASHYD    (6210) |   Area    (ha)=   6.80   Curve Number   (CN)= 66.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.36

     Unit Hyd Qpeak  (cms)=   0.721

     PEAK FLOW       (cms)=   0.165 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  17.427
     TOTAL RAINFALL   (mm)=  62.710
     RUNOFF COEFFICIENT   =   0.278

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

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

-------------------
| ADD HYD   (6251) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (6207):    11.10   0.188     5.50    17.11
        + ID2= 2 (6209):    10.00   0.186     5.50    17.63
          ================================================
          ID = 3 (6251):    21.10   0.373     5.50    17.36

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

-------------------
| ADD HYD   (6251) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (6251):    21.10   0.373     5.50    17.36
        + ID2= 2 (6210):     6.80   0.165     5.25    17.43
          ================================================
          ID = 1 (6251):    27.90   0.513     5.50    17.37

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

-------------------
| ADD HYD   (6251) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (6251):    27.90   0.513     5.50    17.37
        + ID2= 2 (6211):     4.80   0.127     5.25    16.33
          ================================================
          ID = 3 (6251):    32.70   0.618     5.25    17.22

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| ADD HYD   (6253) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (6208):    30.80   0.421     5.75    15.60
        + ID2= 2 (6251):    32.70   0.618     5.25    17.22
          ================================================
          ID = 3 (6253):    63.50   0.977     5.50    16.43

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
-------------------
| CALIB           |
| NASHYD    (5501) |   Area    (ha)=  15.80   Curve Number   (CN)= 70.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.21

     Unit Hyd Qpeak  (cms)=   2.874

     PEAK FLOW       (cms)=   0.473 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  18.235
     TOTAL RAINFALL   (mm)=  62.710
     RUNOFF COEFFICIENT   =   0.291

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

--------------------------------------------------------------------------------
-------------------
| CALIB           |
| NASHYD    (5502) |   Area    (ha)=  11.10   Curve Number   (CN)= 68.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.20

     Unit Hyd Qpeak  (cms)=   2.120

     PEAK FLOW       (cms)=   0.309 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  16.860
     TOTAL RAINFALL   (mm)=  62.710
     RUNOFF COEFFICIENT   =   0.269
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     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (5504)  |   Area    (ha)=  34.60   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.35

     Unit Hyd Qpeak  (cms)=   3.776

     PEAK FLOW       (cms)=   1.186 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  23.790
     TOTAL RAINFALL   (mm)=  62.710
     RUNOFF COEFFICIENT   =   0.379

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (5507)  |   Area    (ha)=   7.70   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.22

     Unit Hyd Qpeak  (cms)=   1.337

     PEAK FLOW       (cms)=   0.281 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  22.321
     TOTAL RAINFALL   (mm)=  62.710
     RUNOFF COEFFICIENT   =   0.356

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (5508)  |   Area    (ha)=   1.30   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.08

     Unit Hyd Qpeak  (cms)=   0.621

     PEAK FLOW       (cms)=   0.013 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=   5.734
     TOTAL RAINFALL   (mm)=  62.710
     RUNOFF COEFFICIENT   =   0.091

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

--------------------------------------------------------------------------------
-------------------
| ADD HYD   (5550)  |
|   1 +  2 =  3     |         AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (5502):    11.10   0.309     5.25    16.86
       + ID2= 2 (5504):    34.60   1.186     5.25    23.79
         ================================================
         ID = 3 (5550):    45.70   1.495     5.25    22.11

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| ADD HYD   (5550)  |
|   3 +  2 =  1     |         AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
         ID1= 3 (5550):    45.70   1.495     5.25    22.11
       + ID2= 2 (5507):     7.70   0.281     5.25    22.32
         ================================================
         ID = 1 (5550):    53.40   1.776     5.25    22.14

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
-------------------
| ADD HYD   (5550)  |
|   1 +  2 =  3     |         AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (5550):    53.40   1.776     5.25    22.14
       + ID2= 2 (5508):     1.30   0.013     5.25     5.73
         ================================================
         ID = 3 (5550):    54.70   1.789     5.25    21.75

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| CALIB             |
| NASHYD    (5505)  |   Area    (ha)=   2.50   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.15

     Unit Hyd Qpeak  (cms)=   0.637

     PEAK FLOW       (cms)=   0.078 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  18.424
     TOTAL RAINFALL   (mm)=  62.710
     RUNOFF COEFFICIENT   =   0.294

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

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-------------------
| CALIB             |
| NASHYD    (5506)  |   Area    (ha)=   6.60   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.19

     Unit Hyd Qpeak  (cms)=   1.327

     PEAK FLOW       (cms)=   0.233 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  21.237
     TOTAL RAINFALL   (mm)=  62.710
     RUNOFF COEFFICIENT   =   0.339

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

--------------------------------------------------------------------------------
-------------------
| ADD HYD   (5551)  |
|   1 +  2 =  3     |         AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (5505):     2.50   0.078     5.25    18.42
       + ID2= 2 (5506):     6.60   0.233     5.25    21.24
         ================================================
         ID = 3 (5551):     9.10   0.312     5.25    20.46

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
-------------------
| ADD HYD   (5552)  |
|   1 +  2 =  3     |         AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (5550):    54.70   1.789     5.25    21.75
       + ID2= 2 (5551):     9.10   0.312     5.25    20.46
         ================================================
         ID = 3 (5552):    63.80   2.100     5.25    21.56

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (5503)  |   Area    (ha)=   1.60   Curve Number   (CN)= 68.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.19

     Unit Hyd Qpeak  (cms)=   0.322

     PEAK FLOW       (cms)=   0.044 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  16.526
     TOTAL RAINFALL   (mm)=  62.710
     RUNOFF COEFFICIENT   =   0.264

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

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--------------------
| ADD HYD   (0038) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (5501):    15.80   0.473     5.25    18.24
        + ID2= 2 (5503):     1.60   0.044     5.25    16.53
          ================================================
          ID = 3 (0038):    17.40   0.517     5.25    18.08

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0038) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0038):    17.40   0.517     5.25    18.08
        + ID2= 2 (5552):    63.80   2.100     5.25    21.56
          ================================================
          ID = 1 (0038):    81.20   2.617     5.25    20.82

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (6206) |   Area    (ha)=   1.50   Curve Number   (CN)= 62.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.30

     Unit Hyd Qpeak  (cms)=   0.191

     PEAK FLOW       (cms)=   0.034 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  15.201
     TOTAL RAINFALL   (mm)=  62.710
     RUNOFF COEFFICIENT   =   0.242

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

-------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (6205) |   Area    (ha)=   1.90   Curve Number   (CN)= 62.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.26

     Unit Hyd Qpeak  (cms)=   0.279

     PEAK FLOW       (cms)=   0.044 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  14.935
     TOTAL RAINFALL   (mm)=  62.710
     RUNOFF COEFFICIENT   =   0.238

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

-------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (6204) |   Area    (ha)=   1.00   Curve Number   (CN)= 62.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.25

     Unit Hyd Qpeak  (cms)=   0.153

     PEAK FLOW       (cms)=   0.023 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  14.838
     TOTAL RAINFALL   (mm)=  62.710
     RUNOFF COEFFICIENT   =   0.237

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

-------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (6203) |   Area    (ha)=   1.40
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  30.00
--------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.42         0.98
     Dep. Storage     (mm)=      1.00         1.50
     Average Slope     (%)=      1.00         1.50
     Length            (m)=     96.61        40.00
     Mannings n            =     0.013        0.250

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


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

     Max.Eff.Inten.(mm/hr)=      28.84        20.66
                over (min)        5.00        20.00
     Storage Coeff.  (min)=       4.11 (ii)   18.57 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=       0.24         0.06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.03         0.05          0.082 (iii)
     TIME TO PEAK    (hrs)=       5.17         5.33          5.25
     RUNOFF VOLUME    (mm)=      61.71        35.33         43.24
     TOTAL RAINFALL   (mm)=      62.71        62.71         62.71
     RUNOFF COEFFICIENT   =       0.98         0.56          0.69

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

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

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--------------------
| ADD HYD   (6252) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (6203):     1.40   0.082     5.25    43.24
        + ID2= 2 (6204):     1.00   0.023     5.25    14.84
          ================================================
          ID = 3 (6252):     2.40   0.105     5.25    31.40

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (6252) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (6252):     2.40   0.105     5.25    31.40
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          + ID2= 2 (6205):     1.90   0.044     5.25    14.94
            ================================================
            ID = 1 (6252):     4.30   0.150     5.25    24.13

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (6252) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (6252):     4.30   0.150     5.25    24.13
       + ID2= 2 (6206):     1.50   0.034     5.25    15.20
         ================================================
         ID = 3 (6252):     5.80   0.184     5.25    21.82

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (6202) |   Area    (ha)=   7.10   Curve Number   (CN)= 64.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.76

         NOTE:  RAINFALL WAS TRANSFORMED TO  15.0 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
               0.250    0.00 | 3.500   10.66 | 6.750    4.39 | 10.00    0.63
               0.500    0.63 | 3.750   10.66 | 7.000    4.39 | 10.25    0.63
               0.750    0.63 | 4.000   10.66 | 7.250    4.39 | 10.50    0.63
               1.000    0.63 | 4.250   10.66 | 7.500    2.51 | 10.75    0.63
               1.250    0.63 | 4.500   28.84 | 7.750    2.51 | 11.00    0.63
               1.500    0.63 | 4.750   28.84 | 8.000    2.51 | 11.25    0.63
               1.750    0.63 | 5.000   28.84 | 8.250    2.51 | 11.50    0.63
               2.000    0.63 | 5.250   28.84 | 8.500    1.25 | 11.75    0.63
               2.250    0.63 | 5.500    8.15 | 8.750    1.25 | 12.00    0.63
               2.500    3.76 | 5.750    8.15 | 9.000    1.25 | 12.25    0.63
               2.750    3.76 | 6.000    8.15 | 9.250    1.25 |
               3.000    3.76 | 6.250    8.15 | 9.500    0.63 |
               3.250    3.76 | 6.500    4.39 | 9.750    0.63 |

     Unit Hyd Qpeak  (cms)=   0.357

     PEAK FLOW       (cms)=   0.111 (i)
     TIME TO PEAK    (hrs)=   5.750
     RUNOFF VOLUME    (mm)=  16.591
     TOTAL RAINFALL   (mm)=  62.710
     RUNOFF COEFFICIENT   =   0.265

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (6201) |   Area    (ha)=   2.50
|ID= 1 DT=15.0 min |   Total Imp(%)=  60.00   Dir. Conn.(%)=  60.00
--------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.50         1.00
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.20
     Length            (m)=     129.10        50.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      28.84        12.47
               over (min)        15.00        30.00
     Storage Coeff.  (min)=       4.90 (ii)   22.93 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.11         0.04
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.12         0.03      0.148 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25       5.25
     RUNOFF VOLUME    (mm)=      61.71        22.03      45.83
     TOTAL RAINFALL   (mm)=      62.71        62.71      62.71
     RUNOFF COEFFICIENT   =       0.98         0.35       0.73

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  70.0    Ia = Dep. 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   (0039) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (6201):     2.50   0.148     5.25    45.83
       + ID2= 2 (6202):     7.10   0.111     5.75    16.59
         ================================================
         ID = 3 (0039):     9.60   0.237     5.25    24.21

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0039) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 3 (0039):     9.60   0.237     5.25    24.21
       + ID2= 2 (6252):     5.80   0.184     5.25    21.82
         ================================================
         ID = 1 (0039):    15.40   0.420     5.25    23.31

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:  14 **
  ****************************

--------------------
|    READ STORM    |    Filename: C:\Users\BAbadi\AppD
|                  |              ata\Local\Temp\
|                  |              e8badc81-9aa9-46ad-ba9e-b53b8a08e161\f7e13239
| Ptotal= 73.10 mm |    Comments: 25yr/12hr
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.25    0.00 |  3.50   12.43 |  6.75    5.12 | 10.00    0.73
               0.50    0.73 |  3.75   12.43 |  7.00    5.12 | 10.25    0.73
               0.75    0.73 |  4.00   12.43 |  7.25    5.12 | 10.50    0.73
               1.00    0.73 |  4.25   12.43 |  7.50    2.92 | 10.75    0.73
               1.25    0.73 |  4.50   33.63 |  7.75    2.92 | 11.00    0.73
               1.50    0.73 |  4.75   33.63 |  8.00    2.92 | 11.25    0.73
               1.75    0.73 |  5.00   33.63 |  8.25    2.92 | 11.50    0.73
               2.00    0.73 |  5.25   33.63 |  8.50    1.46 | 11.75    0.73
               2.25    0.73 |  5.50    9.50 |  8.75    1.46 | 12.00    0.73
               2.50    4.39 |  5.75    9.50 |  9.00    1.46 | 12.25    0.73
               2.75    4.39 |  6.00    9.50 |  9.25    1.46 |
               3.00    4.39 |  6.25    9.50 |  9.50    0.73 |
               3.25    4.39 |  6.50    5.12 |  9.75    0.73 |

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (6208) |   Area    (ha)=  30.80   Curve Number   (CN)= 62.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.85

     Unit Hyd Qpeak  (cms)=   1.384

     PEAK FLOW       (cms)=   0.565 (i)
     TIME TO PEAK    (hrs)=   5.750
     RUNOFF VOLUME    (mm)=  20.714
     TOTAL RAINFALL   (mm)=  73.100
     RUNOFF COEFFICIENT   =   0.283

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (6209) |   Area    (ha)=  10.00   Curve Number   (CN)= 66.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.63

     Unit Hyd Qpeak  (cms)=   0.606

     PEAK FLOW       (cms)=   0.247 (i)
     TIME TO PEAK    (hrs)=   5.500
```

```
     RUNOFF VOLUME    (mm)=  23.274
     TOTAL RAINFALL   (mm)=  73.100
     RUNOFF COEFFICIENT   =   0.318

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (6207)  |   Area    (ha)=  11.10   Curve Number   (CN)= 65.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.69

     Unit Hyd Qpeak  (cms)=   0.614

     PEAK FLOW       (cms)=   0.251 (i)
     TIME TO PEAK    (hrs)=   5.500
     RUNOFF VOLUME    (mm)=  22.612
     TOTAL RAINFALL   (mm)=  73.100
     RUNOFF COEFFICIENT   =   0.309

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (6211)  |   Area    (ha)=   4.80   Curve Number   (CN)= 66.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.22

     Unit Hyd Qpeak  (cms)=   0.833

     PEAK FLOW       (cms)=   0.167 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  21.547
     TOTAL RAINFALL   (mm)=  73.100
     RUNOFF COEFFICIENT   =   0.295

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (6210)  |   Area    (ha)=   6.80   Curve Number   (CN)= 66.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.36

     Unit Hyd Qpeak  (cms)=   0.721

     PEAK FLOW       (cms)=   0.219 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  22.999
     TOTAL RAINFALL   (mm)=  73.100
     RUNOFF COEFFICIENT   =   0.315

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

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-------------------
| ADD HYD   (6251) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (6207):    11.10   0.251     5.50    22.61
       + ID2= 2 (6209):    10.00   0.247     5.50    23.27
         ================================================
         ID = 3 (6251):    21.10   0.498     5.50    22.93

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| ADD HYD   (6251) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
         ID1= 3 (6251):    21.10   0.498     5.50    22.93
       + ID2= 2 (6210):     6.80   0.219     5.25    23.00
         ================================================
         ID = 1 (6251):    27.90   0.682     5.50    22.94

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| ADD HYD   (6251) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (6251):    27.90   0.682     5.50    22.94
       + ID2= 2 (6211):     4.80   0.167     5.25    21.55
         ================================================
         ID = 3 (6251):    32.70   0.824     5.25    22.74

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| ADD HYD   (6253) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (6208):    30.80   0.565     5.75    20.71
       + ID2= 2 (6251):    32.70   0.824     5.25    22.74
         ================================================
         ID = 3 (6253):    63.50   1.305     5.50    21.76

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| CALIB             |
| NASHYD    (5501)  |   Area    (ha)=  15.80   Curve Number   (CN)= 70.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.21

     Unit Hyd Qpeak  (cms)=   2.874

     PEAK FLOW       (cms)=   0.617 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  23.902
     TOTAL RAINFALL   (mm)=  73.100
     RUNOFF COEFFICIENT   =   0.327

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (5502)  |   Area    (ha)=  11.10   Curve Number   (CN)= 68.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.20

     Unit Hyd Qpeak  (cms)=   2.120

     PEAK FLOW       (cms)=   0.405 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  22.177
     TOTAL RAINFALL   (mm)=  73.100
     RUNOFF COEFFICIENT   =   0.303

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (5504)  |   Area    (ha)=  34.60   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.35

     Unit Hyd Qpeak  (cms)=   3.776

     PEAK FLOW       (cms)=   1.540 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  30.806
     TOTAL RAINFALL   (mm)=  73.100
     RUNOFF COEFFICIENT   =   0.421

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (5507)  |   Area    (ha)=   7.70   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.22

     Unit Hyd Qpeak  (cms)=   1.337

     PEAK FLOW       (cms)=   0.361 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  28.904
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     TOTAL RAINFALL   (mm)=  73.100
     RUNOFF COEFFICIENT   =   0.395

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (5508)  |   Area    (ha)=   1.30   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.08

     Unit Hyd Qpeak  (cms)=   0.621

     PEAK FLOW       (cms)=   0.017 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=   7.426
     TOTAL RAINFALL   (mm)=  73.100
     RUNOFF COEFFICIENT   =   0.102

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

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-------------------
| ADD HYD   (5550) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (5502):    11.10   0.405     5.25    22.18
       + ID2= 2 (5504):    34.60   1.540     5.25    30.81
         ================================================
         ID = 3 (5550):    45.70   1.944     5.25    28.71

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| ADD HYD   (5550) |
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 3 (5550):    45.70   1.944     5.25    28.71
       + ID2= 2 (5507):     7.70   0.361     5.25    28.90
         ================================================
         ID = 1 (5550):    53.40   2.305     5.25    28.74

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| ADD HYD   (5550) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (5550):    53.40   2.305     5.25    28.74
       + ID2= 2 (5508):     1.30   0.017     5.25     7.43
         ================================================
         ID = 3 (5550):    54.70   2.322     5.25    28.23

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| CALIB             |
| NASHYD    (5505)  |   Area    (ha)=   2.50   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.15

     Unit Hyd Qpeak  (cms)=   0.637

     PEAK FLOW       (cms)=   0.101 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  23.858
     TOTAL RAINFALL   (mm)=  73.100
     RUNOFF COEFFICIENT   =   0.326

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (5506)  |   Area    (ha)=   6.60   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.19

     Unit Hyd Qpeak  (cms)=   1.327

     PEAK FLOW       (cms)=   0.300 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  27.501
     TOTAL RAINFALL   (mm)=  73.100
     RUNOFF COEFFICIENT   =   0.376

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

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-------------------
| ADD HYD   (5551) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (5505):     2.50   0.101     5.25    23.86
       + ID2= 2 (5506):     6.60   0.300     5.25    27.50
         ================================================
         ID = 3 (5551):     9.10   0.401     5.25    26.50

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| ADD HYD   (5552) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (5550):    54.70   2.322     5.25    28.23
       + ID2= 2 (5551):     9.10   0.401     5.25    26.50
         ================================================
         ID = 3 (5552):    63.80   2.722     5.25    27.98

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (5503)  |   Area    (ha)=   1.60   Curve Number   (CN)= 68.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.19

     Unit Hyd Qpeak  (cms)=   0.322

     PEAK FLOW       (cms)=   0.058 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  21.737
     TOTAL RAINFALL   (mm)=  73.100
     RUNOFF COEFFICIENT   =   0.297

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

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-------------------
| ADD HYD   (0038) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (5501):    15.80   0.617     5.25    23.90
       + ID2= 2 (5503):     1.60   0.058     5.25    21.74
         ================================================
         ID = 3 (0038):    17.40   0.674     5.25    23.70

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

-------------------
| ADD HYD   (0038) |
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 3 (0038):    17.40   0.674     5.25    23.70
       + ID2= 2 (5552):    63.80   2.722     5.25    27.98
         ================================================
         ID = 1 (0038):    81.20   3.397     5.25    27.07

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (6206)  |   Area    (ha)=   1.50   Curve Number   (CN)= 62.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.30

     Unit Hyd Qpeak  (cms)=   0.191
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     PEAK FLOW      (cms)=   0.045 (i)
     TIME TO PEAK   (hrs)=   5.250
     RUNOFF VOLUME   (mm)=  20.185
     TOTAL RAINFALL  (mm)=  73.100
     RUNOFF COEFFICIENT  =   0.276

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

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| NASHYD    (6205) |   Area    (ha)=   1.90   Curve Number   (CN)= 62.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.26

     Unit Hyd Qpeak  (cms)=   0.279

     PEAK FLOW      (cms)=   0.059 (i)
     TIME TO PEAK   (hrs)=   5.250
     RUNOFF VOLUME   (mm)=  19.832
     TOTAL RAINFALL  (mm)=  73.100
     RUNOFF COEFFICIENT  =   0.271

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

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| NASHYD    (6204) |   Area    (ha)=   1.00   Curve Number   (CN)= 62.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.25

     Unit Hyd Qpeak  (cms)=   0.153

     PEAK FLOW      (cms)=   0.031 (i)
     TIME TO PEAK   (hrs)=   5.250
     RUNOFF VOLUME   (mm)=  19.702
     TOTAL RAINFALL  (mm)=  73.100
     RUNOFF COEFFICIENT  =   0.270

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

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD  (6203) |   Area    (ha)=   1.40
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  30.00
--------------------

                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.42         0.98
     Dep. Storage     (mm)=      1.00         1.50
     Average Slope     (%)=      1.00         1.50
     Length            (m)=     96.61        40.00
     Mannings n            =     0.013        0.250

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

                      ---- TRANSFORMED HYETOGRAPH ----
  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
 0.083    0.00 | 3.167    4.39 | 6.250    9.50 |  9.33    0.73
 0.167    0.00 | 3.250    4.39 | 6.333    5.12 |  9.42    0.73
 0.250    0.00 | 3.333   12.43 | 6.417    5.12 |  9.50    0.73
 0.333    0.73 | 3.417   12.43 | 6.500    5.12 |  9.58    0.73
 0.417    0.73 | 3.500   12.43 | 6.583    5.12 |  9.67    0.73
 0.500    0.73 | 3.583   12.43 | 6.667    5.12 |  9.75    0.73
 0.583    0.73 | 3.667   12.43 | 6.750    5.12 |  9.83    0.73
 0.667    0.73 | 3.750   12.43 | 6.833    5.12 |  9.92    0.73
 0.750    0.73 | 3.833   12.43 | 6.917    5.12 | 10.00    0.73
 0.833    0.73 | 3.917   12.43 | 7.000    5.12 | 10.08    0.73
 0.917    0.73 | 4.000   12.43 | 7.083    5.12 | 10.17    0.73
 1.000    0.73 | 4.083   12.43 | 7.167    5.12 | 10.25    0.73
 1.083    0.73 | 4.167   12.43 | 7.250    5.12 | 10.33    0.73
 1.167    0.73 | 4.250   12.43 | 7.333    2.92 | 10.42    0.73
 1.250    0.73 | 4.333   33.63 | 7.417    2.92 | 10.50    0.73
 1.333    0.73 | 4.417   33.63 | 7.500    2.92 | 10.58    0.73
 1.417    0.73 | 4.500   33.63 | 7.583    2.92 | 10.67    0.73
 1.500    0.73 | 4.583   33.63 | 7.667    2.92 | 10.75    0.73
 1.583    0.73 | 4.667   33.63 | 7.750    2.92 | 10.83    0.73
 1.667    0.73 | 4.750   33.63 | 7.833    2.92 | 10.92    0.73
 1.750    0.73 | 4.833   33.63 | 7.917    2.92 | 11.00    0.73
 1.833    0.73 | 4.917   33.63 | 8.000    2.92 | 11.08    0.73
 1.917    0.73 | 5.000   33.63 | 8.083    2.92 | 11.17    0.73
 2.000    0.73 | 5.083   33.63 | 8.167    2.92 | 11.25    0.73
 2.083    0.73 | 5.167   33.63 | 8.250    2.92 | 11.33    0.73
 2.167    0.73 | 5.250   33.63 | 8.333    1.46 | 11.42    0.73
 2.250    0.73 | 5.333    9.50 | 8.417    1.46 | 11.50    0.73
 2.333    4.39 | 5.417    9.50 | 8.500    1.46 | 11.58    0.73
 2.417    4.39 | 5.500    9.50 | 8.583    1.46 | 11.67    0.73
 2.500    4.39 | 5.583    9.50 | 8.667    1.46 | 11.75    0.73
 2.583    4.39 | 5.667    9.50 | 8.750    1.46 | 11.83    0.73
 2.667    4.39 | 5.750    9.50 | 8.833    1.46 | 11.92    0.73
 2.750    4.39 | 5.833    9.50 | 8.917    1.46 | 12.00    0.73
 2.833    4.39 | 5.917    9.50 | 9.000    1.46 | 12.08    0.73
 2.917    4.39 | 6.000    9.50 | 9.083    1.46 | 12.17    0.73
 3.000    4.39 | 6.083    9.50 | 9.167    1.46 | 12.25    0.73
 3.083    4.39 | 6.167    9.50 | 9.250    1.46 |

     Max.Eff.Inten.(mm/hr)=      33.63        25.46
               over (min)        5.00        20.00
     Storage Coeff.  (min)=      3.87 (ii)   17.17 (ii)
     Unit Hyd. Tpeak (min)=      5.00        20.00
     Unit Hyd. peak  (cms)=      0.25         0.06
                                                        *TOTALS*
     PEAK FLOW      (cms)=       0.04         0.06        0.100 (iii)
     TIME TO PEAK   (hrs)=       5.08         5.25         5.25
     RUNOFF VOLUME   (mm)=      72.10        44.03        52.45
     TOTAL RAINFALL  (mm)=      73.10        73.10        73.10
     RUNOFF COEFFICIENT  =       0.99         0.60         0.72

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

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

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

--------------------
| ADD HYD   (6252) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (6203):     1.40   0.100     5.25    52.45
       + ID2= 2 (6204):     1.00   0.031     5.25    19.70
         ================================================
         ID = 3 (6252):     2.40   0.131     5.25    38.80

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (6252) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 3 (6252):     2.40   0.131     5.25    38.80
       + ID2= 2 (6205):     1.90   0.059     5.25    19.83
         ================================================
         ID = 1 (6252):     4.30   0.190     5.25    30.42

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (6252) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (6252):     4.30   0.190     5.25    30.42
       + ID2= 2 (6206):     1.50   0.045     5.25    20.19
         ================================================
         ID = 3 (6252):     5.80   0.235     5.25    27.77

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| NASHYD    (6202) |   Area    (ha)=   7.10   Curve Number   (CN)= 64.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.76

         NOTE:  RAINFALL WAS TRANSFORMED TO  15.0 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
```

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.250 | 0.00 | 3.500 | 12.43 | 6.750 | 5.12 | 10.00 | 0.73 |
| 0.500 | 0.73 | 3.750 | 12.43 | 7.000 | 5.12 | 10.25 | 0.73 |
| 0.750 | 0.73 | 4.000 | 12.43 | 7.250 | 5.12 | 10.50 | 0.73 |
| 1.000 | 0.73 | 4.250 | 12.43 | 7.500 | 2.92 | 10.75 | 0.73 |
| 1.250 | 0.73 | 4.500 | 33.63 | 7.750 | 2.92 | 11.00 | 0.73 |
| 1.500 | 0.73 | 4.750 | 33.63 | 8.000 | 2.92 | 11.25 | 0.73 |
| 1.750 | 0.73 | 5.000 | 33.63 | 8.250 | 2.92 | 11.50 | 0.73 |
| 2.000 | 0.73 | 5.250 | 33.63 | 8.500 | 1.46 | 11.75 | 0.73 |
| 2.250 | 0.73 | 5.500 | 9.50 | 8.750 | 1.46 | 12.00 | 0.73 |
| 2.500 | 4.39 | 5.750 | 9.50 | 9.000 | 1.46 | 12.25 | 0.73 |
| 2.750 | 4.39 | 6.000 | 9.50 | 9.250 | 1.46 | | |
| 3.000 | 4.39 | 6.250 | 9.50 | 9.500 | 0.73 | | |
| 3.250 | 4.39 | 6.500 | 5.12 | 9.750 | 0.73 | | |

Unit Hyd Qpeak (cms)= 0.357

PEAK FLOW (cms)= 0.148 (i)
TIME TO PEAK (hrs)= 5.750
RUNOFF VOLUME (mm)= 21.965
TOTAL RAINFALL (mm)= 73.100
RUNOFF COEFFICIENT = 0.300

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

---

| CALIB | |
|---|---|
| STANDHYD (6201) | Area (ha)= 2.50 |
| ID= 1 DT=15.0 min | Total Imp(%)= 60.00 Dir. Conn.(%)= 60.00 |

| | IMPERVIOUS | PERVIOUS (i) |
|---|---|---|
| Surface Area (ha)= | 1.50 | 1.00 |
| Dep. Storage (mm)= | 1.00 | 1.50 |
| Average Slope (%)= | 1.00 | 2.20 |
| Length (m)= | 129.10 | 50.00 |
| Mannings n = | 0.013 | 0.250 |
| Max.Eff.Inten.(mm/hr)= | 33.63 | 16.07 |
| over (min) | 15.00 | 30.00 |
| Storage Coeff. (min)= | 4.60 (ii) | 20.90 (ii) |
| Unit Hyd. Tpeak (min)= | 15.00 | 30.00 |
| Unit Hyd. peak (cms)= | 0.11 | 0.05 |

| | *TOTALS* |
|---|---|
| PEAK FLOW (cms)= | 0.14 0.04 0.177 (iii) |
| TIME TO PEAK (hrs)= | 5.25 5.25 5.25 |
| RUNOFF VOLUME (mm)= | 72.10 28.41 54.62 |
| TOTAL RAINFALL (mm)= | 73.10 73.10 73.10 |
| RUNOFF COEFFICIENT = | 0.99 0.39 0.75 |

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (0039) | | AREA | QPEAK | TPEAK | R.V. |
|---|---|---|---|---|---|
| 1 + 2 = 3 | | (ha) | (cms) | (hrs) | (mm) |
| | ID1= 1 (6201): | 2.50 | 0.177 | 5.25 | 54.62 |
| | + ID2= 2 (6202): | 7.10 | 0.148 | 5.75 | 21.97 |
| | ID = 3 (0039): | 9.60 | 0.297 | 5.25 | 30.47 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

| ADD HYD (0039) | | AREA | QPEAK | TPEAK | R.V. |
|---|---|---|---|---|---|
| 3 + 2 = 1 | | (ha) | (cms) | (hrs) | (mm) |
| | ID1= 3 (0039): | 9.60 | 0.297 | 5.25 | 30.47 |
| | + ID2= 2 (6252): | 5.80 | 0.235 | 5.25 | 27.77 |
| | ID = 1 (0039): | 15.40 | 0.533 | 5.25 | 29.45 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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**********
** SIMULATION NUMBER: 16 **
**********

| READ STORM | Filename: C:\Users\BAbadi\AppData\Local\Temp\e8badc81-9aa9-46ad-ba9e-b53b8a08e161\8ebed5ab |
|---|---|
| Ptotal= 80.82 mm | Comments: 50yr/12hr |

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|---|---|---|---|---|---|---|---|
| 0.25 | 0.00 | 3.50 | 13.74 | 6.75 | 5.66 | 10.00 | 0.81 |
| 0.50 | 0.81 | 3.75 | 13.74 | 7.00 | 5.66 | 10.25 | 0.81 |
| 0.75 | 0.81 | 4.00 | 13.74 | 7.25 | 5.66 | 10.50 | 0.81 |
| 1.00 | 0.81 | 4.25 | 13.74 | 7.50 | 3.23 | 10.75 | 0.81 |
| 1.25 | 0.81 | 4.50 | 37.17 | 7.75 | 3.23 | 11.00 | 0.81 |
| 1.50 | 0.81 | 4.75 | 37.17 | 8.00 | 3.23 | 11.25 | 0.81 |
| 1.75 | 0.81 | 5.00 | 37.17 | 8.25 | 3.23 | 11.50 | 0.81 |
| 2.00 | 0.81 | 5.25 | 37.17 | 8.50 | 1.62 | 11.75 | 0.81 |
| 2.25 | 0.81 | 5.50 | 10.50 | 8.75 | 1.62 | 12.00 | 0.81 |
| 2.50 | 4.85 | 5.75 | 10.50 | 9.00 | 1.62 | 12.25 | 0.81 |
| 2.75 | 4.85 | 6.00 | 10.50 | 9.25 | 1.62 | | |
| 3.00 | 4.85 | 6.25 | 10.50 | 9.50 | 0.81 | | |
| 3.25 | 4.85 | 6.50 | 5.66 | 9.75 | 0.81 | | |

---

| CALIB | |
|---|---|
| NASHYD (6208) | Area (ha)= 30.80 Curve Number (CN)= 62.0 |
| ID= 1 DT=15.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00 |
| | U.H. Tp(hrs)= 0.85 |

Unit Hyd Qpeak (cms)= 1.384

PEAK FLOW (cms)= 0.681 (i)
TIME TO PEAK (hrs)= 5.750
RUNOFF VOLUME (mm)= 24.820
TOTAL RAINFALL (mm)= 80.820
RUNOFF COEFFICIENT = 0.307

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

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| CALIB | |
|---|---|
| NASHYD (6209) | Area (ha)= 10.00 Curve Number (CN)= 66.0 |
| ID= 1 DT=15.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00 |
| | U.H. Tp(hrs)= 0.63 |

Unit Hyd Qpeak (cms)= 0.606

PEAK FLOW (cms)= 0.296 (i)
TIME TO PEAK (hrs)= 5.500
RUNOFF VOLUME (mm)= 27.772
TOTAL RAINFALL (mm)= 80.820
RUNOFF COEFFICIENT = 0.344

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

---

| CALIB | |
|---|---|
| NASHYD (6207) | Area (ha)= 11.10 Curve Number (CN)= 65.0 |
| ID= 1 DT=15.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00 |
| | U.H. Tp(hrs)= 0.69 |

Unit Hyd Qpeak (cms)= 0.614

PEAK FLOW (cms)= 0.301 (i)
TIME TO PEAK (hrs)= 5.500
RUNOFF VOLUME (mm)= 27.011
TOTAL RAINFALL (mm)= 80.820
RUNOFF COEFFICIENT = 0.334

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

---

| CALIB | |
|---|---|
| NASHYD (6211) | Area (ha)= 4.80 Curve Number (CN)= 66.0 |
| ID= 1 DT=15.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00 |
| | U.H. Tp(hrs)= 0.22 |

Unit Hyd Qpeak (cms)= 0.833

```
     PEAK FLOW      (cms)=   0.199 (i)
     TIME TO PEAK   (hrs)=   5.250
     RUNOFF VOLUME   (mm)=  25.711
     TOTAL RAINFALL  (mm)=  80.820
     RUNOFF COEFFICIENT   =   0.318

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (6210)  |   Area    (ha)=   6.80   Curve Number   (CN)= 66.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.36

     Unit Hyd Qpeak  (cms)=   0.721

     PEAK FLOW      (cms)=   0.262 (i)
     TIME TO PEAK   (hrs)=   5.250
     RUNOFF VOLUME   (mm)=  27.444
     TOTAL RAINFALL  (mm)=  80.820
     RUNOFF COEFFICIENT   =   0.340

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

--------------------------------------------------------------------------------
-------------------
| ADD HYD   (6251)|
|   1 +  2 =  3   |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (6207):    11.10   0.301     5.50    27.01
       + ID2= 2 (6209):    10.00   0.296     5.50    27.77
         ================================================
         ID = 3 (6251):    21.10   0.598     5.50    27.37

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
-------------------
| ADD HYD   (6251)|
|   3 +  2 =  1   |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
         ID1= 3 (6251):    21.10   0.598     5.50    27.37
       + ID2= 2 (6210):     6.80   0.262     5.25    27.44
         ================================================
         ID = 1 (6251):    27.90   0.817     5.50    27.39

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
-------------------
| ADD HYD   (6251)|
|   1 +  2 =  3   |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (6251):    27.90   0.817     5.50    27.39
       + ID2= 2 (6211):     4.80   0.199     5.25    25.71
         ================================================
         ID = 3 (6251):    32.70   0.990     5.25    27.14

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
-------------------
| ADD HYD   (6253)|
|   1 +  2 =  3   |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (6208):    30.80   0.681     5.75    24.82
       + ID2= 2 (6251):    32.70   0.990     5.25    27.14
         ================================================
         ID = 3 (6253):    63.50   1.568     5.50    26.02

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (5501)  |   Area    (ha)=  15.80   Curve Number   (CN)= 70.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.21

     Unit Hyd Qpeak  (cms)=   2.874

     PEAK FLOW      (cms)=   0.730 (i)
     TIME TO PEAK   (hrs)=   5.250
     RUNOFF VOLUME   (mm)=  28.389
     TOTAL RAINFALL  (mm)=  80.820
     RUNOFF COEFFICIENT   =   0.351

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (5502)  |   Area    (ha)=  11.10   Curve Number   (CN)= 68.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.20

     Unit Hyd Qpeak  (cms)=   2.120

     PEAK FLOW      (cms)=   0.480 (i)
     TIME TO PEAK   (hrs)=   5.250
     RUNOFF VOLUME   (mm)=  26.404
     TOTAL RAINFALL  (mm)=  80.820
     RUNOFF COEFFICIENT   =   0.327

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (5504)  |   Area    (ha)=  34.60   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.35

     Unit Hyd Qpeak  (cms)=   3.776

     PEAK FLOW      (cms)=   1.815 (i)
     TIME TO PEAK   (hrs)=   5.250
     RUNOFF VOLUME   (mm)=  36.297
     TOTAL RAINFALL  (mm)=  80.820
     RUNOFF COEFFICIENT   =   0.449

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (5507)  |   Area    (ha)=   7.70   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.22

     Unit Hyd Qpeak  (cms)=   1.337

     PEAK FLOW      (cms)=   0.423 (i)
     TIME TO PEAK   (hrs)=   5.250
     RUNOFF VOLUME   (mm)=  34.056
     TOTAL RAINFALL  (mm)=  80.820
     RUNOFF COEFFICIENT   =   0.421

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (5508)  |   Area    (ha)=   1.30   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.08

     Unit Hyd Qpeak  (cms)=   0.621

     PEAK FLOW      (cms)=   0.019 (i)
     TIME TO PEAK   (hrs)=   5.250
     RUNOFF VOLUME   (mm)=   8.749
     TOTAL RAINFALL  (mm)=  80.820
     RUNOFF COEFFICIENT   =   0.108

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

--------------------------------------------------------------------------------
-------------------
| ADD HYD   (5550)|
|   1 +  2 =  3   |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (5502):    11.10   0.480     5.25    26.40
       + ID2= 2 (5504):    34.60   1.815     5.25    36.30
         ================================================
         ID = 3 (5550):    45.70   2.295     5.25    33.89
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ADD HYD (5550) | | AREA | QPEAK | TPEAK | R.V. |
|---|---|---|---|---|---|
| 3 + 2 = 1 | | (ha) | (cms) | (hrs) | (mm) |
| | ID1= 3 (5550): | 45.70 | 2.295 | 5.25 | 33.89 |
| | + ID2= 2 (5507): | 7.70 | 0.423 | 5.25 | 34.06 |
| | ID = 1 (5550): | 53.40 | 2.718 | 5.25 | 33.92 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

| ADD HYD (5550) | | AREA | QPEAK | TPEAK | R.V. |
|---|---|---|---|---|---|
| 1 + 2 = 3 | | (ha) | (cms) | (hrs) | (mm) |
| | ID1= 1 (5550): | 53.40 | 2.718 | 5.25 | 33.92 |
| | + ID2= 2 (5508): | 1.30 | 0.019 | 5.25 | 8.75 |
| | ID = 3 (5550): | 54.70 | 2.737 | 5.25 | 33.32 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

| CALIB | | | | |
|---|---|---|---|---|
| NASHYD (5505) | Area (ha)= 2.50 | Curve Number (CN)= 76.0 | | |
| ID= 1 DT=15.0 min | Ia (mm)= 5.00 | # of Linear Res.(N)= 3.00 | | |
| | U.H. Tp(hrs)= 0.15 | | | |

Unit Hyd Qpeak (cms)= 0.637

PEAK FLOW (cms)= 0.118 (i)
TIME TO PEAK (hrs)= 5.250
RUNOFF VOLUME (mm)= 28.110
TOTAL RAINFALL (mm)= 80.820
RUNOFF COEFFICIENT = 0.348

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

---

| CALIB | | | | |
|---|---|---|---|---|
| NASHYD (5506) | Area (ha)= 6.60 | Curve Number (CN)= 76.0 | | |
| ID= 1 DT=15.0 min | Ia (mm)= 5.00 | # of Linear Res.(N)= 3.00 | | |
| | U.H. Tp(hrs)= 0.19 | | | |

Unit Hyd Qpeak (cms)= 1.327

PEAK FLOW (cms)= 0.351 (i)
TIME TO PEAK (hrs)= 5.250
RUNOFF VOLUME (mm)= 32.403
TOTAL RAINFALL (mm)= 80.820
RUNOFF COEFFICIENT = 0.401

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

---

| ADD HYD (5551) | | AREA | QPEAK | TPEAK | R.V. |
|---|---|---|---|---|---|
| 1 + 2 = 3 | | (ha) | (cms) | (hrs) | (mm) |
| | ID1= 1 (5505): | 2.50 | 0.118 | 5.25 | 28.11 |
| | + ID2= 2 (5506): | 6.60 | 0.351 | 5.25 | 32.40 |
| | ID = 3 (5551): | 9.10 | 0.469 | 5.25 | 31.22 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ADD HYD (5552) | | AREA | QPEAK | TPEAK | R.V. |
|---|---|---|---|---|---|
| 1 + 2 = 3 | | (ha) | (cms) | (hrs) | (mm) |
| | ID1= 1 (5550): | 54.70 | 2.737 | 5.25 | 33.32 |
| | + ID2= 2 (5551): | 9.10 | 0.469 | 5.25 | 31.22 |
| | ID = 3 (5552): | 63.80 | 3.206 | 5.25 | 33.02 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

| CALIB | | | | |
|---|---|---|---|---|
| NASHYD (5503) | Area (ha)= 1.60 | Curve Number (CN)= 68.0 | | |
| ID= 1 DT=15.0 min | Ia (mm)= 5.00 | # of Linear Res.(N)= 3.00 | | |
| | U.H. Tp(hrs)= 0.19 | | | |

Unit Hyd Qpeak (cms)= 0.322

PEAK FLOW (cms)= 0.068 (i)
TIME TO PEAK (hrs)= 5.250
RUNOFF VOLUME (mm)= 25.880
TOTAL RAINFALL (mm)= 80.820
RUNOFF COEFFICIENT = 0.320

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

---

| ADD HYD (0038) | | AREA | QPEAK | TPEAK | R.V. |
|---|---|---|---|---|---|
| 1 + 2 = 3 | | (ha) | (cms) | (hrs) | (mm) |
| | ID1= 1 (5501): | 15.80 | 0.730 | 5.25 | 28.39 |
| | + ID2= 2 (5503): | 1.60 | 0.068 | 5.25 | 25.88 |
| | ID = 3 (0038): | 17.40 | 0.798 | 5.25 | 28.16 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

| ADD HYD (0038) | | AREA | QPEAK | TPEAK | R.V. |
|---|---|---|---|---|---|
| 3 + 2 = 1 | | (ha) | (cms) | (hrs) | (mm) |
| | ID1= 3 (0038): | 17.40 | 0.798 | 5.25 | 28.16 |
| | + ID2= 2 (5552): | 63.80 | 3.206 | 5.25 | 33.02 |
| | ID = 1 (0038): | 81.20 | 4.004 | 5.25 | 31.98 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

| CALIB | | | | |
|---|---|---|---|---|
| NASHYD (6206) | Area (ha)= 1.50 | Curve Number (CN)= 62.0 | | |
| ID= 1 DT=15.0 min | Ia (mm)= 5.00 | # of Linear Res.(N)= 3.00 | | |
| | U.H. Tp(hrs)= 0.30 | | | |

Unit Hyd Qpeak (cms)= 0.191

PEAK FLOW (cms)= 0.054 (i)
TIME TO PEAK (hrs)= 5.250
RUNOFF VOLUME (mm)= 24.187
TOTAL RAINFALL (mm)= 80.820
RUNOFF COEFFICIENT = 0.299

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

---

| CALIB | | | | |
|---|---|---|---|---|
| NASHYD (6205) | Area (ha)= 1.90 | Curve Number (CN)= 62.0 | | |
| ID= 1 DT=15.0 min | Ia (mm)= 5.00 | # of Linear Res.(N)= 3.00 | | |
| | U.H. Tp(hrs)= 0.26 | | | |

Unit Hyd Qpeak (cms)= 0.279

PEAK FLOW (cms)= 0.070 (i)
TIME TO PEAK (hrs)= 5.250
RUNOFF VOLUME (mm)= 23.763
TOTAL RAINFALL (mm)= 80.820
RUNOFF COEFFICIENT = 0.294

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

---

| CALIB | | | | |
|---|---|---|---|---|
| NASHYD (6204) | Area (ha)= 1.00 | Curve Number (CN)= 62.0 | | |
| ID= 1 DT=15.0 min | Ia (mm)= 5.00 | # of Linear Res.(N)= 3.00 | | |
| | U.H. Tp(hrs)= 0.25 | | | |

Unit Hyd Qpeak (cms)= 0.153

PEAK FLOW (cms)= 0.037 (i)
TIME TO PEAK (hrs)= 5.250
RUNOFF VOLUME (mm)= 23.608
TOTAL RAINFALL (mm)= 80.820
RUNOFF COEFFICIENT = 0.292

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

---

| CALIB STANDHYD (6203) ID= 1 DT= 5.0 min | Area (ha)= 1.40 Total Imp(%)= 30.00 Dir. Conn.(%)= 30.00 |
|---|---|

| | IMPERVIOUS | PERVIOUS (i) |
|---|---|---|
| Surface Area (ha)= | 0.42 | 0.98 |
| Dep. Storage (mm)= | 1.00 | 1.50 |
| Average Slope (%)= | 1.00 | 1.50 |
| Length (m)= | 96.61 | 40.00 |
| Mannings n = | 0.013 | 0.250 |

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

---- TRANSFORMED HYETOGRAPH ----

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

| | | | | *TOTALS* |
|---|---|---|---|---|
| Max.Eff.Inten.(mm/hr)= | 37.17 | 29.06 | | |
| over (min) | 5.00 | 20.00 | | |
| Storage Coeff. (min)= | 3.72 (ii) | 16.33 (ii) | | |
| Unit Hyd. Tpeak (min)= | 5.00 | 20.00 | | |
| Unit Hyd. peak (cms)= | 0.25 | 0.06 | | |
| PEAK FLOW (cms)= | 0.04 | 0.07 | | 0.114 (iii) |
| TIME TO PEAK (hrs)= | 5.08 | 5.25 | | 5.25 |
| RUNOFF VOLUME (mm)= | 79.82 | 50.68 | | 59.42 |
| TOTAL RAINFALL (mm)= | 80.82 | 80.82 | | 80.82 |
| RUNOFF COEFFICIENT = | 0.99 | 0.63 | | 0.74 |

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.

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

---

| ADD HYD (6252) 1 + 2 = 3 | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 1 (6203): | 1.40 | 0.114 | 5.25 | 59.42 |
| + ID2= 2 (6204): | 1.00 | 0.037 | 5.25 | 23.61 |
| ID = 3 (6252): | 2.40 | 0.151 | 5.25 | 44.50 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

| ADD HYD (6252) 3 + 2 = 1 | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 3 (6252): | 2.40 | 0.151 | 5.25 | 44.50 |
| + ID2= 2 (6205): | 1.90 | 0.070 | 5.25 | 23.76 |
| ID = 1 (6252): | 4.30 | 0.221 | 5.25 | 35.33 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

| ADD HYD (6252) 1 + 2 = 3 | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 1 (6252): | 4.30 | 0.221 | 5.25 | 35.33 |
| + ID2= 2 (6206): | 1.50 | 0.054 | 5.25 | 24.19 |
| ID = 3 (6252): | 5.80 | 0.276 | 5.25 | 32.45 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

| CALIB NASHYD (6202) ID= 1 DT=15.0 min | Area (ha)= 7.10 Curve Number (CN)= 64.0 Ia (mm)= 5.00 # of Linear Res.(N)= 3.00 U.H. Tp(hrs)= 0.76 |
|---|---|

NOTE: RAINFALL WAS TRANSFORMED TO 15.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|---|---|---|---|---|---|---|---|
| 0.250 | 0.00 | 3.500 | 13.74 | 6.750 | 5.66 | 10.00 | 0.81 |
| 0.500 | 0.81 | 3.750 | 13.74 | 7.000 | 5.66 | 10.25 | 0.81 |
| 0.750 | 0.81 | 4.000 | 13.74 | 7.250 | 5.66 | 10.50 | 0.81 |
| 1.000 | 0.81 | 4.250 | 13.74 | 7.500 | 3.23 | 10.75 | 0.81 |
| 1.250 | 0.81 | 4.500 | 37.17 | 7.750 | 3.23 | 11.00 | 0.81 |
| 1.500 | 0.81 | 4.750 | 37.17 | 8.000 | 3.23 | 11.25 | 0.81 |
| 1.750 | 0.81 | 5.000 | 37.17 | 8.250 | 3.23 | 11.50 | 0.81 |
| 2.000 | 0.81 | 5.250 | 37.17 | 8.500 | 1.62 | 11.75 | 0.81 |
| 2.250 | 0.81 | 5.500 | 10.50 | 8.750 | 1.62 | 12.00 | 0.81 |
| 2.500 | 4.85 | 5.750 | 10.50 | 9.000 | 1.62 | 12.25 | 0.81 |
| 2.750 | 4.85 | 6.000 | 10.50 | 9.250 | 1.62 | | |
| 3.000 | 4.85 | 6.250 | 10.50 | 9.500 | 0.81 | | |
| 3.250 | 4.85 | 6.500 | 5.66 | 9.750 | 0.81 | | |

Unit Hyd Qpeak (cms)= 0.357

PEAK FLOW (cms)= 0.177 (i)
TIME TO PEAK (hrs)= 5.750
RUNOFF VOLUME (mm)= 26.266
TOTAL RAINFALL (mm)= 80.820
RUNOFF COEFFICIENT = 0.325

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

---

| CALIB STANDHYD (6201) ID= 1 DT=15.0 min | Area (ha)= 2.50 Total Imp(%)= 60.00 Dir. Conn.(%)= 60.00 |
|---|---|

| | IMPERVIOUS | PERVIOUS (i) |
|---|---|---|
| Surface Area (ha)= | 1.50 | 1.00 |

```
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.20
     Length            (m)=     129.10        50.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      37.17        19.97
                 over (min)      15.00        30.00
     Storage Coeff.  (min)=       4.42 (ii)   19.36 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.11         0.05
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.15         0.04          0.199 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25           5.25
     RUNOFF VOLUME    (mm)=      79.82        33.43          61.26
     TOTAL RAINFALL   (mm)=      80.82        80.82          80.82
     RUNOFF COEFFICIENT   =       0.99         0.41           0.76

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  70.0    Ia = Dep. 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   (0039) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (6201):     2.50   0.199     5.25    61.26
       + ID2= 2 (6202):     7.10   0.177     5.75    26.27
         ================================================
         ID = 3 (0039):     9.60   0.345     5.25    35.38

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

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```
-------------------
| ADD HYD   (0039) |
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 3 (0039):     9.60   0.345     5.25    35.38
       + ID2= 2 (6252):     5.80   0.276     5.25    32.45
         ================================================
         ID = 1 (0039):    15.40   0.621     5.25    34.28

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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  ****************************
  ** SIMULATION NUMBER:  18 **
  ****************************


-------------------
|    READ STORM    |    Filename: C:\Users\BAbadi\AppD
|                  |              ata\Local\Temp\
|                  |              e8badc81-9aa9-46ad-ba9e-b53b8a08e161\eb55db7b
| Ptotal= 88.54 mm |    Comments: 100yr/12hr
-------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.25    0.00 |  3.50   15.05 |  6.75    6.20 | 10.00    0.89
                0.50    0.89 |  3.75   15.05 |  7.00    6.20 | 10.25    0.89
                0.75    0.89 |  4.00   15.05 |  7.25    6.20 | 10.50    0.89
                1.00    0.89 |  4.25   15.05 |  7.50    3.54 | 10.75    0.89
                1.25    0.89 |  4.50   40.71 |  7.75    3.54 | 11.00    0.89
                1.50    0.89 |  4.75   40.71 |  8.00    3.54 | 11.25    0.89
                1.75    0.89 |  5.00   40.71 |  8.25    3.54 | 11.50    0.89
                2.00    0.89 |  5.25   40.71 |  8.50    1.77 | 11.75    0.89
                2.25    0.89 |  5.50   11.51 |  8.75    1.77 | 12.00    0.89
                2.50    5.31 |  5.75   11.51 |  9.00    1.77 | 12.25    0.89
                2.75    5.31 |  6.00   11.51 |  9.25    1.77 |
                3.00    5.31 |  6.25   11.51 |  9.50    0.89 |
                3.25    5.31 |  6.50    6.20 |  9.75    0.89 |
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-------------------
| CALIB            |
| NASHYD    (6208) |   Area    (ha)=  30.80   Curve Number   (CN)= 62.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.85

     Unit Hyd Qpeak  (cms)=   1.384

     PEAK FLOW       (cms)=   0.803 (i)
     TIME TO PEAK    (hrs)=   5.750
     RUNOFF VOLUME    (mm)=  29.160
     TOTAL RAINFALL   (mm)=  88.540
     RUNOFF COEFFICIENT   =   0.329

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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-------------------
| CALIB            |
| NASHYD    (6209) |   Area    (ha)=  10.00   Curve Number   (CN)= 66.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.63

     Unit Hyd Qpeak  (cms)=   0.606

     PEAK FLOW       (cms)=   0.348 (i)
     TIME TO PEAK    (hrs)=   5.500
     RUNOFF VOLUME    (mm)=  32.501
     TOTAL RAINFALL   (mm)=  88.540
     RUNOFF COEFFICIENT   =   0.367

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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-------------------
| CALIB            |
| NASHYD    (6207) |   Area    (ha)=  11.10   Curve Number   (CN)= 65.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.69

     Unit Hyd Qpeak  (cms)=   0.614

     PEAK FLOW       (cms)=   0.355 (i)
     TIME TO PEAK    (hrs)=   5.500
     RUNOFF VOLUME    (mm)=  31.643
     TOTAL RAINFALL   (mm)=  88.540
     RUNOFF COEFFICIENT   =   0.357

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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-------------------
| CALIB            |
| NASHYD    (6211) |   Area    (ha)=   4.80   Curve Number   (CN)= 66.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.22

     Unit Hyd Qpeak  (cms)=   0.833

     PEAK FLOW       (cms)=   0.232 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  30.090
     TOTAL RAINFALL   (mm)=  88.540
     RUNOFF COEFFICIENT   =   0.340

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

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```
-------------------
| CALIB            |
| NASHYD    (6210) |   Area    (ha)=   6.80   Curve Number   (CN)= 66.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.36

     Unit Hyd Qpeak  (cms)=   0.721

     PEAK FLOW       (cms)=   0.307 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  32.118
     TOTAL RAINFALL   (mm)=  88.540
     RUNOFF COEFFICIENT   =   0.363

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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-------------------
| ADD HYD   (6251) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (6207):    11.10   0.355     5.50    31.64
```

```
          + ID2= 2 (6209):    10.00   0.348     5.50    32.50
            ================================================
            ID = 3 (6251):    21.10   0.703     5.50    32.05

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| ADD HYD   (6251) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (6251):    21.10   0.703     5.50    32.05
          + ID2= 2 (6210):    6.80   0.307     5.25    32.12
            ================================================
            ID = 1 (6251):    27.90   0.960     5.50    32.07

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| ADD HYD   (6251) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (6251):    27.90   0.960     5.50    32.07
          + ID2= 2 (6211):     4.80   0.232     5.25    30.09
            ================================================
            ID = 3 (6251):    32.70   1.164     5.25    31.78

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| ADD HYD   (6253) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (6208):    30.80   0.803     5.75    29.16
          + ID2= 2 (6251):    32.70   1.164     5.25    31.78
            ================================================
            ID = 3 (6253):    63.50   1.846     5.50    30.51

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (5501) |   Area    (ha)=  15.80   Curve Number   (CN)= 70.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.21

     Unit Hyd Qpeak  (cms)=   2.874

     PEAK FLOW       (cms)=   0.847 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  33.082
     TOTAL RAINFALL   (mm)=  88.540
     RUNOFF COEFFICIENT   =   0.374

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (5502) |   Area    (ha)=  11.10   Curve Number   (CN)= 68.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.20

     Unit Hyd Qpeak  (cms)=   2.120

     PEAK FLOW       (cms)=   0.558 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  30.836
     TOTAL RAINFALL   (mm)=  88.540
     RUNOFF COEFFICIENT   =   0.348

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (5504) |   Area    (ha)=  34.60   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.35

     Unit Hyd Qpeak  (cms)=   3.776

     PEAK FLOW       (cms)=   2.099 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  41.988
     TOTAL RAINFALL   (mm)=  88.540
     RUNOFF COEFFICIENT   =   0.474

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (5507) |   Area    (ha)=   7.70   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.22

     Unit Hyd Qpeak  (cms)=   1.337

     PEAK FLOW       (cms)=   0.487 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  39.395
     TOTAL RAINFALL   (mm)=  88.540
     RUNOFF COEFFICIENT   =   0.445

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (5508) |   Area    (ha)=   1.30   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.08

     Unit Hyd Qpeak  (cms)=   0.621

     PEAK FLOW       (cms)=   0.022 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  10.121
     TOTAL RAINFALL   (mm)=  88.540
     RUNOFF COEFFICIENT   =   0.114

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

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

-------------------
| ADD HYD   (5550) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (5502):    11.10   0.558     5.25    30.84
          + ID2= 2 (5504):    34.60   2.099     5.25    41.99
            ================================================
            ID = 3 (5550):    45.70   2.657     5.25    39.28

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

-------------------
| ADD HYD   (5550) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (5550):    45.70   2.657     5.25    39.28
          + ID2= 2 (5507):     7.70   0.487     5.25    39.39
            ================================================
            ID = 1 (5550):    53.40   3.145     5.25    39.30

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

-------------------
| ADD HYD   (5550) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (5550):    53.40   3.145     5.25    39.30
          + ID2= 2 (5508):     1.30   0.022     5.25    10.12
            ================================================
            ID = 3 (5550):    54.70   3.167     5.25    38.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

```
| NASHYD    (5505) |   Area    (ha)=   2.50   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.15

     Unit Hyd Qpeak  (cms)=   0.637

     PEAK FLOW       (cms)=   0.135 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  32.517
     TOTAL RAINFALL   (mm)=  88.540
     RUNOFF COEFFICIENT   =   0.367

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (5506) |   Area    (ha)=   6.60   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.19

     Unit Hyd Qpeak  (cms)=   1.327

     PEAK FLOW       (cms)=   0.404 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  37.483
     TOTAL RAINFALL   (mm)=  88.540
     RUNOFF COEFFICIENT   =   0.423

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

--------------------------------------------------------------------------------
-------------------
| ADD HYD   (5551) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (5505):     2.50   0.135     5.25    32.52
       + ID2= 2 (5506):     6.60   0.404     5.25    37.48
         ================================================
         ID = 3 (5551):     9.10   0.539     5.25    36.12

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
-------------------
| ADD HYD   (5552) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (5550):    54.70   3.167     5.25    38.60
       + ID2= 2 (5551):     9.10   0.539     5.25    36.12
         ================================================
         ID = 3 (5552):    63.80   3.706     5.25    38.25

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (5503) |   Area    (ha)=   1.60   Curve Number   (CN)= 68.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.19

     Unit Hyd Qpeak  (cms)=   0.322

     PEAK FLOW       (cms)=   0.079 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  30.225
     TOTAL RAINFALL   (mm)=  88.540
     RUNOFF COEFFICIENT   =   0.341

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

--------------------------------------------------------------------------------
-------------------
| ADD HYD   (0038) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (5501):    15.80   0.847     5.25    33.08
       + ID2= 2 (5503):     1.60   0.079     5.25    30.23
         ================================================
         ID = 3 (0038):    17.40   0.926     5.25    32.82

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
-------------------
| ADD HYD   (0038) |
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 3 (0038):    17.40   0.926     5.25    32.82
       + ID2= 2 (5552):    63.80   3.706     5.25    38.25
         ================================================
         ID = 1 (0038):    81.20   4.633     5.25    37.08

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (6206) |   Area    (ha)=   1.50   Curve Number   (CN)= 62.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.30

     Unit Hyd Qpeak  (cms)=   0.191

     PEAK FLOW       (cms)=   0.064 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  28.416
     TOTAL RAINFALL   (mm)=  88.540
     RUNOFF COEFFICIENT   =   0.321

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (6205) |   Area    (ha)=   1.90   Curve Number   (CN)= 62.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.26

     Unit Hyd Qpeak  (cms)=   0.279

     PEAK FLOW       (cms)=   0.082 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  27.918
     TOTAL RAINFALL   (mm)=  88.540
     RUNOFF COEFFICIENT   =   0.315

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (6204) |   Area    (ha)=   1.00   Curve Number   (CN)= 62.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.25

     Unit Hyd Qpeak  (cms)=   0.153

     PEAK FLOW       (cms)=   0.044 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  27.735
     TOTAL RAINFALL   (mm)=  88.540
     RUNOFF COEFFICIENT   =   0.313

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD  (6203) |   Area    (ha)=   1.40
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  30.00
-------------------

                         IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.42         0.98
     Dep. Storage     (mm)=      1.00         1.50
     Average Slope     (%)=      1.00         1.50
     Length            (m)=     96.61        40.00
     Mannings n           =     0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
   TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
    hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
  0.083    0.00 | 3.167    5.31 | 6.250   11.51 |  9.33    0.89
  0.167    0.00 | 3.250    5.31 | 6.333    6.20 |  9.42    0.89
```

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

| | | | | *TOTALS* |
|---|---|---|---|---|
| Max.Eff.Inten.(mm/hr)= | 40.71 | 32.68 | | |
| over (min) | 5.00 | 20.00 | | |
| Storage Coeff. (min)= | 3.58 (ii) | 15.62 (ii) | | |
| Unit Hyd. Tpeak (min)= | 5.00 | 20.00 | | |
| Unit Hyd. peak (cms)= | 0.26 | 0.07 | | |
| PEAK FLOW (cms)= | 0.05 | 0.08 | | 0.128 (iii) |
| TIME TO PEAK (hrs)= | 5.08 | 5.25 | | 5.25 |
| RUNOFF VOLUME (mm)= | 87.54 | 57.45 | | 66.47 |
| TOTAL RAINFALL (mm)= | 88.54 | 88.54 | | 88.54 |
| RUNOFF COEFFICIENT = | 0.99 | 0.65 | | 0.75 |

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

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

---

ADD HYD (6252)
1 + 2 = 3

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 1 (6203): | 1.40 | 0.128 | 5.25 | 66.47 |
| + ID2= 2 (6204): | 1.00 | 0.044 | 5.25 | 27.74 |
| ID = 3 (6252): | 2.40 | 0.172 | 5.25 | 50.33 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

ADD HYD (6252)
3 + 2 = 1

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 3 (6252): | 2.40 | 0.172 | 5.25 | 50.33 |
| + ID2= 2 (6205): | 1.90 | 0.082 | 5.25 | 27.92 |
| ID = 1 (6252): | 4.30 | 0.254 | 5.25 | 40.43 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

ADD HYD (6252)

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| 1 + 2 = 3 | | | | |
| ID1= 1 (6252): | 4.30 | 0.254 | 5.25 | 40.43 |
| + ID2= 2 (6206): | 1.50 | 0.064 | 5.25 | 28.42 |
| ID = 3 (6252): | 5.80 | 0.318 | 5.25 | 37.32 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

CALIB
NASHYD (6202) | Area (ha)= 7.10 Curve Number (CN)= 64.0
ID= 1 DT=15.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.76

NOTE: RAINFALL WAS TRANSFORMED TO 15.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|---|---|---|---|---|---|---|---|
| 0.250 | 0.00 | 3.500 | 15.05 | 6.750 | 6.20 | 10.00 | 0.89 |
| 0.500 | 0.89 | 3.750 | 15.05 | 7.000 | 6.20 | 10.25 | 0.89 |
| 0.750 | 0.89 | 4.000 | 15.05 | 7.250 | 6.20 | 10.50 | 0.89 |
| 1.000 | 0.89 | 4.250 | 15.05 | 7.500 | 3.54 | 10.75 | 0.89 |
| 1.250 | 0.89 | 4.500 | 40.71 | 7.750 | 3.54 | 11.00 | 0.89 |
| 1.500 | 0.89 | 4.750 | 40.71 | 8.000 | 3.54 | 11.25 | 0.89 |
| 1.750 | 0.89 | 5.000 | 40.71 | 8.250 | 3.54 | 11.50 | 0.89 |
| 2.000 | 0.89 | 5.250 | 40.71 | 8.500 | 1.77 | 11.75 | 0.89 |
| 2.250 | 0.89 | 5.500 | 11.51 | 8.750 | 1.77 | 12.00 | 0.89 |
| 2.500 | 5.31 | 5.750 | 11.51 | 9.000 | 1.77 | 12.25 | 0.89 |
| 2.750 | 5.31 | 6.000 | 11.51 | 9.250 | 1.77 | | |
| 3.000 | 5.31 | 6.250 | 11.51 | 9.500 | 0.89 | | |
| 3.250 | 5.31 | 6.500 | 6.20 | 9.750 | 0.89 | | |

Unit Hyd Qpeak (cms)= 0.357

PEAK FLOW (cms)= 0.209 (i)
TIME TO PEAK (hrs)= 5.750
RUNOFF VOLUME (mm)= 30.800
TOTAL RAINFALL (mm)= 88.540
RUNOFF COEFFICIENT = 0.348

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

---

CALIB
STANDHYD (6201) | Area (ha)= 2.50
ID= 1 DT=15.0 min | Total Imp(%)= 60.00 Dir. Conn.(%)= 60.00

| | IMPERVIOUS | PERVIOUS (i) |
|---|---|---|
| Surface Area (ha)= | 1.50 | 1.00 |
| Dep. Storage (mm)= | 1.00 | 1.50 |
| Average Slope (%)= | 1.00 | 2.20 |
| Length (m)= | 129.10 | 50.00 |
| Mannings n = | 0.013 | 0.250 |

| | | | *TOTALS* |
|---|---|---|---|
| Max.Eff.Inten.(mm/hr)= | 40.71 | 23.00 | |
| over (min) | 15.00 | 30.00 | |
| Storage Coeff. (min)= | 4.27 (ii) | 18.38 (ii) | |
| Unit Hyd. Tpeak (min)= | 15.00 | 30.00 | |
| Unit Hyd. peak (cms)= | 0.11 | 0.05 | |
| PEAK FLOW (cms)= | 0.17 | 0.05 | 0.222 (iii) |
| TIME TO PEAK (hrs)= | 5.25 | 5.25 | 5.25 |
| RUNOFF VOLUME (mm)= | 87.54 | 38.67 | 67.99 |
| TOTAL RAINFALL (mm)= | 88.54 | 88.54 | 88.54 |
| RUNOFF COEFFICIENT = | 0.99 | 0.44 | 0.77 |

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (0039)
1 + 2 = 3

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 1 (6201): | 2.50 | 0.222 | 5.25 | 67.99 |

```
         + ID2= 2 (6202):     7.10   0.209     5.75    30.80
           ============================================
           ID = 3 (0039):     9.60   0.395     5.25    40.48

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0039) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 3 (0039):     9.60   0.395     5.25    40.48
         + ID2= 2 (6252):     5.80   0.318     5.25    37.32
           ============================================
           ID = 1 (0039):    15.40   0.712     5.25    39.29

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

 FINISH
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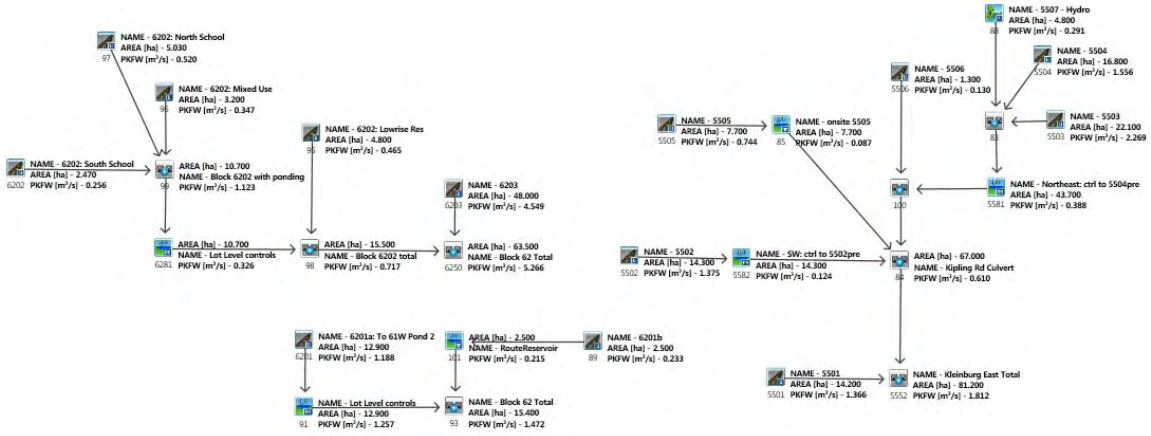
```

**W11-259**
Functional Servicing
Kleinburg-Nashville Secondary Plan Area
Post-Development Model
November 2013

## VO2 Model Schematic



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

       V    V   I    SSSSS  U   U    A    L
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        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    Company
        OOO     T      T    H   H    Y    M   M   OOO                Serial

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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 3.0\VO2\voin.dat
  Output  filename: C:\Users\BAbadi\AppData\Local\Temp\46a17cb2-9c2f-4631-a605-
0ef450f2cd3c\Scenario.out
  Summary filename: C:\Users\BAbadi\AppData\Local\Temp\46a17cb2-9c2f-4631-a605-
0ef450f2cd3c\Scenario.sum


DATE: 02/05/2013                          TIME: 09:49:00

USER:


COMMENTS: _____________________________________________________


-------------------------------------------------------------------------------------------------------
-----
  ****************************
  ** SIMULATION NUMBER:   8 **
  ****************************


-------------------
|    READ STORM     |    Filename: C:\Users\BAbadi\AppD
|                   |              ata\Local\Temp\
|                   |              46a17cb2-9c2f-4631-a605-0ef450f2cd3c\5cb52c34
| Ptotal= 42.00 mm  |    Comments: 2yr/12hr
-------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.25    0.00 |  3.50    7.14 |  6.75    2.94 | 10.00    0.42
                0.50    0.42 |  3.75    7.14 |  7.00    2.94 | 10.25    0.42
                0.75    0.42 |  4.00    7.14 |  7.25    2.94 | 10.50    0.42
                1.00    0.42 |  4.25    7.14 |  7.50    1.68 | 10.75    0.42
                1.25    0.42 |  4.50   19.32 |  7.75    1.68 | 11.00    0.42
                1.50    0.42 |  4.75   19.32 |  8.00    1.68 | 11.25    0.42
                1.75    0.42 |  5.00   19.32 |  8.25    1.68 | 11.50    0.42
                2.00    0.42 |  5.25   19.32 |  8.50    0.84 | 11.75    0.42
                2.25    0.42 |  5.50    5.46 |  8.75    0.84 | 12.00    0.42
                2.50    2.52 |  5.75    5.46 |  9.00    0.84 | 12.25    0.42
                2.75    2.52 |  6.00    5.46 |  9.25    0.84 |
                3.00    2.52 |  6.25    5.46 |  9.50    0.42 |
                3.25    2.52 |  6.50    2.94 |  9.75    0.42 |

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

-------------------
| CALIB             |
| STANDHYD  (5501)  |   Area    (ha)=  14.20
|ID= 1 DT=15.0 min  |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      7.10         7.10
     Dep. Storage     (mm)=      1.00         1.50
     Average Slope     (%)=      1.00         2.00
     Length            (m)=    307.68        40.00
     Mannings n           =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     19.32        10.96
               over (min)       15.00        30.00
     Storage Coeff.  (min)=      9.68 (ii)   26.77 (ii)
     Unit Hyd. Tpeak (min)=     15.00        30.00
     Unit Hyd. peak  (cms)=      0.09         0.04
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.38         0.17        0.549 (iii)
     TIME TO PEAK    (hrs)=      5.25         5.25         5.25
     RUNOFF VOLUME    (mm)=     41.00        19.22        30.11
     TOTAL RAINFALL   (mm)=     42.00        42.00        42.00
     RUNOFF COEFFICIENT   =      0.98         0.46         0.72

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

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

-------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD  (5502)  |   Area    (ha)=  14.30
|ID= 1 DT=15.0 min  |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      7.15         7.15
     Dep. Storage     (mm)=      1.00         1.50
     Average Slope     (%)=      1.00         2.00
     Length            (m)=    308.76        40.00
     Mannings n           =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     19.32        10.96
               over (min)       15.00        30.00
     Storage Coeff.  (min)=      9.70 (ii)   26.79 (ii)
     Unit Hyd. Tpeak (min)=     15.00        30.00
     Unit Hyd. peak  (cms)=      0.09         0.04
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.38         0.17        0.553 (iii)
     TIME TO PEAK    (hrs)=      5.25         5.25         5.25
     RUNOFF VOLUME    (mm)=     41.00        19.22        30.11
     TOTAL RAINFALL   (mm)=     42.00        42.00        42.00
     RUNOFF COEFFICIENT   =      0.98         0.46         0.72

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

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

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-------------------
| RESERVOIR (5582)  |
| IN= 2---> OUT= 1  |
| DT= 15.0 min      |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)    |   (cms)     (ha.m.)
                         0.0000     0.0000    |   0.0950     0.7000
                         0.0370     0.3500    |   0.1110     0.7700
                         0.0600     0.5000    |   0.1290     0.8500
                         0.0750     0.6000    |   0.0000     0.0000

                              AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (5502)     14.300     0.553      5.25      30.11
     OUTFLOW: ID= 1 (5582)     14.300     0.038      8.75      29.94

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  6.86
                   TIME SHIFT OF PEAK FLOW         (min)=210.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  0.3561

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-------------------
| CALIB             |
| STANDHYD  (5503)  |   Area    (ha)=  22.10
|ID= 1 DT=15.0 min  |   Total Imp(%)=  70.00   Dir. Conn.(%)=  60.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     15.47         6.63
     Dep. Storage     (mm)=      1.00         1.50
     Average Slope     (%)=      1.00         2.00
     Length            (m)=    383.84        40.00
     Mannings n           =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     19.32        17.63
               over (min)       15.00        30.00
     Storage Coeff.  (min)=     11.05 (ii)   25.18 (ii)
     Unit Hyd. Tpeak (min)=     15.00        30.00
     Unit Hyd. peak  (cms)=      0.08         0.04
```

```
                                                        *TOTALS*
     PEAK FLOW      (cms)=       0.71         0.25          0.962 (iii)
     TIME TO PEAK   (hrs)=       5.25         5.25           5.25
     RUNOFF VOLUME   (mm)=      41.00        22.43          33.57
     TOTAL RAINFALL  (mm)=      42.00        42.00          42.00
     RUNOFF COEFFICIENT  =       0.98         0.53           0.80

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

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

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-------------------
| CALIB             |
| STANDHYD  (5504)  |   Area    (ha)=  16.80
|ID= 1 DT=15.0 min  |   Total Imp(%)=  40.00   Dir. Conn.(%)=  40.00
-------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.72        10.08
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     334.66        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      19.32        10.96
               over (min)        15.00        30.00
     Storage Coeff.  (min)=      10.18 (ii)   27.27 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.09         0.04
                                                        *TOTALS*
     PEAK FLOW      (cms)=       0.36         0.24          0.598 (iii)
     TIME TO PEAK   (hrs)=       5.25         5.25           5.25
     RUNOFF VOLUME   (mm)=      41.00        19.22          27.93
     TOTAL RAINFALL  (mm)=      42.00        42.00          42.00
     RUNOFF COEFFICIENT  =       0.98         0.46           0.67

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

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

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-------------------
| CALIB             |
| NASHYD    (0088)  |   Area    (ha)=   4.80   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.35

     Unit Hyd Qpeak  (cms)=   0.524

     PEAK FLOW      (cms)=   0.079 (i)
     TIME TO PEAK   (hrs)=   5.250
     RUNOFF VOLUME   (mm)=  11.507
     TOTAL RAINFALL  (mm)=  42.000
     RUNOFF COEFFICIENT  =   0.274

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

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-------------------
| ADD HYD   (0083)  |
|   1 +  2 =  3     |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (5503):    22.10   0.962     5.25    33.57
        + ID2= 2 (5504):    16.80   0.598     5.25    27.93
          ================================================
          ID = 3 (0083):    38.90   1.559     5.25    31.14

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| ADD HYD   (0083)  |
|   3 +  2 =  1     |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0083):    38.90   1.559     5.25    31.14
        + ID2= 2 (0088):     4.80   0.079     5.25    11.51
          ================================================
          ID = 1 (0083):    43.70   1.638     5.25    28.98

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| RESERVOIR (5581)  |
| IN= 2---> OUT= 1  |
| DT= 15.0 min      |     OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)     |   (cms)     (ha.m.)
                         0.0000     0.0000     |   0.2500      1.8000
                         0.1000     1.0000     |   0.3200      2.1000
                         0.1700     1.4000     |   0.3800      2.4000
                         0.1900     1.5000     |   0.0000      0.0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0083)     43.700     1.638      5.25      28.98
     OUTFLOW: ID= 1 (5581)     43.700     0.109      8.75      28.92

                PEAK   FLOW   REDUCTION [Qout/Qin](%)=  6.67
                TIME SHIFT OF PEAK FLOW          (min)=210.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  1.0530

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-------------------
| CALIB             |
| STANDHYD  (5506)  |   Area    (ha)=   1.30
|ID= 1 DT=15.0 min  |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
-------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.65         0.65
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      93.09        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      19.32        10.96
               over (min)        15.00        30.00
     Storage Coeff.  (min)=       4.72 (ii)   21.81 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.11         0.05
                                                        *TOTALS*
     PEAK FLOW      (cms)=       0.03         0.02          0.051 (iii)
     TIME TO PEAK   (hrs)=       5.25         5.25           5.25
     RUNOFF VOLUME   (mm)=      41.00        19.22          30.10
     TOTAL RAINFALL  (mm)=      42.00        42.00          42.00
     RUNOFF COEFFICIENT  =       0.98         0.46           0.72

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

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

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-------------------
| ADD HYD   (0100)  |
|   1 +  2 =  3     |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (5506):     1.30   0.051     5.25    30.10
        + ID2= 2 (5581):    43.70   0.109     8.75    28.92
          ================================================
          ID = 3 (0100):    45.00   0.114     8.25    28.96

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| CALIB             |
| STANDHYD  (5505)  |   Area    (ha)=   7.70
|ID= 1 DT=15.0 min  |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
-------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.85         3.85
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     226.57        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      19.32        10.96
               over (min)        15.00        30.00
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     Storage Coeff.  (min)=       8.05 (ii)   25.14 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.10         0.04
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.21         0.09          0.300 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25           5.25
     RUNOFF VOLUME    (mm)=      41.00        19.22          30.11
     TOTAL RAINFALL   (mm)=      42.00        42.00          42.00
     RUNOFF COEFFICIENT   =       0.98         0.46           0.72

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

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

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-------------------
| RESERVOIR (0085) |
| IN= 2---> OUT= 1 |
| DT= 15.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |  0.0690      0.3600
                         0.0270     0.2000   |  0.0810      0.4000
                         0.0440     0.2600   |  0.0940      0.4500
                         0.0550     0.3000   |  0.0000      0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (5505)     7.700     0.300      5.25      30.11
     OUTFLOW: ID= 1 (0085)     7.700     0.025      8.50      29.87

                PEAK   FLOW   REDUCTION [Qout/Qin](%)=  8.35
                TIME SHIFT OF PEAK FLOW       (min)=195.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  0.1856

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-------------------
| ADD HYD   (0084) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (0100):    45.00   0.114     8.25    28.96
       + ID2= 2 (5582):    14.30   0.038     8.75    29.94
         ================================================
         ID = 3 (0084):    59.30   0.151     8.25    29.19

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| ADD HYD   (0084) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
         ID1= 3 (0084):    59.30   0.151     8.25    29.19
       + ID2= 2 (0085):     7.70   0.025     8.50    29.87
         ================================================
         ID = 1 (0084):    67.00   0.176     8.25    29.27

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| ADD HYD   (5552) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (5501):    14.20   0.549     5.25    30.11
       + ID2= 2 (0084):    67.00   0.176     8.25    29.27
         ================================================
         ID = 3 (5552):    81.20   0.699     5.25    29.42

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| CALIB            |
| STANDHYD  (6202) |   Area    (ha)=   2.47
|ID= 1 DT=15.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  70.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.73         0.74
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     128.32        40.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      19.32        10.96
               over (min)        15.00        30.00
     Storage Coeff.  (min)=       5.73 (ii)   22.82 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.11         0.04
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.09         0.02          0.111 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25           5.25
     RUNOFF VOLUME    (mm)=      41.00        19.22          34.46
     TOTAL RAINFALL   (mm)=      42.00        42.00          42.00
     RUNOFF COEFFICIENT   =       0.98         0.46           0.82

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

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

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-------------------
| CALIB            |
| STANDHYD  (0096) |   Area    (ha)=   3.20
|ID= 1 DT=15.0 min |   Total Imp(%)=  85.00   Dir. Conn.(%)=  85.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.72         0.48
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     146.06        40.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      19.32        10.96
               over (min)        15.00        30.00
     Storage Coeff.  (min)=       6.19 (ii)   23.28 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.10         0.04
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.15         0.01          0.158 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25           5.25
     RUNOFF VOLUME    (mm)=      41.00        19.22          37.73
     TOTAL RAINFALL   (mm)=      42.00        42.00          42.00
     RUNOFF COEFFICIENT   =       0.98         0.46           0.90

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

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

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-------------------
| CALIB            |
| STANDHYD  (0097) |   Area    (ha)=   5.03
|ID= 1 DT=15.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  70.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.52         1.51
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     183.12        40.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      19.32        10.96
               over (min)        15.00        30.00
     Storage Coeff.  (min)=       7.09 (ii)   24.18 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.10         0.04
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.19         0.04          0.226 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25           5.25
     RUNOFF VOLUME    (mm)=      41.00        19.22          34.46
     TOTAL RAINFALL   (mm)=      42.00        42.00          42.00
     RUNOFF COEFFICIENT   =       0.98         0.46           0.82

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  85.0    Ia = Dep. Storage  (Above)
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      (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   (0099) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (6202):     2.47   0.111     5.25    34.46
       + ID2= 2 (0096):     3.20   0.158     5.25    37.73
         ================================================
         ID = 3 (0099):     5.67   0.269     5.25    36.31

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ADD HYD   (0099) |
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 3 (0099):     5.67   0.269     5.25    36.31
       + ID2= 2 (0097):     5.03   0.226     5.25    34.46
         ================================================
         ID = 1 (0099):    10.70   0.495     5.25    35.44

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| RESERVOIR (6281) |
| IN= 2---> OUT= 1 |
| DT= 15.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.3500     0.5500
                          0.0500     0.3000   |   0.0000     0.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0099)     10.700     0.495     5.25      35.44
     OUTFLOW: ID= 1 (6281)     10.700     0.049     7.75      35.30

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.91
                    TIME SHIFT OF PEAK FLOW         (min)=150.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.2942

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-------------------
| CALIB             |
| STANDHYD  (0095) |   Area    (ha)=   4.80
|ID= 1 DT=15.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
-------------------

                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=          2.40          2.40
     Dep. Storage     (mm)=          1.00          1.50
     Average Slope     (%)=          1.00          2.00
     Length            (m)=        178.89         40.00
     Mannings n           =         0.013         0.250

     Max.Eff.Inten.(mm/hr)=         19.32         10.96
               over (min)           15.00         30.00
     Storage Coeff.  (min)=          6.99 (ii)    24.08 (ii)
     Unit Hyd. Tpeak (min)=         15.00         30.00
     Unit Hyd. peak  (cms)=          0.10          0.04
                                                          *TOTALS*
     PEAK FLOW       (cms)=          0.13          0.06          0.188 (iii)
     TIME TO PEAK    (hrs)=          5.25          5.25          5.25
     RUNOFF VOLUME    (mm)=         41.00         19.22         30.11
     TOTAL RAINFALL   (mm)=         42.00         42.00         42.00
     RUNOFF COEFFICIENT   =          0.98          0.46          0.72

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

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

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-------------------
| ADD HYD   (0098) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (6281):    10.70   0.049     7.75    35.30
       + ID2= 2 (0095):     4.80   0.188     5.25    30.11
         ================================================
         ID = 3 (0098):    15.50   0.223     5.25    33.69

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| CALIB             |
| STANDHYD  (6203) |   Area    (ha)=  48.00
|ID= 1 DT=15.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
-------------------

                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=         24.00         24.00
     Dep. Storage     (mm)=          1.00          1.50
     Average Slope     (%)=          1.00          2.00
     Length            (m)=        565.69         40.00
     Mannings n           =         0.013         0.250

     Max.Eff.Inten.(mm/hr)=         19.32         10.96
               over (min)           15.00         45.00
     Storage Coeff.  (min)=         13.95 (ii)    31.04 (ii)
     Unit Hyd. Tpeak (min)=         15.00         45.00
     Unit Hyd. peak  (cms)=          0.07          0.03
                                                          *TOTALS*
     PEAK FLOW       (cms)=          1.28          0.52          1.746 (iii)
     TIME TO PEAK    (hrs)=          5.25          5.50          5.25
     RUNOFF VOLUME    (mm)=         41.00         19.22         30.11
     TOTAL RAINFALL   (mm)=         42.00         42.00         42.00
     RUNOFF COEFFICIENT   =          0.98          0.46          0.72

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

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

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-------------------
| ADD HYD   (6250) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (6203):    48.00   1.746     5.25    30.11
       + ID2= 2 (0098):    15.50   0.223     5.25    33.69
         ================================================
         ID = 3 (6250):    63.50   1.969     5.25    30.99

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| CALIB             |
| STANDHYD  (6201) |   Area    (ha)=  12.90
|ID= 1 DT=15.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  70.00
-------------------

                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=          9.03          3.87
     Dep. Storage     (mm)=          1.00          1.50
     Average Slope     (%)=          1.00          2.00
     Length            (m)=        293.26         40.00
     Mannings n           =         0.013         0.250

     Max.Eff.Inten.(mm/hr)=         19.32          5.06
               over (min)           15.00         45.00
     Storage Coeff.  (min)=          9.40 (ii)    32.69 (ii)
     Unit Hyd. Tpeak (min)=         15.00         45.00
     Unit Hyd. peak  (cms)=          0.09          0.03
                                                          *TOTALS*
     PEAK FLOW       (cms)=          0.48          0.04          0.516 (iii)
     TIME TO PEAK    (hrs)=          5.25          5.50          5.25
     RUNOFF VOLUME    (mm)=         41.00          8.94         31.38
     TOTAL RAINFALL   (mm)=         42.00         42.00         42.00
     RUNOFF COEFFICIENT   =          0.98          0.21          0.75

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  64.0    Ia = Dep. 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 (0091) |
| IN= 2---> OUT= 1 |
| DT= 15.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   1.0830     0.0700
                         0.4880     0.0500   |   1.2340     0.0700
                         0.7000     0.0600   |   1.3880     0.0700
                         0.8500     0.0700   |   0.0000     0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (6201)    12.900     0.516     5.25      31.38
     OUTFLOW: ID= 1 (0091)    12.900     0.486     5.25      31.38

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 94.29
                    TIME SHIFT OF PEAK FLOW         (min)=  0.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0512

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-------------------
| CALIB             |
| STANDHYD  (0089)  |   Area    (ha)=   2.50
|ID= 1 DT=15.0 min  |   Total Imp(%)=  67.00   Dir. Conn.(%)=  67.00
-------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.67         0.82
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.20
     Length            (m)=     129.10        50.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      19.32         6.23
               over (min)        15.00        30.00
     Storage Coeff.  (min)=       5.75 (ii)   29.55 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.10         0.04
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.09         0.01         0.100 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.50          5.25
     RUNOFF VOLUME    (mm)=      41.00        10.98         31.09
     TOTAL RAINFALL   (mm)=      42.00        42.00         42.00
     RUNOFF COEFFICIENT   =       0.98         0.26          0.74

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  70.0    Ia = Dep. 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 (0101) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.1770     0.0210
                         0.0930     0.0110   |   0.1990     0.0240
                         0.1250     0.0140   |   0.2220     0.0260
                         0.1480     0.0190   |   0.0000     0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0089)     2.500     0.100     5.25      31.09
     OUTFLOW: ID= 1 (0101)     2.500     0.093     5.25      31.08

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 92.41
                    TIME SHIFT OF PEAK FLOW         (min)=  0.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0111

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| ADD HYD   (0093) |
|  1 +  2 =  3     |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0101):     2.50   0.093     5.25    31.08
        + ID2= 2 (0091):    12.90   0.486     5.25    31.38
          ================================================
          ID = 3 (0093):    15.40   0.579     5.25    31.33

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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  ***************************
  ** SIMULATION NUMBER:  10 **
  ***************************


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|    READ STORM     |    Filename: C:\Users\BAbadi\AppD
|                   |              ata\Local\Temp\
|                   |              46a17cb2-9c2f-4631-a605-0ef450f2cd3c\ddcac1fe
| Ptotal= 54.38 mm  |    Comments: 5yr/12hr
-------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.25    0.00 |  3.50    9.25 |  6.75    3.81 | 10.00    0.54
                0.50    0.54 |  3.75    9.25 |  7.00    3.81 | 10.25    0.54
                0.75    0.54 |  4.00    9.25 |  7.25    3.81 | 10.50    0.54
                1.00    0.54 |  4.25    9.25 |  7.50    2.18 | 10.75    0.54
                1.25    0.54 |  4.50   25.02 |  7.75    2.18 | 11.00    0.54
                1.50    0.54 |  4.75   25.02 |  8.00    2.18 | 11.25    0.54
                1.75    0.54 |  5.00   25.02 |  8.25    2.18 | 11.50    0.54
                2.00    0.54 |  5.25   25.02 |  8.50    1.09 | 11.75    0.54
                2.25    0.54 |  5.50    7.07 |  8.75    1.09 | 12.00    0.54
                2.50    3.26 |  5.75    7.07 |  9.00    1.09 | 12.25    0.54
                2.75    3.26 |  6.00    7.07 |  9.25    1.09 |
                3.00    3.26 |  6.25    7.07 |  9.50    0.54 |
                3.25    3.26 |  6.50    3.81 |  9.75    0.54 |

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| CALIB             |
| STANDHYD  (5501)  |   Area    (ha)=  14.20
|ID= 1 DT=15.0 min  |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
-------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.10         7.10
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     307.68        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      25.02        16.91
               over (min)        15.00        30.00
     Storage Coeff.  (min)=       8.73 (ii)   23.09 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.09         0.04
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.49         0.26         0.758 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25          5.25
     RUNOFF VOLUME    (mm)=      53.38        28.62         41.00
     TOTAL RAINFALL   (mm)=      54.38        54.38         54.38
     RUNOFF COEFFICIENT   =       0.98         0.53          0.75

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

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

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-------------------
| CALIB             |
| STANDHYD  (5502)  |   Area    (ha)=  14.30
|ID= 1 DT=15.0 min  |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
-------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.15         7.15
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     308.76        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      25.02        16.91
               over (min)        15.00        30.00
     Storage Coeff.  (min)=       8.75 (ii)   23.11 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.09         0.04
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.50         0.27         0.763 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25          5.25
     RUNOFF VOLUME    (mm)=      53.38        28.62         41.00
     TOTAL RAINFALL   (mm)=      54.38        54.38         54.38
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     RUNOFF COEFFICIENT   =       0.98         0.53          0.75

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

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

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--------------------
| RESERVOIR (5582) |
| IN= 2---> OUT= 1 |
| DT= 15.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |  0.0950      0.7000
                          0.0370     0.3500   |  0.1110      0.7700
                          0.0600     0.5000   |  0.1290      0.8500
                          0.0750     0.6000   |  0.0000      0.0000

                               AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (5502)     14.300     0.763      5.25      41.00
     OUTFLOW: ID= 1 (5582)     14.300     0.057      8.50      40.83

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  7.48
                   TIME SHIFT OF PEAK FLOW         (min)=195.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  0.4808

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (5503) |   Area    (ha)=  22.10
|ID= 1 DT=15.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  60.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      15.47         6.63
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     383.84        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      25.02        25.18
               over (min)        15.00        30.00
     Storage Coeff.  (min)=       9.97 (ii)   22.22 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.09         0.04
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.92         0.38          1.302 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25           5.25
     RUNOFF VOLUME    (mm)=      53.38        32.65          45.09
     TOTAL RAINFALL   (mm)=      54.38        54.38          54.38
     RUNOFF COEFFICIENT   =       0.98         0.60           0.83

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

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

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--------------------
| CALIB            |
| STANDHYD  (5504) |   Area    (ha)=  16.80
|ID= 1 DT=15.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=  40.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.72        10.08
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     334.66        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      25.02        16.91
               over (min)        15.00        30.00
     Storage Coeff.  (min)=       9.18 (ii)   23.55 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.09         0.04
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.47         0.37          0.840 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25           5.25
     RUNOFF VOLUME    (mm)=      53.38        28.62          38.52
     TOTAL RAINFALL   (mm)=      54.38        54.38          54.38
     RUNOFF COEFFICIENT   =       0.98         0.53          0.71

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

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

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--------------------
| CALIB            |
| NASHYD    (0088) |   Area    (ha)=   4.80   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.35

     Unit Hyd Qpeak  (cms)=   0.524

     PEAK FLOW       (cms)=   0.128 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  18.537
     TOTAL RAINFALL   (mm)=  54.380
     RUNOFF COEFFICIENT   =   0.341

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

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--------------------
| ADD HYD   (0083) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (5503):    22.10    1.302     5.25    45.09
        + ID2= 2 (5504):    16.80    0.840     5.25    38.52
          ================================================
          ID = 3 (0083):    38.90    2.142     5.25    42.25

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0083) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0083):    38.90    2.142     5.25    42.25
        + ID2= 2 (0088):     4.80    0.128     5.25    18.54
          ================================================
          ID = 1 (0083):    43.70    2.270     5.25    39.65

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| RESERVOIR (5581) |
| IN= 2---> OUT= 1 |
| DT= 15.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |  0.2500      1.8000
                          0.1000     1.0000   |  0.3200      2.1000
                          0.1700     1.4000   |  0.3800      2.4000
                          0.1900     1.5000   |  0.0000      0.0000

                               AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0083)     43.700     2.270      5.25      39.65
     OUTFLOW: ID= 1 (5581)     43.700     0.174      8.50      39.59

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  7.66
                   TIME SHIFT OF PEAK FLOW         (min)=195.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  1.4194

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--------------------
| CALIB            |
| STANDHYD  (5506) |   Area    (ha)=   1.30
|ID= 1 DT=15.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.65         0.65
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      93.09        40.00
     Mannings n           =      0.013        0.250
```

```
     Max.Eff.Inten.(mm/hr)=      25.02        16.91
               over (min)       15.00        30.00
     Storage Coeff.  (min)=      4.26 (ii)   18.63 (ii)
     Unit Hyd. Tpeak (min)=     15.00        30.00
     Unit Hyd. peak  (cms)=      0.11         0.05
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.05         0.03          0.071 (iii)
     TIME TO PEAK    (hrs)=      5.25         5.25          5.25
     RUNOFF VOLUME    (mm)=     53.38        28.62         40.99
     TOTAL RAINFALL   (mm)=     54.38        54.38         54.38
     RUNOFF COEFFICIENT   =      0.98         0.53          0.75

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

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

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-------------------
| ADD HYD   (0100) |
|   1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (5506):     1.30   0.071     5.25    40.99
       + ID2= 2 (5581):    43.70   0.174     8.50    39.59
         ================================================
         ID = 3 (0100):    45.00   0.180     8.25    39.63

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD  (5505) |   Area    (ha)=   7.70
|ID= 1 DT=15.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
-------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.85         3.85
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     226.57        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      25.02        16.91
               over (min)       15.00        30.00
     Storage Coeff.  (min)=      7.26 (ii)   21.63 (ii)
     Unit Hyd. Tpeak (min)=     15.00        30.00
     Unit Hyd. peak  (cms)=      0.10         0.05
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.27         0.15          0.414 (iii)
     TIME TO PEAK    (hrs)=      5.25         5.25          5.25
     RUNOFF VOLUME    (mm)=     53.38        28.62         41.00
     TOTAL RAINFALL   (mm)=     54.38        54.38         54.38
     RUNOFF COEFFICIENT   =      0.98         0.53          0.75

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

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

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-------------------
| RESERVOIR (0085) |
| IN= 2---> OUT= 1 |
| DT= 15.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |  0.0690      0.3600
                         0.0270     0.2000   |  0.0810      0.4000
                         0.0440     0.2600   |  0.0940      0.4500
                         0.0550     0.3000   |  0.0000      0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (5505)     7.700     0.414      5.25      41.00
     OUTFLOW: ID= 1 (0085)     7.700     0.041      8.25      40.76

                PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.82
                TIME SHIFT OF PEAK FLOW         (min)=180.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  0.2482

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-------------------
| ADD HYD   (0084) |
|   1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (0100):    45.00   0.180     8.25    39.63
       + ID2= 2 (5582):    14.30   0.057     8.50    40.83
         ================================================
         ID = 3 (0084):    59.30   0.237     8.25    39.92

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| ADD HYD   (0084) |
|   3 +  2 =  1    |        AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 3 (0084):    59.30   0.237     8.25    39.92
       + ID2= 2 (0085):     7.70   0.041     8.25    40.76
         ================================================
         ID = 1 (0084):    67.00   0.278     8.25    40.02

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| ADD HYD   (5552) |
|   1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (5501):    14.20   0.758     5.25    41.00
       + ID2= 2 (0084):    67.00   0.278     8.25    40.02
         ================================================
         ID = 3 (5552):    81.20   0.965     5.25    40.19

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD  (6202) |   Area    (ha)=   2.47
|ID= 1 DT=15.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  70.00
-------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.73         0.74
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     128.32        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      25.02        16.91
               over (min)       15.00        30.00
     Storage Coeff.  (min)=      5.16 (ii)   19.53 (ii)
     Unit Hyd. Tpeak (min)=     15.00        30.00
     Unit Hyd. peak  (cms)=      0.11         0.05
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.12         0.03          0.149 (iii)
     TIME TO PEAK    (hrs)=      5.25         5.25          5.25
     RUNOFF VOLUME    (mm)=     53.38        28.62         45.95
     TOTAL RAINFALL   (mm)=     54.38        54.38         54.38
     RUNOFF COEFFICIENT   =      0.98         0.53          0.84

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

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD  (0096) |   Area    (ha)=   3.20
|ID= 1 DT=15.0 min |   Total Imp(%)=  85.00   Dir. Conn.(%)=  85.00
-------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.72         0.48
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     146.06        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      25.02        16.91
```

```
                over (min)       15.00        30.00
     Storage Coeff.  (min)=       5.58 (ii)   19.95 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.11         0.05
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.19         0.02          0.208 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25          5.25
     RUNOFF VOLUME    (mm)=      53.38        28.62         49.66
     TOTAL RAINFALL   (mm)=      54.38        54.38         54.38
     RUNOFF COEFFICIENT   =       0.98         0.53          0.91

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

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0097) |   Area    (ha)=   5.03
|ID= 1 DT=15.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  70.00
--------------------
                         IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.52         1.51
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     183.12        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      25.02        16.91
                over (min)       15.00        30.00
     Storage Coeff.  (min)=       6.39 (ii)   20.76 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.10         0.05
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.24         0.06          0.303 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25          5.25
     RUNOFF VOLUME    (mm)=      53.38        28.62         45.95
     TOTAL RAINFALL   (mm)=      54.38        54.38         54.38
     RUNOFF COEFFICIENT   =       0.98         0.53          0.84

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

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

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--------------------
| ADD HYD   (0099) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (6202):     2.47   0.149     5.25    45.95
      + ID2= 2 (0096):     3.20   0.208     5.25    49.66
        ================================================
        ID = 3 (0099):     5.67   0.357     5.25    48.04

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0099) |
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (0099):     5.67   0.357     5.25    48.04
      + ID2= 2 (0097):     5.03   0.303     5.25    45.95
        ================================================
        ID = 1 (0099):    10.70   0.659     5.25    47.06

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| RESERVOIR (6281) |
| IN= 2---> OUT= 1 |
| DT= 15.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000    |  0.3500     0.5500
                         0.0500     0.3000    |  0.0000     0.0000
```

```
                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0099)     10.700     0.659      5.25      47.06
     OUTFLOW: ID= 1 (6281)     10.700     0.120      6.75      46.92

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 18.22
                  TIME SHIFT OF PEAK FLOW         (min)= 90.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.3586

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0095) |   Area    (ha)=   4.80
|ID= 1 DT=15.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
--------------------
                         IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.40         2.40
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     178.89        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      25.02        16.91
                over (min)       15.00        30.00
     Storage Coeff.  (min)=       6.30 (ii)   20.67 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.10         0.05
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.17         0.09          0.259 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25          5.25
     RUNOFF VOLUME    (mm)=      53.38        28.62         41.00
     TOTAL RAINFALL   (mm)=      54.38        54.38         54.38
     RUNOFF COEFFICIENT   =       0.98         0.53          0.75

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

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

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--------------------
| ADD HYD   (0098) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (6281):    10.70   0.120     6.75    46.92
      + ID2= 2 (0095):     4.80   0.259     5.25    41.00
        ================================================
        ID = 3 (0098):    15.50   0.306     5.25    45.08

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| CALIB            |
| STANDHYD  (6203) |   Area    (ha)=  48.00
|ID= 1 DT=15.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
--------------------
                         IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      24.00        24.00
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     565.69        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      25.02        16.91
                over (min)       15.00        30.00
     Storage Coeff.  (min)=      12.58 (ii)   26.94 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.08         0.04
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.66         0.85          2.513 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25          5.25
     RUNOFF VOLUME    (mm)=      53.38        28.62         41.00
     TOTAL RAINFALL   (mm)=      54.38        54.38         54.38
     RUNOFF COEFFICIENT   =       0.98         0.53          0.75

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
```

THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| ADD HYD (6250) | | AREA | QPEAK | TPEAK | R.V. |
|---|---|---|---|---|---|
| 1 + 2 = 3 | | (ha) | (cms) | (hrs) | (mm) |
| ID1= 1 (6203): | | 48.00 | 2.513 | 5.25 | 41.00 |
| + ID2= 2 (0098): | | 15.50 | 0.306 | 5.25 | 45.08 |
| ID = 3 (6250): | | 63.50 | 2.819 | 5.25 | 42.00 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

| CALIB | | | | |
|---|---|---|---|---|
| STANDHYD (6201) | Area (ha)= 12.90 | | | |
| ID= 1 DT=15.0 min | Total Imp(%)= 70.00 | Dir. Conn.(%)= 70.00 | | |
| | | IMPERVIOUS | PERVIOUS (i) | |
| Surface Area | (ha)= | 9.03 | 3.87 | |
| Dep. Storage | (mm)= | 1.00 | 1.50 | |
| Average Slope | (%)= | 1.00 | 2.00 | |
| Length | (m)= | 293.26 | 40.00 | |
| Mannings n | = | 0.013 | 0.250 | |
| Max.Eff.Inten.(mm/hr)= | | 25.02 | 8.08 | |
| over (min) | | 15.00 | 30.00 | |
| Storage Coeff. (min)= | | 8.48 (ii) | 27.79 (ii) | |
| Unit Hyd. Tpeak (min)= | | 15.00 | 30.00 | |
| Unit Hyd. peak (cms)= | | 0.09 | 0.04 | |
| | | | | *TOTALS* |
| PEAK FLOW | (cms)= | 0.63 | 0.07 | 0.692 (iii) |
| TIME TO PEAK | (hrs)= | 5.25 | 5.50 | 5.25 |
| RUNOFF VOLUME | (mm)= | 53.38 | 14.28 | 41.65 |
| TOTAL RAINFALL | (mm)= | 54.38 | 54.38 | 54.38 |
| RUNOFF COEFFICIENT | = | 0.98 | 0.26 | 0.77 |

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 64.0 Ia = Dep. 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 (0091) | | | | | |
|---|---|---|---|---|---|
| IN= 2---> OUT= 1 | | | | | |
| DT= 15.0 min | OUTFLOW (cms) | STORAGE (ha.m.) | OUTFLOW (cms) | STORAGE (ha.m.) | |
| | 0.0000 | 0.0000 | 1.0830 | 0.0700 | |
| | 0.4880 | 0.0500 | 1.2340 | 0.0700 | |
| | 0.7000 | 0.0600 | 1.3880 | 0.0700 | |
| | 0.8500 | 0.0700 | 0.0000 | 0.0000 | |

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| INFLOW : ID= 2 (6201) | 12.900 | 0.692 | 5.25 | 41.65 |
| OUTFLOW: ID= 1 (0091) | 12.900 | 0.683 | 5.25 | 41.65 |

PEAK FLOW REDUCTION [Qout/Qin](%)= 98.70
TIME SHIFT OF PEAK FLOW (min)= 0.00
MAXIMUM STORAGE USED (ha.m.)= 0.0596

---

| CALIB | | | | |
|---|---|---|---|---|
| STANDHYD (0089) | Area (ha)= 2.50 | | | |
| ID= 1 DT=15.0 min | Total Imp(%)= 67.00 | Dir. Conn.(%)= 67.00 | | |
| | | IMPERVIOUS | PERVIOUS (i) | |
| Surface Area | (ha)= | 1.67 | 0.82 | |
| Dep. Storage | (mm)= | 1.00 | 1.50 | |
| Average Slope | (%)= | 1.00 | 2.20 | |
| Length | (m)= | 129.10 | 50.00 | |
| Mannings n | = | 0.013 | 0.250 | |
| Max.Eff.Inten.(mm/hr)= | | 25.02 | 9.80 | |
| over (min) | | 15.00 | 30.00 | |
| Storage Coeff. (min)= | | 5.18 (ii) | 25.04 (ii) | |
| Unit Hyd. Tpeak (min)= | | 15.00 | 30.00 | |
| Unit Hyd. peak (cms)= | | 0.11 | 0.04 | |
| | | | | *TOTALS* |
| PEAK FLOW | (cms)= | 0.12 | 0.02 | 0.134 (iii) |
| TIME TO PEAK | (hrs)= | 5.25 | 5.25 | 5.25 |
| RUNOFF VOLUME | (mm)= | 53.38 | 17.29 | 41.46 |
| TOTAL RAINFALL | (mm)= | 54.38 | 54.38 | 54.38 |
| RUNOFF COEFFICIENT | = | 0.98 | 0.32 | 0.76 |

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (0101) | | | | | |
|---|---|---|---|---|---|
| IN= 2---> OUT= 1 | | | | | |
| DT= 5.0 min | OUTFLOW (cms) | STORAGE (ha.m.) | OUTFLOW (cms) | STORAGE (ha.m.) | |
| | 0.0000 | 0.0000 | 0.1770 | 0.0210 | |
| | 0.0930 | 0.0110 | 0.1990 | 0.0240 | |
| | 0.1250 | 0.0140 | 0.2220 | 0.0260 | |
| | 0.1480 | 0.0190 | 0.0000 | 0.0000 | |

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| INFLOW : ID= 2 (0089) | 2.500 | 0.134 | 5.25 | 41.46 |
| OUTFLOW: ID= 1 (0101) | 2.500 | 0.125 | 5.25 | 41.45 |

PEAK FLOW REDUCTION [Qout/Qin](%)= 93.73
TIME SHIFT OF PEAK FLOW (min)= 0.00
MAXIMUM STORAGE USED (ha.m.)= 0.0142

---

| ADD HYD (0093) | | AREA | QPEAK | TPEAK | R.V. |
|---|---|---|---|---|---|
| 1 + 2 = 3 | | (ha) | (cms) | (hrs) | (mm) |
| ID1= 1 (0101): | | 2.50 | 0.125 | 5.25 | 41.45 |
| + ID2= 2 (0091): | | 12.90 | 0.683 | 5.25 | 41.65 |
| ID = 3 (0093): | | 15.40 | 0.808 | 5.25 | 41.62 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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**********
** SIMULATION NUMBER: 12 **
**********

| READ STORM | Filename: C:\Users\BAbadi\AppData\Local\Temp\46a17cb2-9c2f-4631-a605-0ef450f2cd3c\69c7c2ed |
|---|---|
| Ptotal= 62.71 mm | Comments: 10yr/12hr |

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|---|---|---|---|---|---|---|---|
| 0.25 | 0.00 | 3.50 | 10.66 | 6.75 | 4.39 | 10.00 | 0.63 |
| 0.50 | 0.63 | 3.75 | 10.66 | 7.00 | 4.39 | 10.25 | 0.63 |
| 0.75 | 0.63 | 4.00 | 10.66 | 7.25 | 4.39 | 10.50 | 0.63 |
| 1.00 | 0.63 | 4.25 | 10.66 | 7.50 | 2.51 | 10.75 | 0.63 |
| 1.25 | 0.63 | 4.50 | 28.84 | 7.75 | 2.51 | 11.00 | 0.63 |
| 1.50 | 0.63 | 4.75 | 28.84 | 8.00 | 2.51 | 11.25 | 0.63 |
| 1.75 | 0.63 | 5.00 | 28.84 | 8.25 | 2.51 | 11.50 | 0.63 |
| 2.00 | 0.63 | 5.25 | 28.84 | 8.50 | 1.25 | 11.75 | 0.63 |
| 2.25 | 0.63 | 5.50 | 8.15 | 8.75 | 1.25 | 12.00 | 0.63 |
| 2.50 | 3.76 | 5.75 | 8.15 | 9.00 | 1.25 | 12.25 | 0.63 |
| 2.75 | 3.76 | 6.00 | 8.15 | 9.25 | 1.25 | | |
| 3.00 | 3.76 | 6.25 | 8.15 | 9.50 | 0.63 | | |
| 3.25 | 3.76 | 6.50 | 4.39 | 9.75 | 0.63 | | |

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| CALIB | | | | |
|---|---|---|---|---|
| STANDHYD (5501) | Area (ha)= 14.20 | | | |
| ID= 1 DT=15.0 min | Total Imp(%)= 50.00 | Dir. Conn.(%)= 50.00 | | |
| | | IMPERVIOUS | PERVIOUS (i) | |
| Surface Area | (ha)= | 7.10 | 7.10 | |

```
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     307.68        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      28.84        20.66
               over (min)        15.00        30.00
     Storage Coeff.  (min)=       8.25 (ii)   21.51 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.09         0.05
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.57         0.33          0.902 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25          5.25
     RUNOFF VOLUME    (mm)=      61.71        35.33         48.52
     TOTAL RAINFALL   (mm)=      62.71        62.71         62.71
     RUNOFF COEFFICIENT   =       0.98         0.56          0.77

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

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

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-------------------
| CALIB             |
| STANDHYD  (5502)  |   Area    (ha)=  14.30
|ID= 1 DT=15.0 min  |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
-------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.15         7.15
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     308.76        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      28.84        20.66
               over (min)        15.00        30.00
     Storage Coeff.  (min)=       8.26 (ii)   21.52 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.09         0.05
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.57         0.34          0.908 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25          5.25
     RUNOFF VOLUME    (mm)=      61.71        35.33         48.52
     TOTAL RAINFALL   (mm)=      62.71        62.71         62.71
     RUNOFF COEFFICIENT   =       0.98         0.56          0.77

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

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

--------------------------------------------------------------------------------
-------------------
| RESERVOIR (5582) |
| IN= 2---> OUT= 1 |
| DT= 15.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |  0.0950      0.7000
                         0.0370     0.3500   |  0.1110      0.7700
                         0.0600     0.5000   |  0.1290      0.8500
                         0.0750     0.6000   |  0.0000      0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (5502)   14.300     0.908      5.25      48.52
     OUTFLOW: ID= 1 (5582)   14.300     0.070      8.50      48.35

               PEAK   FLOW   REDUCTION [Qout/Qin](%)=  7.70
               TIME SHIFT OF PEAK FLOW        (min)=195.00
               MAXIMUM  STORAGE   USED       (ha.m.)=  0.5663

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-------------------
| CALIB             |
| STANDHYD  (5503)  |   Area    (ha)=  22.10
|ID= 1 DT=15.0 min  |   Total Imp(%)=  70.00   Dir. Conn.(%)=  60.00
-------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      15.47         6.63
```

```
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     383.84        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      28.84        30.37
               over (min)        15.00        30.00
     Storage Coeff.  (min)=       9.42 (ii)   20.78 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.09         0.05
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.06         0.47          1.534 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25          5.25
     RUNOFF VOLUME    (mm)=      61.71        39.84         52.96
     TOTAL RAINFALL   (mm)=      62.71        62.71         62.71
     RUNOFF COEFFICIENT   =       0.98         0.64          0.84

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

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

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-------------------
| CALIB             |
| STANDHYD  (5504)  |   Area    (ha)=  16.80
|ID= 1 DT=15.0 min  |   Total Imp(%)=  40.00   Dir. Conn.(%)=  40.00
-------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.72        10.08
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     334.66        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      28.84        20.66
               over (min)        15.00        30.00
     Storage Coeff.  (min)=       8.67 (ii)   21.93 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.09         0.04
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.54         0.47          1.009 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25          5.25
     RUNOFF VOLUME    (mm)=      61.71        35.33         45.88
     TOTAL RAINFALL   (mm)=      62.71        62.71         62.71
     RUNOFF COEFFICIENT   =       0.98         0.56          0.73

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

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (0088)  |   Area    (ha)=   4.80   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.35

     Unit Hyd Qpeak  (cms)=   0.524

     PEAK FLOW       (cms)=   0.165 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  23.789
     TOTAL RAINFALL   (mm)=  62.710
     RUNOFF COEFFICIENT   =   0.379

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

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-------------------
| ADD HYD   (0083)  |
|   1 +   2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (5503):    22.10    1.534     5.25    52.96
        + ID2= 2 (5504):    16.80    1.009     5.25    45.88
          ================================================
          ID = 3 (0083):    38.90    2.544     5.25    49.90
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ADD HYD (0083) | | AREA | QPEAK | TPEAK | R.V. |
|---|---|---|---|---|---|
| 3 + 2 = 1 | | (ha) | (cms) | (hrs) | (mm) |
| ID1= 3 (0083): | | 38.90 | 2.544 | 5.25 | 49.90 |
| + ID2= 2 (0088): | | 4.80 | 0.165 | 5.25 | 23.79 |
| ID = 1 (0083): | | 43.70 | 2.708 | 5.25 | 47.04 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| RESERVOIR (5581) | | | | | |
|---|---|---|---|---|---|
| IN= 2---> OUT= 1 | | | | | |
| DT= 15.0 min | OUTFLOW (cms) | STORAGE (ha.m.) | OUTFLOW (cms) | STORAGE (ha.m.) | |
| | 0.0000 | 0.0000 | 0.2500 | 1.8000 | |
| | 0.1000 | 1.0000 | 0.3200 | 2.1000 | |
| | 0.1700 | 1.4000 | 0.3800 | 2.4000 | |
| | 0.1900 | 1.5000 | 0.0000 | 0.0000 | |

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| INFLOW : ID= 2 (0083) | 43.700 | 2.708 | 5.25 | 47.04 |
| OUTFLOW: ID= 1 (5581) | 43.700 | 0.223 | 8.50 | 46.98 |

PEAK FLOW REDUCTION [Qout/Qin](%)= 8.24
TIME SHIFT OF PEAK FLOW (min)=195.00
MAXIMUM STORAGE USED (ha.m.)= 1.6667

---

| CALIB | | | |
|---|---|---|---|
| STANDHYD (5506) | Area (ha)= 1.30 | | |
| ID= 1 DT=15.0 min | Total Imp(%)= 50.00 | Dir. Conn.(%)= 50.00 | |

| | | IMPERVIOUS | PERVIOUS (i) |
|---|---|---|---|
| Surface Area | (ha)= | 0.65 | 0.65 |
| Dep. Storage | (mm)= | 1.00 | 1.50 |
| Average Slope | (%)= | 1.00 | 2.00 |
| Length | (m)= | 93.09 | 40.00 |
| Mannings n | = | 0.013 | 0.250 |
| Max.Eff.Inten.(mm/hr)= | | 28.84 | 20.66 |
| over (min) | | 15.00 | 30.00 |
| Storage Coeff. (min)= | | 4.02 (ii) | 17.29 (ii) |
| Unit Hyd. Tpeak (min)= | | 15.00 | 30.00 |
| Unit Hyd. peak (cms)= | | 0.11 | 0.05 |

| | | *TOTALS* |
|---|---|---|
| PEAK FLOW | (cms)= | 0.05 | 0.03 | 0.084 (iii) |
| TIME TO PEAK | (hrs)= | 5.25 | 5.25 | 5.25 |
| RUNOFF VOLUME | (mm)= | 61.71 | 35.33 | 48.52 |
| TOTAL RAINFALL | (mm)= | 62.71 | 62.71 | 62.71 |
| RUNOFF COEFFICIENT | = | 0.98 | 0.56 | 0.77 |

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

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

---

| ADD HYD (0100) | | AREA | QPEAK | TPEAK | R.V. |
|---|---|---|---|---|---|
| 1 + 2 = 3 | | (ha) | (cms) | (hrs) | (mm) |
| ID1= 1 (5506): | | 1.30 | 0.084 | 5.25 | 48.52 |
| + ID2= 2 (5581): | | 43.70 | 0.223 | 8.50 | 46.98 |
| ID = 3 (0100): | | 45.00 | 0.231 | 8.25 | 47.02 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| CALIB | | | |
|---|---|---|---|
| STANDHYD (5505) | Area (ha)= 7.70 | | |
| ID= 1 DT=15.0 min | Total Imp(%)= 50.00 | Dir. Conn.(%)= 50.00 | |

| | | IMPERVIOUS | PERVIOUS (i) |
|---|---|---|---|
| Surface Area | (ha)= | 3.85 | 3.85 |
| Dep. Storage | (mm)= | 1.00 | 1.50 |
| Average Slope | (%)= | 1.00 | 2.00 |
| Length | (m)= | 226.57 | 40.00 |
| Mannings n | = | 0.013 | 0.250 |
| Max.Eff.Inten.(mm/hr)= | | 28.84 | 20.66 |
| over (min) | | 15.00 | 30.00 |
| Storage Coeff. (min)= | | 6.86 (ii) | 20.12 (ii) |
| Unit Hyd. Tpeak (min)= | | 15.00 | 30.00 |
| Unit Hyd. peak (cms)= | | 0.10 | 0.05 |

| | | *TOTALS* |
|---|---|---|
| PEAK FLOW | (cms)= | 0.31 | 0.18 | 0.492 (iii) |
| TIME TO PEAK | (hrs)= | 5.25 | 5.25 | 5.25 |
| RUNOFF VOLUME | (mm)= | 61.71 | 35.33 | 48.52 |
| TOTAL RAINFALL | (mm)= | 62.71 | 62.71 | 62.71 |
| RUNOFF COEFFICIENT | = | 0.98 | 0.56 | 0.77 |

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

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

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| RESERVOIR (0085) | | | | | |
|---|---|---|---|---|---|
| IN= 2---> OUT= 1 | | | | | |
| DT= 15.0 min | OUTFLOW (cms) | STORAGE (ha.m.) | OUTFLOW (cms) | STORAGE (ha.m.) | |
| | 0.0000 | 0.0000 | 0.0690 | 0.3600 | |
| | 0.0270 | 0.2000 | 0.0810 | 0.4000 | |
| | 0.0440 | 0.2600 | 0.0940 | 0.4500 | |
| | 0.0550 | 0.3000 | 0.0000 | 0.0000 | |

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| INFLOW : ID= 2 (5505) | 7.700 | 0.492 | 5.25 | 48.52 |
| OUTFLOW: ID= 1 (0085) | 7.700 | 0.052 | 8.00 | 48.28 |

PEAK FLOW REDUCTION [Qout/Qin](%)= 10.57
TIME SHIFT OF PEAK FLOW (min)=165.00
MAXIMUM STORAGE USED (ha.m.)= 0.2892

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| ADD HYD (0084) | | AREA | QPEAK | TPEAK | R.V. |
|---|---|---|---|---|---|
| 1 + 2 = 3 | | (ha) | (cms) | (hrs) | (mm) |
| ID1= 1 (0100): | | 45.00 | 0.231 | 8.25 | 47.02 |
| + ID2= 2 (5582): | | 14.30 | 0.070 | 8.50 | 48.35 |
| ID = 3 (0084): | | 59.30 | 0.301 | 8.25 | 47.34 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ADD HYD (0084) | | AREA | QPEAK | TPEAK | R.V. |
|---|---|---|---|---|---|
| 3 + 2 = 1 | | (ha) | (cms) | (hrs) | (mm) |
| ID1= 3 (0084): | | 59.30 | 0.301 | 8.25 | 47.34 |
| + ID2= 2 (0085): | | 7.70 | 0.052 | 8.00 | 48.28 |
| ID = 1 (0084): | | 67.00 | 0.353 | 8.25 | 47.45 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ADD HYD (5552) | | AREA | QPEAK | TPEAK | R.V. |
|---|---|---|---|---|---|
| 1 + 2 = 3 | | (ha) | (cms) | (hrs) | (mm) |
| ID1= 1 (5501): | | 14.20 | 0.902 | 5.25 | 48.52 |
| + ID2= 2 (0084): | | 67.00 | 0.353 | 8.25 | 47.45 |
| ID = 3 (5552): | | 81.20 | 1.150 | 5.25 | 47.64 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| CALIB           |
| STANDHYD  (6202) |   Area    (ha)=   2.47
|ID= 1 DT=15.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  70.00
-------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      1.73         0.74
     Dep. Storage     (mm)=      1.00         1.50
     Average Slope     (%)=      1.00         2.00
     Length            (m)=    128.32        40.00
     Mannings n           =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     28.84        20.66
               over (min)       15.00        30.00
     Storage Coeff.  (min)=      4.88 (ii)   18.14 (ii)
     Unit Hyd. Tpeak (min)=     15.00        30.00
     Unit Hyd. peak  (cms)=      0.11         0.05
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.14         0.04          0.175 (iii)
     TIME TO PEAK    (hrs)=      5.25         5.25           5.25
     RUNOFF VOLUME    (mm)=     61.71        35.33          53.79
     TOTAL RAINFALL   (mm)=     62.71        62.71          62.71
     RUNOFF COEFFICIENT   =      0.98         0.56           0.86

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

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

-------------------------------------------------------------------------------
-------------------
| CALIB           |
| STANDHYD  (0096) |   Area    (ha)=   3.20
|ID= 1 DT=15.0 min |   Total Imp(%)=  85.00   Dir. Conn.(%)=  85.00
-------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      2.72         0.48
     Dep. Storage     (mm)=      1.00         1.50
     Average Slope     (%)=      1.00         2.00
     Length            (m)=    146.06        40.00
     Mannings n           =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     28.84        20.66
               over (min)       15.00        30.00
     Storage Coeff.  (min)=      5.27 (ii)   18.54 (ii)
     Unit Hyd. Tpeak (min)=     15.00        30.00
     Unit Hyd. peak  (cms)=      0.11         0.05
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.22         0.02          0.241 (iii)
     TIME TO PEAK    (hrs)=      5.25         5.25           5.25
     RUNOFF VOLUME    (mm)=     61.71        35.33          57.75
     TOTAL RAINFALL   (mm)=     62.71        62.71          62.71
     RUNOFF COEFFICIENT   =      0.98         0.56           0.92

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

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

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-------------------
| CALIB           |
| STANDHYD  (0097) |   Area    (ha)=   5.03
|ID= 1 DT=15.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  70.00
-------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      3.52         1.51
     Dep. Storage     (mm)=      1.00         1.50
     Average Slope     (%)=      1.00         2.00
     Length            (m)=    183.12        40.00
     Mannings n           =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     28.84        20.66
               over (min)       15.00        30.00
     Storage Coeff.  (min)=      6.04 (ii)   19.30 (ii)
     Unit Hyd. Tpeak (min)=     15.00        30.00
     Unit Hyd. peak  (cms)=      0.10         0.05
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.28         0.07          0.355 (iii)
     TIME TO PEAK    (hrs)=      5.25         5.25           5.25
     RUNOFF VOLUME    (mm)=     61.71        35.33          53.79
     TOTAL RAINFALL   (mm)=     62.71        62.71          62.71
     RUNOFF COEFFICIENT   =      0.98         0.56           0.86

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

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

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| ADD HYD   (0099) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (6202):     2.47   0.175     5.25    53.79
       + ID2= 2 (0096):     3.20   0.241     5.25    57.75
         ================================================
         ID = 3 (0099):     5.67   0.416     5.25    56.03

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| ADD HYD   (0099) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 3 (0099):     5.67   0.416     5.25    56.03
       + ID2= 2 (0097):     5.03   0.355     5.25    53.79
         ================================================
         ID = 1 (0099):    10.70   0.771     5.25    54.98

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| RESERVOIR (6281) |
| IN= 2---> OUT= 1 |
| DT= 15.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.3500      0.5500
                         0.0500     0.3000   |   0.0000      0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0099)    10.700     0.771      5.25      54.98
     OUTFLOW: ID= 1 (6281)    10.700     0.170      6.50      54.84

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 22.12
                   TIME SHIFT OF PEAK FLOW        (min)= 75.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  0.4014

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-------------------
| CALIB           |
| STANDHYD  (0095) |   Area    (ha)=   4.80
|ID= 1 DT=15.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
-------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      2.40         2.40
     Dep. Storage     (mm)=      1.00         1.50
     Average Slope     (%)=      1.00         2.00
     Length            (m)=    178.89        40.00
     Mannings n           =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     28.84        20.66
               over (min)       15.00        30.00
     Storage Coeff.  (min)=      5.96 (ii)   19.22 (ii)
     Unit Hyd. Tpeak (min)=     15.00        30.00
     Unit Hyd. peak  (cms)=      0.10         0.05
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.19         0.12          0.308 (iii)
     TIME TO PEAK    (hrs)=      5.25         5.25           5.25
     RUNOFF VOLUME    (mm)=     61.71        35.33          48.52
     TOTAL RAINFALL   (mm)=     62.71        62.71          62.71
     RUNOFF COEFFICIENT   =      0.98         0.56           0.77

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
```

```
          CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-------------------
| ADD HYD   (0098) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (6281):    10.70   0.170     6.50    54.84
      + ID2= 2 (0095):     4.80   0.308     5.25    48.52
        ================================================
        ID = 3 (0098):    15.50   0.393     5.25    52.88

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| CALIB             |
| STANDHYD  (6203) |   Area    (ha)=  48.00
|ID= 1 DT=15.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      24.00         24.00
     Dep. Storage     (mm)=       1.00          1.50
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     565.69         40.00
     Mannings n           =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=      28.84         20.66
               over (min)        15.00         30.00
     Storage Coeff.  (min)=      11.88 (ii)    25.14 (ii)
     Unit Hyd. Tpeak (min)=      15.00         30.00
     Unit Hyd. peak  (cms)=       0.08          0.04
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.91          1.08          2.996 (iii)
     TIME TO PEAK    (hrs)=       5.25          5.25           5.25
     RUNOFF VOLUME    (mm)=      61.71         35.33          48.52
     TOTAL RAINFALL   (mm)=      62.71         62.71          62.71
     RUNOFF COEFFICIENT   =       0.98          0.56           0.77

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

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

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-------------------
| ADD HYD   (6250) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (6203):    48.00   2.996     5.25    48.52
      + ID2= 2 (0098):    15.50   0.393     5.25    52.88
        ================================================
        ID = 3 (6250):    63.50   3.388     5.25    49.59

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| CALIB             |
| STANDHYD  (6201) |   Area    (ha)=  12.90
|ID= 1 DT=15.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  70.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       9.03          3.87
     Dep. Storage     (mm)=       1.00          1.50
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     293.26         40.00
     Mannings n           =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=      28.84         10.37
               over (min)        15.00         30.00
     Storage Coeff.  (min)=       8.01 (ii)    25.48 (ii)
     Unit Hyd. Tpeak (min)=      15.00         30.00
     Unit Hyd. peak  (cms)=       0.10          0.04
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.72          0.09          0.809 (iii)
     TIME TO PEAK    (hrs)=       5.25          5.25           5.25
     RUNOFF VOLUME    (mm)=      61.71         18.36          48.70
     TOTAL RAINFALL   (mm)=      62.71         62.71          62.71
     RUNOFF COEFFICIENT   =       0.98          0.29           0.78

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  64.0    Ia = Dep. 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 (0091) |
| IN= 2---> OUT= 1 |
| DT= 15.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   1.0830     0.0700
                         0.4880     0.0500   |   1.2340     0.0700
                         0.7000     0.0600   |   1.3880     0.0700
                         0.8500     0.0700   |   0.0000     0.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (6201)     12.900     0.809      5.25      48.70
     OUTFLOW: ID= 1 (0091)     12.900     0.791      5.25      48.70

               PEAK   FLOW   REDUCTION [Qout/Qin](%)= 97.74
               TIME SHIFT OF PEAK FLOW         (min)=  0.00
               MAXIMUM  STORAGE   USED       (ha.m.)=  0.0669

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-------------------
| CALIB             |
| STANDHYD  (0089) |   Area    (ha)=   2.50
|ID= 1 DT=15.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  67.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.67          0.82
     Dep. Storage     (mm)=       1.00          1.50
     Average Slope     (%)=       1.00          2.20
     Length            (m)=     129.10         50.00
     Mannings n           =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=      28.84         12.47
               over (min)        15.00         30.00
     Storage Coeff.  (min)=       4.90 (ii)    22.93 (ii)
     Unit Hyd. Tpeak (min)=      15.00         30.00
     Unit Hyd. peak  (cms)=       0.11          0.04
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.13          0.02          0.157 (iii)
     TIME TO PEAK    (hrs)=       5.25          5.25           5.25
     RUNOFF VOLUME    (mm)=      61.71         22.03          48.61
     TOTAL RAINFALL   (mm)=      62.71         62.71          62.71
     RUNOFF COEFFICIENT   =       0.98          0.35           0.78

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  70.0    Ia = Dep. 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 (0101) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.1770     0.0210
                         0.0930     0.0110   |   0.1990     0.0240
                         0.1250     0.0140   |   0.2220     0.0260
                         0.1480     0.0190   |   0.0000     0.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0089)      2.500     0.157      5.25      48.61
     OUTFLOW: ID= 1 (0101)      2.500     0.139      5.33      48.60

               PEAK   FLOW   REDUCTION [Qout/Qin](%)= 88.69
               TIME SHIFT OF PEAK FLOW         (min)=  5.00
               MAXIMUM  STORAGE   USED       (ha.m.)=  0.0173

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-------------------
| ADD HYD   (0093) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0101):     2.50   0.139     5.33    48.60
       + ID2= 2 (0091):    12.90   0.791     5.25    48.70
         ================================================
          ID = 3 (0093):    15.40   0.930     5.25    48.68

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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  ****************************
  ** SIMULATION NUMBER:  14 **
  ****************************


-------------------
|    READ STORM    |    Filename: C:\Users\BAbadi\AppD
|                  |              ata\Local\Temp\
|                  |              46a17cb2-9c2f-4631-a605-0ef450f2cd3c\f72dbdbd
| Ptotal= 73.10 mm |    Comments: 25yr/12hr
-------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.25    0.00 |  3.50   12.43 |  6.75    5.12 | 10.00    0.73
                0.50    0.73 |  3.75   12.43 |  7.00    5.12 | 10.25    0.73
                0.75    0.73 |  4.00   12.43 |  7.25    5.12 | 10.50    0.73
                1.00    0.73 |  4.25   12.43 |  7.50    2.92 | 10.75    0.73
                1.25    0.73 |  4.50   33.63 |  7.75    2.92 | 11.00    0.73
                1.50    0.73 |  4.75   33.63 |  8.00    2.92 | 11.25    0.73
                1.75    0.73 |  5.00   33.63 |  8.25    2.92 | 11.50    0.73
                2.00    0.73 |  5.25   33.63 |  8.50    1.46 | 11.75    0.73
                2.25    0.73 |  5.50    9.50 |  8.75    1.46 | 12.00    0.73
                2.50    4.39 |  5.75    9.50 |  9.00    1.46 | 12.25    0.73
                2.75    4.39 |  6.00    9.50 |  9.25    1.46 |
                3.00    4.39 |  6.25    9.50 |  9.50    0.73 |
                3.25    4.39 |  6.50    5.12 |  9.75    0.73 |

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| CALIB             |
| STANDHYD  (5501) |   Area    (ha)=  14.20
|ID= 1 DT=15.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
-------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.10         7.10
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     307.68        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      33.63        25.46
               over (min)        15.00        30.00
     Storage Coeff.  (min)=       7.75 (ii)   19.95 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.10         0.05
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.66         0.42          1.087 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25           5.25
     RUNOFF VOLUME    (mm)=      72.10        44.03          58.07
     TOTAL RAINFALL   (mm)=      73.10        73.10          73.10
     RUNOFF COEFFICIENT   =       0.99         0.60           0.79

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

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

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| CALIB             |
| STANDHYD  (5502) |   Area    (ha)=  14.30
|ID= 1 DT=15.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
-------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.15         7.15
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     308.76        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      33.63        25.46
               over (min)        15.00        30.00
     Storage Coeff.  (min)=       7.77 (ii)   19.97 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.10         0.05
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.67         0.43          1.095 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25           5.25
     RUNOFF VOLUME    (mm)=      72.10        44.03          58.07
     TOTAL RAINFALL   (mm)=      73.10        73.10          73.10
     RUNOFF COEFFICIENT   =       0.99         0.60           0.79

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

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

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-------------------
| RESERVOIR (5582) |
| IN= 2---> OUT= 1 |
| DT= 15.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)    |   (cms)     (ha.m.)
                         0.0000     0.0000    |   0.0950      0.7000
                         0.0370     0.3500    |   0.1110      0.7700
                         0.0600     0.5000    |   0.1290      0.8500
                         0.0750     0.6000    |   0.0000      0.0000

                              AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
    INFLOW : ID= 2 (5502)     14.300     1.095      5.25      58.07
    OUTFLOW: ID= 1 (5582)     14.300     0.090      8.50      57.90

               PEAK   FLOW   REDUCTION [Qout/Qin](%)=  8.18
               TIME SHIFT OF PEAK FLOW          (min)=195.00
               MAXIMUM  STORAGE   USED        (ha.m.)=  0.6732

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-------------------
| CALIB             |
| STANDHYD  (5503) |   Area    (ha)=  22.10
|ID= 1 DT=15.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  60.00
-------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      15.47         6.63
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     383.84        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      33.63        36.94
               over (min)        15.00        30.00
     Storage Coeff.  (min)=       8.85 (ii)   19.37 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.09         0.05
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.24         0.59          1.829 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25           5.25
     RUNOFF VOLUME    (mm)=      72.10        49.06          62.88
     TOTAL RAINFALL   (mm)=      73.10        73.10          73.10
     RUNOFF COEFFICIENT   =       0.99         0.67           0.86

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

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

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-------------------
| CALIB             |
| STANDHYD  (5504) |   Area    (ha)=  16.80
|ID= 1 DT=15.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=  40.00
-------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.72        10.08
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     334.66        40.00
     Mannings n           =      0.013        0.250
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```
     Max.Eff.Inten.(mm/hr)=      33.63        25.46
               over (min)        15.00        30.00
     Storage Coeff.  (min)=       8.15 (ii)   20.35 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.10         0.05
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.63         0.60          1.227 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25          5.25
     RUNOFF VOLUME    (mm)=      72.10        44.03         55.26
     TOTAL RAINFALL   (mm)=      73.10        73.10         73.10
     RUNOFF COEFFICIENT   =       0.99         0.60          0.76

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

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

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-------------------
| CALIB             |
| NASHYD    (0088)  |   Area    (ha)=   4.80   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.35

     Unit Hyd Qpeak  (cms)=   0.524

     PEAK FLOW       (cms)=   0.214 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  30.806
     TOTAL RAINFALL   (mm)=  73.100
     RUNOFF COEFFICIENT   =   0.421

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

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-------------------
| ADD HYD   (0083) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (5503):    22.10   1.829     5.25    62.88
       + ID2= 2 (5504):    16.80   1.227     5.25    55.26
         ================================================
         ID = 3 (0083):    38.90   3.056     5.25    59.59

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| ADD HYD   (0083) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
         ID1= 3 (0083):    38.90   3.056     5.25    59.59
       + ID2= 2 (0088):     4.80   0.214     5.25    30.81
         ================================================
         ID = 1 (0083):    43.70   3.269     5.25    56.43

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| RESERVOIR (5581) |
| IN= 2---> OUT= 1 |
| DT= 15.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.2500     1.8000
                         0.1000     1.0000   |   0.3200     2.1000
                         0.1700     1.4000   |   0.3800     2.4000
                         0.1900     1.5000   |   0.0000     0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                   (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0083)      43.700     3.269      5.25      56.43
     OUTFLOW: ID= 1 (5581)      43.700     0.291      8.25      56.37

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  8.89
                   TIME SHIFT OF PEAK FLOW       (min)=180.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  1.9764

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-------------------
| CALIB             |
| STANDHYD  (5506)  |   Area    (ha)=   1.30
|ID= 1 DT=15.0 min  |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
-------------------

                                  IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=          0.65          0.65
     Dep. Storage     (mm)=          1.00          1.50
     Average Slope     (%)=          1.00          2.00
     Length            (m)=         93.09         40.00
     Mannings n             =       0.013         0.250

     Max.Eff.Inten.(mm/hr)=         33.63         25.46
               over (min)           15.00         30.00
     Storage Coeff.  (min)=          3.78 (ii)    15.98 (ii)
     Unit Hyd. Tpeak (min)=         15.00         30.00
     Unit Hyd. peak  (cms)=          0.11          0.05
                                                      *TOTALS*
     PEAK FLOW       (cms)=          0.06          0.04          0.101 (iii)
     TIME TO PEAK    (hrs)=          5.25          5.25          5.25
     RUNOFF VOLUME    (mm)=         72.10         44.03         58.06
     TOTAL RAINFALL   (mm)=         73.10         73.10         73.10
     RUNOFF COEFFICIENT   =          0.99          0.60          0.79

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

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

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-------------------
| ADD HYD   (0100) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (5506):     1.30   0.101     5.25    58.06
       + ID2= 2 (5581):    43.70   0.291     8.25    56.37
         ================================================
         ID = 3 (0100):    45.00   0.301     8.25    56.42

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| CALIB             |
| STANDHYD  (5505)  |   Area    (ha)=   7.70
|ID= 1 DT=15.0 min  |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
-------------------

                                  IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=          3.85          3.85
     Dep. Storage     (mm)=          1.00          1.50
     Average Slope     (%)=          1.00          2.00
     Length            (m)=        226.57         40.00
     Mannings n             =       0.013         0.250

     Max.Eff.Inten.(mm/hr)=         33.63         25.46
               over (min)           15.00         30.00
     Storage Coeff.  (min)=          6.45 (ii)    18.65 (ii)
     Unit Hyd. Tpeak (min)=         15.00         30.00
     Unit Hyd. peak  (cms)=          0.10          0.05
                                                      *TOTALS*
     PEAK FLOW       (cms)=          0.36          0.23          0.593 (iii)
     TIME TO PEAK    (hrs)=          5.25          5.25          5.25
     RUNOFF VOLUME    (mm)=         72.10         44.03         58.06
     TOTAL RAINFALL   (mm)=         73.10         73.10         73.10
     RUNOFF COEFFICIENT   =          0.99          0.60          0.79

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

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

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-------------------
| RESERVOIR (0085) |
| IN= 2---> OUT= 1 |
| DT= 15.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.0690     0.3600
                         0.0270     0.2000   |   0.0810     0.4000
                         0.0440     0.2600   |   0.0940     0.4500
                         0.0550     0.3000   |   0.0000     0.0000
```

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| INFLOW : ID= 2 (5505) | 7.700 | 0.593 | 5.25 | 58.06 |
| OUTFLOW: ID= 1 (0085) | 7.700 | 0.065 | 7.75 | 57.82 |

PEAK FLOW REDUCTION [Qout/Qin](%)= 10.96
TIME SHIFT OF PEAK FLOW (min)=150.00
MAXIMUM STORAGE USED (ha.m.)= 0.3426

---

ADD HYD (0084)
1 + 2 = 3

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 1 (0100): | 45.00 | 0.301 | 8.25 | 56.42 |
| + ID2= 2 (5582): | 14.30 | 0.090 | 8.50 | 57.90 |
| ID = 3 (0084): | 59.30 | 0.390 | 8.25 | 56.78 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

ADD HYD (0084)
3 + 2 = 1

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 3 (0084): | 59.30 | 0.390 | 8.25 | 56.78 |
| + ID2= 2 (0085): | 7.70 | 0.065 | 7.75 | 57.82 |
| ID = 1 (0084): | 67.00 | 0.455 | 8.25 | 56.90 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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ADD HYD (5552)
1 + 2 = 3

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 1 (5501): | 14.20 | 1.087 | 5.25 | 58.07 |
| + ID2= 2 (0084): | 67.00 | 0.455 | 8.25 | 56.90 |
| ID = 3 (5552): | 81.20 | 1.410 | 5.25 | 57.10 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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CALIB
STANDHYD (6202) | Area (ha)= 2.47
ID= 1 DT=15.0 min | Total Imp(%)= 70.00 Dir. Conn.(%)= 70.00

| | IMPERVIOUS | PERVIOUS (i) |
|---|---|---|
| Surface Area (ha)= | 1.73 | 0.74 |
| Dep. Storage (mm)= | 1.00 | 1.50 |
| Average Slope (%)= | 1.00 | 2.00 |
| Length (m)= | 128.32 | 40.00 |
| Mannings n = | 0.013 | 0.250 |
| Max.Eff.Inten.(mm/hr)= | 33.63 | 25.46 |
| over (min) | 15.00 | 30.00 |
| Storage Coeff. (min)= | 4.59 (ii) | 16.79 (ii) |
| Unit Hyd. Tpeak (min)= | 15.00 | 30.00 |
| Unit Hyd. peak (cms)= | 0.11 | 0.05 |

| | | *TOTALS* |
|---|---|---|
| PEAK FLOW (cms)= | 0.16 | 0.05 | 0.207 (iii) |
| TIME TO PEAK (hrs)= | 5.25 | 5.25 | 5.25 |
| RUNOFF VOLUME (mm)= | 72.10 | 44.03 | 63.68 |
| TOTAL RAINFALL (mm)= | 73.10 | 73.10 | 73.10 |
| RUNOFF COEFFICIENT = | 0.99 | 0.60 | 0.87 |

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

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

---

CALIB
STANDHYD (0096) | Area (ha)= 3.20
ID= 1 DT=15.0 min | Total Imp(%)= 85.00 Dir. Conn.(%)= 85.00

| | IMPERVIOUS | PERVIOUS (i) |
|---|---|---|
| Surface Area (ha)= | 2.72 | 0.48 |
| Dep. Storage (mm)= | 1.00 | 1.50 |
| Average Slope (%)= | 1.00 | 2.00 |
| Length (m)= | 146.06 | 40.00 |
| Mannings n = | 0.013 | 0.250 |
| Max.Eff.Inten.(mm/hr)= | 33.63 | 25.46 |
| over (min) | 15.00 | 30.00 |
| Storage Coeff. (min)= | 4.96 (ii) | 17.16 (ii) |
| Unit Hyd. Tpeak (min)= | 15.00 | 30.00 |
| Unit Hyd. peak (cms)= | 0.11 | 0.05 |

| | | *TOTALS* |
|---|---|---|
| PEAK FLOW (cms)= | 0.25 | 0.03 | 0.284 (iii) |
| TIME TO PEAK (hrs)= | 5.25 | 5.25 | 5.25 |
| RUNOFF VOLUME (mm)= | 72.10 | 44.03 | 67.89 |
| TOTAL RAINFALL (mm)= | 73.10 | 73.10 | 73.10 |
| RUNOFF COEFFICIENT = | 0.99 | 0.60 | 0.93 |

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

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

---

CALIB
STANDHYD (0097) | Area (ha)= 5.03
ID= 1 DT=15.0 min | Total Imp(%)= 70.00 Dir. Conn.(%)= 70.00

| | IMPERVIOUS | PERVIOUS (i) |
|---|---|---|
| Surface Area (ha)= | 3.52 | 1.51 |
| Dep. Storage (mm)= | 1.00 | 1.50 |
| Average Slope (%)= | 1.00 | 2.00 |
| Length (m)= | 183.12 | 40.00 |
| Mannings n = | 0.013 | 0.250 |
| Max.Eff.Inten.(mm/hr)= | 33.63 | 25.46 |
| over (min) | 15.00 | 30.00 |
| Storage Coeff. (min)= | 5.68 (ii) | 17.88 (ii) |
| Unit Hyd. Tpeak (min)= | 15.00 | 30.00 |
| Unit Hyd. peak (cms)= | 0.11 | 0.05 |

| | | *TOTALS* |
|---|---|---|
| PEAK FLOW (cms)= | 0.33 | 0.09 | 0.421 (iii) |
| TIME TO PEAK (hrs)= | 5.25 | 5.25 | 5.25 |
| RUNOFF VOLUME (mm)= | 72.10 | 44.03 | 63.68 |
| TOTAL RAINFALL (mm)= | 73.10 | 73.10 | 73.10 |
| RUNOFF COEFFICIENT = | 0.99 | 0.60 | 0.87 |

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

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

---

ADD HYD (0099)
1 + 2 = 3

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 1 (6202): | 2.47 | 0.207 | 5.25 | 63.68 |
| + ID2= 2 (0096): | 3.20 | 0.284 | 5.25 | 67.89 |
| ID = 3 (0099): | 5.67 | 0.491 | 5.25 | 66.05 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

ADD HYD (0099)
3 + 2 = 1

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 3 (0099): | 5.67 | 0.491 | 5.25 | 66.05 |
| + ID2= 2 (0097): | 5.03 | 0.421 | 5.25 | 63.68 |
| ID = 1 (0099): | 10.70 | 0.912 | 5.25 | 64.94 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

| RESERVOIR (6281) | IN= 2---> OUT= 1 | DT= 15.0 min | OUTFLOW (cms) | STORAGE (ha.m.) | OUTFLOW (cms) | STORAGE (ha.m.) |
|---|---|---|---|---|---|---|
| | | | 0.0000 | 0.0000 | 0.3500 | 0.5500 |
| | | | 0.0500 | 0.3000 | 0.0000 | 0.0000 |

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| INFLOW : ID= 2 (0099) | 10.700 | 0.912 | 5.25 | 64.94 |
| OUTFLOW: ID= 1 (6281) | 10.700 | 0.233 | 6.25 | 64.80 |

PEAK FLOW REDUCTION [Qout/Qin](%)= 25.52
TIME SHIFT OF PEAK FLOW (min)= 60.00
MAXIMUM STORAGE USED (ha.m.)= 0.4542

---

| CALIB | STANDHYD (0095) | ID= 1 DT=15.0 min | Area (ha)= 4.80 | Total Imp(%)= 50.00 | Dir. Conn.(%)= 50.00 |
|---|---|---|---|---|---|

| | | IMPERVIOUS | PERVIOUS (i) |
|---|---|---|---|
| Surface Area | (ha)= | 2.40 | 2.40 |
| Dep. Storage | (mm)= | 1.00 | 1.50 |
| Average Slope | (%)= | 1.00 | 2.00 |
| Length | (m)= | 178.89 | 40.00 |
| Mannings n | = | 0.013 | 0.250 |
| Max.Eff.Inten.(mm/hr)= | | 33.63 | 25.46 |
| over (min) | | 15.00 | 30.00 |
| Storage Coeff. (min)= | | 5.60 (ii) | 17.80 (ii) |
| Unit Hyd. Tpeak (min)= | | 15.00 | 30.00 |
| Unit Hyd. peak (cms)= | | 0.11 | 0.05 |

| | | *TOTALS* |
|---|---|---|
| PEAK FLOW | (cms)= | 0.22 0.15 0.371 (iii) |
| TIME TO PEAK | (hrs)= | 5.25 5.25 5.25 |
| RUNOFF VOLUME | (mm)= | 72.10 44.03 58.07 |
| TOTAL RAINFALL | (mm)= | 73.10 73.10 73.10 |
| RUNOFF COEFFICIENT | = | 0.99 0.60 0.79 |

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

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

---

| ADD HYD (0098) | 1 + 2 = 3 | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|---|
| | ID1= 1 (6281): | 10.70 | 0.233 | 6.25 | 64.80 |
| | + ID2= 2 (0095): | 4.80 | 0.371 | 5.25 | 58.07 |
| | ID = 3 (0098): | 15.50 | 0.524 | 5.25 | 62.71 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

| CALIB | STANDHYD (6203) | ID= 1 DT=15.0 min | Area (ha)= 48.00 | Total Imp(%)= 50.00 | Dir. Conn.(%)= 50.00 |
|---|---|---|---|---|---|

| | | IMPERVIOUS | PERVIOUS (i) |
|---|---|---|---|
| Surface Area | (ha)= | 24.00 | 24.00 |
| Dep. Storage | (mm)= | 1.00 | 1.50 |
| Average Slope | (%)= | 1.00 | 2.00 |
| Length | (m)= | 565.69 | 40.00 |
| Mannings n | = | 0.013 | 0.250 |
| Max.Eff.Inten.(mm/hr)= | | 33.63 | 25.46 |
| over (min) | | 15.00 | 30.00 |
| Storage Coeff. (min)= | | 11.17 (ii) | 23.37 (ii) |
| Unit Hyd. Tpeak (min)= | | 15.00 | 30.00 |
| Unit Hyd. peak (cms)= | | 0.08 | 0.04 |

| | | *TOTALS* |
|---|---|---|
| PEAK FLOW | (cms)= | 2.24 1.38 3.615 (iii) |
| TIME TO PEAK | (hrs)= | 5.25 5.25 5.25 |
| RUNOFF VOLUME | (mm)= | 72.10 44.03 58.07 |
| TOTAL RAINFALL | (mm)= | 73.10 73.10 73.10 |
| RUNOFF COEFFICIENT | = | 0.99 0.60 0.79 |

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

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

---

| ADD HYD (6250) | 1 + 2 = 3 | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|---|
| | ID1= 1 (6203): | 48.00 | 3.615 | 5.25 | 58.07 |
| | + ID2= 2 (0098): | 15.50 | 0.524 | 5.25 | 62.71 |
| | ID = 3 (6250): | 63.50 | 4.139 | 5.25 | 59.20 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

| CALIB | STANDHYD (6201) | ID= 1 DT=15.0 min | Area (ha)= 12.90 | Total Imp(%)= 70.00 | Dir. Conn.(%)= 70.00 |
|---|---|---|---|---|---|

| | | IMPERVIOUS | PERVIOUS (i) |
|---|---|---|---|
| Surface Area | (ha)= | 9.03 | 3.87 |
| Dep. Storage | (mm)= | 1.00 | 1.50 |
| Average Slope | (%)= | 1.00 | 2.00 |
| Length | (m)= | 293.26 | 40.00 |
| Mannings n | = | 0.013 | 0.250 |
| Max.Eff.Inten.(mm/hr)= | | 33.63 | 13.50 |
| over (min) | | 15.00 | 30.00 |
| Storage Coeff. (min)= | | 7.53 (ii) | 23.25 (ii) |
| Unit Hyd. Tpeak (min)= | | 15.00 | 30.00 |
| Unit Hyd. peak (cms)= | | 0.10 | 0.04 |

| | | *TOTALS* |
|---|---|---|
| PEAK FLOW | (cms)= | 0.84 0.12 0.959 (iii) |
| TIME TO PEAK | (hrs)= | 5.25 5.25 5.25 |
| RUNOFF VOLUME | (mm)= | 72.10 23.90 57.64 |
| TOTAL RAINFALL | (mm)= | 73.10 73.10 73.10 |
| RUNOFF COEFFICIENT | = | 0.99 0.33 0.79 |

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 64.0 Ia = Dep. 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 (0091) | IN= 2---> OUT= 1 | DT= 15.0 min | OUTFLOW (cms) | STORAGE (ha.m.) | OUTFLOW (cms) | STORAGE (ha.m.) |
|---|---|---|---|---|---|---|
| | | | 0.0000 | 0.0000 | 1.0830 | 0.0700 |
| | | | 0.4880 | 0.0500 | 1.2340 | 0.0700 |
| | | | 0.7000 | 0.0600 | 1.3880 | 0.0700 |
| | | | 0.8500 | 0.0700 | 0.0000 | 0.0000 |

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| INFLOW : ID= 2 (6201) | 12.900 | 0.959 | 5.25 | 57.64 |
| OUTFLOW: ID= 1 (0091) | 12.900 | 0.959 | 5.00 | 57.64 |

PEAK FLOW REDUCTION [Qout/Qin](%)= 99.96
TIME SHIFT OF PEAK FLOW (min)=-15.00
MAXIMUM STORAGE USED (ha.m.)= 0.0688

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| CALIB | STANDHYD (0089) | ID= 1 DT=15.0 min | Area (ha)= 2.50 | Total Imp(%)= 67.00 | Dir. Conn.(%)= 67.00 |
|---|---|---|---|---|---|

| | | IMPERVIOUS | PERVIOUS (i) |
|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| Surface Area | (ha)= | 1.67 | 0.82 | |
| Dep. Storage | (mm)= | 1.00 | 1.50 | |
| Average Slope | (%)= | 1.00 | 2.20 | |
| Length | (m)= | 129.10 | 50.00 | |
| Mannings n | = | 0.013 | 0.250 | |
| Max.Eff.Inten.(mm/hr) | = | 33.63 | 16.07 | |
| over (min) | | 15.00 | 30.00 | |
| Storage Coeff. | (min)= | 4.60 (ii) | 20.90 (ii) | |
| Unit Hyd. Tpeak | (min)= | 15.00 | 30.00 | |
| Unit Hyd. peak | (cms)= | 0.11 | 0.05 | |
| | | | | *TOTALS* |
| PEAK FLOW | (cms)= | 0.16 | 0.03 | 0.187 (iii) |
| TIME TO PEAK | (hrs)= | 5.25 | 5.25 | 5.25 |
| RUNOFF VOLUME | (mm)= | 72.10 | 28.41 | 57.67 |
| TOTAL RAINFALL | (mm)= | 73.10 | 73.10 | 73.10 |
| RUNOFF COEFFICIENT | = | 0.99 | 0.39 | 0.79 |

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (0101) | | | | |
|---|---|---|---|---|
| IN= 2---> OUT= 1 | | | | |
| DT= 5.0 min | OUTFLOW (cms) | STORAGE (ha.m.) | OUTFLOW (cms) | STORAGE (ha.m.) |
| | 0.0000 | 0.0000 | 0.1770 | 0.0210 |
| | 0.0930 | 0.0110 | 0.1990 | 0.0240 |
| | 0.1250 | 0.0140 | 0.2220 | 0.0260 |
| | 0.1480 | 0.0190 | 0.0000 | 0.0000 |

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| INFLOW : ID= 2 (0089) | 2.500 | 0.187 | 5.25 | 57.67 |
| OUTFLOW: ID= 1 (0101) | 2.500 | 0.174 | 5.25 | 57.66 |

PEAK FLOW REDUCTION [Qout/Qin](%)= 92.96
TIME SHIFT OF PEAK FLOW (min)= 0.00
MAXIMUM STORAGE USED (ha.m.)= 0.0210

---

| ADD HYD (0093) | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 1 (0101): | 2.50 | 0.174 | 5.25 | 57.66 |
| + ID2= 2 (0091): | 12.90 | 0.959 | 5.00 | 57.64 |
| ID = 3 (0093): | 15.40 | 1.109 | 5.17 | 57.64 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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** SIMULATION NUMBER: 16 **

| READ STORM | Filename: C:\Users\BAbadi\AppData\Local\Temp\46a17cb2-9c2f-4631-a605-0ef450f2cd3c\b06ced34 |
|---|---|
| Ptotal= 80.82 mm | Comments: 50yr/12hr |

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|---|---|---|---|---|---|---|---|
| 0.25 | 0.00 | 3.50 | 13.74 | 6.75 | 5.66 | 10.00 | 0.81 |
| 0.50 | 0.81 | 3.75 | 13.74 | 7.00 | 5.66 | 10.25 | 0.81 |
| 0.75 | 0.81 | 4.00 | 13.74 | 7.25 | 5.66 | 10.50 | 0.81 |
| 1.00 | 0.81 | 4.25 | 13.74 | 7.50 | 3.23 | 10.75 | 0.81 |
| 1.25 | 0.81 | 4.50 | 37.17 | 7.75 | 3.23 | 11.00 | 0.81 |
| 1.50 | 0.81 | 4.75 | 37.17 | 8.00 | 3.23 | 11.25 | 0.81 |
| 1.75 | 0.81 | 5.00 | 37.17 | 8.25 | 3.23 | 11.50 | 0.81 |
| 2.00 | 0.81 | 5.25 | 37.17 | 8.50 | 1.62 | 11.75 | 0.81 |
| 2.25 | 0.81 | 5.50 | 10.50 | 8.75 | 1.62 | 12.00 | 0.81 |
| 2.50 | 4.85 | 5.75 | 10.50 | 9.00 | 1.62 | 12.25 | 0.81 |
| 2.75 | 4.85 | 6.00 | 10.50 | 9.25 | 1.62 | | |
| 3.00 | 4.85 | 6.25 | 10.50 | 9.50 | 0.81 | | |
| 3.25 | 4.85 | 6.50 | 5.66 | 9.75 | 0.81 | | |

---

| CALIB | | | |
|---|---|---|---|
| STANDHYD (5501) | Area (ha)= 14.20 | | |
| ID= 1 DT=15.0 min | Total Imp(%)= 50.00 | Dir. Conn.(%)= 50.00 | |
| | IMPERVIOUS | PERVIOUS (i) | |
| Surface Area | (ha)= | 7.10 | 7.10 |
| Dep. Storage | (mm)= | 1.00 | 1.50 |
| Average Slope | (%)= | 1.00 | 2.00 |
| Length | (m)= | 307.68 | 40.00 |
| Mannings n | = | 0.013 | 0.250 |
| Max.Eff.Inten.(mm/hr) | = | 37.17 | 29.06 |
| over (min) | | 15.00 | 30.00 |
| Storage Coeff. | (min)= | 7.45 (ii) | 19.02 (ii) |
| Unit Hyd. Tpeak | (min)= | 15.00 | 30.00 |
| Unit Hyd. peak | (cms)= | 0.10 | 0.05 |
| | | | *TOTALS* |
| PEAK FLOW | (cms)= | 0.73 | 0.49 | 1.226 (iii) |
| TIME TO PEAK | (hrs)= | 5.25 | 5.25 | 5.25 |
| RUNOFF VOLUME | (mm)= | 79.82 | 50.68 | 65.25 |
| TOTAL RAINFALL | (mm)= | 80.82 | 80.82 | 80.82 |
| RUNOFF COEFFICIENT | = | 0.99 | 0.63 | 0.81 |

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

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

---

| CALIB | | | |
|---|---|---|---|
| STANDHYD (5502) | Area (ha)= 14.30 | | |
| ID= 1 DT=15.0 min | Total Imp(%)= 50.00 | Dir. Conn.(%)= 50.00 | |
| | IMPERVIOUS | PERVIOUS (i) | |
| Surface Area | (ha)= | 7.15 | 7.15 |
| Dep. Storage | (mm)= | 1.00 | 1.50 |
| Average Slope | (%)= | 1.00 | 2.00 |
| Length | (m)= | 308.76 | 40.00 |
| Mannings n | = | 0.013 | 0.250 |
| Max.Eff.Inten.(mm/hr) | = | 37.17 | 29.06 |
| over (min) | | 15.00 | 30.00 |
| Storage Coeff. | (min)= | 7.47 (ii) | 19.04 (ii) |
| Unit Hyd. Tpeak | (min)= | 15.00 | 30.00 |
| Unit Hyd. peak | (cms)= | 0.10 | 0.05 |
| | | | *TOTALS* |
| PEAK FLOW | (cms)= | 0.74 | 0.50 | 1.234 (iii) |
| TIME TO PEAK | (hrs)= | 5.25 | 5.25 | 5.25 |
| RUNOFF VOLUME | (mm)= | 79.82 | 50.68 | 65.25 |
| TOTAL RAINFALL | (mm)= | 80.82 | 80.82 | 80.82 |
| RUNOFF COEFFICIENT | = | 0.99 | 0.63 | 0.81 |

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

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

---

| RESERVOIR (5582) | | | | |
|---|---|---|---|---|
| IN= 2---> OUT= 1 | | | | |
| DT= 15.0 min | OUTFLOW (cms) | STORAGE (ha.m.) | OUTFLOW (cms) | STORAGE (ha.m.) |
| | 0.0000 | 0.0000 | 0.0950 | 0.7000 |
| | 0.0370 | 0.3500 | 0.1110 | 0.7700 |
| | 0.0600 | 0.5000 | 0.1290 | 0.8500 |
| | 0.0750 | 0.6000 | 0.0000 | 0.0000 |

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| INFLOW : ID= 2 (5502) | 14.300 | 1.234 | 5.25 | 65.25 |
| OUTFLOW: ID= 1 (5582) | 14.300 | 0.106 | 8.25 | 65.08 |

PEAK FLOW REDUCTION [Qout/Qin](%)= 8.63
TIME SHIFT OF PEAK FLOW (min)=180.00

```
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.7509

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-------------------
| CALIB             |
| STANDHYD  (5503)  |   Area    (ha)=  22.10
|ID= 1 DT=15.0 min  |   Total Imp(%)=  70.00   Dir. Conn.(%)=  60.00
-------------------

                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       15.47         6.63
     Dep. Storage     (mm)=        1.00         1.50
     Average Slope     (%)=        1.00         2.00
     Length            (m)=      383.84        40.00
     Mannings n            =       0.013        0.250

     Max.Eff.Inten.(mm/hr)=       37.17        41.83
               over (min)         15.00        30.00
     Storage Coeff.  (min)=        8.51 (ii)   18.51 (ii)
     Unit Hyd. Tpeak (min)=       15.00        30.00
     Unit Hyd. peak  (cms)=        0.09         0.05
                                                          *TOTALS*
     PEAK FLOW       (cms)=        1.37         0.68          2.049 (iii)
     TIME TO PEAK    (hrs)=        5.25         5.25           5.25
     RUNOFF VOLUME    (mm)=       79.82        56.05          70.31
     TOTAL RAINFALL   (mm)=       80.82        80.82          80.82
     RUNOFF COEFFICIENT   =        0.99         0.69           0.87

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

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD  (5504)  |   Area    (ha)=  16.80
|ID= 1 DT=15.0 min  |   Total Imp(%)=  40.00   Dir. Conn.(%)=  40.00
-------------------

                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        6.72        10.08
     Dep. Storage     (mm)=        1.00         1.50
     Average Slope     (%)=        1.00         2.00
     Length            (m)=      334.66        40.00
     Mannings n            =       0.013        0.250

     Max.Eff.Inten.(mm/hr)=       37.17        29.06
               over (min)         15.00        30.00
     Storage Coeff.  (min)=        7.83 (ii)   19.41 (ii)
     Unit Hyd. Tpeak (min)=       15.00        30.00
     Unit Hyd. peak  (cms)=        0.10         0.05
                                                          *TOTALS*
     PEAK FLOW       (cms)=        0.69         0.70          1.390 (iii)
     TIME TO PEAK    (hrs)=        5.25         5.25           5.25
     RUNOFF VOLUME    (mm)=       79.82        50.68          62.34
     TOTAL RAINFALL   (mm)=       80.82        80.82          80.82
     RUNOFF COEFFICIENT   =        0.99         0.63           0.77

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

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD    (0088)  |   Area    (ha)=   4.80   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.35

     Unit Hyd Qpeak  (cms)=   0.524

     PEAK FLOW       (cms)=   0.252 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  36.297
     TOTAL RAINFALL   (mm)=  80.820
     RUNOFF COEFFICIENT   =   0.449

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

--------------------------------------------------------------------------------
-------------------
| ADD HYD   (0083)  |
|   1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (5503):    22.10   2.049     5.25    70.31
        + ID2= 2 (5504):    16.80   1.390     5.25    62.34
          ================================================
          ID = 3 (0083):    38.90   3.439     5.25    66.87

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
-------------------
| ADD HYD   (0083)  |
|   3 +  2 =  1     |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0083):    38.90   3.439     5.25    66.87
        + ID2= 2 (0088):     4.80   0.252     5.25    36.30
          ================================================
          ID = 1 (0083):    43.70   3.691     5.25    63.51

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
-------------------
| RESERVOIR (5581)  |
| IN= 2---> OUT= 1  |
| DT= 15.0 min      |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)    |   (cms)     (ha.m.)
                         0.0000     0.0000    |   0.2500      1.8000
                         0.1000     1.0000    |   0.3200      2.1000
                         0.1700     1.4000    |   0.3800      2.4000
                         0.1900     1.5000    |   0.0000      0.0000

                              AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0083)     43.700      3.691      5.25      63.51
     OUTFLOW: ID= 1 (5581)     43.700      0.341      8.25      63.45

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.24
                   TIME SHIFT OF PEAK FLOW          (min)=180.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  2.2060

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD  (5506)  |   Area    (ha)=   1.30
|ID= 1 DT=15.0 min  |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
-------------------

                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        0.65         0.65
     Dep. Storage     (mm)=        1.00         1.50
     Average Slope     (%)=        1.00         2.00
     Length            (m)=       93.09        40.00
     Mannings n            =       0.013        0.250

     Max.Eff.Inten.(mm/hr)=       37.17        29.06
               over (min)         15.00        30.00
     Storage Coeff.  (min)=        3.64 (ii)   15.21 (ii)
     Unit Hyd. Tpeak (min)=       15.00        30.00
     Unit Hyd. peak  (cms)=        0.11         0.05
                                                          *TOTALS*
     PEAK FLOW       (cms)=        0.07         0.05          0.114 (iii)
     TIME TO PEAK    (hrs)=        5.25         5.25           5.25
     RUNOFF VOLUME    (mm)=       79.82        50.68          65.24
     TOTAL RAINFALL   (mm)=       80.82        80.82          80.82
     RUNOFF COEFFICIENT   =        0.99         0.63           0.81

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

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

--------------------------------------------------------------------------------
-------------------
| ADD HYD   (0100)  |
|   1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (5506):     1.30   0.114     5.25    65.24
        + ID2= 2 (5581):    43.70   0.341     8.25    63.45
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          ================================================
          ID = 3 (0100):    45.00   0.352     7.25    63.50

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| CALIB             |
| STANDHYD  (5505)  |   Area    (ha)=   7.70
|ID= 1 DT=15.0 min  |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
-------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.85         3.85
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     226.57        40.00
     Mannings n          =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      37.17        29.06
               over (min)        15.00        30.00
     Storage Coeff.  (min)=       6.20 (ii)   17.77 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.10         0.05
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.40         0.27          0.668 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25           5.25
     RUNOFF VOLUME    (mm)=      79.82        50.68          65.25
     TOTAL RAINFALL   (mm)=      80.82        80.82          80.82
     RUNOFF COEFFICIENT   =       0.99         0.63           0.81

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

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

--------------------------------------------------------------------------------
-------------------
| RESERVOIR (0085) |
| IN= 2---> OUT= 1 |
| DT= 15.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.0690     0.3600
                         0.0270     0.2000   |   0.0810     0.4000
                         0.0440     0.2600   |   0.0940     0.4500
                         0.0550     0.3000   |   0.0000     0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (5505)     7.700     0.668      5.25      65.25
     OUTFLOW: ID= 1 (0085)     7.700     0.076      7.75      65.01

               PEAK   FLOW   REDUCTION [Qout/Qin](%)= 11.35
               TIME SHIFT OF PEAK FLOW        (min)=150.00
               MAXIMUM  STORAGE   USED       (ha.m.)=  0.3829

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-------------------
| ADD HYD   (0084) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0100):    45.00   0.352     7.25    63.50
        + ID2= 2 (5582):    14.30   0.106     8.25    65.08
          ================================================
          ID = 3 (0084):    59.30   0.458     8.25    63.88

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| ADD HYD   (0084) |
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0084):    59.30   0.458     8.25    63.88
        + ID2= 2 (0085):     7.70   0.076     7.75    65.01
          ================================================
          ID = 1 (0084):    67.00   0.534     8.25    64.01

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| ADD HYD   (5552) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (5501):    14.20   1.226     5.25    65.25
        + ID2= 2 (0084):    67.00   0.534     8.25    64.01
          ================================================
          ID = 3 (5552):    81.20   1.607     5.25    64.23

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| CALIB             |
| STANDHYD  (6202)  |   Area    (ha)=   2.47
|ID= 1 DT=15.0 min  |   Total Imp(%)=  70.00   Dir. Conn.(%)=  70.00
-------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.73         0.74
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     128.32        40.00
     Mannings n          =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      37.17        29.06
               over (min)        15.00        30.00
     Storage Coeff.  (min)=       4.41 (ii)   15.98 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.11         0.05
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.18         0.05          0.232 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25           5.25
     RUNOFF VOLUME    (mm)=      79.82        50.68          71.07
     TOTAL RAINFALL   (mm)=      80.82        80.82          80.82
     RUNOFF COEFFICIENT   =       0.99         0.63           0.88

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

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

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-------------------
| CALIB             |
| STANDHYD  (0096)  |   Area    (ha)=   3.20
|ID= 1 DT=15.0 min  |   Total Imp(%)=  85.00   Dir. Conn.(%)=  85.00
-------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.72         0.48
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     146.06        40.00
     Mannings n          =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      37.17        29.06
               over (min)        15.00        30.00
     Storage Coeff.  (min)=       4.76 (ii)   16.33 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.11         0.05
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.28         0.03          0.315 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25           5.25
     RUNOFF VOLUME    (mm)=      79.82        50.68          75.45
     TOTAL RAINFALL   (mm)=      80.82        80.82          80.82
     RUNOFF COEFFICIENT   =       0.99         0.63           0.93

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

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD  (0097)  |   Area    (ha)=   5.03
|ID= 1 DT=15.0 min  |   Total Imp(%)=  70.00   Dir. Conn.(%)=  70.00
-------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.52         1.51
     Dep. Storage     (mm)=       1.00         1.50
```

| | | | | |
|---|---|---|---|---|
| Average Slope | (%)= | 1.00 | 2.00 | |
| Length | (m)= | 183.12 | 40.00 | |
| Mannings n | = | 0.013 | 0.250 | |
| Max.Eff.Inten.(mm/hr)= | | 37.17 | 29.06 | |
| over (min) | | 15.00 | 30.00 | |
| Storage Coeff. (min)= | | 5.46 (ii) | 17.03 (ii) | |
| Unit Hyd. Tpeak (min)= | | 15.00 | 30.00 | |
| Unit Hyd. peak (cms)= | | 0.11 | 0.05 | |
| | | | | *TOTALS* |
| PEAK FLOW | (cms)= | 0.36 | 0.11 | 0.470 (iii) |
| TIME TO PEAK | (hrs)= | 5.25 | 5.25 | 5.25 |
| RUNOFF VOLUME | (mm)= | 79.82 | 50.68 | 71.08 |
| TOTAL RAINFALL | (mm)= | 80.82 | 80.82 | 80.82 |
| RUNOFF COEFFICIENT | = | 0.99 | 0.63 | 0.88 |

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

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

---

ADD HYD (0099)
1 + 2 = 3

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 1 (6202): | 2.47 | 0.232 | 5.25 | 71.07 |
| + ID2= 2 (0096): | 3.20 | 0.315 | 5.25 | 75.45 |
| ID = 3 (0099): | 5.67 | 0.547 | 5.25 | 73.54 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

ADD HYD (0099)
3 + 2 = 1

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 3 (0099): | 5.67 | 0.547 | 5.25 | 73.54 |
| + ID2= 2 (0097): | 5.03 | 0.470 | 5.25 | 71.08 |
| ID = 1 (0099): | 10.70 | 1.017 | 5.25 | 72.38 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

RESERVOIR (6281)
IN= 2---> OUT= 1
DT= 15.0 min

| OUTFLOW (cms) | STORAGE (ha.m.) | OUTFLOW (cms) | STORAGE (ha.m.) |
|---|---|---|---|
| 0.0000 | 0.0000 | 0.3500 | 0.5500 |
| 0.0500 | 0.3000 | 0.0000 | 0.0000 |

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| INFLOW : ID= 2 (0099) | 10.700 | 1.017 | 5.25 | 72.38 |
| OUTFLOW: ID= 1 (6281) | 10.700 | 0.279 | 6.25 | 72.24 |

PEAK FLOW REDUCTION [Qout/Qin](%)= 27.46
TIME SHIFT OF PEAK FLOW (min)= 60.00
MAXIMUM STORAGE USED (ha.m.)= 0.4923

---

CALIB
STANDHYD (0095)
ID= 1 DT=15.0 min
Area (ha)= 4.80
Total Imp(%)= 50.00 Dir. Conn.(%)= 50.00

| | | IMPERVIOUS | PERVIOUS (i) |
|---|---|---|---|
| Surface Area | (ha)= | 2.40 | 2.40 |
| Dep. Storage | (mm)= | 1.00 | 1.50 |
| Average Slope | (%)= | 1.00 | 2.00 |
| Length | (m)= | 178.89 | 40.00 |
| Mannings n | = | 0.013 | 0.250 |
| Max.Eff.Inten.(mm/hr)= | | 37.17 | 29.06 |
| over (min) | | 15.00 | 30.00 |
| Storage Coeff. (min)= | | 5.38 (ii) | 16.95 (ii) |
| Unit Hyd. Tpeak (min)= | | 15.00 | 30.00 |
| Unit Hyd. peak (cms)= | | 0.11 | 0.05 |

| | | | | *TOTALS* |
|---|---|---|---|---|
| PEAK FLOW | (cms)= | 0.25 | 0.17 | 0.418 (iii) |
| TIME TO PEAK | (hrs)= | 5.25 | 5.25 | 5.25 |
| RUNOFF VOLUME | (mm)= | 79.82 | 50.68 | 65.25 |
| TOTAL RAINFALL | (mm)= | 80.82 | 80.82 | 80.82 |
| RUNOFF COEFFICIENT | = | 0.99 | 0.63 | 0.81 |

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

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

---

ADD HYD (0098)
1 + 2 = 3

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 1 (6281): | 10.70 | 0.279 | 6.25 | 72.24 |
| + ID2= 2 (0095): | 4.80 | 0.418 | 5.25 | 65.25 |
| ID = 3 (0098): | 15.50 | 0.620 | 5.25 | 70.08 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

CALIB
STANDHYD (6203)
ID= 1 DT=15.0 min
Area (ha)= 48.00
Total Imp(%)= 50.00 Dir. Conn.(%)= 50.00

| | | IMPERVIOUS | PERVIOUS (i) |
|---|---|---|---|
| Surface Area | (ha)= | 24.00 | 24.00 |
| Dep. Storage | (mm)= | 1.00 | 1.50 |
| Average Slope | (%)= | 1.00 | 2.00 |
| Length | (m)= | 565.69 | 40.00 |
| Mannings n | = | 0.013 | 0.250 |
| Max.Eff.Inten.(mm/hr)= | | 37.17 | 29.06 |
| over (min) | | 15.00 | 30.00 |
| Storage Coeff. (min)= | | 10.74 (ii) | 22.31 (ii) |
| Unit Hyd. Tpeak (min)= | | 15.00 | 30.00 |
| Unit Hyd. peak (cms)= | | 0.09 | 0.04 |

| | | | | *TOTALS* |
|---|---|---|---|---|
| PEAK FLOW | (cms)= | 2.47 | 1.61 | 4.080 (iii) |
| TIME TO PEAK | (hrs)= | 5.25 | 5.25 | 5.25 |
| RUNOFF VOLUME | (mm)= | 79.82 | 50.68 | 65.25 |
| TOTAL RAINFALL | (mm)= | 80.82 | 80.82 | 80.82 |
| RUNOFF COEFFICIENT | = | 0.99 | 0.63 | 0.81 |

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

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

---

ADD HYD (6250)
1 + 2 = 3

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 1 (6203): | 48.00 | 4.080 | 5.25 | 65.25 |
| + ID2= 2 (0098): | 15.50 | 0.620 | 5.25 | 70.08 |
| ID = 3 (6250): | 63.50 | 4.700 | 5.25 | 66.43 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

CALIB
STANDHYD (6201)
ID= 1 DT=15.0 min
Area (ha)= 12.90
Total Imp(%)= 70.00 Dir. Conn.(%)= 70.00

| | | IMPERVIOUS | PERVIOUS (i) |
|---|---|---|---|
| Surface Area | (ha)= | 9.03 | 3.87 |
| Dep. Storage | (mm)= | 1.00 | 1.50 |
| Average Slope | (%)= | 1.00 | 2.00 |
| Length | (m)= | 293.26 | 40.00 |
| Mannings n | = | 0.013 | 0.250 |

```
     Max.Eff.Inten.(mm/hr)=      37.17        17.02
               over (min)       15.00        30.00
     Storage Coeff.  (min)=      7.24 (ii)    21.57 (ii)
     Unit Hyd. Tpeak (min)=     15.00        30.00
     Unit Hyd. peak  (cms)=      0.10         0.05
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.93         0.14          1.073 (iii)
     TIME TO PEAK    (hrs)=      5.25         5.25          5.25
     RUNOFF VOLUME    (mm)=     79.82        28.32         64.37
     TOTAL RAINFALL   (mm)=     80.82        80.82         80.82
     RUNOFF COEFFICIENT   =      0.99         0.35          0.80

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  64.0    Ia = Dep. 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 (0091) |
| IN= 2---> OUT= 1 |
| DT= 15.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   1.0830     0.0700
                         0.4880     0.0500   |   1.2340     0.0700
                         0.7000     0.0600   |   1.3880     0.0700
                         0.8500     0.0700   |   0.0000     0.0000

                               AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (6201)     12.900     1.073      5.25      64.37
     OUTFLOW: ID= 1 (0091)     12.900     1.074      5.00      64.37

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=100.11
                  TIME SHIFT OF PEAK FLOW          (min)=-15.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0686

     **** WARNING : HYDROGRAPH PEAK WAS NOT REDUCED.
                    CHECK OUTFLOW/STORAGE TABLE  OR REDUCE DT.
--------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD  (0089)  |   Area    (ha)=   2.50
|ID= 1 DT=15.0 min  |   Total Imp(%)=  67.00   Dir. Conn.(%)=  67.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      1.67         0.82
     Dep. Storage     (mm)=      1.00         1.50
     Average Slope     (%)=      1.00         2.20
     Length            (m)=    129.10        50.00
     Mannings n           =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=      37.17        19.97
               over (min)       15.00        30.00
     Storage Coeff.  (min)=      4.42 (ii)    19.36 (ii)
     Unit Hyd. Tpeak (min)=     15.00        30.00
     Unit Hyd. peak  (cms)=      0.11         0.05
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.17         0.04          0.210 (iii)
     TIME TO PEAK    (hrs)=      5.25         5.25          5.25
     RUNOFF VOLUME    (mm)=     79.82        33.43         64.51
     TOTAL RAINFALL   (mm)=     80.82        80.82         80.82
     RUNOFF COEFFICIENT   =      0.99         0.41          0.80

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  70.0    Ia = Dep. 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 (0101) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.1770     0.0210
                         0.0930     0.0110   |   0.1990     0.0240
                         0.1250     0.0140   |   0.2220     0.0260
                         0.1480     0.0190   |   0.0000     0.0000

                               AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0089)     2.500     0.210      5.25      64.51
     OUTFLOW: ID= 1 (0101)     2.500     0.192      5.25      64.50

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 91.37
                  TIME SHIFT OF PEAK FLOW          (min)=  0.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0233

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-------------------
| ADD HYD   (0093) |
|  1 +   2 =   3   |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0101):     2.50   0.192     5.25    64.50
        + ID2= 2 (0091):    12.90   1.074     5.00    64.37
          ================================================
          ID = 3 (0093):    15.40   1.252     5.00    64.39

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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  ****************************
  ** SIMULATION NUMBER:  18 **
  ****************************


-------------------
|    READ STORM     |    Filename: C:\Users\BAbadi\AppD
|                   |              ata\Local\Temp\
|                   |              46a17cb2-9c2f-4631-a605-0ef450f2cd3c\5982b2e0
| Ptotal= 88.54 mm  |    Comments: 100yr/12hr
-------------------
                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                  0.25    0.00 |  3.50   15.05 |  6.75    6.20 | 10.00    0.89
                  0.50    0.89 |  3.75   15.05 |  7.00    6.20 | 10.25    0.89
                  0.75    0.89 |  4.00   15.05 |  7.25    6.20 | 10.50    0.89
                  1.00    0.89 |  4.25   15.05 |  7.50    3.54 | 10.75    0.89
                  1.25    0.89 |  4.50   40.71 |  7.75    3.54 | 11.00    0.89
                  1.50    0.89 |  4.75   40.71 |  8.00    3.54 | 11.25    0.89
                  1.75    0.89 |  5.00   40.71 |  8.25    3.54 | 11.50    0.89
                  2.00    0.89 |  5.25   40.71 |  8.50    1.77 | 11.75    0.89
                  2.25    0.89 |  5.50   11.51 |  8.75    1.77 | 12.00    0.89
                  2.50    5.31 |  5.75   11.51 |  9.00    1.77 | 12.25    0.89
                  2.75    5.31 |  6.00   11.51 |  9.25    1.77 |
                  3.00    5.31 |  6.25   11.51 |  9.50    0.89 |
                  3.25    5.31 |  6.50    6.20 |  9.75    0.89 |

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-------------------
| CALIB             |
| STANDHYD  (5501)  |   Area    (ha)=  14.20
|ID= 1 DT=15.0 min  |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      7.10         7.10
     Dep. Storage     (mm)=      1.00         1.50
     Average Slope     (%)=      1.00         2.00
     Length            (m)=    307.68        40.00
     Mannings n           =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=      40.71        32.69
               over (min)       15.00        30.00
     Storage Coeff.  (min)=      7.18 (ii)    18.22 (ii)
     Unit Hyd. Tpeak (min)=     15.00        30.00
     Unit Hyd. peak  (cms)=      0.10         0.05
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.80         0.56          1.366 (iii)
     TIME TO PEAK    (hrs)=      5.25         5.25          5.25
     RUNOFF VOLUME    (mm)=     87.54        57.45         72.50
     TOTAL RAINFALL   (mm)=     88.54        88.54         88.54
     RUNOFF COEFFICIENT   =      0.99         0.65          0.82

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

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

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| CALIB           |
| STANDHYD  (5502) |   Area    (ha)=  14.30
|ID= 1 DT=15.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
-------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      7.15         7.15
     Dep. Storage     (mm)=      1.00         1.50
     Average Slope     (%)=      1.00         2.00
     Length            (m)=    308.76        40.00
     Mannings n           =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     40.71        32.69
               over (min)       15.00        30.00
     Storage Coeff.  (min)=      7.20 (ii)   18.24 (ii)
     Unit Hyd. Tpeak (min)=     15.00        30.00
     Unit Hyd. peak  (cms)=      0.10         0.05
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.81         0.57          1.375 (iii)
     TIME TO PEAK    (hrs)=      5.25         5.25          5.25
     RUNOFF VOLUME    (mm)=     87.54        57.45         72.50
     TOTAL RAINFALL   (mm)=     88.54        88.54         88.54
     RUNOFF COEFFICIENT   =      0.99         0.65          0.82

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

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

--------------------------------------------------------------------------------
-------------------
| RESERVOIR (5582) |
| IN= 2---> OUT= 1 |
| DT= 15.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.0950      0.7000
                         0.0370     0.3500   |   0.1110      0.7700
                         0.0600     0.5000   |   0.1290      0.8500
                         0.0750     0.6000   |   0.0000      0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (5502)     14.300      1.375      5.25      72.50
     OUTFLOW: ID= 1 (5582)     14.300      0.124      8.25      72.33

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.01
                    TIME SHIFT OF PEAK FLOW         (min)=180.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.8281

--------------------------------------------------------------------------------
-------------------
| CALIB           |
| STANDHYD  (5503) |   Area    (ha)=  22.10
|ID= 1 DT=15.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  60.00
-------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     15.47         6.63
     Dep. Storage     (mm)=      1.00         1.50
     Average Slope     (%)=      1.00         2.00
     Length            (m)=    383.84        40.00
     Mannings n           =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     40.71        46.73
               over (min)       15.00        30.00
     Storage Coeff.  (min)=      8.20 (ii)   17.77 (ii)
     Unit Hyd. Tpeak (min)=     15.00        30.00
     Unit Hyd. peak  (cms)=      0.10         0.05
                                                      *TOTALS*
     PEAK FLOW       (cms)=      1.50         0.77          2.269 (iii)
     TIME TO PEAK    (hrs)=      5.25         5.25          5.25
     RUNOFF VOLUME    (mm)=     87.54        63.13         77.78
     TOTAL RAINFALL   (mm)=     88.54        88.54         88.54
     RUNOFF COEFFICIENT   =      0.99         0.71          0.88

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

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

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| CALIB           |
| STANDHYD  (5504) |   Area    (ha)=  16.80
|ID= 1 DT=15.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=  40.00
-------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      6.72        10.08
     Dep. Storage     (mm)=      1.00         1.50
     Average Slope     (%)=      1.00         2.00
     Length            (m)=    334.66        40.00
     Mannings n           =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     40.71        32.69
               over (min)       15.00        30.00
     Storage Coeff.  (min)=      7.55 (ii)   18.59 (ii)
     Unit Hyd. Tpeak (min)=     15.00        30.00
     Unit Hyd. peak  (cms)=      0.10         0.05
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.76         0.80          1.556 (iii)
     TIME TO PEAK    (hrs)=      5.25         5.25          5.25
     RUNOFF VOLUME    (mm)=     87.54        57.45         69.49
     TOTAL RAINFALL   (mm)=     88.54        88.54         88.54
     RUNOFF COEFFICIENT   =      0.99         0.65          0.78

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

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

--------------------------------------------------------------------------------
-------------------
| CALIB           |
| NASHYD    (0088) |   Area    (ha)=   4.80   Curve Number   (CN)= 76.0
|ID= 1 DT=15.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.35

     Unit Hyd Qpeak  (cms)=   0.524

     PEAK FLOW       (cms)=   0.291 (i)
     TIME TO PEAK    (hrs)=   5.250
     RUNOFF VOLUME    (mm)=  41.988
     TOTAL RAINFALL   (mm)=  88.540
     RUNOFF COEFFICIENT   =   0.474

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

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-------------------
| ADD HYD   (0083) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (5503):    22.10    2.269     5.25    77.78
        + ID2= 2 (5504):    16.80    1.556     5.25    69.49
          ================================================
          ID = 3 (0083):    38.90    3.825     5.25    74.20

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| ADD HYD   (0083) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0083):    38.90    3.825     5.25    74.20
        + ID2= 2 (0088):     4.80    0.291     5.25    41.99
          ================================================
          ID = 1 (0083):    43.70    4.116     5.25    70.66

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| RESERVOIR (5581) |
| IN= 2---> OUT= 1 |
| DT= 15.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.2500      1.8000
                         0.1000     1.0000   |   0.3200      2.1000
                         0.1700     1.4000   |   0.3800      2.4000
                         0.1900     1.5000   |   0.0000      0.0000
```

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| INFLOW : ID= 2 (0083) | 43.700 | 4.116 | 5.25 | 70.66 |
| OUTFLOW: ID= 1 (5581) | 43.700 | 0.388 | 8.25 | 70.60 |

PEAK FLOW REDUCTION [Qout/Qin](%)= 9.43
TIME SHIFT OF PEAK FLOW (min)=180.00
MAXIMUM STORAGE USED (ha.m.)= 2.4407

---

CALIB
STANDHYD (5506) | Area (ha)= 1.30
ID= 1 DT=15.0 min | Total Imp(%)= 50.00 Dir. Conn.(%)= 50.00

| | | IMPERVIOUS | PERVIOUS (i) |
|---|---|---|---|
| Surface Area | (ha)= | 0.65 | 0.65 |
| Dep. Storage | (mm)= | 1.00 | 1.50 |
| Average Slope | (%)= | 1.00 | 2.00 |
| Length | (m)= | 93.09 | 40.00 |
| Mannings n | = | 0.013 | 0.250 |
| Max.Eff.Inten.(mm/hr)= | | 40.71 | 32.69 |
| over (min) | | 15.00 | 15.00 |
| Storage Coeff. (min)= | | 3.51 (ii) | 14.54 (ii) |
| Unit Hyd. Tpeak (min)= | | 15.00 | 15.00 |
| Unit Hyd. peak (cms)= | | 0.11 | 0.07 |

| | | *TOTALS* |
|---|---|---|
| PEAK FLOW | (cms)= | 0.07 0.06 0.130 (iii) |
| TIME TO PEAK | (hrs)= | 5.25 5.25 5.25 |
| RUNOFF VOLUME | (mm)= | 87.54 57.45 72.49 |
| TOTAL RAINFALL | (mm)= | 88.54 88.54 88.54 |
| RUNOFF COEFFICIENT | = | 0.99 0.65 0.82 |

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

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

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ADD HYD (0100)
1 + 2 = 3

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 1 (5506): | 1.30 | 0.130 | 5.25 | 72.49 |
| + ID2= 2 (5581): | 43.70 | 0.388 | 8.25 | 70.60 |
| ID = 3 (0100): | 45.00 | 0.401 | 7.25 | 70.66 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

CALIB
STANDHYD (5505) | Area (ha)= 7.70
ID= 1 DT=15.0 min | Total Imp(%)= 50.00 Dir. Conn.(%)= 50.00

| | | IMPERVIOUS | PERVIOUS (i) |
|---|---|---|---|
| Surface Area | (ha)= | 3.85 | 3.85 |
| Dep. Storage | (mm)= | 1.00 | 1.50 |
| Average Slope | (%)= | 1.00 | 2.00 |
| Length | (m)= | 226.57 | 40.00 |
| Mannings n | = | 0.013 | 0.250 |
| Max.Eff.Inten.(mm/hr)= | | 40.71 | 32.69 |
| over (min) | | 15.00 | 30.00 |
| Storage Coeff. (min)= | | 5.98 (ii) | 17.02 (ii) |
| Unit Hyd. Tpeak (min)= | | 15.00 | 30.00 |
| Unit Hyd. peak (cms)= | | 0.10 | 0.05 |

| | | *TOTALS* |
|---|---|---|
| PEAK FLOW | (cms)= | 0.44 0.31 0.744 (iii) |
| TIME TO PEAK | (hrs)= | 5.25 5.25 5.25 |
| RUNOFF VOLUME | (mm)= | 87.54 57.45 72.49 |
| TOTAL RAINFALL | (mm)= | 88.54 88.54 88.54 |
| RUNOFF COEFFICIENT | = | 0.99 0.65 0.82 |

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

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

---

RESERVOIR (0085)
IN= 2---> OUT= 1
DT= 15.0 min

| OUTFLOW (cms) | STORAGE (ha.m.) | OUTFLOW (cms) | STORAGE (ha.m.) |
|---|---|---|---|
| 0.0000 | 0.0000 | 0.0690 | 0.3600 |
| 0.0270 | 0.2000 | 0.0810 | 0.4000 |
| 0.0440 | 0.2600 | 0.0940 | 0.4500 |
| 0.0550 | 0.3000 | 0.0000 | 0.0000 |

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| INFLOW : ID= 2 (5505) | 7.700 | 0.744 | 5.25 | 72.49 |
| OUTFLOW: ID= 1 (0085) | 7.700 | 0.087 | 7.50 | 72.25 |

PEAK FLOW REDUCTION [Qout/Qin](%)= 11.67
TIME SHIFT OF PEAK FLOW (min)=135.00
MAXIMUM STORAGE USED (ha.m.)= 0.4228

---

ADD HYD (0084)
1 + 2 = 3

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 1 (0100): | 45.00 | 0.401 | 7.25 | 70.66 |
| + ID2= 2 (5582): | 14.30 | 0.124 | 8.25 | 72.33 |
| ID = 3 (0084): | 59.30 | 0.524 | 8.25 | 71.06 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

ADD HYD (0084)
3 + 2 = 1

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 3 (0084): | 59.30 | 0.524 | 8.25 | 71.06 |
| + ID2= 2 (0085): | 7.70 | 0.087 | 7.50 | 72.25 |
| ID = 1 (0084): | 67.00 | 0.610 | 8.25 | 71.20 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

ADD HYD (5552)
1 + 2 = 3

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 1 (5501): | 14.20 | 1.366 | 5.25 | 72.50 |
| + ID2= 2 (0084): | 67.00 | 0.610 | 8.25 | 71.20 |
| ID = 3 (5552): | 81.20 | 1.812 | 5.25 | 71.42 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

CALIB
STANDHYD (6202) | Area (ha)= 2.47
ID= 1 DT=15.0 min | Total Imp(%)= 70.00 Dir. Conn.(%)= 70.00

| | | IMPERVIOUS | PERVIOUS (i) |
|---|---|---|---|
| Surface Area | (ha)= | 1.73 | 0.74 |
| Dep. Storage | (mm)= | 1.00 | 1.50 |
| Average Slope | (%)= | 1.00 | 2.00 |
| Length | (m)= | 128.32 | 40.00 |
| Mannings n | = | 0.013 | 0.250 |
| Max.Eff.Inten.(mm/hr)= | | 40.71 | 32.69 |
| over (min) | | 15.00 | 30.00 |
| Storage Coeff. (min)= | | 4.25 (ii) | 15.29 (ii) |
| Unit Hyd. Tpeak (min)= | | 15.00 | 30.00 |
| Unit Hyd. peak (cms)= | | 0.11 | 0.05 |

| | | *TOTALS* |
|---|---|---|
| PEAK FLOW | (cms)= | 0.20 0.06 0.256 (iii) |
| TIME TO PEAK | (hrs)= | 5.25 5.25 5.25 |
| RUNOFF VOLUME | (mm)= | 87.54 57.45 78.51 |
| TOTAL RAINFALL | (mm)= | 88.54 88.54 88.54 |
| RUNOFF COEFFICIENT | = | 0.99 0.65 0.89 |

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

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

---

| CALIB | | | | | |
|---|---|---|---|---|---|
| STANDHYD (0096) | Area (ha)= 3.20 | | | | |
| ID= 1 DT=15.0 min | Total Imp(%)= 85.00 | Dir. Conn.(%)= 85.00 | | | |
| | | IMPERVIOUS | PERVIOUS (i) | | |
| Surface Area | (ha)= | 2.72 | 0.48 | | |
| Dep. Storage | (mm)= | 1.00 | 1.50 | | |
| Average Slope | (%)= | 1.00 | 2.00 | | |
| Length | (m)= | 146.06 | 40.00 | | |
| Mannings n | = | 0.013 | 0.250 | | |
| Max.Eff.Inten.(mm/hr)= | | 40.71 | 32.69 | | |
| over (min) | | 15.00 | 30.00 | | |
| Storage Coeff. (min)= | | 4.59 (ii) | 15.63 (ii) | | |
| Unit Hyd. Tpeak (min)= | | 15.00 | 30.00 | | |
| Unit Hyd. peak (cms)= | | 0.11 | 0.05 | | |
| | | | | *TOTALS* | |
| PEAK FLOW | (cms)= | 0.31 | 0.04 | 0.347 (iii) | |
| TIME TO PEAK | (hrs)= | 5.25 | 5.25 | 5.25 | |
| RUNOFF VOLUME | (mm)= | 87.54 | 57.45 | 83.02 | |
| TOTAL RAINFALL | (mm)= | 88.54 | 88.54 | 88.54 | |
| RUNOFF COEFFICIENT | = | 0.99 | 0.65 | 0.94 | |

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

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

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| CALIB | | | | | |
|---|---|---|---|---|---|
| STANDHYD (0097) | Area (ha)= 5.03 | | | | |
| ID= 1 DT=15.0 min | Total Imp(%)= 70.00 | Dir. Conn.(%)= 70.00 | | | |
| | | IMPERVIOUS | PERVIOUS (i) | | |
| Surface Area | (ha)= | 3.52 | 1.51 | | |
| Dep. Storage | (mm)= | 1.00 | 1.50 | | |
| Average Slope | (%)= | 1.00 | 2.00 | | |
| Length | (m)= | 183.12 | 40.00 | | |
| Mannings n | = | 0.013 | 0.250 | | |
| Max.Eff.Inten.(mm/hr)= | | 40.71 | 32.69 | | |
| over (min) | | 15.00 | 30.00 | | |
| Storage Coeff. (min)= | | 5.26 (ii) | 16.30 (ii) | | |
| Unit Hyd. Tpeak (min)= | | 15.00 | 30.00 | | |
| Unit Hyd. peak (cms)= | | 0.11 | 0.05 | | |
| | | | | *TOTALS* | |
| PEAK FLOW | (cms)= | 0.40 | 0.12 | 0.520 (iii) | |
| TIME TO PEAK | (hrs)= | 5.25 | 5.25 | 5.25 | |
| RUNOFF VOLUME | (mm)= | 87.54 | 57.45 | 78.51 | |
| TOTAL RAINFALL | (mm)= | 88.54 | 88.54 | 88.54 | |
| RUNOFF COEFFICIENT | = | 0.99 | 0.65 | 0.89 | |

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

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

---

| ADD HYD (0099) | | | | | |
|---|---|---|---|---|---|
| 1 + 2 = 3 | | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
| ID1= 1 (6202): | | 2.47 | 0.256 | 5.25 | 78.51 |
| + ID2= 2 (0096): | | 3.20 | 0.347 | 5.25 | 83.02 |
| ID = 3 (0099): | | 5.67 | 0.603 | 5.25 | 81.06 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

| ADD HYD (0099) | | | | | |
|---|---|---|---|---|---|
| 3 + 2 = 1 | | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
| ID1= 3 (0099): | | 5.67 | 0.603 | 5.25 | 81.06 |
| + ID2= 2 (0097): | | 5.03 | 0.520 | 5.25 | 78.51 |
| ID = 1 (0099): | | 10.70 | 1.123 | 5.25 | 79.86 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| RESERVOIR (6281) | | | | |
|---|---|---|---|---|
| IN= 2---> OUT= 1 | | | | |
| DT= 15.0 min | OUTFLOW (cms) | STORAGE (ha.m.) | OUTFLOW (cms) | STORAGE (ha.m.) |
| | 0.0000 | 0.0000 | 0.3500 | 0.5500 |
| | 0.0500 | 0.3000 | 0.0000 | 0.0000 |

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| INFLOW : ID= 2 (0099) | 10.700 | 1.123 | 5.25 | 79.86 |
| OUTFLOW: ID= 1 (6281) | 10.700 | 0.326 | 6.25 | 79.72 |

PEAK FLOW REDUCTION [Qout/Qin](%)= 29.05
TIME SHIFT OF PEAK FLOW (min)= 60.00
MAXIMUM STORAGE USED (ha.m.)= 0.5306

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| CALIB | | | | | |
|---|---|---|---|---|---|
| STANDHYD (0095) | Area (ha)= 4.80 | | | | |
| ID= 1 DT=15.0 min | Total Imp(%)= 50.00 | Dir. Conn.(%)= 50.00 | | | |
| | | IMPERVIOUS | PERVIOUS (i) | | |
| Surface Area | (ha)= | 2.40 | 2.40 | | |
| Dep. Storage | (mm)= | 1.00 | 1.50 | | |
| Average Slope | (%)= | 1.00 | 2.00 | | |
| Length | (m)= | 178.89 | 40.00 | | |
| Mannings n | = | 0.013 | 0.250 | | |
| Max.Eff.Inten.(mm/hr)= | | 40.71 | 32.69 | | |
| over (min) | | 15.00 | 30.00 | | |
| Storage Coeff. (min)= | | 5.19 (ii) | 16.23 (ii) | | |
| Unit Hyd. Tpeak (min)= | | 15.00 | 30.00 | | |
| Unit Hyd. peak (cms)= | | 0.11 | 0.05 | | |
| | | | | *TOTALS* | |
| PEAK FLOW | (cms)= | 0.27 | 0.19 | 0.465 (iii) | |
| TIME TO PEAK | (hrs)= | 5.25 | 5.25 | 5.25 | |
| RUNOFF VOLUME | (mm)= | 87.54 | 57.45 | 72.49 | |
| TOTAL RAINFALL | (mm)= | 88.54 | 88.54 | 88.54 | |
| RUNOFF COEFFICIENT | = | 0.99 | 0.65 | 0.82 | |

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

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

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| ADD HYD (0098) | | | | | |
|---|---|---|---|---|---|
| 1 + 2 = 3 | | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
| ID1= 1 (6281): | | 10.70 | 0.326 | 6.25 | 79.72 |
| + ID2= 2 (0095): | | 4.80 | 0.465 | 5.25 | 72.49 |
| ID = 3 (0098): | | 15.50 | 0.717 | 5.25 | 77.48 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| CALIB | | | | |
|---|---|---|---|---|
| STANDHYD (6203) | Area (ha)= 48.00 | | | |
| ID= 1 DT=15.0 min | Total Imp(%)= 50.00 | Dir. Conn.(%)= 50.00 | | |
| | | IMPERVIOUS | PERVIOUS (i) | |
| Surface Area | (ha)= | 24.00 | 24.00 | |

```
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     565.69        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      40.71        32.69
               over (min)        15.00        30.00
     Storage Coeff.  (min)=      10.35 (ii)   21.39 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.09         0.05
                                                    *TOTALS*
     PEAK FLOW       (cms)=       2.71         1.84          4.549 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25          5.25
     RUNOFF VOLUME    (mm)=      87.54        57.45         72.50
     TOTAL RAINFALL   (mm)=      88.54        88.54         88.54
     RUNOFF COEFFICIENT   =       0.99         0.65          0.82

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

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

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--------------------
| ADD HYD   (6250) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (6203):    48.00   4.549     5.25    72.50
        + ID2= 2 (0098):    15.50   0.717     5.25    77.48
          ================================================
          ID = 3 (6250):    63.50   5.266     5.25    73.71

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| CALIB            |
| STANDHYD  (6201) |   Area    (ha)=  12.90
|ID= 1 DT=15.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  70.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       9.03         3.87
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     293.26        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      40.71        19.74
               over (min)        15.00        30.00
     Storage Coeff.  (min)=       6.98 (ii)   20.49 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.10         0.05
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.02         0.17          1.188 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25          5.25
     RUNOFF VOLUME    (mm)=      87.54        32.95         71.16
     TOTAL RAINFALL   (mm)=      88.54        88.54         88.54
     RUNOFF COEFFICIENT   =       0.99         0.37          0.80

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  64.0    Ia = Dep. 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 (0091) |
| IN= 2---> OUT= 1 |
| DT= 15.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)    (ha.m.)   |   (cms)    (ha.m.)
                          0.0000     0.0000   |  1.0830     0.0700
                          0.4880     0.0500   |  1.2340     0.0700
                          0.7000     0.0600   |  1.3880     0.0700
                          0.8500     0.0700   |  0.0000     0.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (6201)     12.900     1.188      5.25      71.16
     OUTFLOW: ID= 1 (0091)     12.900     1.257      5.25      71.16

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=105.83
                    TIME SHIFT OF PEAK FLOW         (min)=  0.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0731

     **** WARNING : HYDROGRAPH PEAK WAS NOT REDUCED.
                    CHECK OUTFLOW/STORAGE TABLE  OR REDUCE DT.
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--------------------
| CALIB            |
| STANDHYD  (0089) |   Area    (ha)=   2.50
|ID= 1 DT=15.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  67.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.67         0.82
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.20
     Length            (m)=     129.10        50.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      40.71        23.00
               over (min)        15.00        30.00
     Storage Coeff.  (min)=       4.27 (ii)   18.38 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=       0.11         0.05
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.19         0.04          0.233 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25          5.25
     RUNOFF VOLUME    (mm)=      87.54        38.67         71.41
     TOTAL RAINFALL   (mm)=      88.54        88.54         88.54
     RUNOFF COEFFICIENT   =       0.99         0.44          0.81

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  70.0    Ia = Dep. 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 (0101) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)    (ha.m.)   |   (cms)    (ha.m.)
                          0.0000     0.0000   |  0.1770     0.0210
                          0.0930     0.0110   |  0.1990     0.0240
                          0.1250     0.0140   |  0.2220     0.0260
                          0.1480     0.0190   |  0.0000     0.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0089)     2.500     0.233      5.25      71.41
     OUTFLOW: ID= 1 (0101)     2.500     0.215      5.25      71.40

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 92.45
                    TIME SHIFT OF PEAK FLOW         (min)=  0.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0257

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--------------------
| ADD HYD   (0093) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0101):     2.50   0.215     5.25    71.40
        + ID2= 2 (0091):    12.90   1.257     5.25    71.16
          ================================================
          ID = 3 (0093):    15.40   1.472     5.25    71.20

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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 FINISH
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